PACIFIC REGION
FINAL

INTEGRATED FISHERIES MANAGEMENT PLAN

JUNE 1, 2021 - MAY 31, 2022

SALMON
SOUTHERN BC

Genus Oncorhynchus

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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.

TABLE OF CONTENTS

TABLE OF FIGURES

DEPARTMENT 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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Recreational Fishing: http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/index-eng.html
Commercial Fishing: http://www.dfo-mpo.gc.ca/fisheries-peches/commercial-commerciale/pac-yukon-eng.html

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INDEX OF WEB-BASED INFORMATION

FISHERIES AND OCEANS CANADA GENERAL INFORMATION

MAIN PAGE

http://www.dfo-mpo.gc.ca

Our Vision, Latest News, Current Topics

Twitter:
DFO Pacific: @DFO_Pacific
En Français: @MPO_Pacifique

ACTS, ORDERS, AND REGULATIONS

https://www.dfo-mpo.gc.ca/acts-lois/index-eng.htm

Atlantic Fisheries Restructuring Act, Canada Shipping Act, Coastal Fisheries Protection Act, Department of Fisheries and Oceans Act, Financial Administration Act, Fisheries Act, Fisheries Development Act, Fisheries Improvements Loan Act, Fishing and Recreational Harbours Act, Freshwater Fish Marketing Act, Great Lakes Fisheries Convention Act, Oceans Act, Species at Risk Act

REPORTS AND PUBLICATIONS

http://www.dfo-mpo.gc.ca/reports-rapports-eng.htm

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

WAVES

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

Fisheries and Oceans Canada online library catalogue

PACIFIC SALMON TREATY

http://www.psc.org

Background information; full text of the treaty

PACIFIC REGION GENERAL

MAIN PAGE

http://www.pac.dfo-mpo.gc.ca/index-eng.html

General information, Area information, Latest news, Current topics

POLICIES, REPORTS AND AGREEMENTS

https://www.dfo-mpo.gc.ca/about-notre-sujet/publications/fisheries-peche-eng.html

Reports and Discussion Papers, New Directions Policy Series, Agreements

OCEANS PROGRAM

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

Integrated Coastal Management; Marine Protected Areas; Areas of Interest; Canada's Ocean Strategy; *Oceans Act*

PACIFIC REGION FISHERIES MANAGEMENT

MAIN PAGE

http://www.dfo-mpo.gc.ca/fm-gp/index-eng.htm

Commercial Fisheries, Aboriginal Fisheries, Recreational Fisheries, Maps, Notices and Plans, International Management, Enforcement

ABORIGINAL FISHERIES STRATEGY

http://www.pac.dfo-mpo.gc.ca/abor-autoc/index-eng.html
or http://www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/index-eng.htm

Aboriginal Fisheries Strategy (AFS) principles and objectives; AFS agreements; Programs; Treaty Negotiations

AQUACULTURE MANAGEMENT

http://www.pac.dfo-mpo.gc.ca/aquaculture/index-eng.html

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

RECREATIONAL FISHERIES

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

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

COMMERCIAL FISHERIES

http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/comm/index-eng.htm

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

INITIATIVE TO UPDATE THE COMMERCIAL SALMON ALLOCATION FRAMEWORK

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

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

FISHERIES NOTICES

http://www-ops2.pac.dfo-mpo.gc.ca/fns-sap/index-eng.cfm?

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

INTEGRATED FISHERY MANAGEMENT PLANS

http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/ifmp-gmp/index-eng.htm

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

SALMON TEST FISHERY - PACIFIC REGION

https://www.pac.dfo-mpo.gc.ca/pacific-smon-pacifique/science/research-recherche/testfishery-pechedessai-eng.html

Definition, description, location and target stocks

LICENCING

http://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/index-eng.html

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

NATIONAL ON-LINE LICENSING SYSTEM (NOLS)

https://fishing-peche.dfo-mpo.gc.ca
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Fax: 613-990-1866
TTY: 1-800-465-7735

SALMON

https://www.pac.dfo-mpo.gc.ca/fm-gp/salmon-saumon/index-eng.html

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

FRASER AND INTERIOR AREA RESOURCE MANAGEMENT AND STOCK ASSESSMENT

http://www.pac.dfo-mpo.gc.ca/fm-gp/fraser/index-eng.html

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

NORTH COAST RESOURCE MANAGEMENT

http://www.pac.dfo-mpo.gc.ca/fm-gp/northcoast-cotenord/index-eng.html

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

YUKON/TRANSBOUNDARY RIVERS AREA MAIN PAGE

http://www.pac.dfo-mpo.gc.ca/yukon/index-eng.html

Fisheries Management; Recreational fisheries; Habitat; Licencing; Contacts

PACIFIC REGION
SALMONID ENHANCEMENT PROGRAM

MAIN PAGE

http://www.pac.dfo-mpo.gc.ca/sep-pmvs/index-eng.html

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

PACIFIC REGION
POLICY AND COMMUNICATIONS

MAIN PAGE

http://www.pac.dfo-mpo.gc.ca/index-eng.html

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

CONSULTATION SECRETARIAT

http://www.pac.dfo-mpo.gc.ca/consultation/index-eng.html

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

PUBLICATIONS CATALOGUE

http://www.pac.dfo-mpo.gc.ca/publications/index-eng.html

Information booklets and fact sheets available through Communications branch

SPECIES AT RISK ACT (SARA)

https://www.dfo-mpo.gc.ca/species-especes/sara-lep/index-eng.html

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

PACIFIC REGION
SCIENCE

MAIN PAGE

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

Science divisions; Research facilities; PSARC; International Research Initiatives

GLOSSARY AND LIST OF ACRONYMS

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

ACRONYM	PHRASE
CWT	Coded Wire Tag
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

ACRONYM	PHRASE
ISBM	Individual Stock-Based Management
ISC	Inside Southern Chum
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

ACRONYM	PHRASE
PST	Pacific Salmon Treaty
RCA	Rockfish Conservation Area
SARA	*Species at Risk Act*
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)

FOREWORD

The purpose of this Integrated Fisheries Management Plan (IFMP) is to identify the main objectives and requirements for the Southern B.C. Pacific 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.

NEW FOR 2021/2022

KEY CHANGES FOR THE 2021/22 SOUTHERN BC SALMON IFMP

PACIFIC SALMON STRATEGY INITIATIVE

In April 2021, the Government of Canada released Budget 2021, which includes a commitment of $647.1 million over five years to implement a transformative Pacific Salmon Strategy Initiative (PSSI). The PSSI will aim to curb historic declines in key Pacific salmon stocks and rebuild the species to a sustainable level by using the funds to:

- Stabilize and conserve wild Pacific salmon populations, including through investment in research, new hatchery facilities, and habitat restoration.
- Create a Pacific Salmon Secretariat and Restoration Centre of Expertise.
- Improve management of commercial and recreational fisheries.
- Double the British Columbia Salmon Restoration and Innovation Fund with an additional $100 million.
- Further engage with First Nations and fish harvesters.

Work through the PSSI will be categorized under four pillars including conservation and stewardship; enhanced hatchery production; harvest transformation, and; integrated management and collaboration.

As an immediate step, the Minister has announced significant Commercial salmon fishing closures for 2021 in areas with stocks of conservation concern (a list of specific fisheries is identified in Appendix 11). These closures are an initial step toward long-term conservation closures beginning in 2022, which will be considered following consultation with affected groups. The impacts from the long-term closure will be mitigated by a commercial licence retirement program and other initiatives to support transformation of the fishery.

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 assessed systems;

2) BC snowpacks 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.

FRASER RIVER CHINOOK – CONSERVATION MEASURES

Management measures to address conservation concerns for Fraser Chinook continue to be required in 2021 and will likely be required for several years.

Highly precautionary fishery restrictions continue to be necessary to provide a high degree of protection to at risk Fraser Spring 4_2, Spring 5_2 and Summer 5_2 Chinook and management measures similar to 2020 are outlined in this IFMP. Expected fishery mortalities are not intended to be a management target and the objective is to allow as many fish to pass through to the spawning grounds as possible. Fishery impacts are expected to include incidental Chinook mortalities in Fraser River Chinook and Sockeye test fisheries, limited Chinook retention or bycatch retention in Fraser River First Nation FSC fisheries, release mortalities, and incidental mortalities during Chinook-directed fisheries. The management outcome is to pass as many fish as reduce overall Canadian fishery mortalities on these populations to very low levels approaching 5%; however, actual outcomes may vary due to a range of factors including annual variability in Chinook distribution and run timing; distribution of fishing effort and uncertainties in the assessment data). In addition, 2021 management measures are also intended to further reduce exploitation rates on Harrison River Chinook which have not achieved their escapement goal in most recent years.

Achieving these conservation objectives is the highest priority and requires significant actions in commercial troll, recreational and First Nations fisheries in times and areas where at risk.

The Department has also approved a small number of mark selective fishery (MSF) opportunities for 2021 and details can be found here: (Conservation measures for Fraser River chinook and limited mark selective fisheries opportunities (dfo-mpo.gc.ca)).

Further information on specific measures is included in the Species Specific Salmon Fishing Plans 13.1.

SOUTHERN RESIDENT KILLER WHALES - FISHERY MANAGEMENT MEASURES TO SUPPORT CHINOOK SALMON PREY AVAILABILITY

The Government of Canada is taking important steps to protect and recover the Southern Resident Killer Whale population which is facing imminent threats to its survival and recovery. Since 2018, the Government of Canada, with input from the Indigenous and Multi-Stakeholder Advisory Group, Technical Working Groups and consultation with Indigenous groups and stakeholders, has implemented a number of enhanced management measures aimed at increasing prey availability for Southern Resident Killer Whales - particularly Chinook salmon—and reducing threats related to physical and acoustic disturbance with a focus in key foraging areas within Southern Resident Killer Whale critical habitat.

The fishery management measures for the 2021 season include area-based fishery closures for recreational and commercial salmon fishing in a portion of Swiftsure Bank from July 16 to October 31, 2021 and the Strait of Juan de Fuca from August 1 to October 31, 2021.

New for 2021, Fisheries and Oceans Canada (DFO) will be piloting a new fishing closure protocol for the southern Gulf Islands recreational and commercial salmon fisheries, whereby fishery closures are triggered by the first confirmed presence of Southern Resident killer whales in the area. The Vancouver Fraser Port Authority Enhancing Cetacean and Observation (ECHO) Program, working closely with its local partners, and the DFO Whale Tracking Network are monitoring the area staring June 1, 2021, and once a Southern Resident killer whale is confirmed, fishery closures will be triggered and will remain in place until October 31, 2021.

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, 2021 as per the Interim Order enacted under the Canada Shipping Act. For detailed coordinates, please see FN0519.

These closures do 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 (do not haul gear) within 1,000 metres of killer whales and let them pass;
- Reduce speed to less than 7 knots when within 1000m of the nearest marine mammal
- When safe to do so, turn off echo sounders and fish finders
- Place engine in neutral idle and allow animals to pass if your vessel is not in compliance with the approach distance regulations

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

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 https://www.canada.ca/southern-resident-killer-whales)

INTERIOR FRASER RIVER (THOMPSON AND CHILCOTIN) STEELHEAD AND FRASER RIVER CHUM

For 2021, this IFMP outlines window closures implemented in 2020 to protect Interior Fraser River (IFR) Steelhead from incidental fishing mortality occurring in salmon fisheries. This includes additional restrictions for set gillnet fisheries in the Fraser River. Moving window closures will apply to most salmon fisheries located along the migratory route of Thompson and Chilcotin River Steelhead, including Southern BC marine waters and the Fraser River and tributaries downstream of Thompson and Chilcotin River Steelhead spawning areas.

- The closure window for commercial gillnet and seine fisheries (including purse seine, beach seine, and shallow seine gear) is 42 days, while commercial troll fisheries will be closed for 27 days. Following the closure window, set gillnet gear will be further restricted to operate during daylight hours only, while attended by a harvester at all times.
- Recreational salmon fisheries within the Fraser River and tributaries (including areas immediately off the Fraser River mouth), are closed for a moving window period of 42 days.
- First Nations' Food, Social, and Ceremonial (FSC) salmon fisheries occurring within the Fraser River and tributaries downstream of Thompson and Chilcotin River Steelhead spawning areas are closed for a 27-day moving window. Following the closure window, set gillnet gear will be further restricted to operate during daylight hours only, while attended by a harvester at all times.
- Marine recreational and marine FSC salmon fisheries remain open with a requirement for Steelhead release.

- Any salmon fisheries occurring in terminal areas that are not considered to overlap with the migratory pathway of Thompson and Chilcotin Steelhead will not be subject to these closures.

IFR Steelhead window closure dates by area are outlined in Appendix 9, and implementation details are provided for all affected fisheries in Section 13. Appendix 9 also contains a list of terminal fishing areas that are proposed to be exempted from the moving window closures in 2021, as they are not considered to be within the probable migratory route for returning IFR Steelhead.

The current IFR Steelhead window closure overlaps with the majority of the Fraser Chum return; therefore, if TAC is identified for Chum fishing opportunities approximately one quarter of the terminal Fraser Chum run size will be accessible to these fisheries. Consideration to potential long-term consequences of fishing pressure on the tail end of the run may include: a shift to earlier peak timing of the entire return; shorter overall duration of the return; and, loss of genetic diversity and capacity to withstand environmental change. Details on mitigation of these concerns in 2021 are outlined in Section 13.2.3.

INTERIOR FRASER COHO

For 2021, Interior Fraser River Coho will remain in the Low status zone, which would permit Canada and the United States to manage up to a 20% exploitation rate (with a cap of 10% for each party) under the PST. The Department plans to manage Canadian domestic fisheries using a precautionary approach to management of Southern BC fisheries, with management measures similar to those in place prior to 2014. Under this approach, fisheries impacts would be limited to incidental, bycatch or release mortalities in most areas, and in recent years this was expected to result in a 3-5% Canadian domestic exploitation rate.

For further information see Section 6.5.

FRASER RIVER PINK

Forecast returns (range: 1.7M to 5.4M; 80% interval) are anticipated to be below the escapement goal of 6M and fishing opportunities will likely be limited to 0-15% exploitation. Please refer to the Fraser River Pink section of the Southern Pink Salmon Fishing Plan in Section 13 for more information.

FRASER RIVER SOCKEYE

For the 2021 forecast, escapement plan options, proposed window closure dates, ESSR fishery guidelines and a proposed framework; please refer to the Fraser River Sockeye section of the Southern Sockeye Salmon Fishing Plan in Section 13 for more information.

BIG BAR LANDSLIDE

On June 23, 2019, a significant landslide was reported in a remote, rugged canyon along the Fraser River near Big Bar Creek, north of Lillooet, British Columbia. Approximately 110,000 m^3 of rock and debris sheared off a 125-metre cliff, falling into the river and creating a five-metre waterfall across the channel. This barrier prevented migrating Pacific salmon from moving beyond the landslide to reach their spawning grounds, disrupting the reproductive cycle of several key Upper Fraser salmon populations.

In 2020, an engineering contractor, Peter Kiewit Sons ULC, built a road to the slide site and commenced blasting and rock removal, significantly improving flows through the canyon. This work enabled natural passage at higher thresholds than in 2019. However, unusually high water levels on the Fraser River further impacted the migration of the at-risk, early-season sockeye. In addition, 2019 and 2020 were some of the lowest returns of the Fraser River sockeye population on record.

A long-term solution is necessary to provide sustainable fish passage at Big Bar. In the short-term, a number of systems are in place to ensure a higher rate of survival for the 2021 migrating Fraser salmon. A "truck and transport" program will move early-season fish upstream, bypassing the canyon, while a robust monitoring program will track fish movement and river currents. Another year of emergency enhancement is underway for priority sockeye and Chinook populations to preserve the genetic diversity of these stocks.

The most significant long-term effects of the slide will be on the individual salmon populations that have suffered two or more years of significant spawning failure due to the slide. Fish that migrate during high water, when the slide is hardest to navigate, are impacted the greatest. These fish are already under significant conservation threat due to underlying population declines and many are assessed as threatened or endangered by COSEWIC.

Additional information and updates can be found at the following link:
https://www.pac.dfo-mpo.gc.ca/pacific-smon-pacifique/big-bar-landslide-eboulement/index-eng.html

COMMERCIAL SALMON ALLOCATION FRAMEWORK

*Please see Appendix 6 for details of CSAF demonstration fisheries for 2021.

Additional information on the work completed since 2013 can be found at the following link: http://www.pac.dfo-mpo.gc.ca/consultation/smon/saf-crrs/index-eng.html

1 OVERVIEW

1.1 INTRODUCTION

The Southern BC Salmon Integrated Fisheries Management Plan (IFMP) covers the period June 1, 2021 to May 31, 2022.

This IFMP provides a broad context to the management of the Pacific salmon fishery and the interrelationships of all fishing sectors involved in this fishery. Section 2 considers stock assessment, while Sections 3 and 4 consider the shared stewardship arrangements and the social, cultural, and economic performance of the fishery. Section 5 describes the broader management issues, and the objectives to address these issues are identified in Section 6. Sections 7 and 8 describe allocation, general decision guidelines, and compliance plans. 2018 Post-season review information is outlined in Section 9. Sections 10, 11, and 12 are sections that describe the different fisheries and Section 13 of the IFMP covers off the fishing plans for each salmon species.

The Appendices in the IFMP provide information such as the fishing vessel safety, advisory board members, and maps of commercial licence areas.

1.2 HISTORY

For thousands of years, the history, economy, and culture of Canada's west coast have been inextricably linked to Pacific salmon. These magnificent fish are an important part of the diet, culture, and economy of First Nations people. Since the late 1800s, salmon have supported a vibrant commercial fishing industry, vital to the establishment and well-being of many coastal communities. Salmon, particularly Chinook and Coho, also play a key role in the west coast recreational fishery.

1.3 TYPE OF FISHERY AND PARTICIPANTS

This plan describes the management of First Nations, recreational, and commercial fisheries for Pacific salmon in southern BC and the factors that influence decision-making. Salmon fisheries are coordinated regionally with many management decisions occurring in area and field offices. Key to salmon management is the development and implementation of integrated fisheries management plans that meet specified objectives focusing on conservation, allocation, and obligations to First Nations and international treaties.

1.4 LOCATION OF FISHERY

This IFMP covers fisheries in tidal and non-tidal waters from Cape Caution south to the to the BC/Washington border, including the Fraser River watershed.

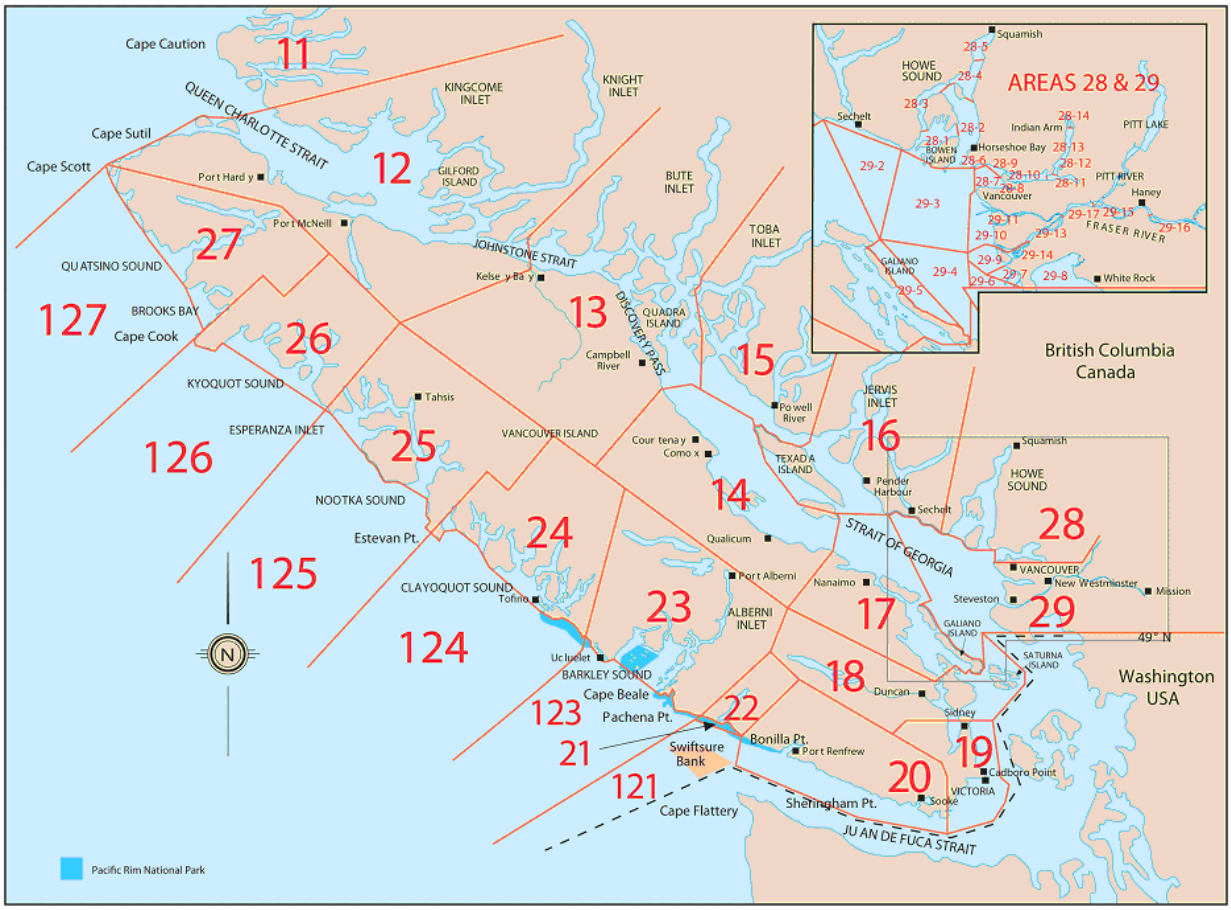

Figure 1.4-1: Management Areas for Southern BC

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 (FSC) 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, 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.

Right-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 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. All recreational fishers must possess a valid sport fishing licence. 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 must have a valid salmon

conservation stamp affixed to their licence. The proceeds from the sale of tidal Pacific Salmon Conservation stamps are used to fund salmon restoration projects supported by the non-profit Pacific Salmon Foundation. The proceeds from the sale of non-tidal Conservation Surcharge stamps directly benefit fish conservation through the Habitat Conservation Trust Foundation.

Fishing techniques used in the recreational fishery include trolling, mooching, and casting with bait, lures, and artificial flies. Boats are most commonly used, but anglers also fish from piers, shores, or beaches. Only barbless hooks may be used when fishing for salmon in British Columbia.

Commercial salmon licences are issued for three gear types: troll, seine, and gill net. Trollers employ hooks and lines, which are suspended from large poles extending from the fishing vessel. Altering the type and arrangement of lures used on lines allows various species to be targeted. Seine nets are set from fishing boats with the assistance of a small skiff. Nets are set in a circle around schools of fish. The bottom edges of the net are then drawn together into a "purse" to prevent escape of the fish. Salmon gill nets are rectangular nets that hang in the water and are set from either the stern or bow of the vessel. Fish swim headfirst into the net, entangling their gills in the mesh. Altering the mesh size and the way in which nets are suspended in the water allows nets to target certain sizes of fish. Gill-netters generally fish near coastal rivers and inlets.

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 biodiversity and a precautionary, ecosystem-based approach to the management of marine resources. Policies were developed with 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 appropriate.

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: https://www.dfo-mpo.gc.ca/reports-rapports/regs/policies-politiques-eng.htm

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 2021/2022

This plan considers the results of consultations and input from First Nations, recreational and commercial harvesters and conservation organizations. Input was received directly through bilateral meetings and submissions to DFO on the proposed plan. Meetings with First Nations, Indigenous organizations and the Integrated Harvest Planning Committee (IHPC) provided opportunities for various parties to come together to discuss issues and concerns related to the management of salmon.

Any further significant changes to provisions in the IFMP will be identified to the parties prior to implementation, unless if circumstances require changes to be made without prior notification, such as the case of in season forecast updates.

Fisheries and Oceans Canada is committed to working with First Nations on planning and management of the salmon fisheries through existing and emerging bilateral and regional processes and relationships, and to achieving reconciliation with Indigenous peoples by working towards renewed nation-to-nation relationships and partnerships that contribute to reconciliation, the recognition of rights and mutual understanding, trust and respect. Fisheries and Oceans Canada also continues to consult with recreational and commercial harvesters, and conservation organizations to seek input on the IFMP and to further plan and co-ordinate fishing activities.

Further information on salmon consultations, including IHPC terms of reference, membership, and meeting dates can be found on the Salmon Consultation website at: http://www.pac.dfo-mpo.gc.ca/consultation/smon/index-eng.html.

1.8 APPROVAL PROCESS

This plan is approved by the Regional Director General – Pacific Region on behalf of the Minister of 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 2.1-1 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 at https://www.pac.dfo-mpo.gc.ca/fm-gp/salmon-saumon/facts-infos-eng.html.

Table 2.1-1: 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 2.1-1). (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).

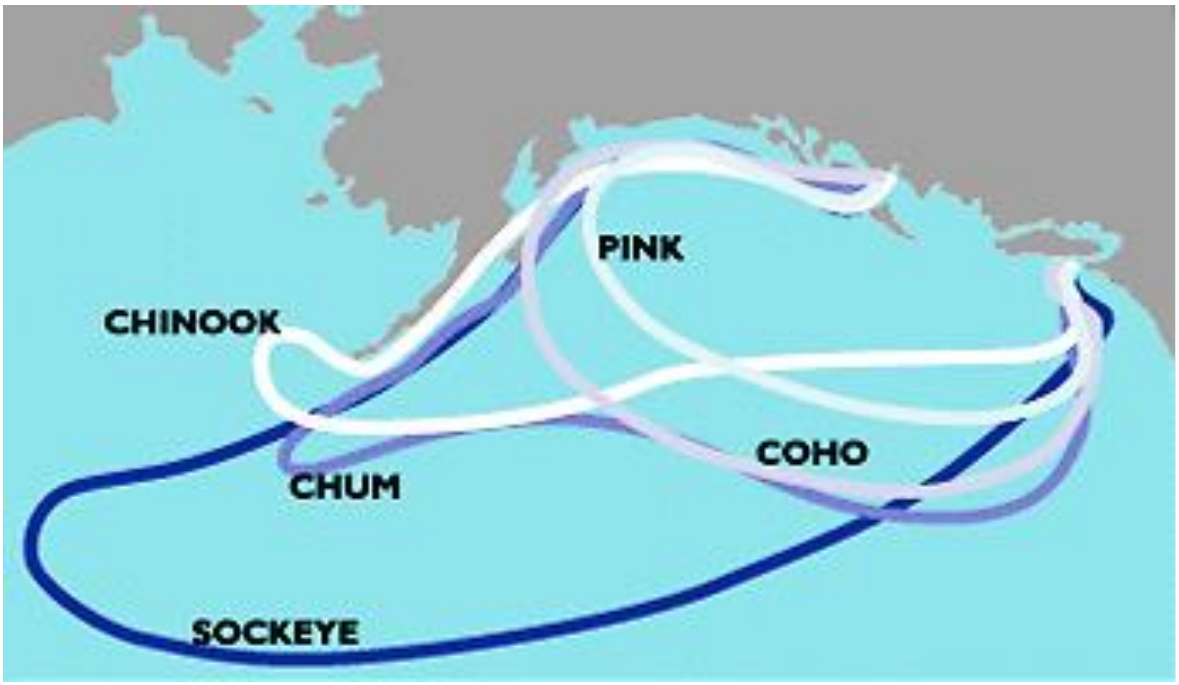

Figure 2.1-1: Generalized habitat of British Columbia Pacific salmon species in the North Pacific Ocean.

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), 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

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Global Climate Change Context for Salmon Outlook

The planet is warming (Figure 2.2-1). 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).

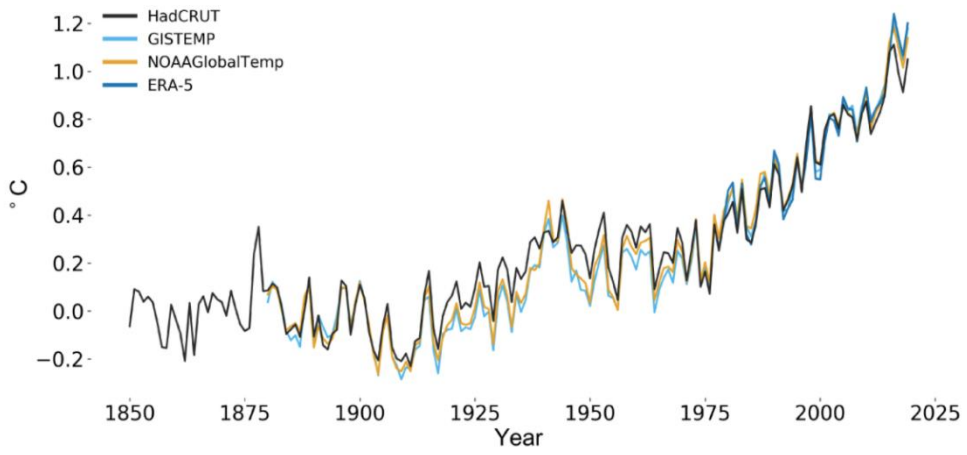

Figure 2.2-1 Global annual mean temperature difference from pre-industrial conditions (1850-1900). Canada's temperature increases are double this global rate of warming, typical of countries occupying northern latitudes.

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 2.2-1, 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 behaviour 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 2.2-2). Warmer temperatures anomalies have been even greater in the Yukon than BC, due to its more northern location (Figure 2.2-2; 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).

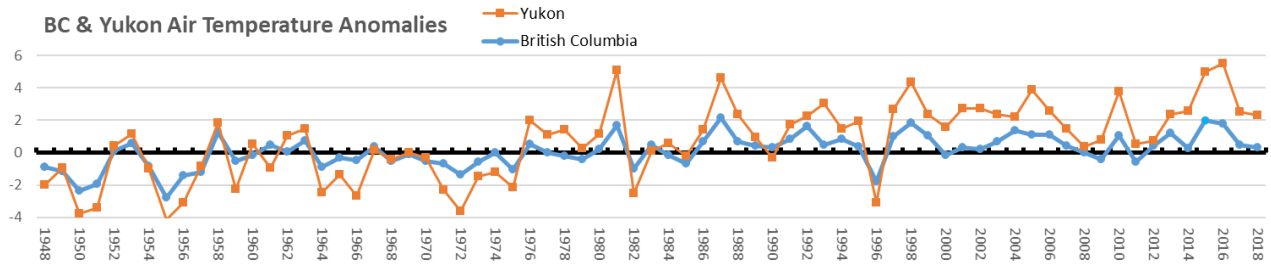

Figure 2.2-2 Canadian gridded temperature and precipitation anomalies (CANGRD) from the Government of Canada: https://climate-change.canada.ca/climate-data/#/historical-gridded-data. Temperatures 2016 to 2018 years coincide with the freshwater residence period of 2021 salmon returns with the exception 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 2.2-3). Marine records were set in these waters throughout this period (Leising and Bograd 2020).

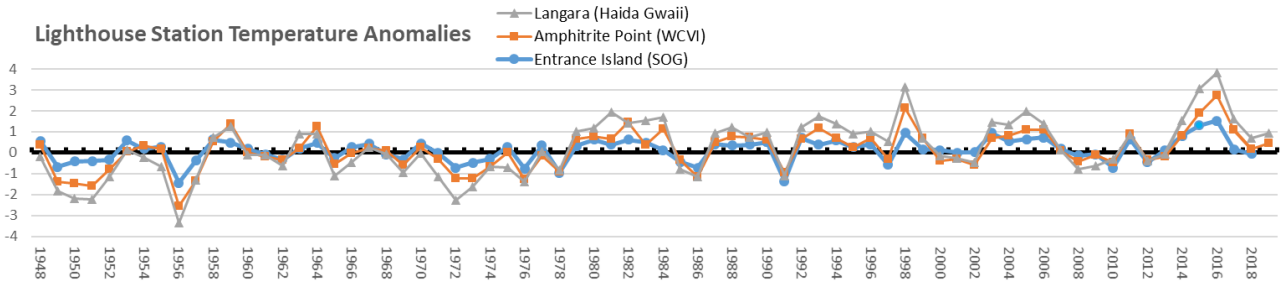

Figure 2.2-3: Annual average sea-surface-temperature anomalies from Fisheries & Oceans Canada lighthouse stations: https://www.dfo-mpo.gc.ca/science/data-donnees/lightstations-phares/index-eng.html.The 2018 and 2019 temperatures at the end of the time series coincide with the marine residence period 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, we predict below-average returns for 2021 salmon due to environmental changes from 2016-2020 related to climate change, though exceptions 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.

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.

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 qualitative outlook of status for salmon management, the Salmon Outlook, for planning purposes prior to formal forecasts of abundance. The Salmon Outlook for the current year is available in Appendix 10.

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

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.
  https://www.dfo-mpo.gc.ca/science/oceanography-oceanographie/index-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):
https://www.dfo-mpo.gc.ca/reports-rapports/regs/afpr-rppa/framework-cadre-eng.htm#toc6

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 schedule consultation sessions and meetings, as needed, to identify, discuss, and help mitigate potential concerns regarding the agreement.

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

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 2021 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.

3.2 LOCAL HARVEST PLANNING

Several salmon roundtables were created by First Nations, commercial fishers, and sport fishers with Fisheries and Oceans Canada to promote a more streamlined, multi-interest, co-management process related to salmon harvest planning and management at a local level. Harvest Roundtables are connected to Stewardship Roundtables and local stewardship groups to address research, restoration, and enhancement in a comprehensive manner.

West Coast Aquatic

West Coast Aquatic facilitates salmon co-management roundtables or collaborative committees for several fishery management areas. These roundtables/committees bring commercial, aboriginal, and sport/recreational fishers together with stewardship groups to provide formal advice to Fisheries and Oceans Canada on decisions related to salmon harvest planning and management. The goal of these roundtables is to ensure fishing plans are coordinated and integrated.

Other new collaborative tables with First Nations, stakeholders, and DFO that are in development in the South Coast Area include the Bute Inlet Round Table and the Quinsam/Campbell River Salmon Committee. The Bute Inlet Round Table was formed due to widespread concern for the impacts of the Southgate River landslide, and has participants from Homalco First Nation, DFO, the Province of BC, ENGO, and Industry. This group is working collaboratively to establish and implement short-term and long-term goals to support salmon and the recovery of the system. Furthermore, the Quinsam/Campbell River Salmon Committee

has also been recently established as a platform where the Wei Wai Kum and We Wai Kai Nations and DFO can partner to form recommendations for sustainable assessing, enhancing, and harvesting of Quinsam and Campbell River salmon.

Area 18 Cowichan Harvest Roundtable

Area 18 Chum fisheries are managed through a "co-management" process via the Cowichan Harvest Roundtable. Members of the Harvest Roundtable include representatives from Cowichan Tribes, Federal and Provincial Government, Provincial and local Sportsfish Advisory Boards and representatives for each of the commercial salmon gear Harvest Committees. The Roundtable serves as both a plenary function and a decision–making function. This format allows for improved planning of local fisheries and better conflict resolution among harvesters. The Cowichan Harvest Roundtable has developed an Area 18 Chum harvest plan that describes the basis of the management and assessment of the Area 18 Chum fisheries and harvest plans for each sector in marine and in-river fisheries. This plan is used to guide an in-season decision making process during which assessment results are reviewed and weekly harvest plans are determined.

Area 23 Harvest Committee

Area 23 Sockeye fisheries are managed through a "co-management" process via the Area 23 Harvest Committee. Members of the Area 23 Harvest Committee include representatives from local First Nations, fishery advisory committees and local stewardship groups. The Area 23 Harvest Committee serves both a plenary function and a decision–making function. This format allows for improved planning of local fisheries and better conflict resolution among harvesters. The Area 23 Harvest Committee has developed a detailed Area 23 Sockeye Local Integrated Fisheries Management Plan that describes the basis of the management and assessment of the Area 23 Sockeye fisheries and harvest plans for each sector. This plan is used to guide an in-season decision making process during which assessment results are reviewed and weekly harvest plans are determined.

The Area 23 Harvest Committee is a forum that includes representatives from the Tseshaht, Hupacasath and Maa-nulth First Nations, the Nuu-chah-nulth Tribal Council, the Area B and D Harvest Committee, local Sport Fishing Advisory Committees, local municipal governments, the provincial government and DFO. The Area 23 Harvest Committee is developing a Somass Chinook local integrated fishery management plan that will define the escapement targets and harvest rates under various run sizes. The Decision Guidelines in this IFMP will be updated once the detailed local plan has been completed through the Area 23 Harvest Committee.

Area 25 Harvest Committee

The Area 25 Harvest Committee is a forum that includes representatives from the Ehattesaht, Mowachaht/Muchalaht, and Nuchatlaht First Nations, the Area D Harvest Committee, the local Sport Fishing Advisory Committee, the Nootka Sound Watershed Society, local municipal governments and DFO. The Area 25 Roundtable is developing a detailed local management plan for Chinook in Nootka Sound and Esperanza Inlet. The Decision Guidelines in this IFMP will be updated once the detailed local plan has been completed through the Area 25 Harvest Committee.

3.3 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.

3.4 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 the Section 13 Fishing Plans.

3.5 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.

3.6 CONSULTATION

In the Pacific Region, DFO consults with and engages First Nations and other interest groups 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

3.7 CO-MANAGEMENT AGREEMENTS

3.7.1 CANADA AND FIRST NATION RECONCILIATION AGREEMENTS

In 2019, the Government of Canada entered into two reconciliation agreements with south coast and interior First Nations that lay the foundation for incremental development and implementation of new arrangements for fisheries and collaborative fisheries governance.

- *Incremental Reconciliation Agreement for Fisheries Resources* between Canada and five Nuu-chah-nulth Nations: Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht and Tla-o-qui-aht First Nations
- Tsʷilhqot'in, Canada and BC *Gwet'sen Nilt'I Pathway Agreement*

In 2021, the Government of Canada signed a similar agreement, the Reconciliation Framework Agreement for Fisheries Resources, with the A-Tlegay Member Nations (We Wai Kai Nation, Wei Wai Kum First Nation, Kwiakah First Nation, Tlowitsis Nation, and K'ómoks First Nation).

As DFO and First Nations develop and implement new fisheries and collaborative governance arrangements, DFO works with these Nations to engage neighbouring First Nations and stakeholders (e.g. commercial and recreational sectors).

3.7.2 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 3.7-1).

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/.

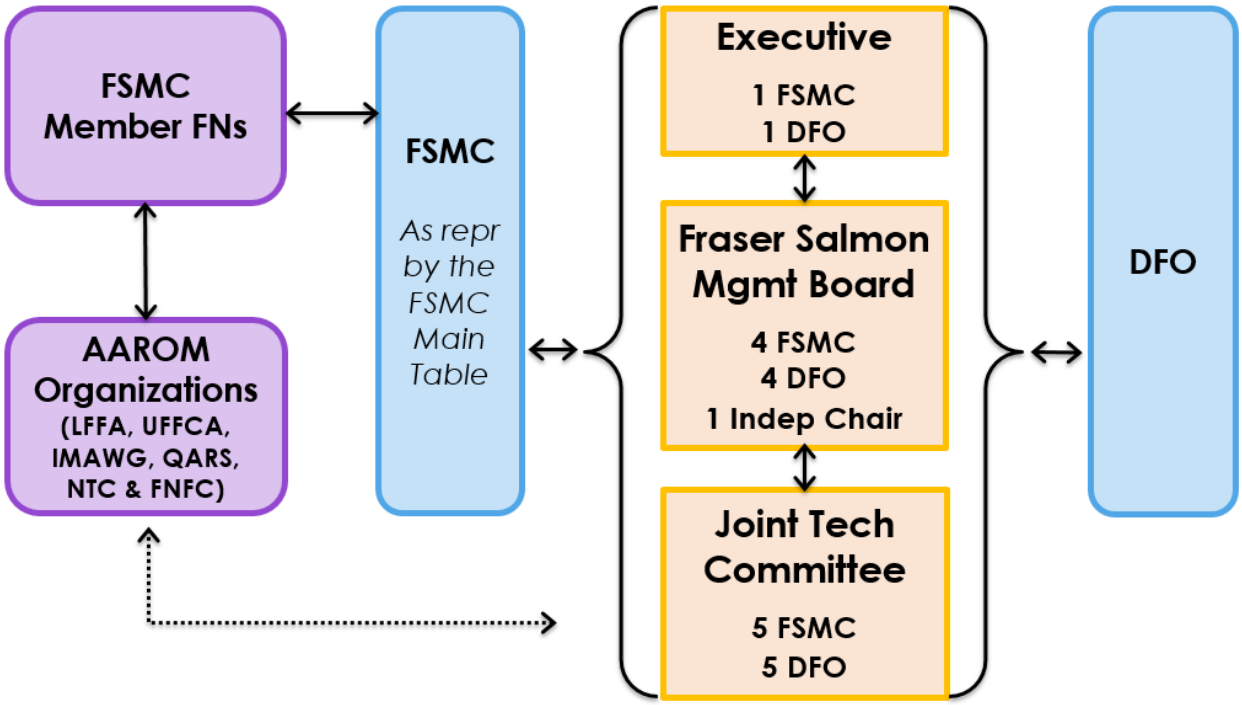

Figure 3.7-1: Governance structures established within the Fraser Salmon Collaborative Management Agreement (FSCMA).

3.8 ADVISORY COMMITTEES AND BOARDS

3.8.1 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; advising on salmon conservation and rebuilding; and the sustainability of pacific salmon fisheries concerns.

3.8.2 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. The current IHPC advisory membership list is located in Appendix 5.

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/).

3.8.3 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

3.8.3.1 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

3.8.4 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

3.9 WHALE, TURTLE AND BASKING SHARK INCIDENT AND SIGHT REPORTS

3.9.1 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

3.9.2 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 overview of the salmon fisheries in British Columbia using available information. In future years, 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. Where possible this summary highlights information specific to the South Coast.

4.1 ABORIGINAL FISHERIES

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.

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. Additional information on AFS implementation for FSC, including harvest target amounts for South Coast are provided in Section 10.1.4.

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, and Tla'amin Nation Final Agreement) have been ratified in British Columbia. (Details of concluded final agreements can be found at: https://www.aadnc-aandc.gc.ca/eng/1402584983606/1402585060047). For information on Tsawwassen First Nation, Maa-nulth First Nations and Tla'amin Nation fisheries please see Section 10.1.

Five Nuu-chah-nulth First Nations located on the west coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht (the Five Nations) – have an Aboriginal right to fish for any species, with the exception of Geoduck, within their court-defined fishing territories and to sell that fish. For further information please see Section 10.3.1.

In addition to modern-day treaties, there are historic treaties in British Columbia: Douglas Treaties (1850-1852), and Treaty 8 (1899).

4.1.1 ECONOMIC VALUE

In terms of Aboriginal commercial harvest opportunities, the Department's general approach is that Aboriginal commercial harvest opportunities are managed using the same harvest decision guidelines as the commercial fishery. Aboriginal commercial harvest opportunities may be implemented with different times, areas, gears and regulations consistent with the overall

management approach for the commercial fishery. The landings and value attributable to Aboriginal commercial harvest are included in the values reported for the commercial sector above and this includes inland fisheries. Participation in the commercial salmon fishery provides socio-economic benefits to Aboriginal communities and individuals from fishery revenues and employment-generated income.

Five Nuu-chah-nulth First Nations located on the west coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht (the Five Nations) – have an aboriginal right to fish for any species, with the exception of Geoduck, within their court-defined fishing territories and to sell that fish. For further information please see Section 10.3.1.

Aboriginal participation within the commercial salmon fishery occurs under four licence categories (A, A-I, N, and F). An Aboriginal vessel owner may elect to pay a reduced fee for a category A licence; thereafter only an Aboriginal may own the vessel. Since 2005, an average of 14% of commercial licences in the North Coast have been reduced fee licences, while the coast-wide average is 11%. Licence categories N and F provide similar fishing privileges as A licence eligibilities, but are non-transferable and are intended to be held permanently for the benefit of the recipient First Nations communities. Both licence categories allow Aboriginal communities to designate vessels and individual fish harvesters to carry out the fishing. The Northern Native Fishing Corporation holds 254 gillnet licences (Category N), of which 61 are in the South Coast.

Since 1994, DFO has acquired a total of 492 commercial salmon fishing licence eligibilities through a voluntary relinquishment process. Once acquired by DFO, licence eligibilities are converted to communal commercial (category F) licence eligibilities and used to support various Aboriginal programs and initiatives including the Aboriginal Fisheries Strategy (AFS, see section 10.3), the Allocation Transfer Program (ATP), the Pacific Integrated Commercial Fisheries Initiative (PICFI), First Nations Inland Demonstration Fisheries projects, Economic Opportunity Fishery arrangements and treaties. As of January 2021, 144 communal commercial salmon licence eligibilities were issued to First Nations under the AFS and ATP, 45 were issued under PICFI, 257 were used to offset First Nations demonstration fisheries projects and Economic Opportunity fishery arrangements with First Nations in the lower Fraser, Somass, Skeena and Nass Rivers, and 33 were used for treaties or other contingencies.

Tsawwassen and Maa-nulth First Nations Treaties came into effect on April 3, 2009 and April 1, 2011, respectively. Most recently, the Tla'amin First Nations Treaty came into effect on April 5, 2016. For additional information please see section 10.1.

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 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 most recent Survey of Recreational Fishing in Canada (2015), tidal water recreational fishing led to more than $600 million dollars (2020$) in expenditures and major purchases in British Columbia. Recreational fishing effort directed toward salmon accounted for an estimated 64% of all angler expenditures, or $383 million.[1] Of these, $294 million was spent in Southern BC (Johnstone Strait, Georgia Strait, Barkley Sound, and West Coast Vancouver Island).

However, due to conservation related fishery management measures, the 2019 fishing season experienced significant restrictions which would have lowered participation, catches, and expenditures. In addition to these conservation related management measures, the 2020 season was also significantly impacted by travel restrictions and a downturn in the economy related to the coronavirus pandemic. Even if BC residents were less likely to be impacted by travel restrictions, it would be reasonable to expect a reduction in their anglings days, distance they traveled to fish, and in their total investments and purchases. BC residents make up the large majority of active anglers as well as days fished and are responsible for the lion share of the expenditures generated by the sector. However, anglers from outside BC spend more on fishing trip packages and make up an important client base for lodges and charter operations.

In order to fish for salmon an angler needs either a tidal or a freshwater licence. In addition, in order to keep salmon, the licence must have a Pacific Salmon Conservation (PSF) Stamp. The number of licences and stamps that can be sold is not restricted and is one way to highlight the level of participation of angler groups in the fishery. Licence data show that the total number of licences and salmon stamps sold was relatively stable from 2001 to 2008 (Figure 4.2-1, below). Starting in 2008, there were consecutive drops in sales of licences to non-residents (i.e. anglers that did not reside in BC). Some of the drop was made up by increased sales to residents and the number of licences sold was relatively steady at the lower level until 2013/14. Sharp increases in the sale of licences to both residents and non-residents in the 2014/15 season resulted in one of the largest annual licence sales in at least 14 years. More recent counts of

[1] DFO Internal Analysis; note that values paid for final goods (such as angler expenditures on fishing trips) should not be considered measures of economic impact of a sector.

licences sold are not yet available, but will be impacted by management restrictions put in place due to conservation related fishery management measures in 2019 and 2020, with 2020 also being impacted due to COVID-19 travel restrictions.

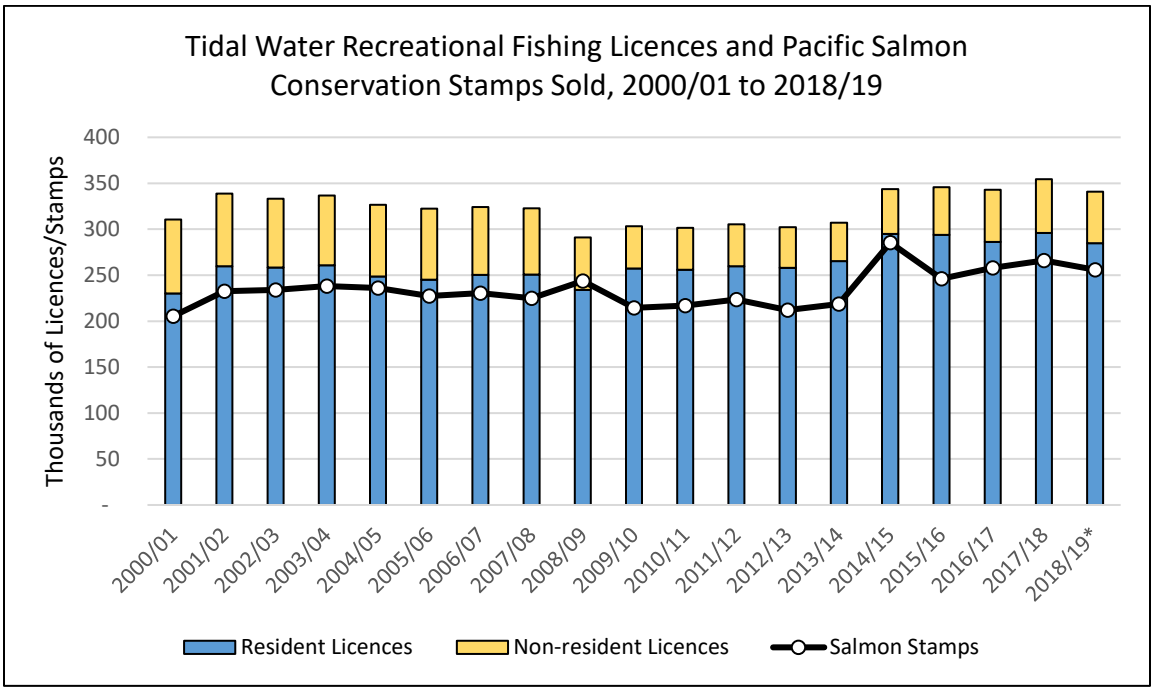

Figure 4.2-1: Tidal Water Recreational Fishing Licences and Pacific Salmon Conservation Stamps Sold, 2000/01 to 2018/19

Source: DFO. www.pac.dfo-mpo.gc.ca/fm-gp/rec/licence-permis/Stats/99tocurrent-eng.html

These restrictions will affect pariticpation in the recreational fishery and also the expenditures and economic impacts generated by the sector. The Survey of Recreational Fishing in Canada provides an estimate of individual expenditures and investment for recreational fishing. This information is used when estimating the direct and indirect contribution of recreational fishing to the economy (e.g. GDP, employment). The survey is administered every 5 years, but it is reasonable to expect highlighted trends to be fairly constant from year to year, barring any significant changes in fishing opportunities, like those we have seen in the last two years. Historically, the combined tidal and freshwater fisheries of BC were the second largest recreational fisheries in Canada in terms of direct and package expenditures, and third largest in terms of investments (DFO 2015). While resident anglers have the largest expenditures, recreational fishing by non-residents also contributes to the provincial economy. In 2015, non-resident direct expenditures (including fishing packages) and investments totaled $159 million (2020$). This number understates the contribution of non-resident tidal water anglers to the overall economy, however, as it only includes expenditures directly attributable to their fishing

experience[2]. Fishing opportunities in BC'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.

Recreational salmon catch has flucuated over the years. On average, from 2015-2018, 828 thousand pieces of salmon were caught coastwide in BC[4]. This number fell slightly in 2019 by 3% to 806 thousand, and preliminary estimates show that it fell by 47% in 2020, to 427 thousand pieces caught. It is clear that COVID-19 travel restrictions have severly impacted the recreational salmon fishing sector this past year, and these affects may continue to be seen in the 2021 fishing season as well. Although catch numbers have fallen in the past two years, the proportion of species caught has remained fairly the same. From 2015-2020, more than half of the recreational catch can be attributed to Chinook (54%), followed by Coho (30%), Pink (9%), Sockeye (7%), and Chum (1%).

Figure 4.2-2 shows the tidal recreational expenditures for all recreational fishing species by resident and non-resident anglers from 2000 to 2015, adjusted to reflect constant 2020 dollars. Though recreational fishing continues to be important to the BC economy, the rate of growth overall has slowed and now declined in the last few years: total expenditures and investments grew by nearly 15% from 2000 to 2005, but by only 1% from 2005 to 2010. From 2010 to 2015, total expenditures and investments in the tidal recreational fishing industry decreased by 26%. This slowdown is due mainly to a drop in visits (and therefore expenditures) to BC by non-resident anglers, particularly other (i.e. international) non-resident anglers whose total expenditures in BC dropped by 48% between 2005 and 2010, and dropped again by 12% between 2010 and 2015. Expenditure on fishing packages by resident anglers increased considerably from 2000-2010; in real terms, it increased by 139% in that time period. However, in the following 5 years, expenditures on fishing packages by resident anglers decreased by 21%, as total expenditures by residents fell by 32%. Nonetheless, BC residents are still the primary consumers of fishing trip packages in the province.

[2] The British Columbia's Fisheries and Aquaculture Sector (BC Stats 2013) report, which calculates direct and indirect economic activity, indicates 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% of them reported they would not have come to BC had there not been tidal water fishing opportunities, while 32% of Canadian visitors would not have come.

[4] Post Season Review, multiple years

	B.C. Tidal Water Recreational Fishing Expenditures for all Species by Angler Type (2020$)			
	2000			
	Direct Expenses	Packages	Investments	Total
Resident	$ 154,727,355	$ 24,885,069	$ 278,846,736	$ 458,459,160
CDN Non-Resident	$ 33,801,797	$ 28,955,880	$ 34,442,854	$ 97,200,531
Other non-resident	$ 73,060,080	$ 60,000,461	$ 17,249,129	$ 150,309,670
Total	$ 261,589,231	$ 113,841,411	$ 330,538,720	$ 705,969,361
	2005			
	Direct Expenses	Packages	Investments	Total
Resident	$ 188,239,452	$ 51,428,029	$ 318,097,398	$ 557,764,879
CDN Non-Resident	$ 41,245,404	$ 48,113,193	$ 15,116,119	$ 104,474,716
Other non-resident	$ 59,263,191	$ 79,138,810	$ 9,875,269	$ 148,277,270
Total	$ 288,748,047	$ 178,680,031	$ 343,088,786	$ 810,516,864
	2010			
	Direct Expenses	Packages	Investments	Total
Resident	$ 227,634,455	$ 59,569,112	$ 364,375,049	$ 651,578,616
CDN Non-Resident	$ 36,428,664	$ 30,475,085	$ 21,461,464	$ 88,365,213
Other non-resident	$ 37,208,810	$ 34,255,185	$ 5,780,209	$ 77,244,204
Total	$ 301,271,929	$ 124,299,382	$ 391,616,723	$ 817,188,034
	2015			
	Direct Expenses	Packages	Investments	Total
Resident	$ 196,069,764	$ 46,954,789	$ 199,577,259	$ 442,601,812
CDN Non-Resident	$ 42,825,731	$ 35,624,179	$ 12,186,101	$ 90,636,011
Other non-resident	$ 38,444,833	$ 28,292,831	$ 1,516,747	$ 68,254,411
Total	$ 277,340,328	$ 110,871,799	$ 213,280,108	$ 601,492,234

Figure 4.2-2: Tidal Water Recreational Fishing Direct and Package Expenditures and Investments for all species, in constant (2020) dollars

Source: Survey of Recreational Fishing in Canada (DFO, multiple years)

The last two years (2019 and 2020) can be expected to have accentuated the trend in declining expenditures by international anglers, given salmon management restrictions and especially COVID-19 travel restrictions. Salmon accounts for roughly 67% of expenditures on fishing trip packages and 64% of total expenditures overall in the tidal recreational fishing industry in British Columbia (DFO 2015) (Figure 4.2-3, below). Given the restrictions highlighted above, participation, expenditures, and economic impacts from the recreational fishing sector will have been significantly impacted. Travel restrictions, impacting both Canadian non-BC residents and foreign (non-Canadian) anglers, will certainly have led to much lower expenditures for the sector.

Additional information on the history and vision for recreational fisheries can be found in the document "Vision for Recreational Fisheries in BC": http://www.pac.dfo-mpo.gc.ca/consultation/smon/sfab-ccps/docs/rec-vision-eng.pdf

	2015 North Coast Salmon Tidal Rec. Expenditures (2020$)			
	Direct Expenditures	Packages	Investments	Total
Residents	$ 13,746,467	$ 17,445,155	$ 12,821,442	$ 44,013,065
Canadian non-resident	$ 7,622,006	$ 16,259,779	$ 3,735,238	$ 27,617,023
Other non-resident	$ 5,540,964	$ 11,680,487	$ 137,401	$ 17,358,853
Total	$ 26,909,438	$ 45,385,422	$ 16,694,081	$ 88,988,941

	2015 South Coast Salmon Tidal Rec. Expenditures (2020$)			
	Direct Expenditures	Packages	Investments	Total
Residents	$ 104,885,553	$ 13,888,187	$ 116,795,121	$ 235,568,862
Canadian non-resident	$ 20,231,973	$ 7,047,390	$ 2,704,342	$ 29,983,705
Other non-resident	$ 19,889,793	$ 7,968,018	$ 538,529	$ 28,396,339
Total	$ 145,007,320	$ 28,903,595	$ 120,037,992	$ 293,948,906

Figure 4.2-3: Tidal Water Recreational Fishing Direct and Package Expenditures and Investments for Salmon North Coast and South Coast, in constant (2020) dollars

Source: Survey of Recreational Fishing in Canada (DFO, 2015)

4.2.1 HARVEST SECTOR

In BC, the salmon fishery is a limited access fishery, mostly managed as a competitive fishery[5]; 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 2020, salmon contributed an average of 17% of the landed value and 14% of the total volume of BC wild caught seafood (DFO Official Catch, 2013-2020). The real value, in 2020 constant dollars (2019$), ranged from a high of $127.8 million in 2014 to a low of $17.9 million in 2019 (Figure 4.2-3, below).

Due to conservation related fishery management measures, the 2019 fishing season was the worst on record and saw salmon commercial landed value at roughly 25% of the previous 4 year average (2015-2018). All areas were impacted but areas B, E, and H were most restricted with no (or virtually no) catch. Many vessels elected not to take part in the fishery. In fact, the number of active vessels in 2019 fell from 924 in 2018 (a high return/high participation year) to 601, a decrease of 35%.

Participation in the commercial fishery in 2020 saw a small increase to 631 active vessels. The number remained low due to conservation related fishery management measures continuing from 2019 into 2020, along with health and safety restrictions delaying the start of the fishing season due to the coronavirus pandemic. Although the number of active vessels only increased by 30 from the previous year, preliminary landing estimates show a 77% increase from 2019 to 2020. However, landed value only rebounded slightly in 2020, increasing by 16% to $20.8 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 nearly 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 63% and 61% of salmon catch, respectively, contributing to a low landed value total for each year. Conservation concerns are expected to continue into future years, negatively impacting the returns to the commercial fleet.

[5] Other names for this style of fishery include derby and Olympic style fishery

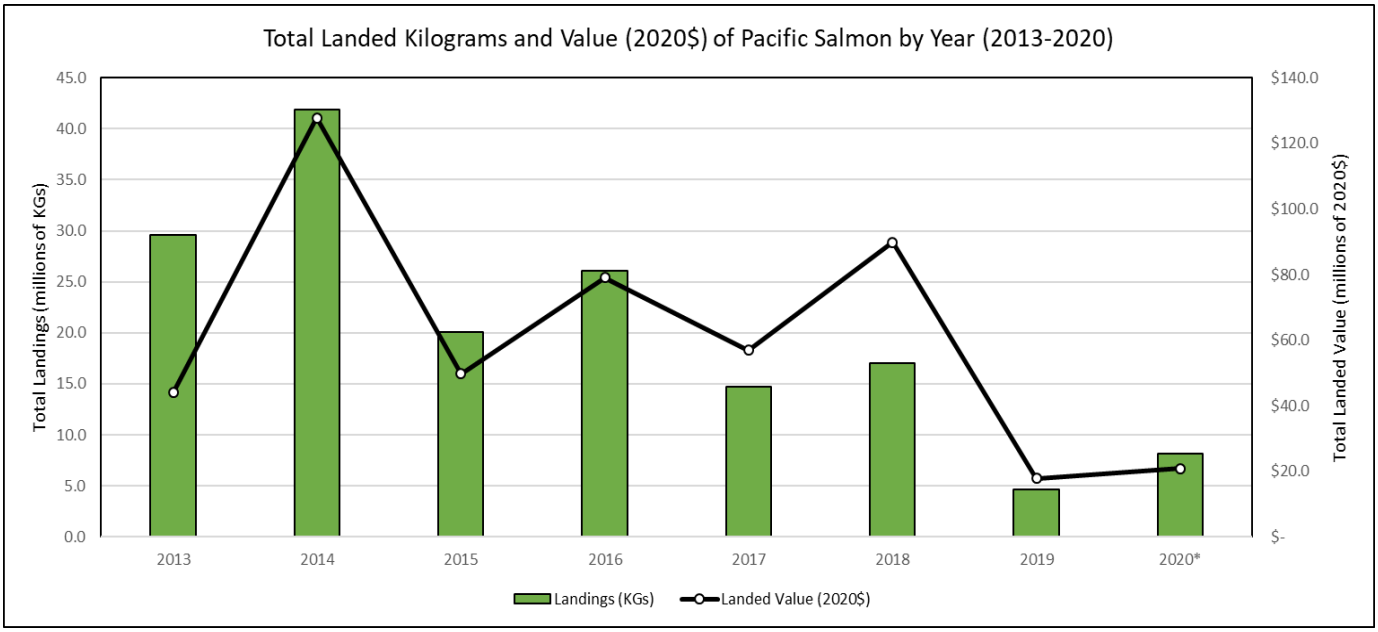

Figure 4.2-3: Total Landed Kilograms and Value (2020$) of Pacific Salmon by Year (2013-2020*)

Source: DFO Official Catch matched to the best available price from sales slips.

*Estimates for 2020 are to be treated as preliminary

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.

Chinook and Chum make up the majority of the landed value in most years, with the exception being years when there is a high return of Sockeye (see Figure 4.3-2 below).

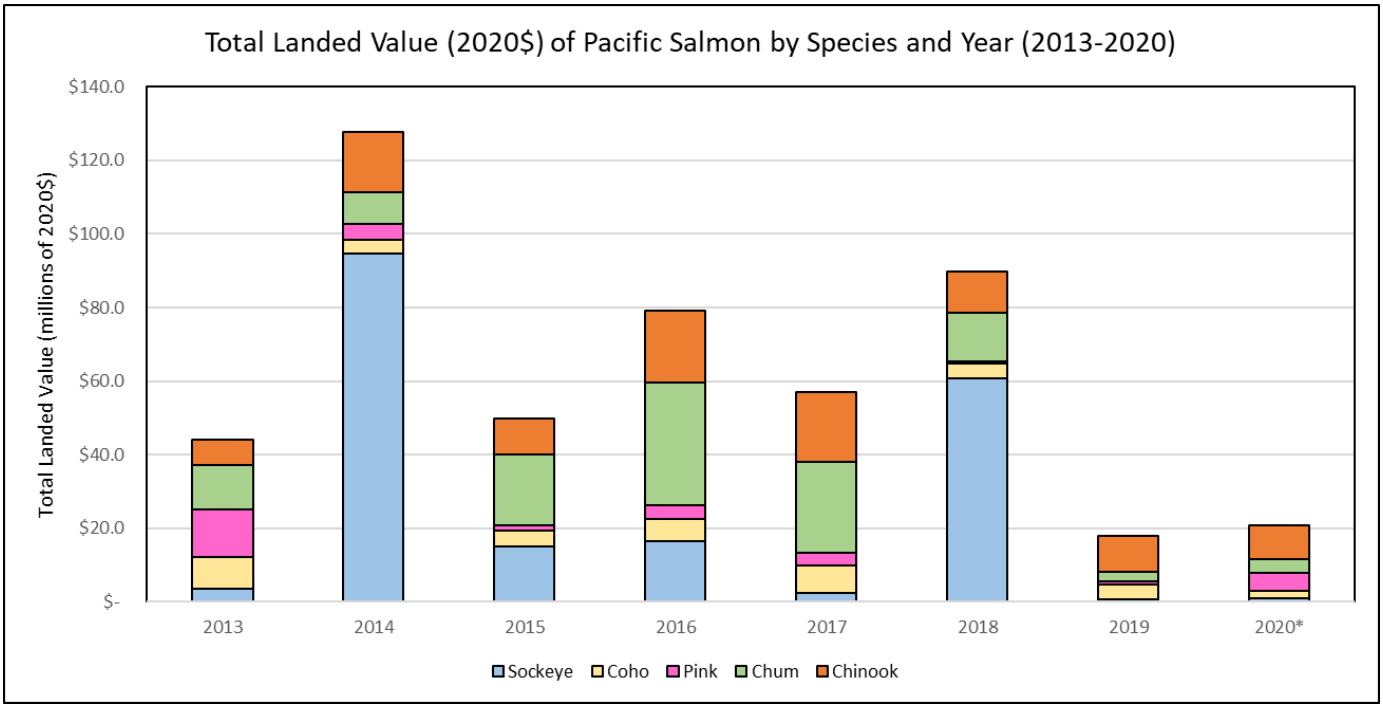

Figure 4.2-4: Total Landed Value (2020$) of Pacific Salmon by Species by Year (2013-2020*)

Source: DFO Official Catch matched to the best available price from sales slips.
*Estimates for 2020 are to be treated as preliminary

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.

Figure 4.3-3 and Figure 4.3-4 (below) present landings (kilograms) and landed value (2020$) of Pacific Salmon by licence area from 2016-2020. For the most part, the graphs coincide with one another; higher landings result in higher landed value. However, salmon licence areas A and F show quite the opposite story: licence area A has higher landings each year (except for 2019) compared to licence area F, but area F has higher landed values. This is the result of majority of catch in area A being Pink Salmon (60%), which has the lowest value in terms of price per kg, and area F landing primarily Coho (44%) and Chinook (38%), which have the third highest and highest value in terms of price per kg in the North Coast, respectively.

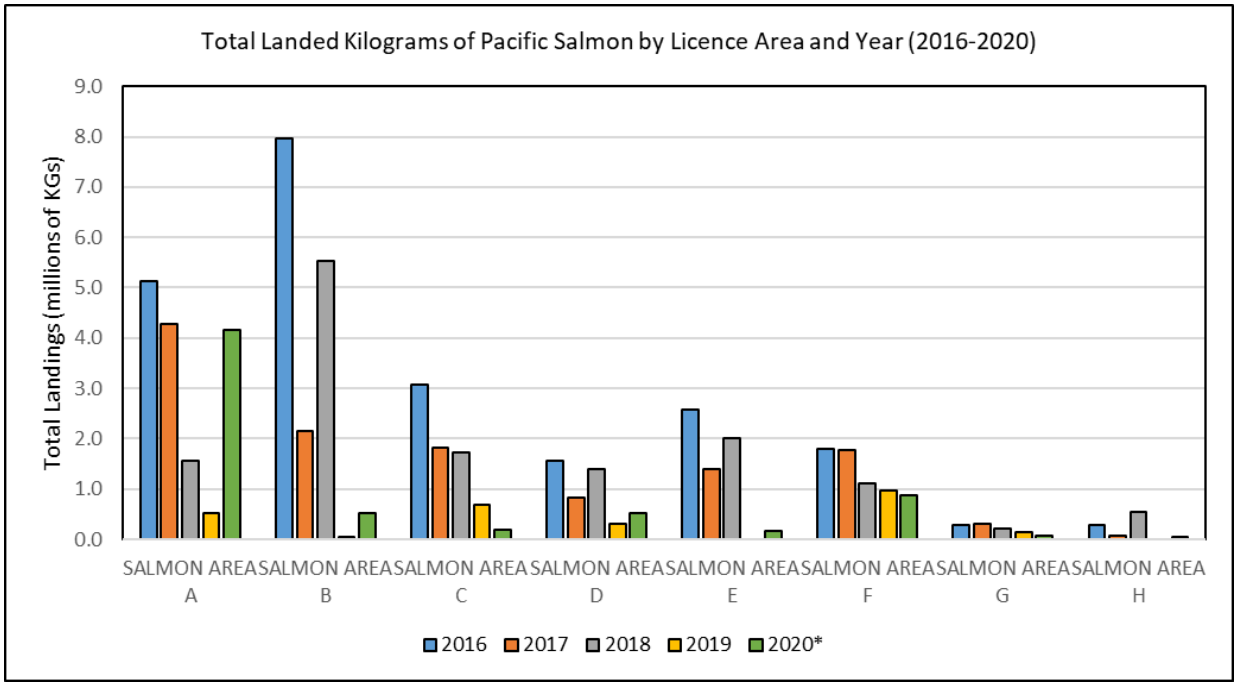

Figure 4.2-3: Total Landed Kilograms of Pacific Salmon by Licence Area by Year (2016-2020*)

Source: DFO Official Catch matched to the best available price from sales slips.
*Estimates for 2020 are to be treated as preliminary

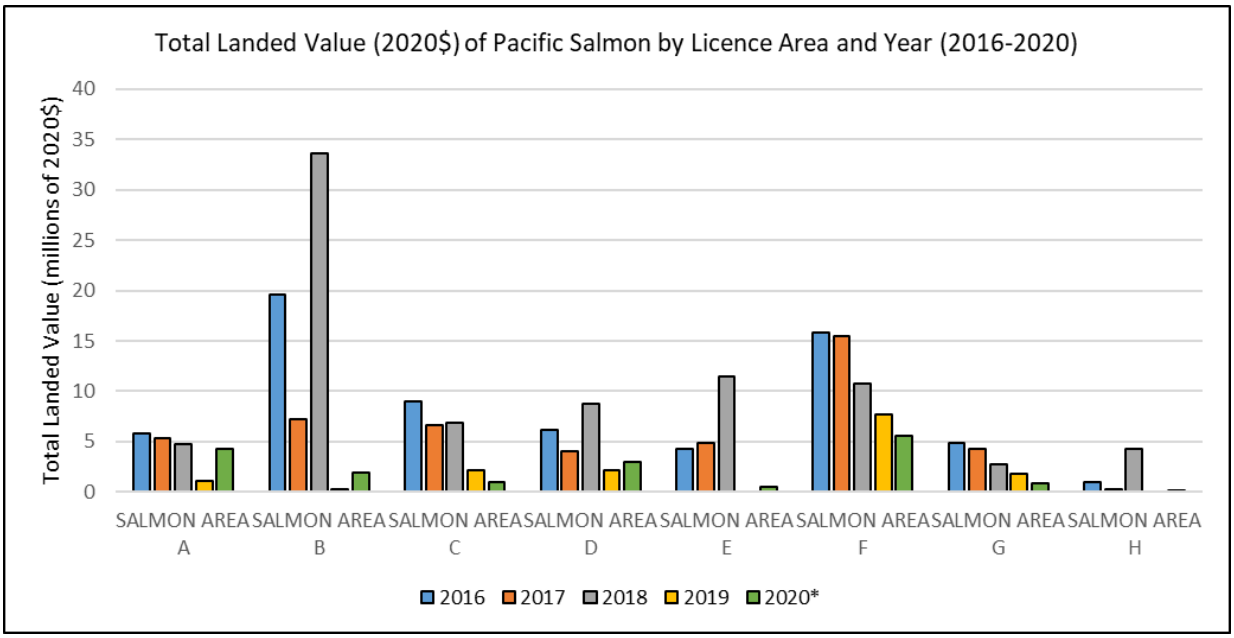

Figure 4.2-4: Total Landed Value (2020$) of Pacific Salmon by Licence Area by Year (2016-2020*)

Source: DFO Official Catch matched to the best available price from sales slips.
*Estimates for 2020 are to be treated as preliminary

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 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.

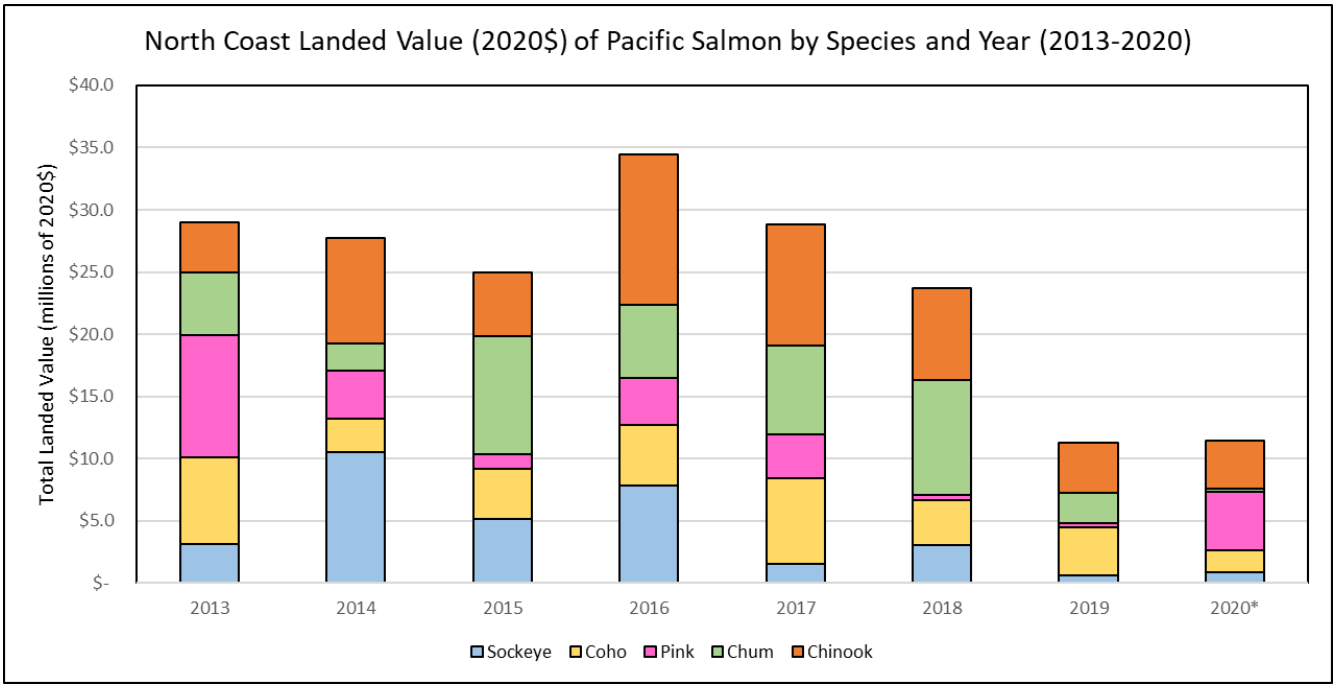

Figure 4.2-5: North Coast salmon value by species, 2013-2020* (in 2020$)

Source: DFO Official Catch matched to best available price from sales slips.
*Estimates for 2020 are to be treated as preliminary

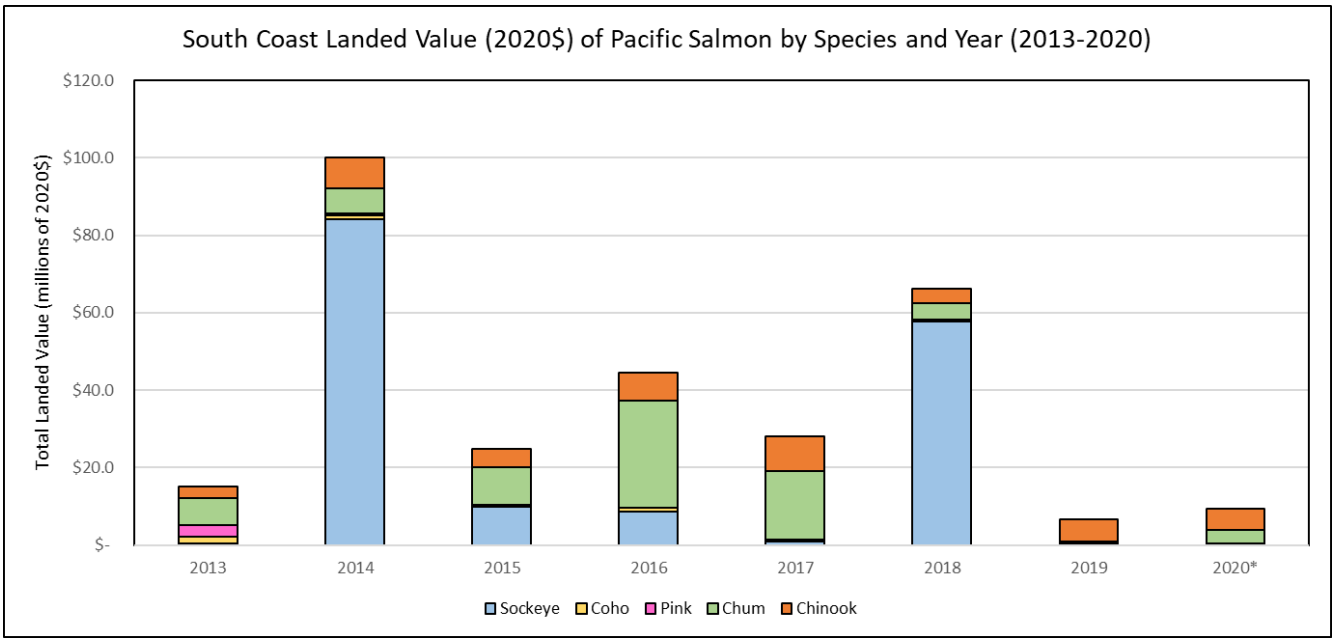

Figure 4.2-6: South Coast salmon value by species, 2013-2020* (in 2020$)

Source: DFO Official Catch matched to best available price from sales slips.
*Estimates for 2020 are to be treated as preliminary

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.

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. License values are a reflection of expected future financial returns but also of speculation. The value of a seine licence remained constant from 2015-2018 ($422K) and increased by 26% to $530K in 2019 (Castlemain, various years). Gillnet licence values steadily increased from 2015-2018 ($54K to $69K), but fell back to $56K in 2019. Troll licence values experienced a similar trend to gillnet, increasing from 2015-2018 ($125K to $199K), and falling in 2019 to $167K. The salmon fleet's financial performance is best reviewed over several years, given the fisheries significant annual swing in harvest. For the seine fishery, the percentage of revenue attributed to the diversified fleet fell from 17% to 15%, when comparing the 2016-2019 average to the 2020 year[6]. For the gillnet fishery, the percentage of revenue attributed to the diversified fleet also fell from 14% to 10% in comparing 2016-2019 average to the 2020 year. For the troll fishery, the percentage of revenue attributed to the troll diversified fleet also decreased from 51% to 47% in comparing the

[6] DFO Fleet Diversification Table Tool

2016-2019 average to the 2020 year. The cost structure of salmon fleets in BC is available through various reports (Nelson, 2009 & 2011 as well as Gislason 2011).

The Department's general approach is that Aboriginal commercial harvest opportunities are managed using the same harvest decision guidelines as the commercial fishery. Aboriginal commercial harvest opportunities may be implemented with different times, areas, gears and regulations consistent with the overall management approach for the commercial fishery. The landings and value attributable to Aboriginal commercial harvest are included in the values reported for the commercial sector above and this includes inland fisheries. Participation in the commercial salmon fishery provides socio-economic benefits to Aboriginal communities and individuals from fishery revenues and employment-generated income.

Five Nuu-chah-nulth First Nations located on the west coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht (the Five Nations) – have an aboriginal right to fish for any species, with the exception of Geoduck, within their court-defined fishing territories and to sell that fish. For further information please see Section 10.3.1.

Aboriginal participation within the commercial salmon fishery occurs under four licence categories (A, A-I, N, and F). An Aboriginal vessel owner may elect to pay a reduced fee for a category A licence; thereafter only an Aboriginal may own the vessel. Since 2005, an average of 14% of commercial licences in the North Coast have been reduced fee licences, while the coast-wide average is 11%. Licence categories N and F provide similar fishing privileges as A licence eligibilities, but are non-transferable and are intended to be held permanently for the benefit of the recipient First Nations communities. Both licence categories allow Aboriginal communities to designate vessels and individual fish harvesters to carry out the fishing. The Northern Native Fishing Corporation holds 254 gillnet licences (Category N), of which 61 are in the South Coast.

Since 1994, DFO has acquired a total of 492 commercial salmon fishing licence eligibilities through a voluntary relinquishment process. Once acquired by DFO, licence eligibilities are converted to communal commercial (category F) licence eligibilities and used to support various Aboriginal programs and initiatives including the Aboriginal Fisheries Strategy (AFS, see section 10.3), the Allocation Transfer Program (ATP), the Pacific Integrated Commercial Fisheries Initiative (PICFI), First Nations Inland Demonstration Fisheries projects, Economic Opportunity Fishery arrangements and treaties. As of January 2021, 144 communal commercial salmon licence eligibilities were issued to First Nations under the AFS and ATP, 45 were issued under PICFI, 257 were used to offset First Nations demonstration fisheries projects and Economic Opportunity fishery arrangements with First Nations in the lower Fraser, Somass, Skeena and Nass Rivers, and 33 were used for treaties or other contingencies.

Tsawwassen and Maa-nulth First Nations Treaties came into effect on April 3, 2009 and April 1, 2011, respectively. Most recently, the Tla'amin First Nations Treaty came into effect on April 5, 2016. For additional information please see section 10.1.

4.2.2 PROCESSING SECTOR

Wild salmon accounts for an average of 22% of the total wholesale value from the processing of wild caught seafood in BC (SYIR, 2014-2019). Although more recent estimates are not yet available from the provincial government, the reduction in salmon landings experienced in 2020 will have affected the overall processed value and economic impacts of salmon from BC.

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. Between 2015-2018, Chum accounted for nearly half of processing sector wages (49%), followed by Sockeye (30%), Pink (10%), Chinook (6%) and Coho (5%). In 2019, processing sector wages were down 80% compared to the previous 4-year average. Chum still accounted for most of the processing sector wages (28%), followed by Chinook (25%), Pink (24%), Coho (18%), and Sockeye (5%). In 2020, processing sector wages increased by 61%, although they still remain at only one-third of the 2015-2018 average. Applying the Gislason & Associates (2017) estimations to 2020 DFO logbook information, processing of salmon species delivered about $2.0M (Pink), $0.8M (Chum), $0.6M (Chinook), $0.3M (Coho), and $0.2M (Sockeye) in processing sector labour wages (Figure 4.2-7:).

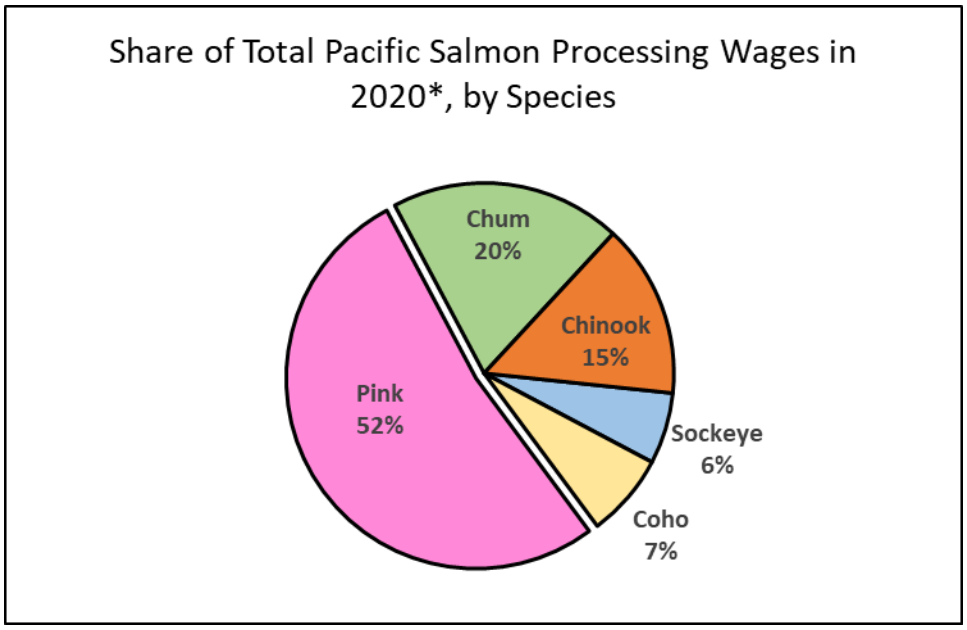

Figure 4.2-7: Share of the total value of processing sector wages in 2020 (per salmon species)

Source: GS Gislason and Associates (2017), DFO Official Catch
*Estimates for 2020 are to be treated as preliminary

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).

4.3 EXPORT MARKET

The province of British Columbia benefits from strong seafood exports that in 2020 were valued at about $1.3 billion, a 7% decrease when compared to 2019.[7] 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 Chum salmon were among the most widely exported wild salmon species in 2020 (by volume). They constituted 34%, 30% and 16% of the total volume of wild salmon exports from BC, respectively. In 2020, Chum was shipped to 13 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 14 countries, with China and the US constituting the most significant importers (by value), and Sockeye was also exported to 14 countries, with the US and Hong Kong being the biggest Sockeye importers (by value).

Notwithstanding the above, salmon exports in the last couple of years have been affected by the lower harvest levels. The value of all wild caught salmon exports from 2010-2020 averaged $127M annually (in 2020$). However, 2019 and 2020 set two consecutive records for the lowest salmon export value. Over the last decade, on average, Chinook (spring) accounted for about 34% of the value; Sockeye for 30%; Chum for 15%; Pink for 13%; Coho for about 6%, and 1% originated from the sale of unspecified salmon. (See Figure 4.4-1 below).

[7] Statistics Canada EXIM Database; value in nominal terms.

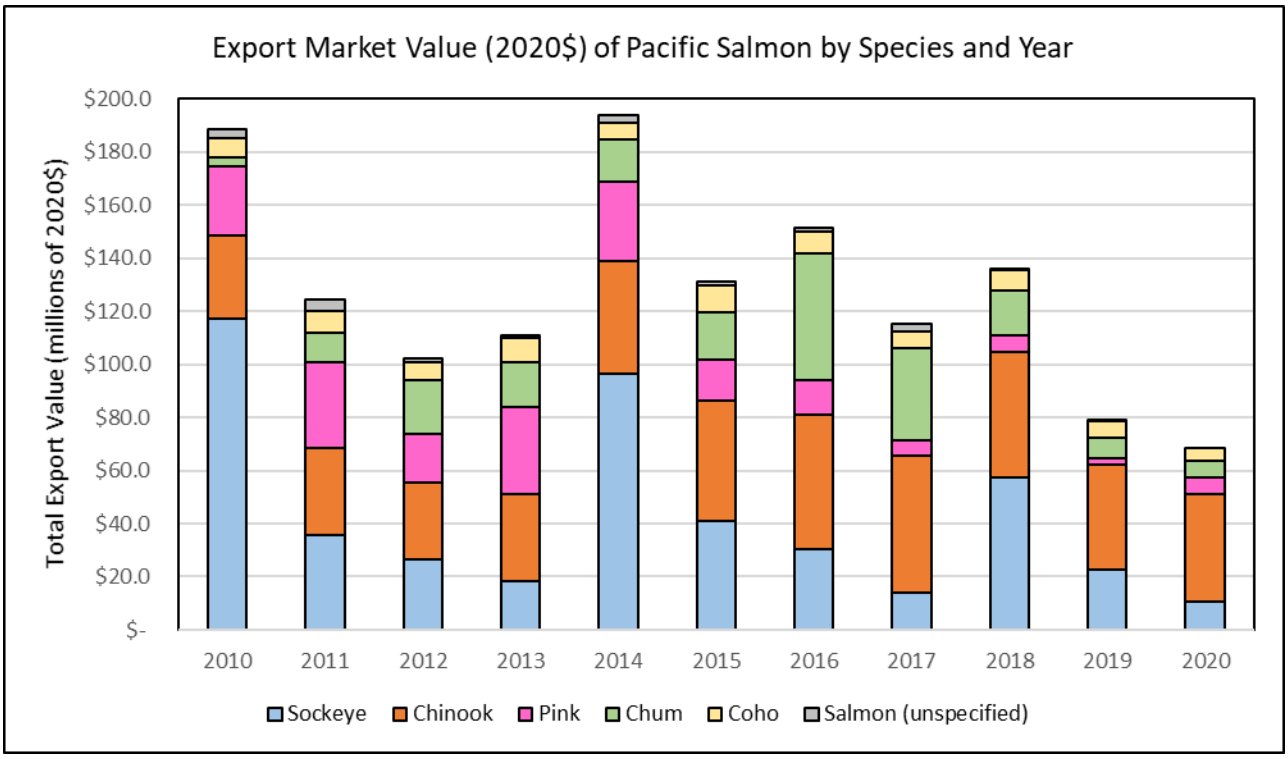

Figure 4.3-1: Total value of wild salmon exports (in 2020 constant dollars), 2010-2020*
Source: Statistics Canada EXIM database accessed on June 7, 2021.
*Estimates for 2020 are to be treated as preliminary

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 60% of the total export value in that period, followed by Japan (13%) and China (6%). The United Kingdom and France were the fourth biggest individual importers of BC wild salmon in that period (3%). For more details, please refer to Figure 4.3-2 below.

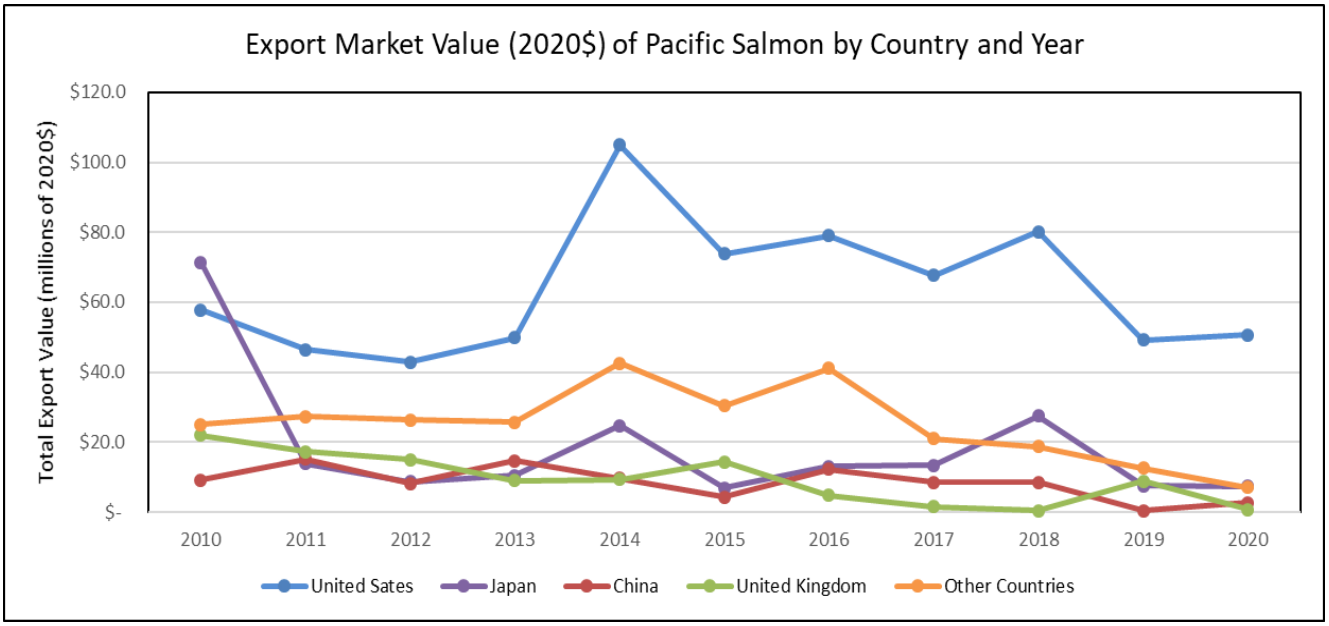

Figure 4.3-2 Total value of wild salmon exports from BC per main importers, 2010-2020* (in 2020$)

Source: Statistics Canada EXIM database accessed on June 7, 2021.
*Estimates for 2020 are to be treated as preliminary

Figure 4.3-3 below shows the proportions of Pacific Salmon exported by value (in 2020$) by destination country in 2020. In 2020, approximately $68.7M worth of wild and farmed Pacific salmon was exported from BC. The export value has been decreasing over the past 5 years, falling by 55% since 2016, and experiencing a decrease of 13% from 2019. Of the total $68.7M, about 74% of the total export value of Pacific salmon is attributable to the United States ($50.8m), 11% to Japan ($7.4m), 4% to China ($2.7m), 1% to the United Kingdom ($0.7m), and the remaining 10% to all other countries ($7.1m).

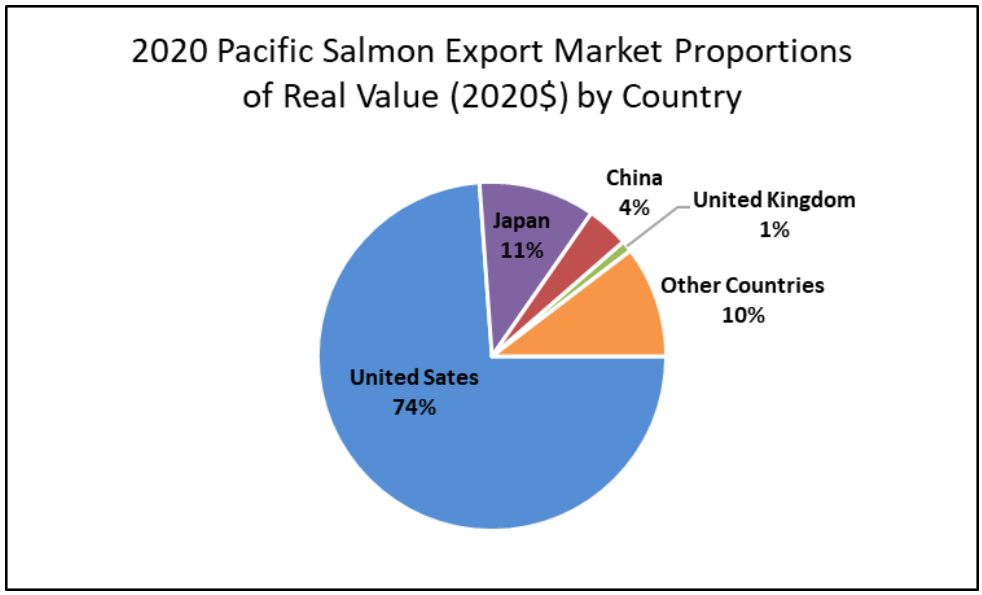

Figure 4.3-3 Proportions of total value of wild salmon exports from BC by main destination countries in 2020* (in 2020$)

Source: Statistics Canada EXIM database accessed on June 7, 2021.
*Estimates for 2020 are to be treated as preliminary

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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 behavior all add risks that can threaten conservation. Accordingly, management actions will be precautionary and risks will be specifically evaluated where possible.

5.1.1 WILD SALMON POLICY

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 5.8), 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

- Ancient Murrelet – Special Concern
- Marbled Murrelet – Threatened
- Black-footed Albatross – Special Concern
- Short-tailed Albatross – Threatened
- Pink-footed Shearwater – Threatened

FISH

- Basking Shark, Pacific population – Endangered
- Bluntnose Sixgill Shark – Special Concern
- Green Sturgeon – Special Concern
- Longspine Thornyhead – Special Concern
- Rougheye Rockfish Types I & II – Special Concern
- Tope Shark – Special Concern
- White Sturgeon – Upper Columbia River population – Endangered
- White Sturgeon – Upper Fraser River population – Endangered
- White Sturgeon – Nechako River Population – Endangered
- White Sturgeon – Upper Kootenay River population – Endangered
- Yelloweye Rockfish, Pacific Ocean inside waters and outside waters populations – Special Concern

MAMMALS

- Blue Whale, Pacific population – Endangered
- Fin Whale, Pacific population – Threatened
- Grey Whale – Eastern North Pacific Population – Special Concern
- Harbour Porpoise, Pacific Ocean population – Special Concern
- Humpback Whale, North Pacific population – Special Concern
- Killer Whale, Northeast Pacific – northern resident population – Threatened
- Killer Whale, Northeast Pacific – southern resident population – Endangered
- Killer Whale, Northeast Pacific – offshore population – Threatened
- Killer Whale, Northeast Pacific – transient population – Threatened
- North Pacific Right Whale – Endangered
- Sea Otter – Special Concern
- Sei Whale, Pacific population – Endangered
- Steller Sea Lion – Special Concern

REPTILES

- Leatherback Sea Turtle – Endangered

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

FISH

- Bocaccio – assessed as Endangered
- Canary Rockfish – assessed as Threatened
- Darkblotched Rockfish – assessed as Special Concern
- Eulachon – Fraser River Designatable Unit – assessed as Endangered
- Eulachon – Central Pacific Coast Designatable Unit – assessed as Endangered
- Eulachon – Nass/Skeena Rivers Designatable Unit – assessed as Special Concern
- North Pacific Spiny Dogfish – assessed as Special Concern
- Salmon, Chinook (Okanagan population) – assessed as Endangered
- Salmon, Coho (Interior Fraser population) – assessed as Threatened
- Salmon, Sockeye (Sakinaw population) – assessed as Endangered
- Salmon, Sockeye (15 Fraser River Designatable Units; DU) – assessed as Endangered (8 DUs), Threatened (2 DUs), Special Concern (5 DUs)
- Salmon, Chinook (Southern BC Designatable Units)- assessed as Endangered (8 DUs), Threatened (4 DUs),Special Concern (1 DU)
- Salmon, Chinook (Southern BC *hatchery enhanced* Designatable Units) – assessed as Endangered (4 DUs), Threatened (3 DUs), Special Concern (1 DU)
- Interior Fraser Steelhead (Chilcotin & Thompson populations) – assessed as Endangered (2 DUs)
- Quillback Rockfish – assessed as Threatened
- White Sturgeon- Lower Fraser River Designatable Unit- Threatened

MAMMALS

- Northern Fur Seal – Threatened
- Grey Whale, Pacific Coast Feeding Group population – Endangered (reclassification from Special Concern, single Pacific population)
- 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 November 2021	Expected Fall 2022

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.

5.3.6.1 THOMPSON AND CHILCOTIN STEELHEAD EMERGENCY SARA LISTING PROCESS

Spawning escapement of IFR 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 2021, 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 with a focus 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 2021 season include area-based fishery closures for recreational and commercial salmon fishing in a portion of Swiftsure Bank from July 16 to October 31, 2021 and the Strait of Juan de Fuca from August 1 to October 31, 2021.

New for 2021, Fisheries and Oceans Canada (DFO) will be piloting a new fishing closure protocol for the southern Gulf Islands recreational and commercial salmon fisheries, whereby fishery closures are triggered by the first confirmed presence of Southern Resident killer whales in the area. The Vancouver Fraser Port Authority Enhancing Cetacean and Observation (ECHO) Program, working closely with its local partners, and the DFO Whale Tracking Network are monitoring the area staring June 1, 2021, and once a Southern Resident killer whale is confirmed, fishery closures will be triggered and will remain in place until October 31, 2021.

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, 2021 as per the Interim Order enacted under the *Canada Shipping Act*.

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 (do not haul gear) within 1,000 metres of killer whales and let them pass;
- Reduce speed to less than 7 knots when within 1000m of the nearest marine mammal
- When safe to do so, turn off echo sounders and fish finders
- Place engine in neutral idle and allow animals to pass if your vessel is not in compliance with the approach distance regulations
- 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

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, 2022. 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 Department 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 FISHERY MANAGEMENT OBJECTIVES FOR STOCKS OF CONCERN

6.1 LOWER STRAIT OF GEORGIA CHINOOK

The objective for Lower Strait of Georgia (LGS) Chinook is to continue rebuilding through a comprehensive set of fishery, hatchery, and habitat related actions.

The Cowichan River is the primary indicator of marine survival and exploitation for the LGS fall Chinook. Returns in 2009 declined to 1,260 adults but have been on an increasing trend, with the 2020 total return of 10,241 adults. S_{msy} for this population is currently 6,500 adults which has been exceeded for five consecutive years. In addition, the 2020 age 2 (jack) return was 14,597 which is above the ten year average for natural spawners (ranging from a return of 583 in 2014 to the 2020 estimate of 14,597). The proportion of hatchery fish within the population was estimated at 15.6% in 2020 based on adipose clips, suggesting wild fish are driving the recent increases in abundance (>90% of production is marked).

Adult fall returns to the Puntledge River were 1.3 times the 12 year average at 9,851. Big Qualicum, Little Qualicum, and Nanaimo River (fall run), saw adult returns that were also above the 12 year averages at 11,175; 8,972; and 4,046, respectively. Returns to the Englishman River were below both the 4 and 12 year averages at 781. Higher than average fall returns to most systems in LGS suggest marine survival may be improving for both hatchery and wild fish. However, returns were below or near average for summer run Chinook in Puntledge and Nanaimo River, with 12 and 634, respectively. The summer run Chinook in these systems (Designatable Unit 20) were listed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2020. A Recovery Potential Assessment (RPA) will be completed in 2021 to assess the status of DU 20 Summer Chinook under the *Species at Risk Act*.

LGS Chinook are harvested by First Nations in terminal areas, in commercial mixed stock troll fisheries (West Coast of Vancouver Island) and in recreational fisheries (West Coast of Vancouver Island, Strait of Juan de Fuca, Strait of Georgia and Johnstone Strait). Fishery restrictions introduced in recent years include PST reductions to the WCVI troll total allowable catch, restrictions in Victoria recreational fisheries, spot closures in the Strait of Georgia, and terminal area recreational closures from Nanaimo to Saanich. In light of proposed management actions to protect SRKW and Fraser Chinook, reductions to recreational catches are expected to occur throughout the Strait of Georgia. These reductions, in combination with average to above average escapements, provided an opportunity to review both spot and terminal area closures; spot closures in the Northern Strait of Georgia will not be in effect in 2021 due to the significant

overlap with management measures directed at Fraser bound Chinook. A management framework that considers abundance levels, triggers, and associated fishery management measures (including potential changes to terminal area closures) is being developed consistent with the Southern BC Chinook strategic planning and the Wild Salmon Policy. Other measures underway are alternative hatchery-release strategies, based on recent work that showed large in-river, post-release mortalities, and a comprehensive watershed based recovery initiative involving partners such as First Nations, NGOs and local governments.

6.2 WEST COAST OF VANCOUVER ISLAND (WCVI) CHINOOK

The objective for West Coast of Vancouver Island (WCVI) Chinook is to manage Canadian ocean fisheries (specified below) to an exploitation rate of 10%. Within the 10% exploitation rate objective, the northern troll fishery will be managed to a WCVI Chinook exploitation rate of 3.2%.

For the past two decades, WCVI wild Chinook have experienced poor marine survival rates and low spawner levels; as a result WCVI wild Chinook continue to be stocks of concern.

Management actions will continue to be required consistent with the exploitation rate objective. Fisheries that this limit applies to are the northern troll, Haida Gwaii recreational, WCVI troll and WCVI recreational. The exploitation rate is estimated by Coded Wire Tag (CWT) data gathered from these fisheries. The exploitation rate limit includes Chinook caught and kept, as well as an estimate of fishing related mortalities.

In order to meet this objective for WCVI Chinook, the key management measure for the Area G WCVI troll fishery is restricting the open areas to offshore portions only during the summer period. Specifically, there will be a 5 nautical mile inside boundary in South West Vancouver Island (Areas 123 to 126) and a 2 nautical mile boundary in North West Vancouver Island (Areas 126-4 and 127) during the period when WCVI Chinook return to the West Coast of the island.

As a result of concerns for WCVI Chinook that emerged in the mid-late1990's a suite of management measures were implemented on the WCVI intended to protect wild WCVI Chinook from recreational fishing pressure. These management measures fluctuated yearly with levels and areas of restriction. In 2000, a recreational fishery "Chinook management corridor", extending one nautical mile offshore from the surfline was put in place along the West Coast of Vancouver Island in order to reduce the exploitation rate on adult female Chinook that migrate along the coastline back to their natal WCVI streams. The surfline is defined in Schedule 1 of the *Pacific Fishery Management Area Regulations*, 2007. From 2006 to 2015 the suite of management measures remained relatively stable with very few local changes.

Chinook corridor management measures were revised in 2016 and adjusted from size limit management within the corridor to a network of open areas and finfish closures. Additional terminal Chinook non-retention areas were included to protect local stocks as well as areas of increased recreational access was provided where hatchery stock composition was considered to be the highest.

6.3 FRASER SPRING 4_2 CHINOOK

For 2021 the objective for Fraser River Spring 4_2 Chinook is to manage Canadian fisheries in a highly precautionary manner to allow as many fish to pass through to the spawning grounds as possible.

Substantial reductions in fishery mortalities are required for Spring 4_2, Spring 5_2 and Summer 5_2 Chinook given their poor stock status, extremely poor productivity and expectations for continued declines in spawner abundance. Any fishery mortalities will worsen spawner declines unless productivity improves.

Expected fishery mortalities are not intended to be a management target and the objective is to allow as many fish to pass through to the spawning grounds as possible. Actual outcomes may vary due to a range of factors, including: annual variability in Chinook distribution and run timing; distribution of fishing effort; and, uncertainties in the assessment data.

Fishery impacts are expected to include incidental Chinook mortalities in Fraser River Chinook and Sockeye test fisheries, Chinook retention or bycatch retention in First Nation FSC fisheries, release mortalities, and incidental mortalities during Chinook-directed fisheries in mixed stock fisheries.

Post-season fishery mortalities based on the Nicola coded-wire tag (CWT) indicator are provided in Section 9.1.3.

Fisheries management actions are now outlined in Section 13 Southern Chinook Salmon Fishing Plan - Southern ISBM Chinook.

In the 2021 Salmon Outlook, the Spring 4_2 Chinook MU has been classified as a stock of concern. Expectations are for continued depressed abundance due to low parental escapements in 2017, ongoing unfavorable marine and freshwater survival conditions, and low productivity. The 2020 escapement estimate was below the parental brood escapement in 2016, and for those systems in which escapement estimates are available, escapement was below the recent average. The reconstructed parental brood year (2017) escapement for the 2021 return was 5,105.

Fraser Spring 4_2 Chinook have historically been encountered in Fraser River First Nations gill net fisheries, Fraser River and tributary recreational fisheries, marine troll fisheries (e.g. WCVI and North Coast), and recreational fisheries in Southern BC.

For further information on the management of Fraser Spring 4_2 Chinook refer to the Southern Chinook ISBM fishery Section 13.1.2 in Section 13 Southern Chinook Salmon Fishing Plan.

6.4 FRASER SPRING 5_2 AND SUMMER 5_2 CHINOOK

For 2021, the objective for Fraser River Spring 5_2 and Summer 5_2 Chinook is to manage Canadian fisheries in a highly precautionary manner to allow as many fish to pass through to the spawning grounds as possible.

In 2019, this approach reduced overall Canadian fishery mortalities on these populations to low levels of approximately 6-7% (Spring 5_2) and 14% (Summer 5_2). 2020 information is not yet available. Post-season fishery mortality information is provided in Section 9.1.4

Substantial reductions in fishery mortalities are required for Spring 4_2, Spring 5_2 and Summer 5_2 Chinook given their poor stock status, extremely poor productivity and expectations for continued declines in spawner abundance. Any fishery mortalities will worsen spawner declines unless productivity improves.

Expected fishery mortalities are not intended to be a management target and the objective is to allow as many fish to pass through to the spawning grounds as possible. Actual outcomes may vary due to a range of factors, including: annual variability in Chinook distribution and run timing; distribution of fishing effort; and, uncertainties in the assessment data.

Fishery impacts are expected to include incidental Chinook mortalities in Fraser River Chinook and Sockeye test fisheries, Chinook retention or bycatch retention in First Nation FSC fisheries, release mortalities, and incidental mortalities during Chinook-directed fisheries in mixed stock fisheries.

Fisheries management actions are now outlined in Section 13 Southern Chinook Salmon Fishing Plan - Southern ISBM Chinook.

In the 2021 Salmon Outlook, Spring 5_2 and Summer 5_2 Chinook stocks have been classified as stocks of concern. Expectations are for continued low abundance related to depressed parental escapements, continuing unfavorable marine and freshwater survival conditions, and low productivity. The 2020 escapement estimate was below parental brood escapements in 2015 and similar to the recent average. For the return in 2021, the reconstructed parental brood year (2016) escapement was approximately 30,000 spawners. This value represents the escapement from a run reconstruction analysis that is conducted annually. That analysis uses the indicator

stock escapement estimates and other data to generate an estimate of the total escapement of all Fraser Chinook Salmon (including those streams that are not monitored regularly).

For further information on the management of Fraser Spring 5_2 and Summer 5_2 Chinook refer to the Southern Chinook ISBM fishery Section 13.1.2 in Section 13 Southern Chinook Salmon Fishing Plan.

6.5 FRASER FALL 4_1 (HARRISON CHINOOK)

The biologically-based escapement goal for Harrison Chinook is 75,100 Chinook.

The Pacific Salmon Treaty specifies that for individual stock-based management ("ISBM") fisheries, U.S. and Canada shall manage these to limit the total adult equivalent mortality for stocks listed in Attachment I of the Treaty that are not meeting agreed biologically-based management objectives, or that do not have agreed management objectives, to no more than the limits identified in Attachment I. Attachment I identifies a biologically-based management objective of 75,100 Chinook (i.e. escapement goal) for Harrison River Chinook and a Canadian ISBM Calendar Year Exploitation Rate (CYER) limit of 95% of the 2009-2015 average if the stock is not meeting biologically-based management objectives. The PST also indicates the (CYER) metric shall be used to monitor the total mortality in ISBM fisheries beginning with the 2019 to 2021 catch years with an obligation to identify stocks that achieved less than 85% of the point estimate (or lower end range) of the management objective for three consecutive years beginning in 2019.

Harrison Chinook continues to experience low productivity. The 2020 Harrison (natural) preliminary escapement estimate was similar to the parental brood escapement in 2016, and below the recent average and escapement goal. Current marine conditions and stock productivity appear to be unfavorable, with escapement estimates only meeting the escapement objective for the Harrison River once in the past 9 years.

For further information on the management of Harrison Chinook refer to the Southern Chinook ISBM fishery Section 13.1.4 in Section 13.1 Southern Chinook Salmon Fishing Plan.

6.6 INTERIOR FRASER RIVER COHO

The objective for Interior Fraser River Coho (including Thompson River Coho) is to manage Canadian fisheries in a highly precautionary manner with fisheries management measures similar to those in place prior to 2014. This approach is expected to achieve an overall exploitation rate in Canadian waters within the range of 3% to 5%.

Assessments of Interior Fraser River Coho Salmon stocks in the mid-1990s revealed that alarming declines in spawning populations were occurring in many spawning sites. Low marine survival rates in combination with excessive fishery impacts were identified as key factors in this decline. Beginning in 1997, DFO implemented a number of fishery management measures to reduce the harvest impacts on these stocks, with more severe measures being implemented beginning in 1998. In most years since that time, Canadian fisheries impacting these stocks have been curtailed to limit the exploitation rate to 3% or less, with an additional 10% permitted in U.S. fisheries (as per the Pacific Salmon Treaty management regime).

Currently, there is no evidence that IFR Coho has departed from the 'low' productivity regime that has persisted since the 1994 return year. Current productivity is still well below that of the relatively high productivity period of 1978-1993.

Despite generally low fisheries impacts, achievement of recovery objectives, as laid out in the Conservation Strategy for Coho Salmon, *Oncorhynchus kisutch*, Interior Fraser River Populations, October 2006 (https://waves-vagues.dfo-mpo.gc.ca/Library/329140.pdf), has not been consistent, suggesting little rationale to move out of the current cautious fisheries management regime.

A further consideration is the poor forecasting ability for IFR Coho. In recent years, there has been weak correspondence between brood-year escapements and subsequent adult returns; therefore, one (or a small number) of strong brood years should not be considered predictive of future strength in returns.

As outlined in Chapter 5 of the Pacific Salmon Treaty (PST), allowable exploitation rates (ERs) for Canada and the U.S. are identified based on the status of Coho Management Units (MUs). Canada is responsible for determining the status level for Canadian MUs and setting the corresponding ER caps for both parties. In 2018, based on the results of the science advice and recommendations from a domestic consultation process, Canada updated the PST management approach based on the status of the Interior Fraser River (IFR) Coho MU using an integration of marine survival rates (with breakpoints at 3% and 6%) and spawner abundance. Under this approach, ER caps will be set at 20%, 30% and 45% for Low, Moderate and Abundant status, respectively. Canada will be required to confirm the status of Interior Fraser River Coho MU in March of each year. Additional background information as well as a summary report from domestic consultations may be found here: http://www.pac.dfo-mpo.gc.ca/consultation/smon/pst-coho-tsp/index-eng.html

Table 6.6-1: Pacific Salmon Treaty Low, Moderate and Abundant status determination criteria and exploitation rate caps for the Interior Fraser River Coho Management Unit.

	Low	Moderate	Abundant
Survival	S <= 0.03	Three consecutive years 0.03 < S <= 0.06	Three consecutive years S > 0.06
		AND	AND
Escapement	Monitored in CUs and subpopulations but no thresholds	Three consecutive years: • Half of subpopulations in each CU > 1000; or • Aggregate MU escapement objective (e.g., 27,000)	Three consecutive years: • All IFR Coho subpopulations in each CU > 1000; or • Aggregate MU escapement objective (e.g., revised 40,000)
ER cap (US/Can)	**0.20** (0.10/0.10)	**0.30** (0.12/0.18)	**0.45** (0.15/0.30)

In addition, Canada or the U.S. may choose to manage to a lower ER based on domestic fisheries management considerations as has been done domestically for Coho in previous years (domestically this has been an ER cap of 3% to 5%). Domestic management decisions will be discussed through the annual process to develop the Integrated Fisheries Management Plans (IFMPs).

For 2021, Interior Fraser River Coho will remain in the Low status zone, which would permit Canada and the United States to manage up to a 20% exploitation rate (with a cap of 10% for each party) under the PST. The Department is planning a precautionary approach to management of Southern BC fisheries, with management measures similar to those in place prior to 2014. Under this approach, fisheries impacts would be limited to incidental, bycatch or release mortalities in most areas and in recent years this was expected to result in a 3% to 5% Canadian domestic exploitation rate.

Details on management measure considerations can be found in Section 13.3.2.

Management measures to protect Interior Fraser River Coho will be applied from May to September when these populations are expected to be encountered in Southern BC waters. These measures are also expected to limit impacts on other Coho populations in Southern BC, including Lower Fraser River Coho and Strait of Georgia Coho populations.

Management measures may be considered for fisheries in the following areas and times to limit overall impacts on Interior Fraser Coho consistent with annual management objectives:

West Coast Vancouver Island (WCVI) troll (commercial and First Nations) and recreational fisheries in offshore areas from late May until early September,

Commercial net and recreational fisheries in the Juan de Fuca Strait from June until early October,

Commercial, recreational and First Nations fisheries in Johnstone and Queen Charlotte Straits from early June until mid-September,

Commercial, recreational and First Nations fisheries in the Strait of Georgia from June until early October,

Commercial, recreational and First Nations fisheries both off the mouth of, and in, the Fraser River from early September until mid-October, and

Commercial, recreational and First Nations fisheries in the Fraser River upstream of Sawmill Creek from mid- to late September until late October.

For planning purposes, Interior Fraser Coho fishing mortality is estimated pre-season using a series of models that integrate assumptions about anticipated Coho encounters, fishing effort levels, an estimate of the proportion of Interior Fraser River Coho stocks within the total encounters based on past data, and an average release mortality rate. A post-season estimate of exploitation rate is developed from the same models but using any actual information on encounter rates and fishing effort collected during the fishing season. These models are expected to undergo further review by CSAS but work is not yet complete.

6.7 CULTUS LAKE SOCKEYE

Cultus Lake Sockeye will be managed within the constraints of the exploitation rate identified for the Late Run aggregate. The maximum allowable exploitation rate for Cultus Lake Sockeye will be the greater of a) the low abundance exploitation rate (LAER) identified for Late Run Sockeye, or b) the exploitation rate that is consistent with continued rebuilding of the population based on in-season information on returns and potential numbers of effective spawners. The exploitation rate on Cultus Lake Sockeye is intended to allow for

fisheries on more abundant co-migrating stocks or species while allowing for the Cultus population to increase in abundance. For Late Run Sockeye, management will be based on an abundance-based Total Allowable Mortality (TAM) and the low abundance exploitation rate (LAER) as outlined in the Fraser Sockeye escapement plan; see Section 13 – Southern Sockeye Salmon Fishing Plan (13.5) under the Fraser Sockeye section.

The recovery objectives as outlined in the National Conservation Strategy for Cultus Lake Sockeye Salmon (Oncorhynchus nerka) (Cultus Lake Sockeye Recovery Team, 2009) are as follows:

Objective 1

Ensure the genetic integrity of the population by exceeding a four year arithmetic mean of 1,000 successful adult spawners with no fewer than 500 successful adult spawners on any one cycle.

Objective 2

Ensure growth of the successful adult spawner population for each generation (that is, across four years relative to the previous four years), and on each cycle (relative to its brood year) for not less than three out of four consecutive years.

Objective 3

Rebuild the population to the level of abundance at which it can be de-listed (i.e., designated Not at Risk) by COSEWIC.

Objective 4

Over the long term, rebuild the population to a level of abundance (beyond that of Objective 3) that will support ecosystem function and sustainable use.

Objective 1 secures genetic variability, Objective 2 ensures the population is growing, and Objective 3 achieves de-listing by COSEWIC – the change in designation from *Endangered* to *Not at Risk*. Once the population is de-listed, conservation objectives should be consistent with (i.e., not less than) those specified for other Sockeye populations. Objective 4 proposes candidate benchmarks that correspond to our current understanding of the dynamics of Cultus Sockeye.

The full conservation strategy is online at:
http://publications.gc.ca/collections/collection_2010/mpo-dfo/Fs97-6-2846-eng.pdf.

Cultus Lake Sockeye is a component of the Late Run Fraser River Sockeye aggregate which is typically harvested in southern BC waters in August and September.

The returns of Sockeye salmon to Cultus Lake have been particularly low relative to historic averages. To work toward rebuilding this population, Late Run Sockeye fishery management

actions were implemented to reduce fishery exploitation levels on this stock. Enhancement measures have included fry and smolt releases as well as a captive brood program. The captive brood program reared fish from brood years 2000 to 2009, at which time the program was phased out – the last progeny of captive brood fish were released in October, 2014. A hatchery supplementation program continues. Total juvenile releases have been reduced to approximately 30% of levels achieved during the captive breeding program years. Freshwater measures in the past have included: predator control (removal of adult northern pikeminnow in Cultus Lake), removal of Eurasian watermilfoil and various research that includes spawning habitat quality assessments, limnology and fry surveys, contaminant assessment, etc. An overview on the recovery activities and the status of Cultus Lake Sockeye to 2009 can be found in the Status of Cultus Lake Sockeye Salmon (Bradford et al., 2010), available on-line at: http://publications.gc.ca/site/eng/404118/publication.html

All Canadian fisheries that could harvest Cultus Lake Sockeye will be impacted by the need to limit exploitation on this stock. This includes:

Closures in all fisheries with the possibility of impacting Cultus or Late Run fish when harvest limits for this stock group have been reached.

Restrictions to First Nations fisheries in Queen Charlotte and Johnstone Strait, Strait of Georgia, Strait of Juan de Fuca, West Coast of Vancouver Island and the lower Fraser River, downstream of the Vedder River. However, where surpluses are identified, first priority will be accorded to First Nations for opportunities to harvest fish for FSC purposes.

Restrictions to recreational salmon fisheries in southern BC will include Sockeye non-retention in specific locations when Cultus Lake Sockeye are present and allowable harvest limits have been reached.

Closures to commercial salmon fisheries in southern BC when Late Run Sockeye are present, or expected to be present, in the area as it will not likely be possible to identify the run size of Cultus Lake Sockeye in-season due to relative low abundances of Cultus Lake Sockeye compared to other co-migrating Sockeye stocks. These closures will come into effect when allowable harvest limits for this stock group have been reached. Fisheries directed at other stocks or species of salmon will be subject to Late Run/Cultus constraints.

Recovery Potential Assessments for Fraser Sockeye, including for Cultus Lake Sockeye, are publicly available through the Canadian Science Advisory Secretariat website (http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2020/2020_011-eng.html).

Several lines of research have been undertaken to increase our understanding of the impacts of human activities on the Cultus Lake ecosystem and to monitor the status of Cultus Lake Sockeye salmon. Beginning with the 2013 brood year (i.e., 2014 fry release); enhancement activities to supplement juvenile production have been implemented at lower levels compared to the captive brood program years.

Release targets for the enhancement program are approximately 20,000 fed fry (summer) into the Lake, 150,000 fed fry (fall) into the Lake, and 50,000 smolts (spring) into Sweltzer Creek near the outlet of Cultus Lake.

Within the Fraser River upstream of the Fraser/Vedder confluence, recreational and First Nations fisheries for Fraser Sockeye during Cultus migration timing will be managed based on Late Run constraints as Cultus Lake Sockeye have exited the Fraser River.

For harvest constraints on the Late Run Sockeye stock group aggregate refer to Fraser Sockeye section of Section 13 – Southern Sockeye Salmon Fishing Plan (13.5).

6.8 SAKINAW LAKE SOCKEYE

The objective for Sakinaw Lake Sockeye is to stop their decline and re-establish a self-sustaining, naturally spawning population.

Sakinaw Sockeye was first assessed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in an emergency assessment in 2002. This designation has been confirmed by several subsequent assessments, the latest being in 2016 due to continued threats from fishing, development around the lake, and low marine survival. Sakinaw Sockeye is currently under consideration for inclusion on Schedule 1 of the *Species at Risk Act* (SARA).

Following the previous emergency assessments of Sakinaw Sockeye Salmon, the Governor in Council decided not to add Sakinaw Sockeye Salmon to the List of Wildlife Species at Risk set out in Schedule 1 of SARA. Although Sakinaw Sockeye Salmon was not listed, a recovery team was engaged to establish recovery goals and actions for Sakinaw Sockeye Salmon. An immediate recovery goal was to stop the decline of the Sakinaw Lake Sockeye Salmon population and re-establish a self-sustaining, naturally spawning population. This objective will not be achieved until spawner abundance relative to previous brood years increases for at least 3 out of 4 consecutive years and there are no fewer than 500 natural spawners annually.

To maximize chances in achieving this objective, a captive brood stock program designed to maintain genetic integrity and minimize inbreeding was initiated in 2001. The captive brood program involves variable release strategies, which not only encompass varying releases by

age/size, but also exploring the option of different release locations. Achieving this objective also meant that mortality, including fishing mortality, needed to be minimized, as much as practicable.

Sakinaw Lake is located on the Sechelt Peninsula in the Strait of Georgia. Migration timing data on Sakinaw Lake Sockeye is limited. Current data suggests Sakinaw Lake Sockeye have a prolonged migration period commencing in Johnstone Strait in late May to July and arriving at the entrance to Sakinaw Lake in northern Strait of Georgia in July and August. Given this timing pattern, Sakinaw Lake Sockeye are most vulnerable to harvest directed at Fraser River Sockeye stocks in July extending into mid-August.

Most fisheries that have the potential to intercept Sakinaw Lake Sockeye will continue to be delayed until the last week of July or mid-August to ensure a significant portion of the return has passed through major fisheries in Johnstone Strait and the northern Strait of Georgia. The current fishery management measures include:

- First Nations FSC fisheries in Johnstone Strait will be restricted to gill net and troll only until July 25 and until August 15 in the northern Strait of Georgia.
- Recreational fisheries in Queen Charlotte Strait, Johnstone Strait, and northern Strait of Georgia will be closed to Sockeye retention until July 25. In addition, there will be Sockeye non-retention restrictions in Area 16 until August 15 at which time Sockeye retention opportunities are expected to be available in Sabine Channel.
- Commercial fisheries in Queen Charlotte Strait and Johnstone Strait will be closed until July 25 and in the northern Strait of Georgia (including Sabine Channel) until August 15.
- The waters near the mouth of Sakinaw Creek in Area 16 will be closed to all fishing from June 15 to September 15.

Recovery planning efforts to rebuild this stock will continue to be supported. In addition to harvest related measures, there will be continued efforts made to study and improve habitat, investigate impacts of predation (seals, otters, and lamprey), and undertake enhancement. Eggs are incubated in nearby hatchery facilities and the resulting fry are adipose clipped and released in the lake. The captive brood program will continue as a form of insurance to reduce the possibility of extirpation.

In 2020, 85 adult Sockeye returned to Sakinaw Lake from 45,302 smolts that left in 2018. Of the returning adults, 37 were natural origin, which is above the 2020 forecast of 10 natural origin adults. While the values of marine survival have showed a slight increase since 2016 ocean

entry, the 2018 cohort survival estimates for hatchery and natural origin Sockeye are still very low at 0.14% and 0.31%, respectively.

Expectations for 2021 are for another low return considering 85,011 smolts were enumerated in 2019 (10 year average is 88k). If marine survival remains low for the 2019 ocean entry year, 83 adults are forecast to return in 2021. If marine survival continues to increase, this forecast could be exceeded and positive returns could also be seen in 2022, as the number of smolts enumerated in 2020 increased significantly to 205,644 (further details can be found in Section 9.1.7).

6.9 NIMPKISH SOCKEYE

The objective is to minimize the impact of Canadian fisheries during periods of low abundance.

The Nimpkish River has generally experienced low Sockeye escapements since the early 1990s similar to other Central Coast Sockeye stocks (Smith and Rivers Inlet) likely attributed mainly to declines in marine survival. Since 2010, returns continued to show improvement over the prior years with consistently above average returns until 2017. The Sockeye escapement estimate in 2017 (30,000) was a below average return. Returns in 2018 (~84,000) and 2019 (~60,000) were an improvement over 2017 but both years demonstrated declines relative to the parental brood years. In 2020, estimated escapement (~25,000) to the Nimpkish was well below average continuing the pattern of declines relative to brood returns in 2016 and 2015 (74,000 and 97,000, respectively). The escapement target for Nimpkish Sockeye is currently under review, but the optimum based on lake capacity and fertilization ranges from 260,000-290,000.

Nimpkish Sockeye are encountered in Queen Charlotte Strait and Queen Charlotte Sound typically during June and July. In order to protect this stock, time and area closures may be implemented for First Nations, commercial, and recreational fisheries in the approach waters to the Nimpkish River (including the river). Other than test fisheries, marine waters north of Lewis Point on Vancouver Island (Subareas 11-1, 11-2 & 12-5 to 12-19) are scheduled to be closed to Sockeye retention in all fisheries until late July. However, marine waters north of Lewis Point may open to Sockeye retention in marine FSC fisheries prior to late July if in-season abundance of Nimpkish Sockeye is higher than expected and no other weak stock constraints exist. If in-season abundance permits, some First Nations FSC harvest may also occur within the Nimpkish River.

The Department is continuing to work in partnership with the Namgis First Nation on an in-season assessment program in the lower river and some FSC harvest may occur in response to returning abundance.

At this time, no directed commercial or recreational fisheries are anticipated for Nimpkish Sockeye.

6.10 INTERIOR FRASER RIVER STEELHEAD

Spawning escapement of Interior Fraser River (Thompson and Chilcotin) Steelhead has been on a downward trend for many years, with recent years' escapements reaching the lowest on record. In February 2018, COSEWIC assessed the Thompson and Chilcotin Designatable Units (DUs) as *Endangered*. Threats to Interior Fraser River (IFR) Steelhead include changes in the marine environment, fishing mortality (both targeted and incidental), degradation of freshwater and marine habitats, predation, and competition. The subsequent SARA Listing Process was concluded on July 11, 2019, when the Minister of Fisheries announced that Cabinet had decided not to list these populations under the *Species at Risk Act*, opting instead to implement measures to recover these stocks through existing regulatory mechanisms under the *Fisheries Act*. In conjunction with the Province of British Columbia, the Minister announced the development of a conservation action plan for Thompson and Chilcotin Steelhead Trout to:

- reduce mortality and increase survival of Thompson and Chilcotin Steelhead returning to rivers to spawn;
- improve freshwater conditions through habitat protection and restoration; and,
- increase science and monitoring activities.

2021 Fisheries Management Measures to Support Recovery of Steelhead

In the coming year, DFO will protect IFR Steelhead from incidental fishing mortality occurring in salmon fisheries using the window closure approach implemented in 2019, with additional restrictions applied to set gillnet fisheries in the Fraser River. Moving window closures will apply to most salmon fisheries located along the migratory route of Thompson and Chilcotin River Steelhead, including Southern BC marine waters and the Fraser River and tributaries downstream of Thompson and Chilcotin River Steelhead spawning areas.

- The closure window for commercial gillnet and seine fisheries (including purse seine, beach seine, and shallow seine gear) is 42 days, while commercial troll fisheries will be closed for 27 days. Following the closure window, set gillnet gear will be further restricted to operate during daylight hours only, while attended by a harvester at all times.
- Recreational salmon fisheries within the Fraser River and tributaries (including areas immediately off the Fraser River mouth), are closed for a moving window period of 42 days.

- First Nations' Food, Social, and Ceremonial (FSC) salmon fisheries occurring within the Fraser River and tributaries downstream of Thompson and Chilcotin River Steelhead spawning areas are closed for a 27-day moving window. Following the closure window, set gillnet gear will be further restricted to operate during daylight hours only, while attended by a harvester at all times.
- Marine recreational and marine FSC salmon fisheries remain open with a requirement for Steelhead release.
- Any salmon fisheries occurring in terminal areas that are not considered to overlap with the migratory pathway of Thompson and Chilcotin Steelhead will not be subject to these closures.

Details of closure dates and areas that will be implemented in 2021 are outlined in Appendix 9, and details are provided for all affected fisheries in Section 13. Appendix 9 also contains a list of terminal fishing areas that are proposed to be exempted from the moving window closures in 2021, as they are not considered to be within the probable migratory route for returning IFR River Steelhead.

The responsibility for conservation and recovery of IFR Steelhead is shared with the Province of British Columbia. The Government of Canada and the Province of British Columbia are committed to working collaboratively to address threats, reduce fish mortality, and promote growth for these populations. In 2021, the Province of British Columbia will continue to implement measures to limit impacts of provincially-managed recreational trout fisheries on Thompson and Chilcotin Steelhead. Additional actions to be taken by the Province to support recovery of these populations are being developed in conjunction with DFO, as part of the Joint Steelhead Action Plan.

6.11 NIMPKISH CHUM

Objective: To rebuild this Chum Salmon population from the serious declines encountered in recent years through an evaluation of limiting factors and the development of a recovery plan.

The Nimpkish River has seen a steady decline in abundance of Chum since 1996. Initial observations indicated the decline perpetuated through that 4-year brood cycle (2000, 2004) and in more recent years other cycle lines have been affected. Currently DFO, in collaboration with 'Namgis First Nation, are developing a recovery plan for this population. This will include an assessment of limiting factors/threats associated with this population and an evaluation of various gaps in our understanding of the productivity of this stock. Ongoing supplementation through enhancement activities is a major component of this recovery.

Based on the late migration timing of Nimpkish Chum (peak in river by mid to late November), it is assumed that the impact from Inner South Coast Fall Chum fisheries would very low.

At this time, no directed commercial or recreational fisheries are anticipated for Nimpkish Chum.

7 GENERAL DECISION GUIDELINES, ACCESS AND ALLOCATION

The Minister can — for reasons of conservation or for any other valid reasons — modify access, allocations, and sharing arrangements as outlined in this IFMP in accordance with the powers granted pursuant to the *Fisheries Act*.

7.1 ACCESS AND ALLOCATION OBJECTIVES

7.1.1 INTERNATIONAL OBJECTIVES

The objective is to manage Canadian treaty fisheries to ensure that obligations within the Pacific Salmon Treaty (PST) are achieved. As of January 1, 2019, treaty fisheries were managed in accordance with new amendments under the PST, which were being provisionally applied until the treaty formally entered into force as of May 3, 2019.

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 Southern and Fraser Panels of the PSC and those results are published post-season.

7.1.2 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: https://waves-vagues.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 7.2.

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

7.2 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 7.2-1: Allocation guidelines

	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.

7.2.1 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 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.

7.2.2 RIGHT-BASED SALE ACCESS

Within the 2018 BC Supreme Court Ahousaht decision, the application of *An Allocation Policy for Pacific Salmon* (SAP) was found to be an unjustified infringement of the five Nuu-chah-nulth Nations' (Ahousaht, Ehattesaht/ Chinekint, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht) Aboriginal rights to fish and sell fish insofar as it accorded 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 Multi-species Fisheries Management Plan (FMP) for the Five Nations, which addresses the right to sell fish. Rather than designing a process limited to addressing the Court's findings in Ahousaht, DFO has initiated a comprehensive process to review and replace the SAP (1999). For further information see the 2021/22 FMP at: https://waves-vagues.dfo-mpo.gc.ca/Library/40953798.pdf.

7.2.3 TEST FISHERIES

DFO uses a range of methodologies to determine in-season stock abundance and composition. Test fisheries play an essential role in providing information to support in-season abundance estimation, driving determination of TACs and ensuring that conservation objectives are met in fisheries management. From 2007 to 2012, $58 million (Larocque Relief Funding) was provided to support the test fishery programs. In 2012, an amendment to the *Fisheries Act* granted the Minister the authority to allocate fish for financing purposes. To implement this authority, DFO adopted a two-track approach.

Track one included a transition where feasible for existing projects previously funded by Larocque relief funding to the new use-of-fish authority for a period starting April 1, 2013 pending completion of Track two.

Track two included the development of a national policy framework to provide a standardized, rigorous, and transparent process for all existing and new project evaluations and approvals.

The draft National Policy for Allocating Fish for Financing Purposes has been implemented since 2013 and the Policy has recently been finalized.

Table 7.2-2 outlines the potential Southern BC salmon test fisheries for 2021. These include: Fraser Panel projects for Fraser River Sockeye, Albion Chinook/Chum gill net, Johnstone Strait Chum seine, and Barkley Sound Sockeye/Chinook seine. For 2021, a final Fraser Sockeye and Pink test fishing plan will be confirmed by the Fraser River Panel prior to the start of the season. Test fisheries and dates in this table may change pre-season. Actual test fishing dates may change in-season based on assessments of abundance and return timing.

The Department plans to continue the Chinook assessment fishery on the Mᵠuqᵂin / Brooks Peninsula beginning in mid-July.

While an objective of the use-of-fish arrangements is for fish revenues to address program costs, in a number of cases since 2013, low salmon stock abundance has curtailed test fish revenues, and alternative funding arrangements to support programs have been pursued.

In 2019, the Pacific Salmon Commission Southern Boundary Restoration and Enhancement Fund approved a DFO proposal to conduct a gill net calibration study for the Round Island test fishery. The objectives of the study are to compare trends in selectivity, catchability, and catch composition between the current 60 mesh multi-strand gill net and a 90 mesh Alaska Twist gill net. The four-year study started in 2019 with the outcome to replace the current multi-strand gill net with the Alaska Twist gill net after calibrating the catchabilities for the Alaska Twist net based on the historical catchabilities with the multi-strand net.

Table 7.2-2: Potential 2021 Test Fisheries*

Test Fisheries, Southern B.C. Salmon	**Proposed Proponent**	**Test Fishery Purpose**	**Proposed dates[a]**		**Advisory process[b]**
			Start	End	
Area 20 GN	PSC Secr.	Fraser Sockeye	11-Jul	11-Aug	Fraser Panel (primary) FN Fr. Forum[c]/IHPC
Area 20 SN	PSC Secr.	Fraser Sockeye and Pink	25-Jul	07-Sep	Fraser Panel (primary) FN Fr. Forum[c]/IHPC

Test Fisheries, Southern B.C. Salmon	Proposed Proponent	Test Fishery Purpose	Proposed dates[a]		Advisory process[b]
Cottonwood GN	PSC Secr.	Fraser Sockeye	12-Jul	10-Sep	Fraser Panel (primary) FN Fr. Forum[c]/IHPC
Whonnock GN	PSC Secr.	Fraser Sockeye	28-Jun	30- Sep	Fraser Panel (primary) FN Fr. Forum[c]/IHPC
Area 12 SN	A-Tlegay/Namgis	Fraser Sockeye and Pink	24-Jul	06-Sep	Fraser Panel (primary) FN Fr. Forum[c]/IHPC
Area 13 SN	A-Tlegay/Namgis	Fraser Sockeye and Pink	31-Jul	13-Aug	Fraser Panel (primary) FN Fr. Forum[c]/IHPC
Area 12 GN (Round Island)	A-Tlegay/Namgis	Fraser Sockeye	09-Jul	09-Aug	Fraser Panel (primary) FN Fr. Forum[c]/IHPC
Area 4B, 5, GN	PSC Secr.	Fraser Sockeye	*Not Scheduled*	*Not Scheduled*	Fraser Panel (primary) FN Fr. Forum[c]/IHPC
Area 7 Reefnet[d]	PSC Secr.	Fraser Sockeye	*10 Observation Days*	*10 Observation Days*	Fraser Panel (primary) FN Fr. Forum[c]/IHPC
Qualark	PSC Secr.	Fraser Sockeye	02-Jul	02-Oct	Fraser Panel (primary) FN Fr. Forum[c]/IHPC
Albion GN	3-way transitional[e]	Fraser Chinook/ Chum	18-Apr	23-Nov	FN Fr. Forum[c]/IHPC
Barkley Sound SN	Hupacasath/ Tseshaht	Somass Sockeye	Late May	Early Aug	A23 Round Table (primary)/IHPC
Mquq^{W}in/ Brooks Peninsula	Kyuquot Checkleset	WCVI Chinook	Mid July	Early Sep	WCVI FNs/Area G/ IHPC

Test Fisheries, Southern B.C. Salmon	Proposed Proponent	Test Fishery Purpose	Proposed dates[a]		Advisory process[b]
Area 12 SN	A-Tlegay/Namgis	Chum	13-Sep	03-Nov	Fraser Panel (primary) FN Fr. Forum[c]/IHPC/Chum Working Group

[*] For 2021, a final Fraser Sockeye and Pink test fishing plan will be confirmed by the Fraser River Panel prior to the start of the season. Test fisheries and dates in this table may change.

[a] All dates subject to change based on in-season factors. In-season information from initial TFs important to determining timing of subsequent TFs.
[b] Advisory process (es) where detailed discussion of test fisheries occurs. This does not preclude discussion and input happening through other process.
[c] FN Fr. Forum = First Nations Forum on Conservation and Harvest Planning
[d] Dates reflect a "potential window of operation", not a start and end date.

[e] 3-way arrangement between proponent, DFO and test fisherman

Salmon Test Fisheries - Pacific Region Webpage:

https://www.pac.dfo-mpo.gc.ca/pacific-smon-pacifique/science/research-recherche/testfishery-pechedessai-eng.html

DFO will work in close collaboration with resource users to ensure that the fisheries data collections necessary to set TACs and ensure conservation will continue to be undertaken.

7.2.4 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 five-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.

7.2.5 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.

Please see Section 13– Species Specific Salmon Fishing Plans for the commercial allocation plan with shares by species, fleet, and fishery production area. 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. Appendix 6 provides further information on updates to commercial sharing arrangements.

When one commercial gear type is unlikely to achieve its allocation, the usual approach will be that the same gear type, but in a different area, will be provided opportunities to harvest the uncaught balance.

Allocation targets are not catch targets for each sector. While the Department will usually plan and implement fisheries to harvest fish in accordance with allocation targets, opportunities may be provided that are inconsistent with the allocation targets. For example, in the case of Late Run Fraser River Sockeye, the Department may choose to close marine fisheries (seine, gill net, and troll) and open river fisheries (gill net) to take advantage of a low abundance of Cultus or Late Run Sockeye and a significantly larger run size of Summer Run Sockeye.

7.2.6 FIRST NATIONS ECONOMIC OPPORTUNITY AND CSAF AND INLAND DEMONSTRATION FISHERIES

The Allocation Transfer Program (ATP) facilitates the voluntary retirement of commercial licences and the issuance of licences to eligible First Nation groups in a manner that does not add to the existing fishing effort on the resource, thereby providing First Nation groups with employment, income, and increasing participation in commercial fisheries as part of relationship-building with the Department. First Nations' economic opportunities are managed under the same allocation guidelines as commercial fisheries under *An Allocation Policy for Pacific Salmon.*

Since 1994–95, when the ATP was first launched and including PICFI, 502 commercial licences have been relinquished for First Nation groups. For a more detailed description of First Nations' commercial fishing opportunities please refer to Section 13 — Species Specific Salmon Fishing Plans.

7.2.7 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, unanticipated differences in in-season run size estimates, and mixed-stock concerns can result in escapement to terminal areas that are in excess of their required habitat or hatchery spawning 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, which authorizes the sale of the surplus.

7.3 GENERAL DECISION GUIDELINES

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 are described in Section 13 — Species Specific Salmon Fishing Plans.

7.3.1 PRE-SEASON PLANNING

Development of decision guidelines is part of the pre-season planning process. Development is guided by relevant departmental policies, scientific advice, consultation with First Nations, commercial and recreational harvesters, and other interests, and the experience of fishery managers and stock assessment staff.

Pre-season decisions include the development of escapement targets, exploitation rate limits, sector allocations, and enforcement objectives.

7.3.2 IN-SEASON DECISIONS

In-season decision 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 closing of fisheries, level of effort deemed acceptable, gear type restrictions, deployment of special projects, etc.

Where possible, in-season decisions will be consistent with guidelines established pre-season; 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, and the availability and timeliness of in-season information.

7.3.3 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.

7.3.4 POST-RELEASE MORTALITY RATES USED TO ACCESS FRIMS

The salmon conservation and fisheries management measures in this IFMP are based on many considerations, including estimates of the mortality rates of salmon that are released from the various types of fishing gear that are used in commercial, recreational, and First Nations fisheries. Post-release mortality rates can vary substantially and depend on many factors, including the location of the fishery, the unique characteristics of each type of fishing gear and

method, and the species of salmon that is captured and released. In April 2001 DFO announced revisions to the post-release mortality rates that had been used by DFO in previous years. The mortality rates applied by DFO to each gear type and fishery prior to 2001, and the revised rates announced by DFO in 2001 with some more recent revisions are summarized in Table 7.3-1. The revised rates reflected 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 including this salmon IFMP.

DFO will review the post-release mortality rates currently used for salmon fisheries in Canadian waters and update Table 7.3-1 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.

For post-season assessments of Chinook salmon, DFO uses the exploitation rates developed by the Pacific salmon Commission Chinook Technical Committee, which employs the mortality rates reported by the PSC (2007).

Table 7.3-1: Post-Release Mortality Rates

Fishery	Pre 2001 Post-Release Rates (for historical comparison)	Post 2001-Release Rates
First Nations Fisheries	Note: When using the same gear and methods noted 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

Fishery	Pre 2001 Post-Release Rates (for historical comparison)	Post 2001-Release Rates
Commercial tooth tangle net 3.5" mesh	n/a	10% Sockeye, 15% Coho

*Recent work by researchers from Carleton University, 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 indicates 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.

8 COMPLIANCE PLAN

8.1 COMPLIANCE AND ENFORCEMENT OBJECTIVES

CONSERVATION AND PROTECTION PROGRAM DESCRIPTION

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, stewardship and stakeholder 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.

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.

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 are being addressed. 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, WSP objectives, domestic and international objectives, First Nations, commercial and recreational objectives, allocation objectives, enhancement objectives, and 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 follow below:

9.1 2020/2021 POST SEASON REVIEW FOR STOCKS OF CONCERN

NOTE: The objectives shown in **bold** below is the wording from the previous year's Integrated Fisheries Management Plan.

9.1.1 LOWER STRAIT OF GEORGIA CHINOOK

2020/2021: The objective for Lower Strait of Georgia (LGS) Chinook was to continue rebuilding through a comprehensive set of fishery, hatchery, and habitat related actions.

The Cowichan River is the primary indicator of marine survival and exploitation for the LGS fall Chinook.

In 2020, Chinook returns to the Cowichan River were well above target, continuing the upward trend since the low point in 2009, see Section 6.1 for more information. The estimated return was 24,838 (all ages) including 147 collected for Cowichan River Hatchery brood. Approximately 59% of the natural spawners (14,597) were estimated to be age 2+ ('jacks') while age 4 fish represented the second largest portion of the escapement at 6,223. Hatchery production present in the return was estimated at 15.6% using adipose clip rates at Skutz falls, due to low visibility at the fence in 2020. This level of return is in the WSP Green zone. The upper WSP abundance benchmark (S_{msy}: spawners at maximum sustained yield) is 6,500 adults and the lower benchmark (S_{gen}: spawners required to get to S_{msy} within 1 cycle) is approximately

1,300 Chinook. With an estimate of 8,849 adult natural spawners, this is the fifth consecutive year since 1997 that the total adult natural spawner abundance was above the S_{msy}.

For the Cowichan indicator stock, the most recent 5 year (2016-2020) average total fishery mortality (CYER) is 51.3% (range 21.1%-73.2%) including an average of 44.3 (range 18.7%-67.2%) in Canadian ocean fisheries Cowichan Chinook are regularly caught in rivers other than the Cowichan River.

The escapement estimate for Nanaimo River fall run Chinook return in 2020 was 4,046 adults which is an improvement over recent years. A high rate of pre-spawn mortality occurred in 2016 due to ich but was not observed in the last four years. In addition, 722 summer run Chinook were observed returning to the upper river, including 634 adults and 88jacks. Pre-spawn removals were 57% of the total summer return, with 64 removed for brood stock and 344 from unexplained removals.

9.1.2 WEST COAST OF VANCOUVER ISLAND (WCVI) CHINOOK

2020/2021: The objective for West Coast of Vancouver Island (WCVI) Chinook was to manage Canadian ocean fisheries (specified below) to an exploitation rate of 10%. The objective for North Coast Chinook was to manage in accordance with the allocation policy, and to manage the northern troll fishery to a WCVI Chinook exploitation rate of 3.2%.

Management actions continued in 2020 for WCVI Chinook. Exploitation rates are determined post-season from Coded Wire Tag (CWT) data gathered from these fisheries. The exploitation rate limit includes Chinook kept, as well as an estimate of fishing related mortalities of released fish.

The time and area management actions for the WCVI troll fishery are designed to maintain negligible impact on returning natural WCVI Chinook stocks. The WCVI troll fishery was restricted to 5 nautical miles offshore in PFMA's 123-126 and 2 nautical miles offshore in Area 127 during the time when WCVI stocks are returning to their natal streams.

Changes to the management of the recreational fishery within the 1 nautical mile management corridor were implemented in 2016 and have continued since, changing from size limit management to a network or open or closed areas. In more terminal inshore areas, conservation measures included a combination of maximum size limits, Chinook non-retention areas and finfish closures depending on the level of concern for local stocks. Fraser Chinook conservation measures in 2020 will have likely reduced harvest pressure in non-terminal interception areas.

2020 WCVI Chinook exploitation rates estimated by CWT are as follows: Northern troll fishery - 2.2%, Haida Gwaii recreational fishery – 1.5%, WCVI Troll fishery – 0.3%, and the WCVI recreational fishery – 1.6% for a total of 5.7%.

9.1.3 FRASER RIVER SPRING 4_2 CHINOOK

2020/2021: The objective for Fraser Spring 4_2 Chinook was to manage Canadian fisheries in a highly precautionary manner to allow as many fish to pass through to the spawning grounds as possible. This approach was expected to reduce overall Canadian fishery mortalities on these populations to very low levels approaching 5%.

Specific fishery management actions are implemented annually to protect the Spring 4_2 Chinook management unit. The evaluation of these actions is based, in part, on the exploitation rate analysis provided by fishery for CTC indicator stocks. This annual analysis uses coded-wire tag (CWT) recoveries from indicator stocks to represent the impacts on all stocks within the management unit. The CWT indicator stock for the Spring 4_2 management unit is Nicola River.

Table 9.1-1: Percent distribution of Nicola River Spring AEQ total fishing mortalities and escapement to represent unmarked fish, when recoveries with incomplete data were assumed to have been caught in a mark-selective fishery.

		AABM Fisheries						ISBM Fisheries																				
		SEAK		NBC		WCVI		Cdn. Ocean Sport					Cdn. Ocn[6]		Terminal Fraser River						US ISBM Fisheries			Escapement	Canadian Total Mortality	
Catch Year	Estimated # of CWTs	Troll	Net & Sport	Troll	Sport	Troll	Sport	Juan de Fuca[5]	Johnstone Strait	Strait of Georgia	WCVI	NBC	Cdn. Ocean Net[1]	Cdn. Ocean Troll[2]	Fraser Mainstem Sport	Shuswap Sport	Chilliwack Sport	Nicola/ Thompson Sport[5]	Comm. Net[4]	FN FSC[3,4]	Troll[5]	Net	Sport[5]	Escapement	Marine	All
1989	1348	0.0%	0.0%	0.4%	1.1%	1.0%	0.0%	7.2%	0.0%	5.5%	0.0%	0.0%	0.4%	0.0%	0.9%	0.0%	0.0%	1.4%	7.9%	4.2%	0.9%	1.0%	1.9%	65.9%	15.7%	30.0%
1990	292	0.0%	0.0%	0.0%	0.0%	4.5%	0.0%	2.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	0.0%	0.0%	10.9%	1.9%	11.8%	2.1%	0.0%	4.8%	57.9%	6.5%	33.6%
1991	1382	0.2%	0.5%	0.3%	0.2%	4.3%	0.0%	4.5%	0.4%	0.4%	0.0%	0.0%	0.6%	0.6%	2.8%	0.0%	0.0%	4.4%	4.0%	8.9%	0.9%	0.1%	2.0%	64.1%	11.1%	31.2%
1992	562	0.0%	0.0%	6.0%	0.0%	6.4%	0.2%	4.4%	2.0%	1.8%	0.0%	0.0%	0.9%	2.3%	0.7%	0.0%	0.0%	6.6%	0.6%	5.6%	5.7%	0.0%	5.9%	50.5%	24.0%	37.5%
1993	1223	0.0%	0.0%	3.1%	0.0%	6.1%	1.2%	2.0%	1.4%	3.3%	0.0%	0.0%	1.4%	0.0%	2.7%	0.0%	0.0%	2.6%	1.4%	8.2%	1.8%	0.0%	2.1%	62.7%	18.5%	33.4%
1994	2065	0.0%	0.0%	0.3%	0.0%	3.6%	0.4%	2.7%	0.0%	0.8%	0.0%	0.0%	0.2%	0.0%	0.5%	0.0%	0.0%	7.5%	0.1%	1.2%	0.3%	0.0%	0.0%	82.0%	8.1%	17.4%
1995	1873	0.0%	0.0%	0.2%	0.6%	1.4%	0.5%	1.5%	0.2%	1.4%	0.0%	0.0%	1.3%	0.0%	1.7%	0.0%	0.2%	1.8%	0.5%	2.9%	0.1%	0.0%	0.4%	85.2%	7.3%	14.3%
1996	76	0.0%	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%	15.2%	0.0%	0.0%	7.9%	73.7%	1.3%	18.4%
1997	216	0.0%	0.0%	0.0%	0.9%	0.0%	0.0%	5.1%	0.0%	0.0%	0.0%	0.0%	4.2%	0.0%	0.0%	0.0%	0.0%	6.5%	0.4%	1.5%	0.0%	0.0%	6.9%	74.5%	10.2%	18.5%
1998	412	0.0%	0.0%	0.0%	3.4%	0.0%	0.0%	1.2%	0.0%	1.5%	0.0%	0.0%	1.0%	0.0%	2.6%	0.0%	0.0%	14.6%	0.8%	9.4%	0.2%	0.0%	0.0%	65.3%	7.0%	34.5%
1999	2426	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.5%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	2.1%	0.0%	0.1%	0.0%	0.2%	6.6%	0.7%	0.0%	0.0%	89.3%	0.9%	10.0%
2000	1769	0.0%	0.0%	0.1%	1.9%	0.0%	0.0%	3.6%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	4.3%	0.4%	7.6%	0.1%	0.0%	0.0%	80.3%	6.3%	19.6%
2001	2270	0.0%	0.0%	0.1%	0.0%	0.2%	0.0%	3.4%	0.4%	0.3%	0.0%	0.0%	0.0%	0.0%	1.9%	0.0%	0.0%	2.4%	0.9%	5.8%	0.8%	0.0%	0.0%	83.6%	4.5%	15.6%
2002	2315	0.0%	0.0%	1.4%	0.3%	0.6%	0.0%	0.8%	0.0%	0.3%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.3%	2.2%	0.4%	3.6%	0.7%	0.0%	0.2%	88.9%	3.7%	10.1%
2003	1805	0.1%	0.0%	2.5%	0.0%	0.9%	0.6%	1.8%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	3.2%	0.0%	0.3%	3.3%	0.1%	0.5%	0.5%	0.0%	0.0%	85.2%	6.9%	14.2%
2004	439	0.0%	0.0%	2.1%	0.0%	2.1%	0.0%	1.4%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	22.0%	0.9%	0.0%	0.0%	67.7%	7.7%	31.4%
2005	413	0.0%	0.0%	1.5%	0.0%	3.9%	0.0%	3.6%	0.0%	3.1%	0.0%	0.0%	0.0%	0.0%	3.0%	0.0%	0.0%	11.8%	0.3%	14.2%	0.5%	0.0%	0.0%	58.1%	12.1%	41.4%
2006	433	0.0%	0.0%	1.6%	0.0%	1.8%	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	8.8%	0.4%	13.5%	0.5%	0.0%	0.7%	69.3%	6.2%	29.6%
2007	159	0.0%	0.0%	0.6%	0.6%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.6%	16.8%	0.4%	30.4%	1.9%	0.0%	0.0%	39.0%	6.9%	59.1%
2008	622	0.0%	0.0%	1.1%	0.6%	0.0%	0.0%	1.4%	0.0%	2.6%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	1.0%	2.4%	0.4%	11.0%	2.3%	0.5%	0.3%	76.2%	5.8%	20.7%
2009	295	0.3%	0.0%	1.7%	0.0%	0.0%	0.0%	8.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.7%	0.0%	0.0%	3.3%	0.6%	18.0%	3.7%	0.0%	2.4%	45.1%	9.8%	48.5%
2010	2324	0.4%	0.0%	1.4%	0.2%	0.0%	0.1%	0.6%	0.7%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	4.2%	0.8%	0.0%	0.5%	90.3%	3.4%	8.0%
2011	686	0.0%	0.0%	0.7%	0.1%	0.0%	0.4%	2.5%	0.7%	1.2%	0.0%	0.0%	0.0%	0.0%	2.5%	0.0%	0.0%	0.0%	0.3%	3.9%	2.8%	0.0%	1.5%	83.4%	5.7%	12.4%
2012	726	0.0%	0.0%	0.8%	0.7%	0.0%	0.0%	1.8%	1.5%	1.1%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.1%	0.6%	17.1%	8.0%	0.0%	0.7%	66.9%	5.9%	24.4%
2013	1459	0.0%	0.0%	1.0%	0.0%	0.3%	0.0%	3.5%	0.0%	1.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	1.9%	3.1%	0.0%	1.2%	87.5%	6.2%	8.3%
2014	438	0.0%	0.0%	0.0%	0.0%	1.8%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	1.0%	9.7%	1.8%	0.0%	0.5%	83.3%	2.7%	14.4%
2015	1552	0.0%	0.0%	0.4%	0.2%	0.3%	0.0%	2.6%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	10.0%	0.8%	0.2%	0.7%	82.9%	4.4%	15.3%
2016	973	0.2%	0.0%	1.6%	0.0%	1.0%	0.0%	7.6%	1.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	10.1%	1.1%	0.0%	0.0%	75.1%	12.7%	23.5%
2017	1085	0.0%	0.0%	0.9%	0.0%	1.2%	0.0%	1.8%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	7.6%	1.8%	0.0%	0.1%	84.8%	5.5%	13.4%
2018	924	0.0%	0.0%	0.0%	0.3%	1.0%	0.0%	3.1%	0.5%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	17.7%	1.4%	0.1%	0.9%	73.4%	6.1%	24.2%
2019	1276	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	2.0%	1.0%	0.0%	1.8%	93.7%	0.9%	3.4%
2020	1877	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	22.4%	0.2%	0.0%	0.6%	76.1%	0.0%	23.1%

Footnotes:

1. Canadian Ocean Net includes Juan de Fuca net, Johnstone Strait net, Northern net, Central net and WCVI net.
2. Canadian ocean troll includes Central and any other Canadian troll fisheries not listed.
3. Imputed CWT recoveries from Fraser Run Reconstructed catch, escapement CWT density, and 2015 relationship between recoveries based on CWT sampling and run reconstruction for 2000, 2005-2009.
4. The CWT data for all Fraser net fisheries was combined for the CTC CWT cohort analysis. The estimated CWT recoveries were used to prorate the CTC analysis into FN FSC and commercial categories for 2011-2020.
5. No adjustments have been made for any mark-selective fisheries.

6. Canadian marine FN FSC mortalities are incompletely represented.

The 2020 CTC spawner abundance for the aggregate was well below the S_{msy} reference point of 22,146. The preliminary escapement estimate for the aggregate is 8,500.

9.1.4 FRASER SPRING 5_2 AND SUMMER 5_2 CHINOOK

2020/2021: The objective for Fraser Spring and Summer (age 5_2) Chinook was to manage Canadian fisheries in a highly precautionary manner to allow as many fish to pass through to the spawning grounds as possible. This approach is expected to reduce overall Canadian fishery mortalities on these populations to very low levels approaching 5%.

The abundance of Spring and Summer 5_2 Chinook returning to the Fraser River is estimated in-season based on Chinook catch observed in the Albion test fishery. In 2020, updates of the predicted return were released in-season for information purposes only, as management measures were not planned to be updated in-season based on a zoned management approach given conservation concerns for Fraser River Spring and Summer 5_2 Chinook.

The post-season terminal run size estimate (based on outputs from the Fraser River Run Reconstruction model) for 2020 is 45,513 (21,034 Spring 5_2 and 24,479 Summer 5_2). Note that this value has not yet been adjusted to account for mortalities at the Big Bar landslide.

The preliminary 2020 CTC index of spawning escapement, as enumerated using various stock assessment techniques, is 30,00 (17,000 Spring 5_2 and 13,000 Summer 5_2). This value represents the escapement to a subset of the total number of populations, which are surveyed annually to provide a reliable index of the escapement for use by the Chinook Technical Committee of the Pacific Salmon Commission.

For 2019, fishery mortality indices for these populations were developed based on the Fraser River Run reconstruction and application of genetic stock identification (DNA) to marine catch and release data. Information for the 2020 fishery are not yet available. Estimates of CWT-based exploitation rates are not available for these populations as there is not a current CWT indicator for these management units.

9.1.5 INTERIOR FRASER RIVER COHO

2020/2021: The objective for Interior Fraser River Coho (including Thompson River Coho) was to manage Canadian fisheries in a highly precautionary manner with fisheries management measures similar to those in place prior to 2014. This approach is expected to achieve an overall Canadian exploitation rate within the 3 to 5 % range.

A preliminary spawning escapement estimate of Interior Fraser River Coho salmon for 2020 is 74,248, which is greater than the pre-season recruitment forecast of 39,223. The preliminary 3-year geometric mean spawner abundance for 2018-2020 is approximately 49,000, which is above the long-term conservation objective of 40,000 Interior Fraser River Coho. In relation to the Pacific Salmon Treaty reference points for Interior Fraser River Coho, the moderate aggregate MU escapement goal was met in each of 2018-2020; Preliminary estimates suggest IFR Coho marine survival continues to be less than 3%, however, which results in the MU remaining in Low status for 2021.

9.1.6 CULTUS LAKE SOCKEYE

2020/2021: For 2020, early planning and development of the IFMP through consultation processes identified the high likelihood that the short term minimum recovery objectives (1 and 2) for Cultus Lake Sockeye would not be met, due to the low pre-season forecast range and environmental factors. At run sizes for the entire range of the forecast level, the maximum allowable exploitation rate for Cultus Lake Sockeye would be limited to the low abundance exploitation rate (LAER) of 10% for a total sockeye return less than the p75 forecast and 20% at or above the p75 forecast. The exploitation rate on Cultus Lake Sockeye was intended to allow for fisheries on more abundant co-migrating stocks and species while planning fisheries to minimize impacts.

The Department consulted pre-season with First Nations and stakeholders on an updated management approach for Late Run and Cultus Lake Sockeye. Given the predicted low return of Late Run Sockeye, managing up to the LAER of 20% could help promote conservation while still providing for flexibility for fishing opportunities for First Nations, commercial and recreational fishers if returns were sufficient. In addition, Science provided preliminary advice regarding the status of Cultus Lake and the lake's inability to support production of wild Sockeye. Ultimately, due to extremely low returns, the Department decided to manage well below the LAER in order to help Sockeye reach the spawning grounds as possible and provide the best opportunity to reach brood targets.

Brood targets were defined by Science in conjunction with SEP. For the migration period, SEP attempted to retain the required number of adults to meet genetic integrity requirements while also allowing some Sockeye to migrate into the lake to spawn naturally.

The preliminary 2020 post-season exploitation rate estimate for Cultus Lake Sockeye is less than 1.0%. This estimate may change dependent on post season run size assessment evaluations. The preliminary escapement to the Sweltzer fence of 212 Cultus Lake Sockeye includes 111 through the fence plus an additional 101 retained for enhancement. The escapement to the fence was just approximately 8% of the brood year escapement of 2,606 (including brood stock).

9.1.7 SAKINAW LAKE SOCKEYE

2020/2021: The objective for Sakinaw Lake Sockeye was to stop their decline and re-establish a self-sustaining, naturally spawning population.

Less than two adult Sockeye returned to Sakinaw Lake, each year, over a four year period (2006-2009). Captive brood-based fry have been released to enhance Sakinaw Lake Sockeye since 2007. These second generation captive brood fish from Rosewall Hatchery were able to find the historic spawning beaches which had been cleaned and cleared of small debris in preparation for their arrival. Recent year escapements, hatchery fry releases, and the number of smolts counted out of the lake are highlighted in Table 9.1-1. The use of captive brood-based enhancement has prevented the extirpation of this stock in the wild; although, if current marine survival conditions continue, we will not reach the recovery objective in the near term.

In 2020, 85 adult Sockeye returned to Sakinaw Lake from 45,302 smolts that left in 2018. Of the returning adults, 37 were natural origin, which is above the 2020 forecast of 10 natural origin adults. While the values of marine survival have showed a slight increase since 2016 ocean entry, the 2018 cohort survival estimates for hatchery and natural origin Sockeye are still very low at 0.14% and 0.31%, respectively.

Expectations for 2021 are for another low return considering ~85,000 smolts were enumerated in 2019 (10 year average is 88k). If marine survival remains low for the 2019 ocean entry year, 4 natural origin adults are forecast to return in 2021. If marine survival continues to increase, this forecast could be exceeded and positive returns could also be seen in 2022, as the number of smolts enumerated in 2020 was 205,644.

Table 9.1-21: Recent year escapements, hatchery fry releases and smolts counted leaving Sakinaw Lake, by brood year.

Brood year	Adult escapement	Hatchery fry releases (brood year +1, X1000)	Smolts leaving the lake (brood year +2)		Predominant return year (brood year +4)
			Hatchery origin	Natural origin	
2013	114	320	16,465	632	2017
2014	452	645	78,156	722	2018
2015	695	329	30,088	4,783	2019
2016	171	256	33,442	11,860	2020
2017	12	530	83,928	1,083	2021
2018	3	555	205,664*		2022
2019	13	798			2023
2020	85				2024

* A large proportion of fry released in 2019 (Brood Year 2018) were not clipped and only 3 adults returned to spawn naturally. Therefore, all of the smolts leaving in 2020 are considered hatchery origin.

9.1.8 NIMPKISH SOCKEYE

2020/2021: The objective was to minimize the impact of Canadian fisheries during periods of low abundance.

Since 2015, DFO has worked in partnership with the 'Namgis First Nation on a lower river in-season assessment program for Nimpkish Sockeye. The objective of the program is to develop high quality estimates of Sockeye abundance entering the Nimpkish River to support in-season management of this stock. The program involves the installation of two deflection weirs in the lower river to concentrate the migration of Sockeye to areas that can be monitored and recorded using a DIDSON acoustic system. This assessment program continued in 2020.

In 2020, there were no directed First Nation FSC, commercial and recreational Fraser River Sockeye fisheries in Johnstone Strait and Queen Charlotte Strait that could encounter Nimpkish Sockeye. A small First Nations FSC harvest occurred on Sockeye in the Nimpkish River.

Results show escapements were ~25,000 Sockeye to the Nimpkish River in 2020.

9.1.9 INTERIOR FRASER RIVER STEELHEAD

Based on their migration timing, Interior Fraser River Steelhead are assumed to be encountered primarily in fisheries targeting Southern Chum, but also to some extent Late-run Fraser Sockeye, Fraser Pinks, and various Southern BC Chinook populations that return in the fall months. The aggregate run of Thompson, Chilcotin and other Interior Fraser River summer Steelhead stocks normally peak in Johnstone Strait and Juan de Fuca Strait in late September. The peak of the run in the lower Fraser River test fishing area near Fort Langley is in mid-October and the run normally extends through the month of October and into mid-November at that location.

Returns of Interior Fraser River Steelhead continued to be poor in 2020. Post-season spawning escapement estimates for the 2020 return (which spawn in the spring of 2021) are anticipated to be available from the Province of B.C. in June or July 2021. Recommended recovery targets for these populations are 938 for Thompson River population and from 562 to 744 for the Chilcotin River population. The time series of spawning escapement for Interior Fraser Steelhead from 1971 to 2020 (return migration years 1970 to 2019) is shown in Figure 9.1-1.

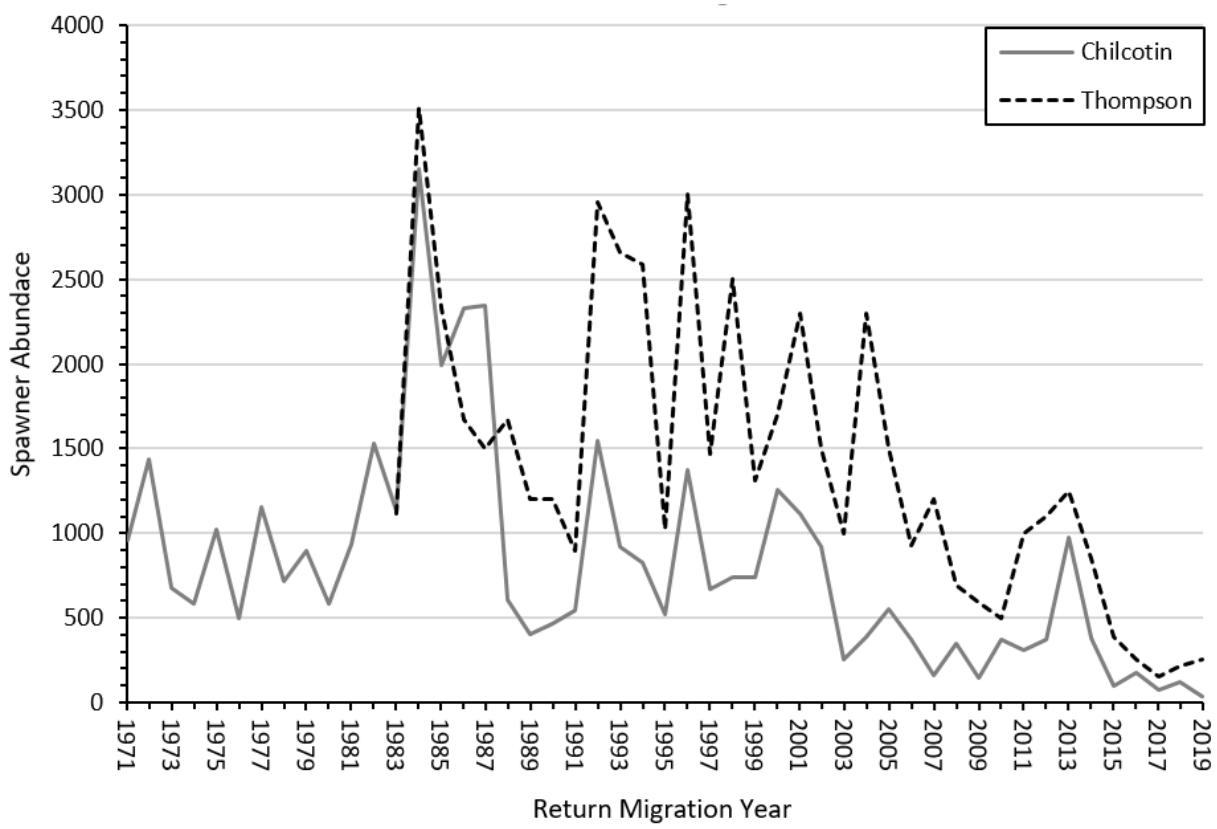


Figure 9.1-1: Historic trend of Interior Fraser River Steelhead spawner abundance*

*Note that Steelhead spawn in the spring following the year of their return migration. For example, Steelhead that migrated in 2017 did not spawn until the spring of 2018. Field programs that estimate the number of spawners are completed summer in the year following return migration.

9.1.10 INSHORE 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 species are currently non-retention in the commercial salmon troll fisheries.

Based on science information, the Department implemented stepped reductions of total Bocaccio harvest from the estimated total catch mortality of 137 metric tonnes (MT) in 2013 to a mortality cap of 75 MT over 3 years (2013-14 to 2015-16). Through the process of regular evaluation of the rebuilding plan, science advice on stock status and rebuilding strategies for Bocaccio was peer-reviewed in autumn 2019. More information on the Bocaccio Rebuilding Plan is available in Appendix 9 of the Groundfish IFMP, which will be linked in the final salmon IFMP once available. The Department has also implemented stepped reductions of total Yelloweye Rockfish (outside population) harvest from the estimated total catch mortality of 287

MT in 2014 to a mortality cap of 100 MT over 3 years (2016/17 to 2018/19). Through the process of regular evaluation of the rebuilding plan, science advice on stock status and rebuilding strategies for Yelloweye Rockfish outside population was peer-reviewed in autumn 2019. More information on the Bocaccio Rebuilding Plan is available in Appendix 9 of the Groundfish IFMP, which will be linked in the final salmon IFMP once available. The Department is working collaboratively with all fishing interests to achieve rockfish conservation and rebuilding. For the salmon troll, recreational, and FSC fisheries, the current emphasis is on increasing awareness, given the limited data available on catch. Current work with these fisheries is focused on:

•Improving rockfish identification among fishers, technicians, guides, lodges, creel surveyors, and other catch monitors; and

• Improving fishery monitoring and catch reporting of rockfish by species.

9.2 2020/2021 Post Season Review for Access and Allocation Objectives

9.2.1 INTERNATIONAL OBJECTIVES

The objective was to manage Canadian treaty fisheries to ensure that obligations within the Pacific Salmon Treaty (PST) are achieved.

Review and performance of the PST provisions for Sockeye, Coho, Chum and Chinook salmon occur annually at bilateral meetings. Results of the meetings are published in the annual post-season reports available from the Pacific Salmon Commission (PSC). More information is available on the PSC website at:
http://www.psc.org/index.htm

9.2.2 DOMESTIC ALLOCATION OBJECTIVES

The objective was to manage fisheries in a manner that is consistent with the Allocation Policy for Pacific Salmon and the Pacific Salmon Commercial Allocation Implementation Plan.

Fisheries were generally conducted in a manner consistent with the Allocation Policy for Pacific Salmon. Post-season reviews were conducted to provide information on stock status, catches and other fishery information.

9.2.1 FIRST NATIONS OBJECTIVES

The objective was to manage fisheries to ensure that, after conservation needs are met, First Nations' food, social and ceremonial requirements and treaty obligations to First Nations have first priority in salmon allocations in accordance with the Allocation Policy for Pacific Salmon.

Harvest opportunities for First Nations FSC fisheries in the South Coast and Fraser River in many cases did not meet expectations and were affected by conservation measures that restricted opportunities, particularly for Fraser Chinook and Sockeye. As in recent years, restrictions were implemented to protect 90% of the Early Stuart component through a rolling window closure as well as limited opportunities targeting all other Fraser River Sockeye given low returns. Restrictions were also in place to protect Spring and Summer run Fraser Chinook, Interior Fraser River Coho, Sakinaw Lake and Nimpkish River Sockeye, Interior Fraser River Steelhead and to minimize impacts upon WCVI Chinook and Lower Strait of Georgia Chinook. Closures to protect Interior Fraser River Coho also benefited lower Fraser Coho which were also a stock of concern. FSC and treaty fisheries targeting Somass Sockeye stocks were generally successful, success in other WCVI FSC fisheries were variable.

9.2.2 RECREATIONAL AND COMMERCIAL OBJECTIVES

The objective was to manage fisheries for sustainable benefits consistent with established policies.

The primary objective in the recreational fishery to maintain the expectation and opportunity to catch fish in a stable manner; similar to 2019, Chinook retention opportunities were limited to protect Fraser River Chinook. In the commercial fishery, harvest opportunities were planned based on the identification of commercial surpluses and based on the commercial allocation plan. Overall, commercial catches were low in 2020 due to poor returns and conservation measures in place for stocks of concern.

9.3 2020/2021 POST SEASON REVIEW OF COMPLIANCE MANAGEMENT OBJECTIVES

Fishery officers carry out inspections on vessels, buying stations, processors, transporters, cold storage facilities, brokers, restaurants and retailers. In-season and future compliance and enforcement activities are adjusted, in consideration of the outcomes of the inspections program. The annual post-season review of the inspection program further informs C&P about the successes of the program and where to align resources to provide the greatest value to Canadians.

10 SOUTHERN BC FIRST NATIONS FISHERIES

First Nations fisheries take place using a variety of gear types and methods depending on the location of the fishery. Marine fisheries may take place using larger communal gear types such as seine or gill nets. More terminal marine fisheries and in-river fisheries may take place using gear types ranging from seine nets and gill nets to dip nets and gaffs. The type of gear and how it used is selected based on the location of the fishery, the target stocks and the objectives and preference of the fisher.

First Nations fisheries are managed to provide opportunity wherever possible subject to conservation concerns and to provide priority, after conservation, to other users of the resource.

10.1 TREATIES, CO-MANAGEMENT ARRANGEMENTS AND RECONCILIATION AGREEMENTS

10.1.1 TREATY FISHERIES

There are currently four modern Treaties: Nisga'a Lisims Government (effective date May 11, 2000), Tsawwassen First Nation (April 3, 2009), Maa-nulth First Nations (April 1, 2011), and Tla'amin First Nation (April 5, 2016). Under the Treaties, Fisheries Operation Guidelines (FOG) set out the operational principles, procedures and guidelines needed to assist Canada, BC, Nisga'a, Tsawwassen, Maa-nulth, and Tla'amin First Nations in implementing Fisheries Chapters of their respective treaties and managing Treaty salmon fisheries on an annual basis. The FOGs provide guidance on how management decisions, with respect to Treaty fisheries, will be made via the Joint Fisheries Committee (JFC), how abundance is estimated, biological and harvesting considerations, fisheries monitoring and catch reporting requirements, etc. Each year the JFC, established under each Treaty, makes recommendations to the Minister on the issuance of specific 'Harvest Documents' to licence the salmon fishery for Domestic harvests (including both food, social and ceremonial and economic fisheries).

More information on the Treaties can be found at:

- Nisga'a Final Agreement: https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/99002_00
- Tsawwassen First Nations Final Agreement: http://www.aadnc-aandc.gc.ca/eng/1100100022706/1100100022717
- Maa-nulth First Nations Final Agreement: http://www.aadnc-aandc.gc.ca/eng/1100100022581/1100100022591

- Tla'amin Final Agreement: https://www.rcaanc-cirnac.gc.ca/eng/1397050017650/1542999641532#chp8a

More information on the BC Treaty process can be found at: http://www.BCtreaty.net/.

Refer to Section 13 – Species Specific Salmon Fishing Plans for the specific domestic and commercial allocations.

In addition to modern-day treaties, the following historic treaties in British Columbia also contain fisheries provisions:

- Douglas Treaties (1850-1852): https://www.rcaanc-cirnac.gc.ca/eng/1100100029052/1581515763202
- Treaty 8 (1899): https://www.rcaanc-cirnac.gc.ca/eng/1100100028813/1581293624572

10.1.2 COLLABORATIVE FISHERIES MANAGEMENT

In July 2019, the Department signed a co-management agreement with the Fraser Salmon Management Council. Further information on the Fraser Salmon Collaborative Management Agreement can be found in section 10.1.3.

10.1.2.1 FORUM

In January 2008, Fisheries and Oceans Canada staff initiated a series of Forums with First Nations throughout the South Coast and the Fraser River watershed to discuss possible management approaches for the upcoming season in the case that there are insufficient salmon returns to meet FSC requirements. Forums occurred in subsequent years with the aim of furthering discussions on management principles and approaches for Fraser salmon, with meetings generally occurring in January, March and April of each year.

As a result of the implementation of the Fraser Salmon Collaborative Management Agreement, the jointly-led DFO-First Nation Forum Planning Committee is working to consider how the objectives and structure of the Forum may change to better reflect the new collaborative management agreement. The Forum Planning Committee is working to update their Terms of Reference, and will provide more information, when available, at https://www.frafs.ca/Forum.

10.1.2.2 RECONCILIATION AGREEMENTS

For South Coast Salmon IFMP:

Canada and First Nation reconciliation agreements

In 2019, the Government of Canada entered into two reconciliation agreements with south coast and interior First Nations that lay the foundation for incremental development and implementation of new arrangements for fisheries and collaborative fisheries governance.

- *Incremental Reconciliation Agreement for Fisheries Resources* between Canada and five Nuu-chah-nulth Nations: Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht and Tla-o-qui-aht First Nations
- Tsʔilhqotʼin, Canada and BC *Gwetʼsen NiltʼI Pathway Agreement*

As DFO and First Nations develop and implement new fisheries and collaborative governance arrangements, DFO works with these Nations to engage neighbouring First Nations and stakeholders (e.g. commercial and recreational sectors).

For North Coast Salmon IFMP:

Canada and First Nation reconciliation agreements

In 2019, the Government of Canada entered into two reconciliation agreements with north coast First Nations that lay the foundation for incremental development and implementation of new arrangements for fisheries and collaborative fisheries governance.

- *Coastal First Nations Fisheries Resource Reconciliation Agreement* between Canada and Metlakatla, Gitxaala, Gitgaʼat, Kitasoo/Xai-Xais, Nuxalk, Heiltsuk, Wuikinuxv, and Haida Nations
- Heiltsuk and Canada *Haíłcístut Incremental House Post Agreement*

As DFO and these Nations develop and implement new arrangements, they will also develop engagement processes with neighbouring First Nations and stakeholders (e.g. commercial and recreational sectors).

10.1.3 FRASER SALMON MANAGEMENT COUNCIL

In the case of the Forum, representatives of First Nations from the Fraser Watershed and marine approach areas (e.g. Vancouver Island) and DFO meet to discuss stock and fisheries information, identify issues and develop management approaches to help meet FSC needs of First Nations as they relate to Fraser salmon species. This type of engagement is critical with respect to migratory species such as Fraser salmon where management approaches in one area can have significant implications for management or fisheries in other areas

10.1.4 ABORIGINAL FISHERIES STRATEGY (AFS)

The AFS was implemented in 1992 to address several objectives related to First Nations and their access to the resource. These included:

Improving relations with First Nations

Providing a framework for the management of the First Nations fishery in a manner that was consistent with the Supreme Court of Canada's 1990 *Sparrow* decision

Greater involvement of First Nations in the management of fisheries

Increased participation in commercial fisheries (Allocation Transfer Program (ATP))

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

10.2 LICENCING

First Nations opportunities to harvest salmon for food, social and ceremonial purposes is provided through communal licences issued by DFO. These licences support the effective management and regulation of First Nations fisheries. These licences are typically issued to individual bands or tribal groupings, and describe the details of the FSC fishery including the dates, times, methods, locations of harvest. Communal licences for Southern Coastal First Nations are typically multi-species and are issued on an annual basis. Shorter duration amendments to licences are also issued on occasion. For Fraser River First Nations, licences are typically of shorter duration, and are issued to provide for specific First Nations' salmon fisheries openings. In several "terminal" or "near terminal" areas of the upper Fraser and Thompson Rivers, licences are generally longer-term and based on in-season assessment information.

Fisheries and Oceans Canada seeks to provide for the effective management and regulation of First Nations fisheries through the negotiation of mutually acceptable and time-limited Fisheries Agreements, frequently referred to as AFS agreements. Where agreement is reached, agreed-to fisheries provisions form the basis of the communal licence issued by DFO. Where agreement cannot be reached, Fisheries and Oceans Canada will nonetheless issue an Aboriginal communal fishing licence to the group based on DFO's best understanding of the group's Aboriginal fishery.

10.2.1 COMMUNAL LICENCE TARGET HARVEST ALLOCATION

Target harvest amounts for communal licences in the Fraser River and Southern BC are outlined in Table 10.2-1 below. Actual opportunities and catches will be dependent on, among other factors: in-season stock strength, management measures taken to ensure conservation of individual stocks, community needs of First Nations, and alternative sources of salmon if preferred species are not available locally due to low abundance.

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

Table 10.2-1: Communal Licence Harvest Target Amounts

	South Coast First Nations *	Lower Fraser Area First Nations * #	Mid/Upper Fraser First Nations	Total
Sockeye Fraser River	266,850	434,000	350,000	1,050,850
Sockeye Non-Fraser River	15,600**	0	20,000	35,600
Coho	Directed harvest may be permitted in specific areas or terminal systems where abundance permits based on in-season assessment. Restrictions on retention of Coho caught incidentally during fisheries on more abundant species or stocks where IFR Coho are present.			
Pink	48,850	129,800	9,500	188,150
Chum	139,000	92,800	0	231,800
Chinook	26,760	25,300	18,000	70,060
Total Salmon	**497,060**	**681,900**	**389,000**	**1,561,460**

* Note: Maa-nulth, Tsawwassen, and Tla'amin Treaty domestic fishery allocations are not included here.

Note: these harvest targets are initial amounts prior to any negotiated comprehensive fisheries agreement

between some Lower Fraser First Nations and DFO for economic opportunities.

** Note: The 15,600 total non-Fraser Sockeye amount does not include Maa-nulth treaty allocation or the FSC quantum in the Tsu-ma-uss agreement.

10.3 ABORIGINAL COMMERCIAL FISHING OPPORTUNITIES

10.3.1 FIVE NATIONS' RIGHT-BASED SALE FISHERY

Five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht (the T'aaq-wiihak First Nations) - have aboriginal rights to fish for any species of fish, with the exception of Geoduck, within their Fishing Territories and to sell that fish. The Department has developed a 2021/22 Five Nations Multi-species Fishery Management Plan (FMP). Feedback provided by the Five Nations during consultations was considered by DFO in the development of the 2021/22 FMP. The FMP includes specific details about the fishery, such as allocation/access, licensing and designations, fishing area, harvesting opportunities, and fishery monitoring and catch reporting. For further information see the FMP at: https://waves-vagues.dfo-mpo.gc.ca/Library/40953798.pdf

The implementation of the Five Nations' right-based sale fishery is an ongoing process. The 2021/22 FMP was developed to implement the right-based multi-species fishery to accommodate the Five Nations' Aboriginal rights consistent with the British Columbia Supreme Court's 2018 decision. On April 19, 2021, the British Columbia Court of Appeal released its decision in relation to the appeal brought forward by the Five Nations. As a result, the department is reviewing the 2021/22 FMP. Following this review, the 2021/22 FMP may be amended and in-season management changes to this IFMP may occur. Changes to the FMP will be announced by fishery notice.

10.3.2 TREATY NATIONS HARVEST AGREEMENTS

The Maa-nulth and Tsawwassen First Nations each have Commercial fisheries through their Fisheries Harvest Agreements. These Agreements, which are outside of Treaty, lay out commercial access (licences) and corresponding allocations that have been provided to these Treaty Nations.

Tsawwassen First Nations Harvest Agreement:

https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/consulting-with-first-nations/agreements/harvest_agreement.pdf

Maa-nulth First Nations Final Agreement:

https://www2.gov.bc.ca/assets/gov/zzzz-to-be-moved/9efbd86da302a0712e6559bdb2c7f9dd/9efbd86da302a0712e6559bdb2c7f9dd/agreements/maa_nulth_first_nations_harvest_agreement.pdf

10.3.3 ALLOCATION TRANSFER PROGRAM

The AFS was implemented to address several objectives related to First Nations and their access to the resource. One of these objectives was to contribute to the economic self-sufficiency of Aboriginal communities. An integral component of the AFS is the Allocation Transfer Program (ATP). This Program facilitates the voluntary retirement of commercial licences and the issuance of licences to eligible Aboriginal groups in a manner that does not add to the existing fishing effort on the resource, thereby providing Aboriginal groups with much needed employment and income, and increasing participation in commercial fisheries as part of relationship-building with the Department. Since 1994-95, when the ATP was first launched and including PICFI, 502 commercial licences have been relinquished for Aboriginal groups.

10.3.4 ECONOMIC OPPORTUNITY FISHERIES

Negotiations to provide economic opportunities to First Nations in Barkley Sound and the lower Fraser River will be undertaken as in recent years. Economic opportunity fisheries will be conducted under agreements that specify provisions for planning fisheries, allocations, catch reporting requirements as well as roles and responsibilities regarding the management of the fishery. The Department's general approach is that Aboriginal commercial harvest opportunities are managed using the same harvest decision guidelines as the commercial fishery. Aboriginal commercial harvest opportunities may be implemented with different times, areas, gears and regulations consistent with the overall management approach for the commercial fishery.

In the lower Fraser, DFO will work with First Nations and commercial harvesters to develop an approach to an integrated commercial fishery based on the principles of transparency, accountability and collaboration. Specific elements of this approach will include defined harvest shares, enhanced catch monitoring and compliance programs, some initial work on a traceability program and improved collaboration amongst harvesters.

10.3.5 PACIFIC INTEGRATED COMMERCIAL FISHERIES INITIATIVE (PICFI)

The Pacific Integrated Commercial Fisheries Initiative (PICFI) was initially launched in 2007 as a five-year program designed to assist eligible First Nations in Pacific Region to develop commercial fisheries capacity and increase access to commercial fishing in the Pacific Region. In

Budget 2017, PICFI received permanent long term funding and committed to expanding the program to allow participation from a greater number of First Nations. The program provides funding and support to Indigenous groups and communities in Canada's Pacific region to maximize the potential of their communal fishing enterprises and to strengthen community economic self-sufficiency within the framework of an orderly, stable integrated commercial fishery.

The program is designed to support Indigenous Peoples and significantly strengthen their ability to become successful fishers, contributing to the economic well-being, not only of Indigenous communities, but of all stakeholders in the fishery. PICFI uses a step-by-step approach to help Indigenous-owned Commercial Fishing Enterprises (CFEs) to develop governance and business management skills, build capacity in commercial fisheries and aquaculture operations, and obtain fisheries enterprise-specific training that meets the needs of participating Indigenous communities. CFEs participating in PICFI can apply for funding under two different components: capacity building and business development that includes support on aquaculture development. In addition, eligible First Nations in Pacific Region can apply for aquaculture development funding, a third funding envelope in the program to support First Nations in developing their aquaculture operations.

In its first 5 years, the Government of Canada committed $175 million to implement the initiative. To continue to build on the progress achieved to date and to continue promoting the integration of commercial fisheries, Economic Action Plan 2014 announced a two-year renewal of PICFI, with resources of $22.05M per year. The 2016/17 federal budget supported a one-year renewal of the PIFCI program at the same funding level ($22.05M) until March 31, 2017. Budget 2017 proposed to provide $250 million over five years, and $62.2 million ongoing, to Fisheries and Oceans Canada to renew and expand the successful Pacific and Atlantic Integrated Commercial Fisheries Initiatives and to augment Indigenous collaborative management programming. In 2017, PICFI received ongoing, permanent funding of $22.05M annually. In 2018/2019, an Aquaculture Development Source (ADS) funding envelope with an annual budget of $1M was launched to support aquaculture projects under PICFI, and the annual budget increased to $1.5M beginning in 2021/22.

PICFI works with eligible participants, Indigenous organizations, and other stakeholders to co-design, co-develop and co-deliver the program that achieve DFO's intended results of improved outcomes for Indigenous Peoples. The six key structures in place to support to the delivery of the program and the use of a collaborative approach of co-design, co-develop and co-deliver are the Business Development Management Committee (BDMC), Business Development Team (BDT), Capacity Development & Training Advisor, Independent Third Party Evaluator (ITPE), Application Review Committee (ARC), and Special Planning Sessions. The governance of PICFI

delivery model contributes to effective collaboration with Indigenous groups. The BDMC is co-chaired by a DFO senior official and an executive of an Indigenous organization and includes other DFO personnel, Indigenous organizations, and program delivery partners to set direction, provide guidance to program delivery, and oversees work of program delivery partners. Further, key delivery partners, such as the BDT, the Capacity Development & Training Advisor, the ITPE, and the ARC, operate at arm's length from DFO, limiting direct government involvement, which adds an element of independence to provide ongoing, transparent support to CFEs and First Nations in the program.

10.3.6 FIRST NATIONS DEMONSTRATION FISHERIES

Discussions regarding demonstration fisheries that will provide commercial opportunities for First Nations and allow for experimentation and testing of inland fisheries are on-going with First Nations and stakeholders through the Commercial Salmon Allocation Framework process. For 2021, as in previous years, the focus with First Nations will be on experimenting mainly in terminal areas on abundant stocks. These fisheries will be conducted separately from FSC fisheries, using the same harvest decision guidelines as the commercial fishery and fish harvested will be off-set with licences voluntarily relinquished from the commercial fishery. The demonstration fisheries proposed are described in Appendix 6.

As part of the reform of Pacific fisheries, DFO is looking for opportunities to increase First Nations participation in commercial fisheries through an interest-driven business planning process. New planning approaches and fishing techniques will be required to ensure an economically viable fishery. In recent years some First Nations inland demonstration fisheries have occurred in order to explore the potential for inland fisheries targeting terminal runs of salmon.

10.3.6.1 TRANSITION OF FIRST NATION INLAND DEMONSTRATION FISHERIES TO REGULAR COMMERCIAL FISHERIES

In 2014, an independent review and evaluation of the Pacific Integrated Commercial Fishing initiative (PICFI) was completed by Malatest and Associates and a number of recommendations were made. A full copy of the report is available at:
http://www.dfo-mpo.gc.ca/ae-ve/evaluations/15-16/6B172-eng.html

Recommendation four was related to development a transition strategy moving demonstration fisheries to regularized fisheries. In response to the review, the Department has developed a transition strategy for the in-river First Nation demonstration component of PICFI. The Department identified criteria to be incorporated into an evaluation framework which will

enable the transition of Inland First Nations Demonstration fisheries to regular commercial fisheries in the future.

A transition strategy has been approved to proceed on a case by case basis of successful inland demonstration fisheries developed thru the Pacific Integrated Commercial Fishery Initiative (PICFI). The evaluation criteria in the strategy will assess their sustainability and ability to meet management objectives, including the ability to harvest fish allocations, conservation objectives and fishery management requirements. If the criteria are met, the transition to an ongoing commercial fishery would occur and will be defined in an Access Agreement. This work is intended to improve consistency and transparency in how the Department assesses, implements, and reviews demonstration fisheries while supporting integrated commercial fisheries consistent with the vision and principles of Pacific Fishery Reform. If further information is required, contact Resource Manager Kory Ryde – Kory.Ryde@dfo-mpo.gc.ca.

10.4 CATCH MONITORING AND REPORTING INITIATIVES

Under the *Strategic Framework for Fisheries Monitoring and Catch Reporting in Pacific Fisheries* (2012), the First Nations Fishery Council (FNFC) and other area aggregate groups assisted in engagement to communicate the requirements of the Framework and importance of improving catch information. In addition, a significant focus has been on the development of integrated and coordinated data management and data entry systems within DFO and First Nations Band offices.

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*. The national *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. A phased approach to implementation of the national *Fishery Monitoring Policy* will result in a transition period from the Strategic Framework to the national policy.

More information on the national *Fishery Monitoring Policy* is available on the internet at:

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

Appendix 8 provides further information on the national *Fishery Monitoring Policy*, risk assessment tools, and steps for implementation.

10.4.1 ABORIGINAL HARVEST MANAGEMENT SYSTEM

Since the year 2000, Fisheries and Oceans Canada have been working with First Nations groups to design and develop electronic recording and reporting systems for First Nations FSC catch data, to improve the efficiency and accuracy of reporting FSC catch and other fishing information used by Aboriginal fishery managers and the Department. The software has incorporated recommendations from numerous First Nations members and is based on their reporting requirements within their communities and those required by the Department. The application also has a harvester designation system, allowing First Nations to track FSC effort and harvest as well as other fishing information for their members.

The initiative first utilized a Microsoft Access database used by interested First Nations groups within the Pacific Region, including the BC Interior area, South Coast and the Central Coast. In the late 2000's approximately 34 First Nations groups employed this software application with different success rates, with a few sending FSC data to DFO's Regional catch database. In 2010, work started on compiling all aspects of the 34 current MS Access databases into one (1) system called the Aboriginal Harvest Management System (AHMS) that could be customizable for each Nation's needs. Since 2010 new Nations have been brought onboard each year bringing the total in 2018 to 16 First Nation's currently using AHMS throughout the Region, with 6 First Nations still using MS Access databases. FSC data is now being maintained by DFO within KREST (the Kept and Released Estimation Survey Tool).

For more information please contact Aleta Rushton at 250-230-1227.

10.4.2 CHINOOK AND COHO CODED WIRE TAG (CWT SAMPLING)

CWT target sample rates are established by the Department to meet bilateral Pacific Salmon Treaty standards. The minimum required sample rates are 20% of the estimated catch of the fishery to recover a minimum quantity of CWTs from indicator stocks. CWT sampling programs in First Nations fisheries are comparable in overall design to CWT sampling in commercial and recreational fisheries but may be different in some aspects to recognize the differences in First Nations economic or demonstration fisheries and FSC fisheries, to recognize regional differences in priorities for CWT sampling, and to integrate sampling into First Nations catch monitoring programs.

In economic and demonstration fisheries, sampling for CWTs is a mandatory catch monitoring requirement in Chinook and Coho retention fisheries that intercept CWT indicator stocks. Where needed, the Department will:

- Count the landed Chinook and Coho catch by adipose fin-clip status of randomly selected landings or at fish processing plants using designated observers and sample the landed catch to collect snouts from fish that contain CWTs, or
- Work with First Nations catch monitoring programs to establish comparable requirements.

In FSC fisheries, the success in achieving the 20% target sample rate relies on CWT sampling that is integrated into the catch monitoring program or on individual submissions of Chinook or Coho heads to catch monitors or to First Nations Salmon Head Depots. Sample rates may also be known as submission rates in these fisheries. Essential requirements for the "submission-style" sampling for CWTs are:

- Submission of heads from hatchery-marked (adipose fin-clipped) Chinook and Coho. With mass marking, not all hatchery-marked Chinook and Coho contain a CWT, but the missing adipose fin is the only external clue to identify the possibility of an internal CWT.
- Completed head label(s) attached to each head with required catch information including location caught and date caught. For salmon caught together (same date and location), one label may be placed in a sealed bag with multiple heads.
- Provision of catch information (number of hatchery marked kept Chinook and Coho) to monitoring programs.

First Nations Salmon Head Depots with head labels exist in communities where submission-style programs are established. Servicing and maintenance of First Nations Salmon Head Depots will be delivered by Department employees. In submission-style programs, information about the origin of their fish will be provided to individuals and First Nations when CWT dissection results are available.

For additional information or locations of First Nations Salmon Head Depots:
Salmon Head Recovery Program
Telephone: 1-866-483-9994 (toll-free)

11 SOUTHERN BC RECREATIONAL FISHERIES

Recreational fisheries are managed to maintain opportunity wherever stock status allows and to allow fisheries to be managed in a predictable manner, wherever possible.

11.1 RECREATIONAL VISION

In May 2018 the Sports Fish Advisory Board created *'Vision 2021' - A Strategic 10-point framework to grow Canada's recreational fishing sector on the Pacific coast.* It serves as a framework for developing initiatives and actions to support achievement of a collective vision for the recreational fishery in BC. The recreational fisheries Vision 2021 document is available from the A/Regional Recreational Fisheries Coordinator Greg Hornby (250) 286-5886.

11.2 LICENCING

Tidal Waters Sport Fishing licences may be purchased for a 1, 3, 5 day, or annual period. Fees depend on licence duration, age (senior, adult, juvenile) and residency status. Licences for juveniles (ages 15 and under) are free. Check for applicable fees and purchase your licence online via the National Recreational Licensing System: http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/licence-permis/application-eng.html

11.2.1 INFORMATION ON OPENINGS AND CLOSURES

Recreational fishing opportunities for salmon are regulated by the *British Columbia Sport Fishing Regulations, 1996* made under the *Fisheries Act*. The regulations are detailed in the online *British Columbia Sport Fishing Guide*: http://www.bcsportfishingguide.ca. As there are frequent in-season changes, especially for salmon, you are advised to check the online *British Columbia Sport Fishing Guide* for restrictions in the intended area of fishing before going on your trip. In addition to finding detailed information on tidal and freshwater salmon sport fishing regulations in the *British Columbia Sport Fishing Guide*, fishers must also make sure to reference the 'Conditions of Licence', as printed to their Tidal Waters Sport Fishing Licence, which includes other mandatory licence requirements, such as catch recording, provision of information, gear requirements and species restrictions such as and catch and size limits.

11.2.1.1 FISHERY NOTICES

To sign up to have recreational Fishery Notices sent directly to your email, there is a link to subscribe to fishery notices on the left hand side of the *British Columbia Sport Fishing Guide* web page. Fishery Notices include important alerts to in-season changes for areas and species,

fishery openings and closures, as well as timely health advisories for e.g. marine bio toxins or fuel spills.

11.2.1.2 FISHINGBC APP

The Sport Fishing Institute of BC has recently developed the 'FishingBC App', a free app you may optionally download to your mobile device if you wish to receive up-to-date sport fishing regulation details for tidal waters in the Pacific region. In addition it offers varied functionality in multiple languages to assist not only with regulations data, but also with species identification and catch recording.

11.3 CATCH MONITORING

The SFAB has been working with DFO on initiatives to strengthen fishery monitoring and catch reporting in the recreational fishery. To this end, a plan has been developed to meet the objectives of the *Strategic Framework for Fishery Monitoring and Catch Reporting in Pacific Fisheries* (2012)(Appendix 8). Following multi-sectoral consultations, DFO released the national *Fishery Monitoring Policy* in 2019, replacing the regional Strategic Framework. A phased approach to implementation of the national *Fishery Monitoring Policy* will result in a transition period from the Strategic Framework to the national policy. For more information on the new national *Fishery Monitoring Policy*, please see Section 1.6.3. The requirement to report catch is a condition of the Tidal Waters Sport Fishing Licence. Licence holders must report information on their recreational fishing activity and catch or provide biological samples to DFO representatives when requested.

11.3.1 CREEL SURVEYS

The Department collects information used to estimate boat based angling harvest of finfish in marine waters and salmon in fresh waters throughout BC using a variety of methods. Recreational harvesters may be requested by a Fishery Officer or designated DFO representative, such as a creel interviewer, to provide mandatory catch and effort information or biological samples either on the water or at the dock. Approximately 20,000 such interviews and sampling events are conducted annually. Creel surveys for boat based angling in marine waters are the main source of recreational catch and effort information in the highest risk fisheries.

11.3.2 INTERNET RECREATIONAL CATCH AND EFFORT (IREC)

This requirement also includes responding to email requests through the monthly Internet Recreational Effort and Catch - iREC – survey, which started in 2012. Fishers are randomly

selected for the iREC survey and advised at time of licence purchase, and have their iREC survey online access code printed to their licence. Learn more about the iREC survey at: http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/irec/index-eng.html

This survey is based on approximately 30,000 responses and provides monthly estimates of effort and catch for areas, months, and fishing methods not covered by the marine creel surveys, which cover only boat based angling. The methods covered by the iREC survey include angling, trapping, beach collecting, and diving for all sport caught species. The iREC survey methodology was peer reviewed and approved by the Canadian Science Advisory Secretariat (CSAS). Efforts are now underway to implement use of iREC results in months and areas not covered by creel surveys, starting with critical species such as halibut and Chinook salmon.

11.3.3 INTERNET ANNUAL RECREATIONAL CATCH (IARC)

A separate online survey - the Internet Annual Recreational Catch (iARC) survey – is held at the end of the season to ask licence holders to provide the catch records as written on their licences for Chinook, lingcod, and halibut. Approximately 7000 responses form the basis for estimating annual catch of these species. Information on this survey is available at: http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/irec/iarc-eng.html

11.3.4 LOGBOOKS

Finally, the Department is continuing to work with identified groups - sport fishing guides, fishing lodges, associations – with the assistance of the Sport Fishing Institute of BC to implement logbooks in areas of highest risk or areas conducive to reporting through the use of logbooks. The latter includes areas such as the Central Coast, Kyuquot Sound, Port Hardy, and parts of PFMA 13 where there are concentrations of lodges and guided effort.

The development of an improved catch monitoring regime, including reporting standards, will continue to be a priority in the management of recreational fisheries. The Department continues to work with the Sport Fishing Institute of BC, and identified groups - sport fishing guides, fishing lodges, and associations - to develop a Recreational Electronic Logbook (Rec E-Log) as a tool to collect catch and other fishing information and to report this information to the Department.

11.3.5 CHINOOK AND COHO CODED WIRE TAG (CWT) SAMPLING

Essential requirements for the sampling for CWTs in recreational fisheries are:

- Submission of heads from hatchery-marked (adipose fin-clipped) Chinook and Coho. With mass marking, not all hatchery-marked Chinook and Coho contain a CWT, but the missing adipose fin is the only external clue to identify the possibility of an internal CWT.
- Completed DFO-supplied head label(s) attached to each head with required catch information including location caught and date caught. For salmon caught together (same date and location), one label may be placed in a sealed bag with multiple heads.
- Provision of catch information (number of hatchery marked kept Chinook and Coho) to DFO catch monitoring programs.

CWT target sample rates are established by the Department to meet bilateral Pacific Salmon Treaty standards. The minimum required sample rates in recreational fisheries are 20% of the estimated hatchery-marked catch to recover a minimum quantity of CWTs from indicator stocks. It is not cost effective or possible to acquire this quota through direct sampling of recreational fisheries due to the wide distribution of the fishery throughout the year and throughout the province. Instead, the success in achieving the 20% sample rate relies on submissions by anglers to a network of Salmon Head Depots. Because of the reliance on fisher-provided samples, sample rates are also known as submission rates in recreational fisheries.

Salmon Head Depots exist at more than 250 locations in BC and are situated at marinas, tackle stores, fishing lodges, and hatcheries. Depot operators provide head labels and store the heads in freezers or buckets containing a brine solution. Servicing and maintenance of Salmon Head Depots will be delivered by a federal government contractor or by Department employees. Information about the origin of their fish will be provided to anglers, guides and depots, when CWT dissection results are available.

While the majority of CWTs are collected from submissions to Salmon Head Depots, recreational harvesters are also required as a condition of the Tidal Waters Sport Fishing Licence to provide biological samples (salmon heads) to Department representatives when requested.

For additional information or locations of Salmon Head Depots:
Salmon Head Recovery Program
Phone: 1-866-483-9994 (toll-free)
Search: DFO Salmon Head Recovery

12 SOUTHERN BC COMMERCIAL FISHERIES

Details regarding specific commercial fisheries are contained in the Section 13 - Species Specific Salmon Fishing Plans.

12.1 LICENSING

12.1.1 NATIONAL ONLINE LICENSING SYSTEM (NOLS) CLIENT SUPPORT - LICENSING SERVICES

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. Telephone support is available Monday to Friday (excluding holidays) from (07:00 AM to 19:00 PM Eastern).

For more information on how to register and use the system, visit the Department's website at the website address above, or contact our client support.

12.1.2 LICENCE CATEGORY

A salmon licence, category A, NAG or FA, is required to commercially harvest salmon. Salmon, category A, licence eligibilities are limited entry and vessel based. Category FA and NAG licence eligibilities are party based and must be designated to a registered commercial fishing vessel that meets established length restrictions. Category NAG licence eligibilities are held by the Northern Native Fishing Corporation (NNFC). Category FA is communal commercial licence eligibilities, category FA, an aboriginal group is the licence eligibility holder.

Vessels authorized to fish under the authority of a salmon licence are also permitted to catch and retain species described in Schedule II, Part 2 of the *Pacific Fishery Regulations, 1993*, transport species caught by other vessels, and be designated to fish under the authority of a category Z licence.

12.1.3 LICENCE CATEGORY BACKGROUND

Salmon has been a limited entry vessel based fishery since 1969. In 1996 under the Pacific Salmon Revitalisation Plan, area and gear selection were introduced in the salmon fishery. Salmon licensed vessel owners selected a gear and area for each licence eligibility. Gear selections were seine, gill net or troll. Gear selection was permanent.

Area selections for seine were area A or B; for gill net, areas C, D or E; and, for troll, areas F, G or H. A vessel may hold only one licence eligibility per area. Area licensing has been a feature of salmon management for the past 10 years with area selections processes in 1996, 2000, 2006 and 2007. Initial area selection was for a four year period.

Licence Stacking was also introduced in 1996 as a method to decrease the number of vessels actively participating in the fishery while allow vessel owners to fish in more than one area or with more than one gear.

12.1.4 LICENCE RENEWAL

Renewal of a Category A licence and payment of the licence renewal fees must be done on an annual basis to retain the privilege to be issued the licence in the future, regardless of whether or not fishing is carried out. Those category A licenses not renewed by March 31, 2022 will cease and licence issuance requests will be unable to be considered in future.

Salmon licence renewal fees are available at full fee and reduced rates. Annual licence renewal fees are based on the length of the vessel. Reduced fee eligibilities must be held on vessels owned by aboriginal individuals.

In accordance with the *Service Fees Act*, annual licence renewal fees will be adjusted by the annual rate of inflation determined by the Consumer Price Index (CPI) published by Statistics Canada.

The commercial Salmon (Categories AG, AT, and AS) licence renewal fees may be found on the following link: https://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/fees-frais-21-22-eng.html

There is no annual licence renewal fee for communal commercial category FAG, FAT, and FAS licences.

12.1.5 LICENCE ISSUANCE

Upon the Department receiving the required payment, and information, the salmon licence will be issued and notification will be sent via email to advise vessel owners/licence holders that a

change has been made to the vessel owners/licence holder's online account. The salmon licence documents, licence conditions and receipt will be available to be printed at that time.

Prior to annual licence issuance of a communal commercial licence, licence eligibility holders are required to annually designate the fishing vessel to hold the licence. This must be done by navigating to the 'Submit a Request' menu selection within the National Online Licensing System (NOLS). Full instructions are available at: https://www.dfo-mpo.gc.ca/fisheries-peches/sdc-cps/products-produits/user-manual-utilisateurs-sec1-eng.html.

Prior to annual application of a salmon licence, vessel owner(s)/licence eligibility holders are required to:

- Meet any Ministerial conditions placed on the licence eligibility
- Ensure any conditions of the previous year's licence are met, such as:
    - Catch reporting requirements (i.e. all trips are closed), and that all harvest logs are submitted. Submit a nil report if no fishing occurred. For further information contact the Commercial Salmon Catch Monitoring Unit at cscmu-usccs@dfo-mpo.gc.ca; and
    - Submission of all fish slips (for further information contact the Regional Data Unit at (604) 666-2716).
- the designated vessel's overall length does not exceed the maximum vessel length of the category FAG, FAT, FAS licence eligibility

CLEARANCE

Copies of the Nil Reports and Statutory Declarations may be found under 'Additional Licensing Services Forms' on the licensing webpage located at: http://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/index-eng.html.

LICENCE DOCUMENTS

Salmon licence documents are valid from the date of issue to March 31, 2022.

Replacements for lost or destroyed licence documents may be obtained by reprinting the licence documents through the National Online Licensing System.

For further licencing information see:
http://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/index-eng.html

DESIGNATION OF HARVESTERS TO FISH A COMMUNAL COMMERCIAL LICENCE

Under the *Aboriginal Communal Fishing Licence Regulations*, every person working on a vessel that is only fishing under authority of a Communal Commercial Licence, must be designated by the First Nation that holds the licence. The designation must be made in writing and include the person's name and reference the Communal Commercial Licence.

First Nations licence holders interested in obtaining an example template to use to designate their fish harvesters may contact a DFO Resource Manager or Pacific Fishery Licensing Unit office.

VESSEL REPLACEMENT (CATEGORY A ONLY)

The owner(s) of a category A licensed Salmon vessel may make an application to replace the commercial fishing vessel. Both the replacement vessel and the vessel being replaced must have a survey on file with the Pacific Fishery Licence Unit (PFLU) or submitted with the vessel replacement application. Vessels must be surveyed according to the Department guidelines.

Communal commercial licenses are not eligible for vessel replacement as the licence eligibility is party-based.

A salmon licence eligibility may not be split from other vessel based licence eligibilities.

Replacement vessels for salmon licence eligibilities where no stacking is involved remain at exact overall length or smaller of the existing vessel.

Temporary vessel replacement (e.g. total loss of vessel) requests are not eligible for any of the salmon stacking allowances.

STACKING

Processing of salmon licence eligibility stacking applications ends May 31. Stacking applications are not accepted from June 01 to November 30, annually.

A salmon licence may not be split from other licence eligibilities.

Different gear and area licence eligibilities may be combined on one vessel. That is, one vessel may have a salmon gill net licence eligibility and a salmon troll licence eligibility. Multiple licence eligibilities of the same gear may be stacked on one vessel, as each licence eligibility will have a different area. A vessel may not hold more than one licence eligibility for the same area.

For the purpose of stacking licenses, a single salmon licence eligibility may be stacked to a vessel that is up to 30% longer in overall length than the overall length of the vessel from which the licence eligibility is being removed.

Salmon licence eligibilities that are married to other licence categories (or another salmon licence) may be stacked, but the additional 30% in overall length is not applicable and the salmon stacking cannot result in the stacking of other licence categories, except where permitted for that licence category.

An area change request may only be made at the time of submission of an application for licence stacking and the area change may only be made for the licence eligibility that is being stacked. The owner of the receiving vessel must make the request by completion of the applicable section on the form.

Reduced fee category A licence eligibilities may be stacked with either another reduced fee licence eligibility or a full fee licence eligibility, but the receiving vessel must be owned by an aboriginal person.

Category N licence eligibilities may be stacked with any category A licence eligibility, full fee or reduced fee, or another category N licence eligibility, in compliance with all stacking rules except that they will not be tied to the other salmon licence eligibility. Stacking a category N licence eligibility does not result in a change of licence area for the category N licence eligibility.

Category F licence eligibilities may be stacked with any category A or category N licence eligibility or another category F licence eligibility, in compliance with all stacking rules except that they will not be tied to the other salmon licence eligibility. Stacking deadline dates may vary for category F licence eligibilities due to the sign off dates of communal or contribution agreements. Stacking a category F licence eligibility does not result in a change of licence area for the category F licence eligibility.

Please visit the Salmon licence page for further information at:
http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especes/salmon-saumon/fisheries-peches/licence-permis-eng.html

12.2 OPENINGS AND CLOSURES

Due to uncertainty of both timing and size of returning salmon runs, many commercial openings are not confirmed until a few days prior to the actual opening. Also, the management plan for any area may change in-season. Fishing Areas and Subareas (or portions thereof), provisions for extensions, opening patterns, and the duration of the fishing season can all be

adjusted based on factors such as weak stock concerns, target stock abundance, fishing effort, rate of gear selectivity, domestic allocations, and other factors.

This fishing plan is designed to minimize the incidental harvest and bycatch of a range of stocks of concern (see Section 6 – Management Objectives for Stocks of Concern). Fisheries that occur on the South Coast may be required to release all non-target species to the water with the least harm, depending on local stock concerns.

Under circumstances where there appears to be an abundance of fish that could support a commercial fishery and that fishery is not specifically addressed in the IFMP, DFO will address requests to fish as identified below:

1. Attempt to verify the abundance using available observations and information of the salmon species and to determine whether or not it could provide a fishing opportunity consistent with conservation objectives and Allocation priorities for First Nations FSC and recreational fisheries. DFO will consult with local First Nations regarding any interests or concerns they may have.
2. If 1 is addressed and there appears to be adequate numbers of fish to support some level of a commercial fishery; then a precautionary approach will be taken and information requirements will be discussed and agreed upon. Initially, a limited number of vessels may be licenced, and independent catch verification will be required with timely reporting of harvest data.
3. Regular dialogue between harvesters, DFO, and others — as appropriate — will take place throughout the fishery including whether the scope of the fishery could be increased and other relevant parameters.

DFO continues to encourage the development of demonstration fisheries that promote biologically sustainable and economically viable fisheries. Fishery managers are working with fleet advisors to develop demonstration fisheries that experiment with meeting a range of objectives including matching fleet size to the available harvest, pacing fisheries to maximize value of the harvest, and developing more cooperative fishing arrangements between harvesters.

In addition to existing demonstration fisheries reviewed and approved prior to 2016; the collaborative work of the Department, FNFC, SCC, and CSAB through the initiative to update the CSAF has resulted in a common assessment process to review and develop flexible harvest arrangements (CSAF Demonstration fisheries). Additional detail on CSAF demonstration fisheries proposed for this season and information on other related work is outlined in Appendix 6.

12.3 LICENCE CONDITIONS

12.3.1 TRANSPORTING

Please see Part III of the commercial conditions of licence for transporting of salmon for additional details and information.

Transporting conditions for the salmon fisheries include a requirement to submit fish slips for all fish transferred to any commercial vessel transporting salmon; the requirement to maintain a salmon transfer log on board the vessel receiving fish; and a phone-in hail requirement to the DFO Fishery Manager.

The requirement to submit fish slips is currently in place for commercial salmon licence eligibility holders and has previously been a provincial requirement for transport (packer) vessels. It is a federal requirement for transport (packer) vessels to submit fish slips as a condition of licence.

The phone-in hail will alert DFO fishery managers prior to an opening that the vessel is active for transporting salmon in a fishery and will provide managers a better understanding of the fishing effort during an opening. After each opening, there is a requirement to phone the DFO Fishery Manager with information on where the transport (packer) vessel received fish, approximate amount of fish, total number of landings, and the time and location of the final offload. No service provider is needed to deliver on this requirement currently.

The salmon transfer log will identify when, where, and from whom fish were received. This transfer log will be required to be on board the vessel and produced for examination when requested by a representative of DFO. The completed transfer log must also be submitted to the Regional Data Unit at the end of the calendar year. No service provider is needed to deliver on this requirement currently. This condition will complement the existing fish slip program and support improved enforcement of unreported harvests and unauthorized sales in the commercial salmon fishery.

A copy of the salmon transfer log template is available on DFO website at:
https://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/forms/smon-trans-log-journal-eng.html

12.3.2 NON-RETENTION SPECIES

There will be non-retention of Chinook and Coho in most southern BC commercial fisheries with the exception of some Area E (Fraser River) and Area G (WCVI) fisheries where retention of Chinook and possibly hatchery-marked Coho may be permitted. In addition, some terminal opportunities may be provided in areas such as the WCVI (Area D) where surpluses of Coho

and Chinook may be identified. If the forecast for Fraser Late Chinook is below the escapement goal range, non-retention in any Area E Chum directed fisheries may be considered. Non-retention of Steelhead will be in effect in all commercial fisheries.

There are also local and, at times, seasonal restrictions on various other salmon species. Please refer to the Fishery Notice that is released prior to every commercial fishery to determine any locally restricted species, or any in-season updates to the above.

12.3.3 RETENTION OF LINGCOD BY SALMON TROLL

To help meet the conservation and sustainability objectives under groundfish integration, an individual transferable quota (ITQ) management system has been established for the lingcod fishery.

Implementation of an integrated commercial groundfish fishery has monitoring and reporting requirements for those wishing to retain Lingcod while salmon trolling. As in previous years, all vessels wishing to retain any amount of lingcod must have their fish validated through the established Dockside Monitoring Program. In addition to this, any vessel wishing to land lingcod must hold or acquire sufficient quota to cover catch.

Requirements include the following (less than 500 lbs. of lingcod per trip):

Vessel must have or acquire sufficient lingcod to cover catch.

Transportation requirement — All lingcod must be transported by the licenced vessel either directly to land or to a fish pen.

In addition to submitting Start Fishing and End Fishing Reports to the designated salmon service provider, the vessel master must report to the designated groundfish hail service provider to create Hail-in and Hail-out Reports. The vessel master must adhere to specific dates, times and port locations when landing groundfish catch.

Landing requirements — The landing of any fish of any species is not permitted unless a designated observer is present to authorize the commencement of weight verification.

Vessels wishing to retain and land **more than 500 lbs**. per trip of lingcod must, in addition to all of the above, meet the electronic monitoring requirements described in the Groundfish Integrated Fisheries Management Plan.

12.3.4 RETENTION OF FREEZER TROLL CHINOOK AND COHO HEADS

These requirements apply to all troll licences, unless the license is listed in a fisheries notice that identifies the troll licenses that are exempted from retaining salmon heads during the fishing season.

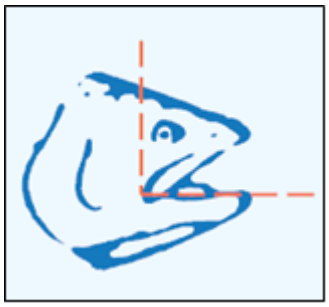


Figure 12.3-1: Fish Head CWT Portion

Head Retention: Troll vessel masters that are freezing their catch at sea must retain all heads from Chinook and Coho. Recognizing that vessels may have space limitations for retaining heads, the Department allows the alternative of retaining only the portion of the head likely to contain the CWT, referred to as the 'snout'. At a minimum, the portion of each head retained must include the upper portion of the head extending from the tip of the snout to a cut travelling from the top of the head, passing 1 centimeter behind the eye, and ending at the back corner of the mouth.

Head Storage: Heads must be stored in Salmon Head Recovery Program bags with labels. Bags and labels are available free of charge from the Department. Heads must be kept frozen until delivery and each bag must contain only the heads from a single week of fishing (where weeks run from Sunday to Saturday). All bags must be labelled completely and securely closed. Bags and labels can be obtained in three ways:

i) Pick them up at DFO offices announced via fishery notice,

ii) Contact DFO toll-free at 1-866-483-9994 to make arrangements for shipping, or

iii) Obtain them from CWT samplers at fish landing stations.

Head Delivery: The vessel master shall ensure that all bags containing heads are offloaded at the first designated fish landing station at which Chinook or Coho catch is offloaded.

In accordance with the conditions of the Area G troll license, all vessels that freeze their catch at seas are required to bring all Chinook and Coho heads (or snouts) to the dock for submission, unless the license is listed in a fisheries notice listing the Area G troll licenses that are exempted during the fishing season. The small number of vessels in Area G that freeze their catch at sea has led to the requirement that 100% of the Area G troll fleet retain salmon heads. If the number of vessels that freeze their catch at sea increases significantly, the Department may introduce exemptions by releasing a fisheries notice.

For complete head retention requirements, vessel masters freezing their catch at sea should refer to their conditions of license.

12.3.5 CHINOOK AND COHO CODED WIRE TAG (CWT) SAMPLING

Fisheries and Oceans Canada uses independent designated dockside monitoring program observers (CWT samplers) who are federally-contracted to the DFO Mark Recovery Program to sample the entire catch from randomly selected vessels at fish landing stations or processors. CWT target sample rates are established by the Department to meet bilateral Pacific Salmon Treaty standards for statistically reliable data. The minimum required sample rate is 20% of the estimated catch in all Chinook or Coho retention fisheries that intercept CWT indicator stocks. CWT target sampling rates may be adjusted in-season for high abundance or to meet additional CWT program requirements to recover a minimum quantity of CWTs from indicator stocks.

Sampling for CWTs is a mandatory catch monitoring requirement for commercial salmon fisheries. Conforming to the *Fishery (General) Regulations*, when requested, the master or owner of fishing vessels and the owner or any person who has the care, charge or control of a fish landing station must permit access to the catch and provide CWT samplers with assistance that is reasonably necessary to enable them to perform their duties according to DFO-approved sampling protocols including:

i) Making the fish readily accessible to the CWT samplers;

ii) Providing samplers with a suitable work area; and

iii) Permitting CWT samplers to remove the head from the fish free of charge

In the past, Chinook and Coho were checked for a missing adipose fin to indicate that it had a CWT. Due to mass marking, it is necessary to use electronic equipment such as handheld wands or tube detectors to recover CWTs in most fisheries. Because detection rates may be affected by sampling technique, it is important to ensure CWT samplers are given adequate time and opportunity to sample the entire catch of each vessel selected. Incomplete or unrepresentative sampling of CWTs in fisheries is a serious concern because it generates unknown bias in stock identification for fisheries management, stock assessment, hatchery assessment, and implementation of Pacific Salmon Treaty management regimes.

For more information, please contact Kathryn Fraser at 250-756-7371 or Erik Grundmann at (250) 756-7374.

12.3.6 COMMERCIAL HARVEST LOGS AND IN-SEASON REPORTING

A mandatory harvest log and in-season reporting program for catch information is required in all commercial fisheries. Harvest logs are a record of fishing activities and are required to be kept under the conditions of licence and can be administered through either a hard copy (paper)

logbook version or an electronic (E-Log) version, unless otherwise specified. Commercial salmon harvesters are required to maintain a harvest log of all harvest operations and are responsible for any associated financial costs.

To facilitate reporting of catch information, the Commercial Salmon Advisory Board (CSAB) has identified the following service provider for the paper logbook program for 2021:

Paper logbook Program:
Archipelago Marine Research Ltd. (AMR)
525 Head Street
Victoria, BC
V9A 5S1

Telephone: (250) 383-4535
Fax: (250) 383-0103
Toll Free: 1-877-280-3474
Website: http://www.archipelago.ca
Email: SalmonRegistration@archipelago.ca

Harvesters may also meet their reporting licence conditions through the E-log Program. The service provider for the E-log Program in 2021 is:

E-log Program:
M.C. Wright and Associates Ltd.
Telephone: (250) 753-1055
Website: http://www.mcwrightonline.com
Email: support@mcwrightonline.com

To make arrangements for their 2021 harvest log requirement, harvesters are required to enlist the services of one of these identified service providers. Sample logbook pages are provided in Appendix 1.

Harvesters can continue to use their existing E-logs as long as software changes are not required to meet licence conditions. If software changes are required to meet licence conditions, harvesters can select to use a paper logbook or arrange to pay for any associated costs for software updates with a service provider.

The Department has been working with the Canadian Pacific Sustainable Fisheries Society to address conditions set out in the Marine Stewardship Council action plan for the continued certification of BC Pink, Chum, and Sockeye salmon fisheries. Several conditions within the action plan identify the need for improved reporting of catch, particularly in reference to Endangered, Threatened, and Protected species. The harvest logs have been updated and include additional materials for identifying groundfish, seabirds, Sturgeon, and marine mammals at the species level. Harvesters are encouraged to provide the correct identification of

all catch to the species level in the harvest logs and when submitting catch reports to the service provider.

12.4 CATCH MONITORING

Since 2011, the Department has been working with the Commercial Salmon Advisory Board as part of a Catch Monitoring Working Group to review catch monitoring requirements consistent with the *Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries* (2012). A set of minimum requirements has been developed for commercial salmon catch monitoring programs. Minimum catch monitoring requirements identified by DFO and the Commercial Salmon Advisory Board Catch Monitoring Working Group (CSAB CMWG) include:

Independent verification of fishery specific effort

Independent verification of landed catch

Independent verification of at-sea releases

Fishery specific minimum biological sampling standards

Independent verification of compliance with fishery rules

Following multi-sectoral consultations, DFO released the national *Fishery Monitoring Policy* in 2019 (available at: http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/fishery-monitoring-surveillance-des-peches-eng.htm), replacing the regional *Strategic Framework for Fisheries Monitoring and Catch Reporting in the Pacific Fisheries*. The national *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. A phased approach to implementation of the national *Fishery Monitoring Policy* will result in a transition period from the Strategic Framework to the national policy.

Appendix 8 provides further information on the national Fishery Monitoring Policy, risk assessment tools, and steps for implementation.

12.5 COMMERCIAL SALMON ALLOCATION IMPLEMENTATION PLAN

This section describes the commercial salmon allocation implementation plan. An overview of the process to update the CSAF initiated in 2013, with principles and guidelines approved in 2015 and an evaluation framework for assessing CSAF demonstration fishery proposals

implemented in 2016. For background information on the CSAF initiative please see: http://www.pac.dfo-mpo.gc.ca/consultation/smon/saf-crrs/index-eng.html

COMMERCIAL ALLOCATION IMPLEMENTATION PLAN FOR THE 2015 – CURRENT PERIOD

Shares recommended by the CSAB were intended to apply for a 5 year period (2015 through 2019 seasons) with provision for a review after year 4 (2018 season) to determine if adjustments should be made to any sharing arrangements in subsequent years. For 2021, the sharing arrangements outlined in this IFMP are expected to remain in effect for the current fishing season. Consideration of changes to the commercial allocation implementation plan may be considered in the future based on advice for the Commercial Salmon Advisory Board and any changes will be consulted on in advance of the fishing season through the IFMP process.

The sharing arrangements described in this plan are intended to guide fishing arrangements at the local level and are not fixed entitlements. Application of these sharing arrangements is subject to meeting all conservation objectives, First Nations obligations, international commitments, deliverability and manageability constraints and other management considerations.

Although best efforts will be made to achieve these allocation targets/shares, no guarantees are offered that allocations will actually be achieved in any given year. The achievement of these shares will depend upon the ability to fish selectively and the conservation needs of the resource. In the event that allocations are not achieved, no compensatory adjustments will be made to future allocations.

As in previous years, there will be no directed commercial fisheries for Fraser River Sockeye or Fraser River Pink salmon in the north (i.e. area licence categories A, C and F and First Nations economic fisheries).

The tables below provide a complete list of allocation shares by gear type, species and production area for fisheries starting in 2015 for a period of 5 years with a review planned following the 4th year. Three new productions were approved in 2015 to clarify sharing arrangements associated with the Pacific Salmon Treaty for troll harvests of AABM Chinook and AB line Pink fisheries. For 2021 the sharing arrangements outlined in this IFMP are expected to remain in effect for the current fishing season.

SOCKEYE

Description	Areas	Seine A	Gill Net C	Troll F
Skeena/Nass	1, 3 to 5, 101 to 105	25%	75%	*
Central Coast	6 to 8	80%[a]	20%[b]	*
Rivers/Smiths Inlets	9 to 10	5%	95%	[c]

Notes on Sockeye allocation (north):
* bycatch provisions
[a] share reflects current Sockeye bycatch during Pink directed fisheries
[b] potential for re-negotiation of sharing arrangements in event of a future directed Sockeye fishery
[c] potential for future re-negotiation

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South Local	23	60.0%	40.0%	0.0%	0.0%[c]	0.0%
South -Fraser	11 to 20, 29, 121, 123 to 127	48.5%	21.6%	25.1%	0.0%[d]	4.8%
South-Fraser – Large return year (eg. 2010, 2014, 2018)	11 to 20, 29, 121, 123 to 127	48. 5%	21.6%	25.1%	0% [d]	4.8%

Notes on Sockeye allocation (south):
[c] potential for future re-negotiation
[d] a 1% share to occur in large Fraser River return years only. A 1% reduction will be proportionately applied across other fleets in those years

PINK

Description	Areas	Seine A	Gill Net C	Troll F
North	1, 2E, 2W (even), 3 to 5, 101 to 105	75.5%	22.5%[a]	2.0%
Central	6 to 10	95.0%	5.0%[b]	*

Notes on Pink allocations (north):
* bycatch provision
[a] Skeena sharing 75% seine: 25% gill net
[b] potential for future re-negotiation

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
Fraser	11 to 20, 29, 121, 123 to 127	82.5%	4.0%*	3.0%*	0.5%[c]	10.0%
Mainland	12 to 13 (mainland inlets only)	73.0%	9.0%	0.0%	0.0%	18.0%

Notes on Pink allocations (south):
[*] Pink bycatch provision required for fisheries on more abundant species
[C] potential for future re-negotiation. Pink bycatch required for fisheries on more abundant species

<<NEW PRODUCTION AREA STARTED IN 2015>>

Description	Area	Troll F
A-B line Pink troll fishery	101	100%

CHUM

Description	Areas	Seine A	Gill Net C	Troll F
North	1, 2E, 2W, 101 to 111, 130, 142	54.0%	43.0%	3.0%
North	3 to 5	55.0%[b]	45.0%[b]	*
Central	6 to 10	45.0%[c]	55.0%	*

Notes on Chum allocations (north):
[b] recent Chum non-retention; fishery allows bycatch of Chum only
[C] currently Chum non-retention
[*] bycatch provision

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South Inside	11 to 19, 28 to 29	63.0%	19.2%	12.0%	0.0%	5.8%
Nitinat	21 to 22	65.5%	0.0%	34.5%	*	0.0%
South Outside	23 to 27	0.0%d	98.0%	0.0%	2.0%	0.0%

Notes on Chum allocations (south):
[*] bycatch provision
[d] potential for future re-negotiation if Chum populations re-build

Commercial allocation sharing arrangements in Johnstone Strait are; seine Area B – 77 percent; gill net Area D – 17 percent; and troll Area H – 6 percent.

COHO

Description	Areas	Seine A	Gill Net C	Troll F
North	1 to 10, 101 to 111, 130, 142	12.5%	6.5%	81.0%

Notes on Coho allocations (north):

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South Inside	11 to 20, 29	TBD	TBD	TBD	TBD	TBD
South Outside	21 to 27, 121 to 127	9.5%	9.5%	1.0%	80.0%[a]	0.0%

Notes on Coho allocations (south):
TBD currently no directed fisheries in this area. Will be reviewed should future directed opportunity develop. Principles to be drafted regarding how to distribute impacts.
[a] Coho taken primarily in offshore fisheries

CHINOOK

Description	Areas	Seine A	Gill Net C	Troll F
Northern BC AABM Chinook	1, 2E, 2W, 101-105, 130, 142	*	*	100.0%[a]
Central	6 to 10	*	100.0%[b]	*[c]

<< NEW PRODUCTION AREA STARTED IN 2015 >>

Description	Areas	Seine A	Gill Net C	Troll F
North-Inside	3 to 5	*	100.0%[d]	*

Notes on Chinook allocations (north):
* bycatch provisions
[a] Northern BC AABM Chinook harvest
[b] near-terminal fisheries (primarily hatchery origin)
[c] review potential re-entry of troll into Production Areas 6 + 7. Bycatch provisions
[d] bycatch provision and near-terminal directed fisheries (e.g. Skeena)

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South- Inside	11 to 20, 29	1.0%[e]	3.0%	90.0%[f]	0.0%	6.0%
South - WCVI AABM Chinook	21, 23 to 27, 121 to 127	*	*	0.0%	100.0%[g]	0.0%

<< NEW PRODUCTION AREA STARTED IN 2015>>

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South- WCVI Inside	21 to 27	5.0%[h]	75.0%[i]	5.0%[i]	15.0%[j]	0.0%

Notes on Chinook allocations (south):
[e] subject review pending completion of southern BC Chinook initiative
[f] directed Fraser Chinook fishery
[g] this is WCVI AABM Chinook fishery
[h] Area 23 sharing arrangement currently 33.3% seine: 66.7% gill net. May need to review
[I] Area 25 fishery (potential for future review. 75% fishery to Area D (e.g. Conuma Bay fishery); potential 5% to Area E if future surplus at Nitinat; otherwise default to Area D)
[j] winter troll fishery

12.6 CONSERVATION MEASURES

12.6.1 SELECTIVE FISHING

The Department will work with Area Harvest Committee representatives to implement selective fishing measures to avoid non-target fish or, if encountered, to release them alive and unharmed. These measures include but are not limited to: the use of troll plugs, Alaska twist gill nets, maximum gill net set time and net length, gill net mesh size, gill net depth, seine bunt mesh size, brailing and sorting for seine vessels, and revival tanks.

12.6.2 ROBSON BIGHT

DFO will once again be seeking the co-operation of harvesters in minimizing fishing activities in Robson Bight. This is part of a long-term management plan to afford protection to the killer whale populations that frequent this area during periods from mid-May to early October. Fish harvesters are requested not to moor in the Robson Bight area. See Section 5 – Southern Resident Killer Whales for more information. Information on this management initiative can also be obtained from Department charter patrol vessels on the grounds and from Fisheries and Oceans Canada offices.

12.6.3 ROCKFISH CONSERVATION MEASURES IN SALMON TROLL

BOCACCIO

Bocaccio was recommended as "threatened" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2006. Following consultation and review, the Government of

Canada decided not to add Bocaccio to the list of wildlife species at risk. COSEWIC reassessed Bocaccio in November 2013 and recommended it as "endangered": https://species-registry.canada.ca/index-en.html#/species/740-315.

Based on updated science information and DFO's policy document "Guidance for the Development of Rebuilding Plans under the Precautionary Approach Framework", the Department set out a rebuilding plan in 2013 for stepped reductions of total Bocaccio harvest to a target level of 75 tonnes over 3 years (2013-14 to 2015-16). The rebuilding plan accounts for First Nations' priority access for food, social, and ceremonial purposes. Through the process of regular evaluation of the rebuilding plan, science advice on stock status and rebuilding strategies for Bocaccio was peer-reviewed in autumn 2019. Based on updated science information, the 2021/22 mortality cap for Bocaccio will be increased to 500 t, in the same proportion as the 2013 mortality cap. The Bocaccio mortality cap for the salmon troll fishery is 24 tonnes and is subject to daily limits specifically for Bocaccio (please refer to Conditions of Licence for details).

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

YELLOWEYE ROCKFISH

Yelloweye Rockfish (Outside and Inside populations) was recommended as "threatened" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2020: https://species-registry.canada.ca/index-en.html#/species/1023-707.

In 2015 the Department set out a plan for stepped reductions of total Yelloweye outside population harvest from the estimated total catch mortality of 287 MT in 2014 to a mortality cap of 100 MT over 3 years (2016-17 to 2018-19). Through the process of regular evaluation of the rebuilding plan, science advice on stock status and rebuilding strategies for Yelloweye Rockfish outside population was peer-reviewed in autumn 2019 (Outside population) and spring 2020 (Inside population). Based on updated science information, the 2021/22 mortality cap for Yelloweye Rockfish outside population will be increased to 217 t. Based on updated science information, the 2021/22 mortality cap for Yelloweye Rockfish inside population will remain at 15 t.

Additional information is available in Appendix 9 of the Groundfish IFMP, which will be linked in the final salmon IFMP once available.

12.7 COMMERCIAL DEMONSTRATION FISHERIES

The Department has conducted extensive consultations with the commercial salmon industry and First Nations concerning fisheries reform and renewal. Changes in the fishery will be designed to improve biological and economic performance of the fishery.

In an ever-changing environment such as resource conservation, a group may want to explore special harvesting initiatives or new management approaches to develop flexible fisheries with greater harvester control that improve product quality, increase value to the fleet and have better catch monitoring and compliance with catch limits.

The Department is interested in continuing to explore innovative ways to access TAC more efficiently, to increase market value of the product, or to access TAC that may be unavailable due to conservation concerns or that a full fleet fishery is unable to access.

To contribute to the Pacific Fisheries Reform vision, the Department will consider demonstration projects that support alternative management strategies that:

- Maintains or improves management control and conservation performance in the fishery;
- Promotes the use of clearly defined shares to improve manageability and industry viability; and
- Increases the ability of harvesters to work cooperatively to harvest available surpluses and to take on greater responsibility for control and monitoring of their fishery.

Details regarding demonstration fisheries that the department is considering are contained in Section 13 - Species Specific Salmon Fishing Plans.

In addition to existing demonstration fisheries within Section 13, additional opportunities to demonstrate flexible harvest arrangements were initiated in 2016 in support of updates to the Commercial Salmon Allocation Framework (CSAF). Guidelines and principles associated with CSAF as well as a list of CSAF demonstration fisheries are included in Appendix 6.

12.7.1 TRANSFER GUIDELINES FOR THE TEMPORARY TRANSFER OF COMMERCIAL SALMON SHARES

In consideration of discussions with the First Nations SCC, the CSAB and any feedback received, these guidelines will be reviewed and may be updated annually. **For 2021 there are no proposed updates and the transfer guidelines have remained unchanged since 2017.**

These guidelines address the transfer of commercial salmon shares between the following groups:

a) Area A-H Fishery participants with a defined percentage share of the commercial TAC

a) Area A-H fleets or portions of fleets or individual licences

b) Marine Demonstration Fishery participants

c) In-river Demonstration Fishery participants

d) First Nations with one or more Area A-H licences

e) First Nations entities who are signatories to current arrangements or area provided communal licences allowing sale that provides a defined commercial share of salmon for the given year including;

- Economic Opportunity agreements
- Harvest Agreements
- Demonstration Fisheries

Transfers of harvest shares may occur when there is a formal arrangement outlining possibilities as defined by the Guiding Principles and Operational Considerations below, (approved by DFO) between the original share-holders and the recipient. Requests can include transfer from downstream to upstream locations, and vice versa. These arrangements should identify mechanisms pre-season that will be used for transfers to ensure proper management and accounting of shares (Actual transfers may occur in-season; e.g. between ITQ fishery participants using established transfer request processes). For transfers of commercial licences, arrangements will need to be made in advance of the fishery opening for which the transfer is intended to apply to ensure appropriate allocations associated with the licence can be set aside.

In-season proposals to transfer uncaught commercial Total Allowable Catch (TAC) allocations between the above groups will reviewed and DFO will determine whether to allow the transfer of some or all of the uncaught TAC.

Requests for temporary transfers of commercial salmon shares will be reviewed with consideration to the following general principles and the operational considerations identified below.

A) Guiding Principles for Temporary Transfer of Salmon Shares:

1) Result in similar or better management control and/or conservation performance in the fishery (both for target and bycatch species/stocks)

2) Consistent with conservation measures and allocation approaches (if any) for stocks of concern, including bycatch species/stocks;

3) Respect existing aboriginal and treaty rights and the priority of Food, Social and Ceremonial access.

4) Consistent with international obligations;

5) Consistent with objectives and management measures outlined in Salmon Integrated Fishery Management Plans;

6) Respect the Common property nature of the fisheries resource: subject to Principle 3, access to the resource does not imply ownership of the resource or any portion of the resource, and is not conferred irrevocably to individuals.

7) Support opportunities to utilize Canadian commercial total allowable catch while respecting conservation requirements.

8) First Nations commercial fisheries and Area A-H commercial fisheries conducted in tidal waters will be managed under common and transparent rules for each gear type. For example, First Nations commercial troll fisheries conducted in tidal waters where Area F licences are permitted to operate will be managed in accordance with the same rules as the Area F commercial fishery for those tidal waters.

9) First Nations commercial fisheries conducted in non-tidal waters will be managed under transparent rules that are consistent with the rules used to manage marine commercial fisheries that target similar stocks associated with that production area.

10) Affordable to implement i.e. would not result in any substantive incremental costs to DFO in areas such as monitoring stock assessment and enforcement.

B) Operational Considerations Regarding Requests for Temporary Transfers:

1) Transfers of commercial salmon allocation shares will only occur when there is a Canadian commercial Total Allowable Catch (TAC) (i.e. commercial harvestable surplus) identified for the target stock or species which is available for harvest.

2) Transfers of commercial salmon shares between parties will only be considered for commercial fisheries and commercial participants with a clearly defined percentage share of the Canadian commercial total allowable catch.

3) In most cases, transfers will be based on a percentage share of the available commercial TAC. Alternate approaches for calculating transfer shares may be considered.

4) In-season transfers may occur if pre-season plans outline possibilities. For share transfers between Area A-H commercial fisheries, individual salmon shareholders or groups of salmon shareholders; the mechanism (e.g. tracking, management and accounting of shares) for facilitating transfers needs to be described and agreed upon by all parties to the arrangement and DFO pre-season. Individual commercial licence holders or groups of commercial licence holders will not be permitted to make their own allocation transfer arrangements unless these are part of a pre-season plan approved by the Department.

5) DFO will not be responsible for leading or facilitating the negotiation of transfer arrangements between parties.

6) For commercial salmon licences held by the Department, individual licence allocations will be based on an equal percentage allocation of the commercial TAC for all licences in that commercial licence area (i.e. Areas A to H).

7) If, despite the best efforts of any commercial harvest group, it becomes apparent that it will be unable to harvest its share, and no mechanisms are in place that would permit the transfer of the share to another commercial harvest group, the Department may consider transfers of uncaught commercial harvest shares to any other commercial harvest group already holding a clearly defined percentage share of the Canadian commercial total allowable catch, on a case by case basis, assuming that harvest can occur using fishing methods, times and locations permitted for that commercial harvest group.

8) Transfers of commercial salmon allocations must consider shares of all stocks that will be harvested in the recipient area.

a) Allocations transferred inland will be reduced proportionately to reflect the reduced stock composition in the more terminal harvest location (e.g. Area F troll licence shares allocated to the Kamloops Lake inland demo fishery will be only for the proportion of Thompson Chinook encountered in the marine commercial troll fishery). Alternative approaches may be considered in specific circumstances (e.g. allocation may not be proportionally reduced if harvest of an allocation in a terminal area reduces impact on stocks of conservation concern). DFO will document the rationale for its decision and make it publicly available.

b) For co-migrating stocks or management units of concern or where little or no Commercial TAC has been identified, transfers will need to consider and/or mitigate potential impacts. For example: access to a harvest share of Fraser Pink salmon might require the fishing group or individuals to have some Sockeye remaining in their harvest share of co-migrating Fraser Sockeye.

c) For co-migrating stocks/species or management units of concern where exploitation rate caps or some other limit on mortalities have been defined (e.g. Interior Fraser River Coho), the parties to the transfer arrangements are responsible for demonstrating that the transfer arrangement will be neutral or of benefit to the stock or management unit of concern (i.e. same or lower impact in the new fishing area). Limiting stocks/species will only be transferred to the extent needed to harvest the target stock transfer amount with residual amounts being available for the use by all other commercial harvest groups with a share of the targeted stocks.

d) Transfers into areas that require management adjustments need to be accounted for in determining TAC (e.g. a similar accounting process to current Fraser Sockeye).

e) Priority will be given to those proposals that allow shares to be harvested using fishing techniques that are more selective than the original technique, and / or allow harvesting in fishing areas that avoid stocks or management units of concern.

9) Harvest of commercial salmon allocations is not guaranteed and actual harvest opportunities may be limited by constraints to protect species or stocks of concern. Commercial fishery participants that demonstrate an ability to fish selectively may be able to access a greater amount of their harvest share.

10) Enhanced fisheries monitoring and catch reporting programs must be in place for participants to ensure that there is reliable accounting for both retained and released fish and that harvests do not exceed defined shares. Incremental monitoring costs will not be assumed by DFO, and will need to be covered by parties to the transfer arrangement.

11) Proposals for transfer arrangement must include contingencies for situations where shares are exceeded. Parties not complying with agreed-to arrangements could face enforcement actions.

12) Transfers of commercial salmon shares will not be permitted when this may adversely affect First Nations Food, Social and Ceremonial harvest opportunities in the area.

13) Surpluses of salmon in terminal areas (i.e. ESSR fisheries) will continue to be managed using existing ESSR guidelines.

All decisions regarding temporary salmon share transfers are one-time only. Unless otherwise communicated by DFO at the time of the decision, all future transfer requests must undergo new process of application, review and approval from DFO.

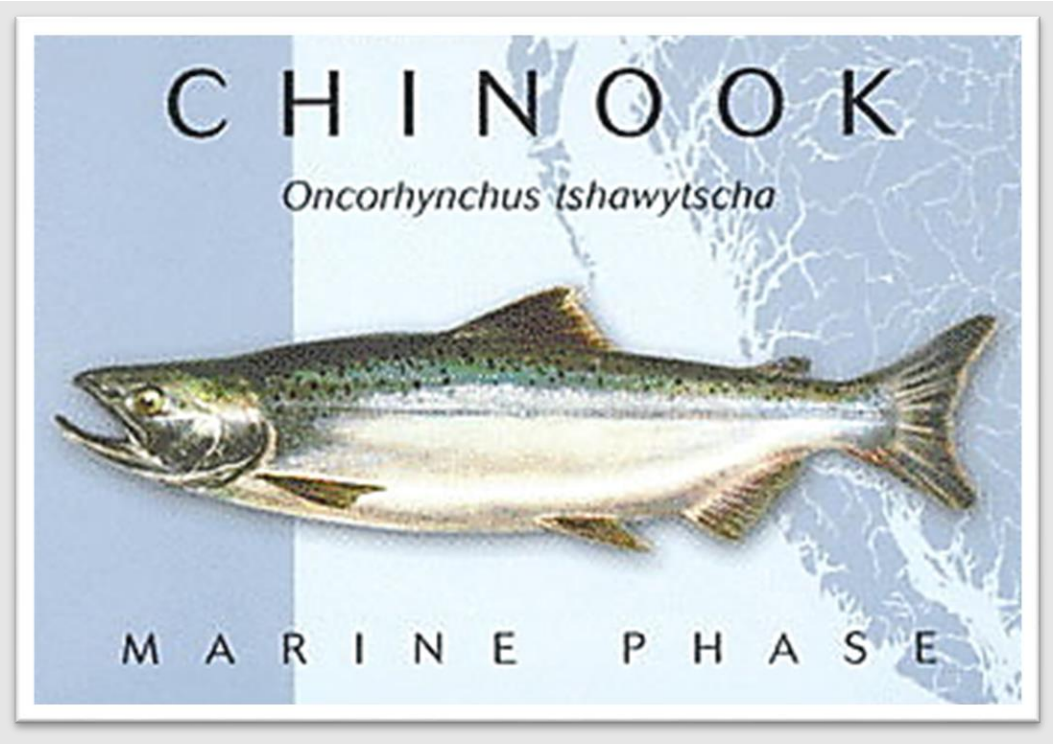
12.7.1.1 2021 TRANSFER PROPOSAL

The Area H Harvest Committee's request to transfer available Cowichan River Chum commercial TAC with Area H, Area E and Cowichan Tribes First Nation EO & demonstration fisheries was not approved in 2021. The Department will continue to work with First Nations and commercial harvesters on future fishery proposals.

13 SPECIES SPECIFIC SALMON FISHING PLANS

TABLE OF CONTENTS

13.1 SOUTHERN CHINOOK SALMON FISHING PLAN



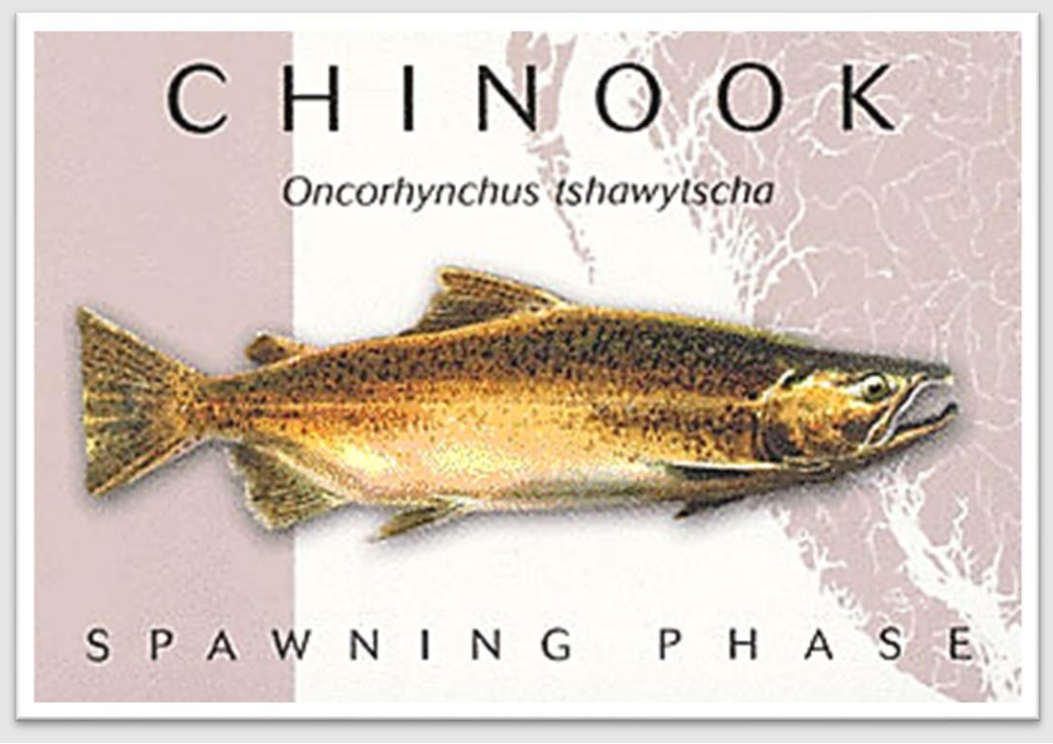


TABLE OF CONTENTS

13.1.1 SOUTHERN CHINOOK OVERVIEW

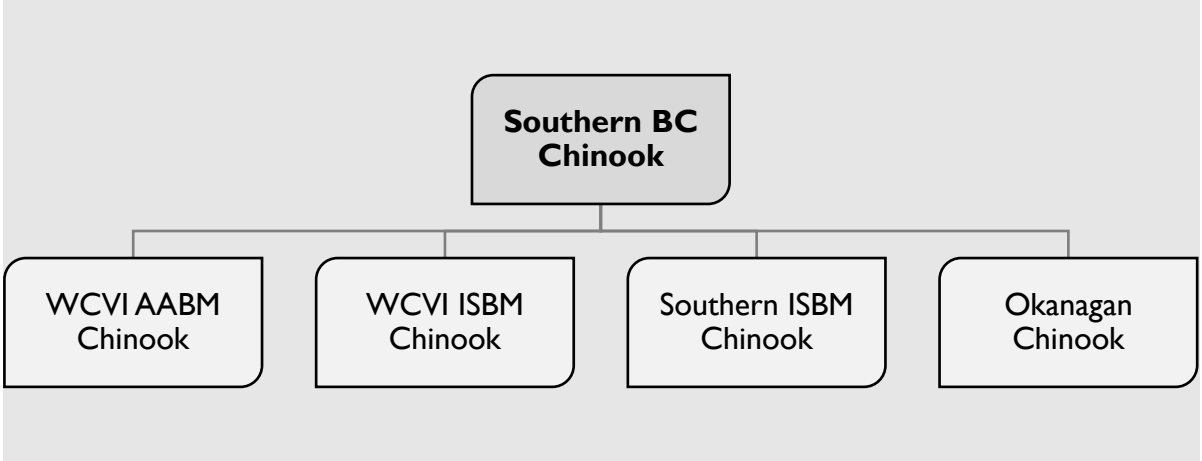


Figure 13.1-1: Overview of Southern BC Chinook

FRASER RIVER CHINOOK CONSERVATION CONCERNS:

This section of the IFMP outlines conservation measures for Fraser River. Management measures for the 2021/22 season are outlined through section 13.1 or can be found via fisheries notice or http://www.pac.dfo-mpo.gc.ca/fm-gp/salmon-saumon/fraser-chin-mgmt-gest-quin-eng.html.

GENERAL OVERVIEW

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/

Chinook salmon fisheries under the PST 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: AABM FISHERIES

AABM fisheries are mixed stock fisheries that intercept and catch migratory Chinook from many Canada- and U.S.-origin populations.

In southern BC, AABM applies to the following waters on the WCVI:

The West Coast of Vancouver Island (WCVI) troll fishery in Areas 21, 23 to 27, and Areas 121, 123 to 127

The outside recreational fishery in the following areas and times:

Areas 21, 23 and 24 and Areas 121, 123, 124 during the period October 16 through July 31, plus that portion of Areas 21, 121, 123, 124 outside of a line one nautical mile seaward of the surfline, during the period August 1 through October 15.

Areas 25, 26, 27 and Areas 125, 126, 127 during the period October 16 through June 30, plus that portion of Areas 125, 126, 127 outside of a line one nautical mile seaward from the surfline, for the period July 1 through October 15.

These fisheries are managed to an annual total allowable catch based on a forecast abundance index (AI) of the aggregate of stocks that contribute to the fishery.

All other areas and times are managed as ISBM fisheries.

OVERVIEW: ISBM FISHERIES

In response to conservation concerns for Chinook in both countries, several changes were made to PST Chapter 3 (Chinook), including targeted harvest reductions in both Canadian and U.S. fisheries and 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 or CYER). The agreement identifies reductions of up to 12.5% from 2009-2015 levels for specified Canadian and U.S. indicator populations in Canadian ISBM fisheries.

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 in southern BC include First Nations fisheries in both marine and fresh waters, recreational fisheries, WCVI seine and gill net, and Fraser River gill net.

SOUTHERN CHINOOK ENHANCEMENT INFORMATION

The major DFO operation enhancement facilities that produce Chinook are:

South Coast Area:

- Big Qualicum River hatchery
- Conuma River hatchery
- Little Qualicum River hatchery
- Nitinat River hatchery
- Puntledge River hatchery
- Quinsam River hatchery
- Robertson Creek hatchery

Fraser River Area:

- Capilano River hatchery
- Chehalis River hatchery
- Chilliwack River hatchery
- Inch Creek hatchery
- Shuswap Falls hatchery
- Spius Creek hatchery
- Tenderfoot Creek hatchery

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 (PIP and DPI) operated by volunteers, and Aboriginal Fisheries Strategy (AFS).

There are two datasets available: **Post-Season Production** from the 2019 brood year (i.e. 2020 releases, and numbers on hand for 2021 release), and the **Production Plan**, which includes proposed targets for

the upcoming 2021 brood year. These are available at the following website: http://www.pac.dfo-mpo.gc.ca/sep-pmvs/projects-projets/ifmp-pgip-eng.html

SOUTHERN BC CHINOOK – SEP PROPOSALS OR UPDATES FOR 2021

Big Bar Contingency Planning

- The DFO Big Bar Response Team in cooperation with the Upper Fraser Fisheries Conservation Alliance (UFFCA) are completing the final stages of the 2021 brood year enhancement planning to support conservation of stocks impacted by the Big Bar slide. For Chinook, the 2021 enhancement activities will be focused on natal stream collection of genetically unique Spring 5-2 stocks (assuming adequate passage to natal-spawning streams). Stock selection criteria to guide broodstock collection is in the final stages to highlight stocks to be targeted (based on existing fish culture facility constraints). The natal brood collection program will be led by UFFCA, with technical support from DFO. There are contingency plans being developed in the event that Fraser River discharge at the Big Bar site exceeds pre-determined thresholds restricting sufficient passage of Chinook stocks. The contingency includes capture of Chinook by fish wheel at Lillooet operated by the UFFCA, short-term holding in Lillooet for genetic sorting, and then long-term holding of brood at Nechako White Sturgeon Conservation Centre (NWSCC), similar to what occurred in 2020. Opportunities to increase fish culture facility capacity are ongoing, and the Big Bar Response Natal Stream Enhancement Plan will be adaptively managed.

Southern Resident Killer Whale – Recovery Plan Support

- Chilliwack hatchery to continue Chinook production in support of SRKW prey availability.
  - Total release target of 2M Chilliwack fall chinook

Fraser Chinook

- In addition to Big Bar response enhancement, enhancement feasibility pilot projects that have been recently implemented or are currently being implemented to aid in Chinook stock recovery efforts or for assessment purposes in the Fraser include:
  - Maria Slough Chinook (Chehalis Hatchery)
  - Portage Cr Chinook (Tenderfoot Hatchery)
  - Nahatlatch R Chinook (Spius Hatchery)

- Bridge R Chinook (N'Quatqua FN Hatchery)
- Nechako R Chinook (Spruce City Wildlife Association)
- Bowron R Chinook (Spruce City Wildlife Association)
- Lower Chilcotin R Chinook (*ongoing development to fulfill Spring 52 indicator requirements*)

◦ Ongoing conservation/rebuilding enhancement (Spius Hatchery):

- Spius Cr Chinook
- Salmon R Chinook
- Coldwater R Chinook

◦ In order to address a required increase in Pacific Salmon Treaty Fraser Chinook coded-wire tag release targets, DFO continues to assess options. The requirement for additional or re-prioritized hatchery space to accommodate this coincides with the same requirement to address increasing conservation enhancement needs.

South Coast Chinook:

◦ DFO's Salmonid Enhancement Program and Uchucklesaht First Nation are engaged in enhancement activities to support the rebuilding of Hucuktlis Lake Chinook with 100,000 fed fry tagged and released from Nitinat River Hatchery over the next four years.

◦ Mass Marking (fin-clipping) - pilot project occurring with Burman, Sarita and Conuma stocks.

◦ Big Qualicum Chinook – the delayed release timing group has been expanded from 100,000 to 1,000,000 in the 2020 brood year, and will be reducing production by 500,000 in 2021 brood year, based on expected improved marine survival rates of the 1,000,000 delayed group, to maintain expected adult return numbers.

◦ Quinsam River Chinook increasing delayed release timing group to 200,000 smolts.

13.1.2 WCVI AABM CHINOOK

13.1.2.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT

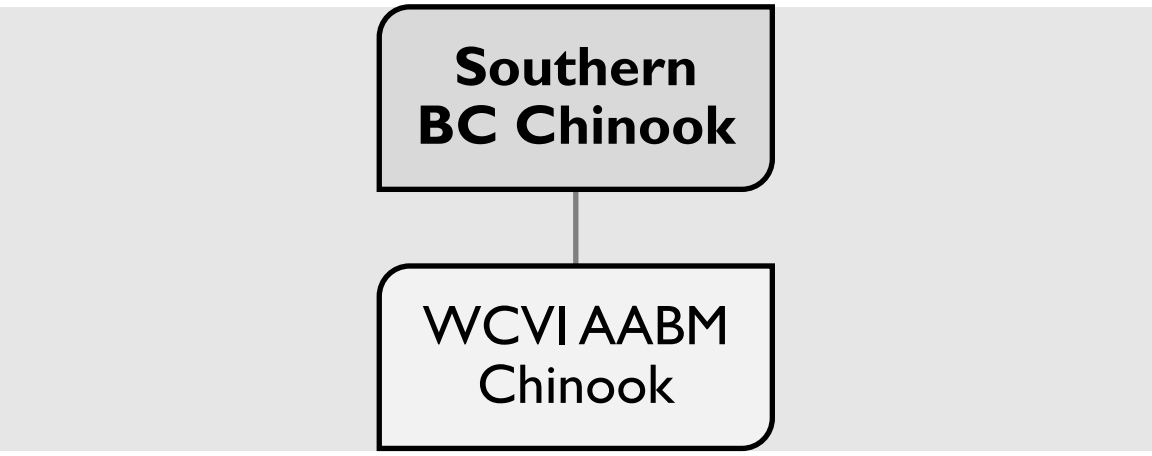


Figure 13.1-2: Overview of WCVI AABM Chinook

The AABM fishery includes commercial and First Nations fisheries catching Chinook salmon in Pacific Fishery Management Areas 21, 23 to 27, 121, and 123 to 127. AABM recreational Chinook fisheries take place annually in offshore WCVI Areas 121 to 127 and seasonally (prior to June and after September) in inshore Areas 21 and 23 to 27. Catch and effort peaks in Areas 121 to 127 during the months of June – August, and effort is largely abundance driven and weather-dependent.

The WCVI AABM Chinook fishery targets Canadian and U.S. origin wild and enhanced Chinook populations that migrate past the WCVI. The main components of the harvest are U.S. origin Chinook, however, most southern BC Chinook conservation units can also be encountered in this area. While some Chinook harvested in the WCVI AABM fishery are returning to spawn in WCVI watersheds, most of these Chinook are migrating to Washington, Oregon, or other parts of southern British Columbia to spawn.

13.1.2.2 STOCK ASSESSMENT INFORMATION

13.1.2.2.1 Pre-season

The PST Chinook Technical Committee (CTC) provides a final calibration of the Chinook Model annually. That calibration is provided in April each year, and provides Abundance Indices (AI) for the three AABM fishing areas: WCVI, South East Alaska (SEAK), and Northern BC (NBC). Table 1 in PST Chapter 3 converts the AI to the Total Allowable Catch (TAC) for each AABM fishing area for the fishing year from the previous October 1 until September 30 in the year of the calibration.

Effective January 1, 2019 the renegotiated PST terms were put into effect including an up to a 12.5 per cent reduction in the West Coast Vancouver Island AABM Total Allowable Catch (TAC). The level of reduction is based on the Abundance Index. The allowable catches for the AABM fisheries are included in Table 13.1-1 below.

Table 13.1-1 Pre-season Abundance indices and associated allowable catches for the October 1, 2021 to September 30, 2022 AABM fisheries

	SEAK	NBC	WCVI
Abundance Index	3.85	1.27	0.76
Allowable Catch	205,165	153,800	88,000

13.1.2.2.2 In-season

There is currently no in-season assessment of abundance completed for Canadian AABM fisheries. All Canadian fisheries are managed based on the pre-season AI and associated pre-season TACs.

13.1.2.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

An AABM fishery is an abundance-based regime that constrains catch or total mortality to a numerical limit computed from either a pre-season forecast or an in-season estimate of abundance, from which a harvest rate index can be calculated, expressed as a proportion of the 1979 to 1982 base period.

AABM fisheries are managed annually so as not to exceed the specified TAC. In addition, domestic conservation concerns may reduce overall harvests below the PST allowable TAC.

When there is a TAC identified for the AABM management area, targeted Chinook fisheries are planned for First Nations, recreational, and commercial sectors.

The commercial TAC is calculated by subtracting the expected Food, Social and Ceremonial (FSC) catch of 5,000, the Maa-nulth treaty entitlement (calculated annually based on the TAC), a share for the Five Nations to exercise their Aboriginal right fish and sell fish (calculated annually based on the Canadian TAC), and the expected recreational catch. COVID-19 impacts to the recreational sector has the potential to impact the catch in the 2021/2022 season. The pre-season expected recreational catch used for planning purposes is 35,000 for the 2021/2022 season.

Adjustments to the commercial harvest level may be made in-season in response to differences between expected and observed recreational catches.

13.1.2.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO AABM CHINOOK FISHERIES

Incidental Harvest, Bycatch and Constraints to AABM Chinook Fisheries Given ongoing declines in Interior Fraser River Steelhead escapement and the designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO is implementing a comprehensive, precautionary approach to the management of all fisheries in Southern BC that are likely to impact this stock of concern. A 27-day rolling window closure will be applied in 2021 to commercial troll fisheries, according to the dates and areas outlined in Table 13.1-1 below. 2021 IFR Steelhead measures will not extend to marine FSC and recreational fisheries.

AABM fisheries may be managed to avoid domestic stocks of concern outlined in Table 13.1-2.

Table 13.1-2: Risk of Impact on Stocks of Concern

Fishery Period	Risk of impact on stocks of concern
Nov – Feb	Low risk. Fisheries in October are outside the migration period and area for several stocks of concern, including Interior Fraser River Coho, WCVI Chinook, Fraser River Spring 4_2, Fraser River Spring, Summer 5_2 Chinook, and Interior Fraser River Steelhead. Catch will be comprised of fish returning in subsequent calendar year or later. The majority of the Chinook catch will be of stocks of U.S. and lower Fraser River origin.
Mar – May	High risk. Specific concerns for Fraser River Spring 4_2, Fraser River Spring and Summer 5_2 Chinook. Increased incidence of Lower Strait of Georgia (LGS) Chinook especially in May.
June – July	High risk. Potential concern for impacts on Fraser River Spring 4_2, Fraser River Spring and Summer 5_2 Chinook in June and July. Monitoring of Coho encounters beginning in early to mid-June is required. Stocks of concern, including Interior Fraser River Coho are present. Concerns for impacts on LGS Chinook.
Aug – mid Sep	High Risk. Concerns for Interior Fraser Coho, and WCVI Chinook. Reduced impacts on Fraser Spring and Summer Chinook populations.
Mid-Sep – Oct	High risk. Concerns for Interior Fraser River Steelhead in this period. WCVI Chinook may be avoided by area restrictions. Concerns for impacts on LGS Chinook and Interior Fraser Coho impacts are reduced because they are at the end of their migration out of WCVI area.

Given ongoing declines in Interior Fraser River Steelhead escapement and the designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO is implementing a comprehensive, precautionary approach to the management of all fisheries in Southern BC that

are likely to impact this stock of concern. A 27-day rolling window closure will be applied in 2021 to commercial troll fisheries, according to the dates and areas outlined in Table 13.1-3 below. 2021 IFR Steelhead measures will not extend to marine FSC and recreational fisheries.

Table 13.1-3: Summary of management actions anticipated in WCVI AABM Chinook fisheries to limit impacts on stocks of concern.

Stock of Concern	First Nations FSC and Treaty Fishery	Recreational Fishery	Commercial Fishery
WCVI Chinook	Harvest levels outlined in harvest documents and communal licences	On-going terminal area restrictions for wild stocks of concern Management measures may include a combination of daily limits, annual limits, size limits, fin fish closures and salmon non-retention areas.	WCVI - Time and area closures on WCVI (i.e. avoid inshore fisheries during the time period July to September)
Fraser River Spring 4_2 Chinook	Harvest levels outlined in Harvest documents and communal licences. Additional biological sampling requested prior to July 15.	Offshore* WCVI recreational fisheries closed to Chinook retention from April 1 – July 14 *Excluding 1 nm seaward of surfline	Time and area closures and effort limits Area G: Closed until August 1.
Fraser River Spring and Summer 5_2 Chinook	Harvest levels outlined in Harvest documents and communal licences. Additional biological sampling requested prior to July 15.	Offshore* recreational fisheries closed to Chinook retention from April 1 – July 14 *Excluding 1 nm seaward of surfline	Time and area closures and effort limits. Area G: Closed until August 1

Stock of Concern	First Nations FSC and Treaty Fishery	Recreational Fishery	Commercial Fishery
Lower Strait of Georgia Chinook	Harvest levels outlined in Harvest documents and communal licences	Catch limits and minimum size limits Measures will vary by area	AABM harvest rate reductions have reduced impact on LGS Chinook Time and area closures (Areas south of Estevan Pt. closed in March and April)* Reduced harvest levels in period March to June* *Superseded by Fraser Chinook measures
South Coast Coho (Interior Fraser River Coho management objective)	Harvest levels outlined in Harvest documents and communal licences. Bycatch retention may be considered during fisheries for other species.	Coho retention limited to selective hatchery mark fishery (SHMF) in most areas. Retention of wild Coho in inside waters on the WCVI may be considered subject to presence of IFR Coho and local abundance of WCVI Coho.	Considerations for Coho retention after mid-September in WCVI troll fisheries when stocks of concern have migrated out of the area*. *Superseded by IFR Steelhead measures.

Stock of Concern	First Nations FSC and Treaty Fishery	Recreational Fishery	Commercial Fishery
Thompson and Chilcotin River Steelhead	No measures for WCVI FSC fisheries	No measures for WCVI recreational fisheries.	27-day moving window closure for Area G troll fisheries in A123 to A127 and portions of Area 26 and Area 27: Area 123 closed September 16 to October 12 Area 124 closed September 13 to October 9 Area 125 closed September 11 to October 7 Area 126 and a portion of Area 26 (26-11) closed September 8 to October 4 Area 127 and portions of Area 27 (27-1, 27-2 westerly of a line from Cape Parkins (50 26.6395 N, 128 02.8157 W) to Kwakiutl Point (50 21.0552 N, 127 59.4362 W), 27-4 to 27-6) closed September 6 to October 2

13.1.2.5 ALLOCATION AND FISHING PLANS

13.1.2.5.1 First Nations Fisheries

Food Social and Ceremonial

WCVI FSC fisheries for AABM Chinook will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

An amount of 5,000 Chinook are set aside annually from the WCVI AABM TAC as an expected catch for WCVI First Nations.

Refer to Section 10.2 for Communal Licence Harvest Target Amounts in Southern BC/Fraser River First Nations Fisheries. Note that AABM and ISBM Chinook amounts are combined.

Fishery Monitoring and Catch Reporting

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations keep records of harvest and provide catch information to DFO in a variety of formats. If a commercial vessel is used for fishing under this licence, First Nations are asked to provide information respecting the species and quantity of fish harvested by the vessel to the DFO Catch Reporting Officer within 24 hours of the landing of fish harvested from that vessel. Catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where in-season management requires, catch reports are sought weekly during the respective fishing season.

To improve the collective understanding of stocks of concern, in terms of their migration routes, timing and fisheries impacts, First Nations are encouraged to collaborate with the Department on shaping a catch monitoring and biological sampling plan for fisheries between April 1 and July 15 to provide stock composition information for Chinook.

Treaty Fisheries

WCVI Treaty fisheries for AABM Chinook will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

Maa-nulth Fisheries (Domestic)

The Domestic allocations for salmon under the Maa-nulth First Nations Final Agreement are "an amount of Ocean Chinook Salmon equal to 1,875 pieces plus 1.78% of the Ocean Chinook Salmon Canadian Total Allowable Catch."

For the 2021/2022 Chinook year the Maa-nulth allocation of Ocean Chinook is 3,441.

The Maa-nulth First Nations provide catch reports to the Department through the Maa-nulth Electronic Reporting Program (MERP). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and pieces of salmon harvested.

To improve the collective understanding of stocks of concern, in terms of their migration routes, timing and fisheries impacts, First Nations are encouraged to collaborate with the Department on shaping a

catch monitoring and biological sampling plan for fisheries between April 1 and July 15 to provide stock composition information for Chinook.

Five Nations (Ahousaht, Ehattesaht, Hesquiaht, Mowachaht / Muchalaht, and Tla-o-qui-aht First Nations) Multi-species Fishery

The Five Nations Multi-species fishery for AABM Chinook will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

Five Nuu-chah-nulth First Nations located on the west coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht (the Five Nations) – have an aboriginal right to fish for any species, with the exception of Geoduck, within their court-defined fishing territories and to sell that fish. For further information please see Section 10.3.1.

In 2021, the Five Nations (Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht) right-based commercial fishery will be delayed until July 15 in areas seaward of 1 nautical mile from the surfline on the West Coast of Vancouver Island. Measures following this delayed opening will be a maximum 80cm size limit from July 16 to July 31. Fishing may be authorized in areas shoreward of 1 nautical mile from the surfline prior to July 16.

13.1.2.5.2 Recreational Fisheries

The recreational total annual limit for Chinook from any tidal waters was set at 10 Chinook in April 2019 as part of conservation measures to address the poor status of many Chinook stocks in BC. This annual limit remains in place for the 2021/22 season. Recreational anglers must record all Chinook retained catch either on their licence, or if mobile internet access is immediately available, the licence holder may alternatively record catch immediately in their National Recreational Licensing System (NRLS) account. DFO is also proposing to reduce the number of slots on the recreational licence to match the annual limit in effect at the time of licence issuance starting 2022.

The AABM recreational fishery includes all catch in northwest WCVI (Areas 25 to 27, 125 to 127) from October 16 to June 30, and the catch outside of the surfline (about one nautical mile offshore) from July 1 to October 15, plus all the catch in southwest WCVI (Areas 21, 23, 24, 121, 123, and 124) from October 16 through July 31, and the catch outside one nautical mile offshore from August 1 to October 15.

WCVI Areas 121, 123-127 seaward of 1 nautical mile outside of the surfline are Chinook non-retention from April 1-July 14 in efforts to address conservation concerns for Fraser River Chinook salmon. Furthermore, a maximum size limit will be in place from July 15-31.

As in all areas, recreational harvesters must purchase a fishing licence from DFO.

Updates to recreational fisheries are provided via Fishery Notice and published on the recreational fisheries website at:
http://ww.bcsportfishingguide.ca

Allocation

For planning purposes an expected catch of 35,000 is set aside for the recreational AABM fishery. If the recreational harvest is forecast in-season to be less than or greater than the pre-season expected catch the commercial TAC will be adjusted to account for the difference. COVID-19 impacts to the recreational sector, has the potential to influence the catch in the 2021/2022 season. ***Recreational Conservation Measures***

WCVI recreational fisheries for AABM Chinook will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

As a result of concerns for WCVI Chinook that emerged in the mid-late 1990's, a suite of management measures was implemented on the WCVI intended to protect wild WCVI Chinook from recreational fishing pressure. These management measures fluctuated yearly with levels and areas of restriction. In 2000, a recreational fishery "Chinook management corridor", extending one nautical mile offshore from the surfline was put in place along the West Coast of Vancouver Island in order to reduce the exploitation rate on adult female Chinook that migrate along the coastline back to their natal WCVI streams. The surfline is defined in Schedule 1 of the *Pacific Fishery Management Area Regulations*, 2007. From 2006 to 2015 the suite of management measures has remained relatively stable with very few local changes.

Management measures were modified in 2016 to focus fisheries on zones of high hatchery production, ensure small systems are provided protection through terminal finfish closures, and simplify regulations for improved compliance, enforceability, assessment, and angler education.

The WCVI Chinook management measures introduced in 2016 remains in effect. Minor modifications may be considered in the pre-season planning process.

Fishery Monitoring and Catch Reporting

Catch monitoring programs including creel surveys, logbooks and the internet recreational effort and catch survey (iREC) are the main tools used to capture recreational catch and effort information in this fishery. South Coast stock assessment staff use these programs to provide annual estimates of the recreational harvest in each area.

13.1.2.5.3 Commercial Fisheries

AABM commercial Chinook fisheries take place annually and may be permitted in Areas 23 to 27, and Areas 123 to 127.

Within the bounds of the PST provisions, commercial troll Chinook fisheries will be managed to limit impacts on domestic stocks of concern, including Fraser River Spring 4_2 Chinook, Fraser River Spring 5_2 and Summer 5_2 Chinook, WCVI wild Chinook, LGS Chinook, and Interior Fraser River Coho, and Interior Fraser River Steelhead.

Fraser River Spring 4_2 Chinook, Fraser River Spring and Summer 5_2 Chinook stocks are present off the WCVI during the spring and summer period, most prevalently when they landfall on their migration back to the Fraser River. To protect returning Fraser Chinook stocks of concern, the Area G troll fishing will not occur until August 1, 2021.

A 27-day rolling window closure to the Area G troll fishery will also be implemented in 2021 to protect Interior Fraser River Steelhead. Areas and dates for this window closure are listed in Table 13.1-4. Terminal fisheries targeting terminal abundance that are understood to not be on the migration route of IFR Steelhead may be excluded from 2021 conservation measures. See Appendix 9 for details on these terminal areas. NOTE: Area G proposal for fishery to remain open until September 30.

Table 13.1-4: IFR Steelhead Rolling Window Closure Dates for Area G Troll Fishery

Area Details	Start	End
Area 123	16-Sep	12-Oct
Area 124	13-Sep	9-Oct
Area 125	11-Sep	7-Oct
Area 26-11	8-Sep	4-Oct
Area 126	8-Sep	4-Oct
Areas 27-1 and 27-2 westerly of a line from Cape Parkins (50 26.6395 N, 128 02.8157 W) to Kwakiutl Point (50 21.0552 N, 127 59.4362 W), 27-4 to 27-6)	6-Sep	2-Oct
Area 127	6-Sep	2-Oct

LGS Chinook identified by coded-wire tagged Cowichan River Chinook are broadly distributed in time and area along the WCVI. A number of management approaches have been utilized in previous troll fisheries to limit impacts on LGS Chinook. It is anticipated that the substantial reduction in commercial

harvests under the 2009 and 2019 PST agreements should continue to provide sufficient protection for LGS Chinook.

WCVI wild Chinook continues to be a stock of concern. As a result, management measures consistent with previous years will be implemented to protect this stock. The objective for commercial troll fisheries will be to avoid encounters with WCVI Chinook by restricting the troll fishery to offshore areas during the summer period. Specifically, there will be a 5 nautical mile inside boundary in Areas 123 to 126 and a 2 nautical mile boundary in Area 127 and Subarea 126-4 during the period when WCVI Chinook return to the West Coast of the island. If further restrictions are required for conservation purposes, zone/area and time closures may be implemented. ***Allocation***

Table 13.1-5: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South - WCVI AABM Chinook	23 to 27, 123 to 127	*	*	0.0%	100.0%[g]	0.0%

Notes on Chinook allocations:
[*] bycatch provisions
[g] this is WCVI AABM Chinook fishery

The commercial TAC is calculated by deducting the Maa-nulth treaty allocation (see above for formula), 5,000 expected catch for FSC, the Five Nations Multi-species Fishery share (calculated annually based on the Canadian TAC), and an expected recreational catch of 35,000.

WCVI AABM Commercial Chinook Fishing Plan

Area G Troll Fishing Plan

Management measures for Fraser River Chinook conservation implemented in 2019 and 2020 continue for 2021. For the Area G Troll fishery, no fishing will occur prior to August 1, 2021. There will be no spring fishery in 2022.

Conservation measures for Interior Fraser River Steelhead will continue in 2021 in the form of a 27-day rolling window closure to the Area G troll fishery. See Table 13.1-4 for areas and dates. The following fishing plan is subject to change to account for domestic stocks of concern passing the WCVI. Fishery openings are planned to distribute harvests proportionately over all fishery periods subject to constraints to protect stocks of concern.

October 1 to March 15: Stock composition data indicate the majority of fish harvested during this period are U.S. origin stocks rearing off the WCVI with the exception of LGS Chinook, which may also

rear off the WCVI. Other Canadian Chinook stocks of concern are not vulnerable to the fishery during this period. Interior Fraser Steelhead measures are in effect on the WCVI in parts of October. See Table 13.1-4 for details.

During the period from October 1 to March 15, a precautionary harvest level will be set to reflect the preliminary nature of the TAC and the low catch per unit effort that typically occurs at this time of year.

March 16 to April 18: Stock composition data indicate the relative abundance of Fraser bound Chinook in the fishery begins to increase in March and April. Fraser River Spring 4_2 Chinook is stock of concern. Fraser River Spring 4_2 Chinook appear to migrate off the continental shelf seaward of the WCVI troll harvest area, rather than along the vicinity of the shoreline. However, a portion of the stock is vulnerable to the offshore troll fishery on their return migration.

A time-area closure will be maintained from March 16 to April 18 to avoid interception of Fraser River Spring 4_2 Chinook.

April 19 to June 15: Stock composition data indicate the relative abundance of Fraser and Columbia Chinook in the fishery increases during this period. Many of the Fraser and Columbia origin stocks vulnerable to the fishery during this period are relatively abundant. With the exception of LGS Chinook and Fraser River Spring 4_2 Chinook in SWVI though early May, other Canadian Chinook stocks of concern are not generally vulnerable to the fishery at this time. However, from mid-to-late June, there is increasing potential for interception of stocks of concern including Fraser River Spring and Summer 5_2 Chinook and Interior Fraser River Coho.

During the period from April 19 to June 15, the harvest is managed by an effort based model. From April 19 through April 30 the boat day cap is 250 boat days. In addition, Area 124 does not open for fishing until May 1 and Area 123 does not open until May 7. These management actions are implemented to avoid interception of Fraser River Spring 4_2 Chinook and reduce release rates for sub-legal Chinook. In 2021, for May 1 through May 31 the boat day cap is 1,000 boat days.

Dependent on the status of Fraser River Spring 4_2 Chinook, Fraser River Spring and Summer 5_2 Chinook stocks further management measures may be implemented during this fishing period including area closures. For Zone 1 management, the boat day cap of 650 boat days from the June period will be moved to April/May fishing period and the Area G fishery will be limited to a maximum of 1,900 vessel days for the period between April 19 and May 31. To provide additional protection for Fraser River Chinook stocks in 2021, no fisheries will occur prior to August 1, 2021.

June 16 to late July: Through July, stock composition data indicate the relative abundance of Fraser and U.S. bound Chinook (Puget Sound, Columbia, Oregon stocks) in the fishery remains high during this period. Many of these stocks are relatively abundant. However, opportunities for harvest in July are limited due to increasing interception of Interior Fraser River Coho. As well, starting in 2007/08, a time–

area closure for the WCVI troll was implemented from June 16 to July 31 to provide protection for Fraser River Spring and Fraser River Summer 5_2 Chinook. In 2011 an impact assessment on Fraser River Spring and Fraser River Summer 5_2 Chinook was undertaken to determine if troll fisheries could be scheduled in the last week of July in WCVI areas. The assessment supported troll opportunities in Areas 125 to 127, commencing July 24. To provide additional protection for Fraser River Chinook stocks in 2021, no fisheries will occur prior to August 1, 2021.

Late July to early August: Through August, stock composition data indicate the relative abundance of Fraser and U.S. bound Chinook (Puget Sound, Columbia, Oregon) in the fishery remains high during this period.

Fraser River Spring and Fraser River Summer 5_2 Chinook are less vulnerable to the fishery at this time. However, opportunities for harvest in August may be limited due to increasing interception of Interior Fraser River Coho.

During this period, the fishery will be managed to minimize mortality on Interior Fraser River Coho through: i) a maximum interception of Coho and ii) the mandatory use of plugs. The fishery will be managed to minimize mortality of WCVI origin Chinook through the use of closures during time and areas where WCVI Chinook stocks are prevalent.

September: Stock composition data indicate the majority of Chinook stocks vulnerable to the fishery during this period are bound for the Fraser River, Puget Sound, and the Columbia River. Vulnerable stocks of concern include Interior Fraser River Coho and WCVI Chinook, which are present until about mid-September. After mid-September, Interior Fraser River Coho are not vulnerable to the fishery and options for the retention of Coho bycatch during the Chinook fishery may be considered. The September fishing period permits the harvest of remaining WCVI AABM TAC as the Chinook year ends on September 30.

Any harvest opportunities prior to mid-September may be managed to avoid interception of Interior Fraser River Coho and WCVI Chinook. Interior Fraser River Steelhead measures are in effect on the WCVI during parts of September. See Table 13.1-4 for details. ***Fishery Monitoring and Catch Reporting***

There is a mandatory harvest log and in-season reporting program for catch information for all commercial fisheries.

- Mandatory requirement to file fishing reports in all commercial fisheries, including "Start/Pause/Cancel/End" Fishing reports.
- Mandatory catch reporting by phone-in with a paper harvest or electronic transmission with an electronic harvest log (E-log).

Catch reporting requirements are specific to each licence group and are detailed in the conditions of licence for each gear type. Additional requirements are in place for providing biological samples as required.

Harvest Agreements

There are no Harvest Agreements for AABM Chinook.

Economic Opportunities

There are no EO fisheries for AABM Chinook.

13.1.2.5.4 ESSR Fisheries

There are no ESSR fisheries for AABM Chinook.

13.1.3 WCVI ISBM CHINOOK

13.1.3.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT.

This section of the plan covers First Nations, recreational, and commercial fisheries for Chinook salmon in all waters along the WCVI and terminal areas that are not defined as AABM fisheries under the Pacific Salmon Treaty.

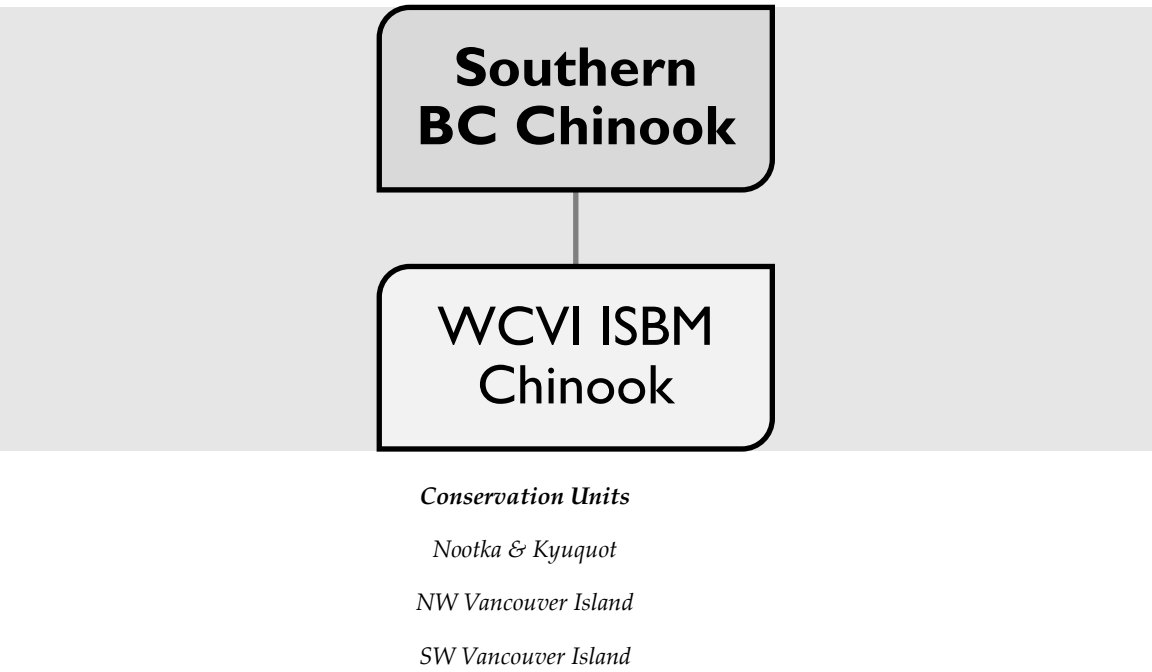


Figure 13.1-3: Overview of WCVI ISBM Chinook

13.1.3.2 STOCK ASSESSMENT INFORMATION

The integrated biological status of WCVI Chinook CUs was assessed by CSAS as part of a review of Southern BC Chinook CUs. The integrated biological status of the Nootka and Kyuquot CU was assessed as RED, SW Vancouver Island CU was RED, and NW Vancouver Island CU was "to be determined" pending development of methods where enhanced sites are predominant.

The Science Advisory Report is available at:
http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2016/2016_042-eng.html

13.1.3.2.1 Pre-season

Terminal return Stamp River / Robertson Creek Hatchery (RCH) Chinook

The forecast terminal return of adult Stamp/RCH Chinook to Barkley Sound and Alberni Inlet in 2021 is approximately 133,000 (range: 98,000–167,000). This is an above average return and similar to the strong return observed in 2020. The predicted adult age composition is 23%, 62% and 15% of 3, 4 and 5-year old fish, respectively. With an expected return of 133,000 adults, directed Chinook fisheries are expected in the terminal Alberni Inlet area for all sectors. Based on historical average age compositions and proportions of females returning in each age class, as well as historical fecundity estimates, an escapement target of 21,000 adults is expected to achieve the 39M egg target. However, in recent decades, body size, age at maturity, and fecundity have been declining in Chinook salmon originating from the west coast of North America (Lewis et al., 2015; Ohlberger et al., 2018, 2020). Hatchery staff have correspondingly observed a decrease in the numbers of eggs yielded from groups of females. While it is likely that the escapement target is biased low, further work is needed to update the estimates of the proportion of females and their average fecundities by age. Stock assessment crews will conduct extensive biosampling on female. Chinook in September and October to provided updated demographic data to inform the escapement target for 2022 and subsequent years. In the meantime, 2021 in-season management decisions will take a conservative approach to reflect the uncertainty in the current escapement target.

Terminal return of other WCVI Chinook populations

Marine survival rates for the other major hatcheries and some other WCVI stocks appeared to be significantly higher than the survival estimated for the Robertson Creek Hatchery (RCH) CWT Indicator Stock for the 2009–2011 brood years. However, for the five most recent brood years (2014–2018), survival rate estimates from the RCH CWT Indicator Stock appear to be more representative of WCVI Chinook as a whole. Therefore, general expectations are for an above average return of adult Chinook to the WCVI area. Similar to Area 23, directed fishery opportunities are expected in WCVI terminal areas dominated by hatchery stocks.

Conuma Hatchery: The predicted terminal return of Conuma Hatchery Chinook to Area 25 is 33,000 (range 20,000–47,000) with an age composition of 27%, 57% and 13% age 3, 4 and 5-year old fish, respectively.

Nitinat Hatchery: The predicted terminal return of Nitinat Hatchery Chinook to Area 22 is 28,000 (range 19,000–35,000) with an age composition of 36%, 35% and 29% age 3, 4 and 5-year old fish, respectively.

Other WCVI Stocks: The predicted terminal return of other WCVI index stocks is 42,000 (28,000–56,000) with an age composition of 20%, 63% and 16% age 3, 4 and 5-year old fish, respectively. This forecast return results largely from index stocks that are enhanced. In most recent

years, spawner abundances of wild indicator stocks within WCVI Conservation Units have been below provisional upper biological benchmarks and, in the case of the SWVI Conservation Unit, often below the lower biological benchmark in many years. Therefore, Canadian fisheries are managed to limit mortality on wild WCVI Chinook.

However, in most recent years, spawner abundances of wild indicator stocks within WCVI Conservation Units have been below provisional upper biological benchmarks, and in the case of the SWVI Conservation Unit, often below the lower biological benchmarks. Therefore, fisheries within Canada are managed to limit mortality on wild WCVI Chinook.

13.1.3.2.2 In-season

Where available, in-season abundance estimates will be reviewed in a timely manner to permit in-season consideration of additional terminal fishing opportunities for WCVI hatchery Chinook.

Brooks Peninsula

A small test fishery near the Mᵠuqᵂin / Brooks Peninsula occurred from 2017 to 2019 as one component of a Pacific Salmon Commission (PSC) high priority Chinook project to improve the precision and accuracy of annual WCVI Chinook return estimates. This test fishery did not occur in 2020 due to Covid-19 but is planned again for 2021.

13.1.3.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

In response to conservation concerns for Chinook in both countries, several changes were made to PST Chapter 3 (Chinook), including targeted harvest reductions in both Canadian and U.S. fisheries and 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). The agreement identifies reductions of up to 12.5 per cent from 2009-2015 levels for specified Canadian and US indicator populations in Canadian ISBM fisheries.

The Area 23 Harvest Committee is a forum that includes representatives from the Tseshaht, Hupacasath and Maa-nulth First Nations, the Nuu-chah-nulth Tribal Council, the Area B and D Harvest Committee, local Sport Fishing Advisory Committees, local municipal governments, the provincial government and DFO. The Area 23 Harvest Committee is developing a Somass Chinook local integrated fishery management plan that will define the escapement targets and harvest rates under various run sizes. The Decision Guidelines in this IFMP will be updated once the detailed local plan has been completed through the Area 23 Harvest Committee.

The Area 25 Harvest Committee is a forum that includes representatives from the Ehattesaht, Mowachaht/Muchalaht, and Nuchatlaht First Nations, the Area D Harvest Committee, the local Sport Fishing Advisory Committee, the Nootka Sound Watershed Society, local municipal governments and DFO. The Area 25 Roundtable is developing a detailed local management plan for Chinook in Nootka Sound and Esperanza Inlet. The Decision Guidelines in this IFMP will be updated once the detailed local plan has been completed through the Area 25 Harvest Committee.

A Chinook mass-marking pilot program is occurring in Area 25 that will require planning for potential mark-selective fisheries in future years when the marked Chinook return. Due to COVID-19, not all released Conuma hatchery Chinook were marked with an adipose fin clip in 2020. The target for 2021 is to mark all Conuma Chinook with COVID-19 safety protocols in place.

ISBM Chinook fisheries will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

13.1.3.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO WCVI ISBM CHINOOK FISHERIES

Table 13.1-6: Actions to protect wild Chinook stocks

First Nations Fishery	Recreational Fishery	Commercial Fishery	Five Nations Multi-species Fishery
Harvest documents and Communal licence harvest targets Conservation measures under discussion.	Time and area closures, including: - Finfish closures - Salmon non-retention areas - Chinook non-retention areas - Maximum size limits Daily, possession and annual limits Measures will vary by area	Time and area closures during the July to October period	Harvest documents and communal commercial licence harvest targets Potential time and area closures during the July to October period Conservation measures under discussion Measures will vary by area

13.1.3.5 ALLOCATION AND FISHING PLANS

13.1.3.5.1 First Nations Fisheries

Food Social and Ceremonial

First Nations target Chinook stocks for FSC purposes throughout the WCVI.

Refer Section 10.2 for Communal Licence Harvest Target Amount Table 10.2-1 in Southern BC/Fraser River First Nations Fisheries. Note that AABM and ISBM Chinook amounts are combined.

Specific Conservation Measures for First Nations Fisheries

Mandatory and voluntary measures have been implemented to support prey availability and reduce disturbance to Southern Resident Killer Whales, including within Southern BC waters and key foraging areas within Strait of Juan de Fuca and the Gulf Islands. These measures are outlined in section 5.8.

Protective measures may be considered in terminal areas, particularly Area 24, to reduce harvest impacts on wild Chinook. Potential measures will be the subject of discussion with First Nations communities prior to development of fishing plans.

Treaty Fisheries

Maa-nulth Fisheries (Domestic)

The Domestic allocations for Chinook salmon under the Maa-nulth First Nations Final Agreement are as follows:

An amount of terminal Chinook salmon equal to:

200 pieces, when the return of terminal Chinook salmon is critical;

1,500 pieces, when the return of terminal Chinook salmon is low;

2,000 pieces, when the return of terminal Chinook salmon is moderate; and

2,600 pieces, when the return of terminal Chinook salmon is abundant.

The Maa-nulth First Nations provide catch reports to the Department through the Maa-nulth Electronic Reporting Program (MERP). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and pieces of salmon harvested.

Five Nations (Ahousaht, Ehattesaht, Hesquiaht, Mowachaht / Muchalaht, and Tla-o-qui-aht First Nations) Multi-species Fishery

Five Nuu-chah-nulth First Nations located on the west coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht (the Five Nations) – have an

aboriginal right to fish for any species, with the exception of Geoduck, within their court-defined fishing territories and to sell that fish. For further information please see Section 10.3.1.

Fishery Monitoring and Catch Reporting

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations keep records of harvest and provide catch information to DFO in a variety of formats. If a commercial vessel is used for fishing under this licence, First Nations are asked to provide information respecting the species and quantity of fish harvested by the vessel to the DFO Catch Reporting Officer within 24 hours of the landing of fish harvested from that vessel. Catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where in-season management requires, catch reports are sought weekly during the respective fishing season.

13.1.3.5.2 Recreational Fisheries

ISBM recreational Chinook fisheries in the WCVI take place annually in inshore Areas 21 to 27. ISBM periods in Areas 21 to 24 are August 1 to October 15, and in Areas 25 to 27 are July 1 to October 15. Chinook caught in these areas outside of this time period are accounted for as part of the AABM fishery catch. Catch and effort typically peaks in these areas during the months of July and August, and effort is largely abundance driven.

The recreational total annual limit for Chinook from any tidal waters was set at 10 Chinook in April 2019 as part of conservation measures to address the poor status of many Chinook stocks in BC. This annual limit remains in place for the 2021/22 season. Recreational anglers must record all Chinook retained catch either on their licence, or if mobile internet access is immediately available, the licence holder may alternatively record catch immediately in their National Recreational Licensing System (NRLS) account. DFO is also proposing to reduce the number of slots on the recreational licence to match the annual limit in effect at the time of licence issuance starting 2022.

The minimum size limit for Chinook in recreational ISBM fisheries is 45 cm. The maximum daily limit for Chinook is 2, and the possession limit is 4. Updates to recreational fisheries are provided via Fishery Notice and published on the recreational fisheries website at:
http://www.bcsportfishingguide.ca

Recreational Fisheries Specific Conservation Measures

Conservation measures for ISBM fisheries are designed largely to protect wild Chinook returning to the WCVI. Decisions on these management measures are primarily made pre-season and go into effect based on stock outlook and expected returns. In-season management decisions can also be made in

response to localized Chinook escapements. Harvests largely target hatchery production and management measures are designed to minimize impact on wild WCVI Chinook populations.

Fishery Monitoring and Catch Reporting

Catch monitoring programs, including seasonal creel surveys, logbooks and the internet recreational effort and catch survey (iREC), are the main tools used to capture recreational catch and effort information in this fishery. South Coast stock assessment staff use these programs to provide annual estimates of the recreational harvest in each area.

13.1.3.5.3 Commercial Fisheries

Allocation

Table 13.1-7: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South- WCVI Inside	21 to 27	5.0%[h]	75.0%[i]	5.0%[i]	15.0%[j]	0.0%

Notes on Chinook allocations (south):
[h]Area 23 sharing arrangement currently 33.3% seine: 66.7% gill net.
[i]Area 25 fishery (potential for future review. 75% fishery to Area D (e.g. Tlupana Inlet fishery); potential 5% to Area E if future surplus at Nitinat; otherwise default to Area D)
[j]winter troll fishery

WCVI ISBM Commercial Chinook Fisheries

Commercial fisheries for WCVI ISBM Chinook do not occur in areas that will be impacted by 2021 Interior Fraser River Steelhead management measures.

Area D Gill Net Potential Fisheries

Mid-August to Early September - Area 23: Based on the pre-season forecast directed fishing opportunities are being planned.

Mid-August - Area 25: Based on the pre-season forecast directed fishing opportunities are being planned.

Area B Seine Potential Fisheries

Mid-August to Early September – Area 23: Based on the pre-season forecast directed fishing opportunities are being planned.

Fishery Monitoring and Catch Reporting

There is a mandatory harvest log and in-season reporting requirements for catch information for all commercial fisheries.

Mandatory requirement to file fishing reports in all commercial fisheries, including "Start/Pause/Cancel/End" Fishing reports.

Mandatory catch reporting by phone-in with a paper harvest or electronic transmission with an electronic harvest log (E-log).

Catch reporting requirements are specific to each licence group and are detailed in the conditions of licence for each gear type. Additional requirements are in place for providing biological samples as required.

Any potential Area B fishery in Area 23 would be conducted as a pooled fishery with 100% dockside monitoring program.

WCVI ISBM Chinook First Nations Economic Opportunity Fisheries

Economic Opportunities

Economic opportunities for Somass First Nations (Tseshaht and Hupacasath First Nations) are expected with agreements in place for 2021 with both Nations. Economic opportunity fisheries will be conducted under agreements that specify provisions for planning fisheries, allocations, catch reporting requirements as well as roles and responsibilities regarding the management of the fishery. The Department's general approach is that Aboriginal commercial harvest opportunities are managed using the same harvest decision guidelines as the commercial fishery. Aboriginal commercial harvest opportunities may be implemented with different times, areas, gears and regulations consistent with the overall management approach for the commercial fishery.

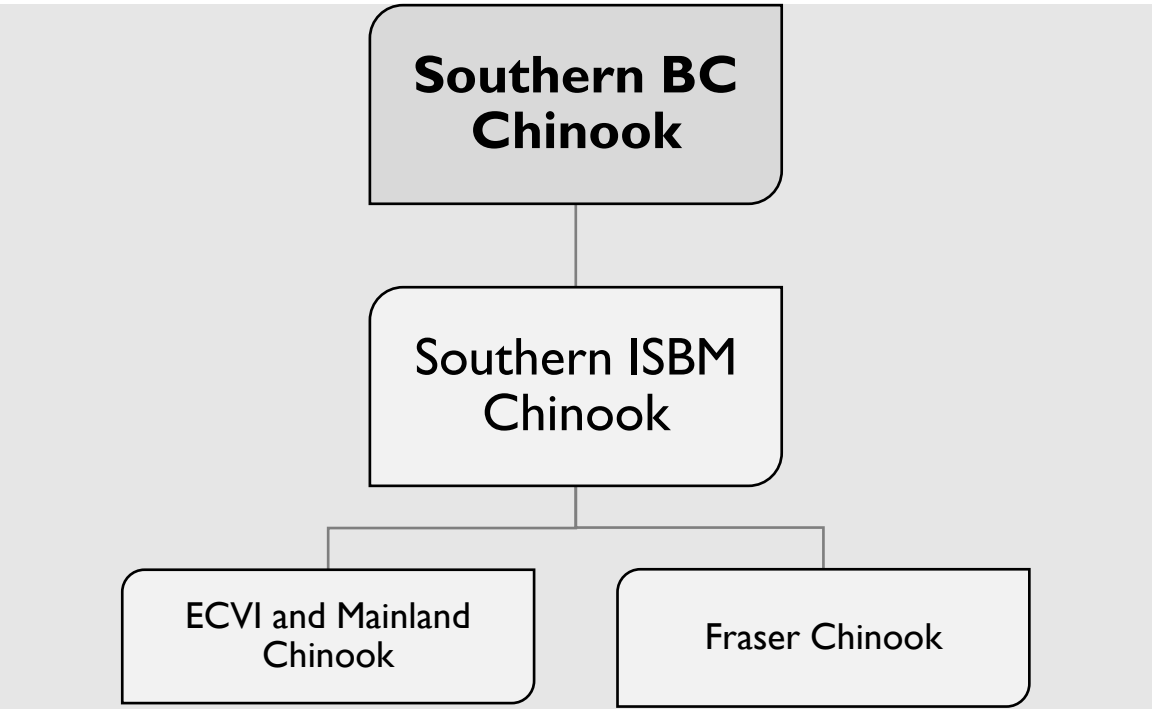
Economic opportunity fisheries for WCVI ISBM Chinook do not occur in areas that will be impacted by 2021 Interior Fraser River Steelhead management measures.

13.1.3.5.4 ESSR Fisheries

There is the potential for ESSR fisheries at the Robertson and Nitinat hatcheries as well as Burman River when broodstock collection targets will be met. These fisheries are implemented in collaboration with local First Nations and DFO hatchery staff. ESSR fisheries for other enhanced streams may be considered where excess escapements can be identified in-season. There is the potential for a Surplus to Escapement fishery on Conuma Chinook for the Five Nations under the Five Nations Multi-Species Fishery Management Plan.

13.1.4 SOUTHERN ISBM CHINOOK

13.1.4.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT



Conservation Units

Homathko

Klinaklini

NE Vancouver Island

South Coast - Southern Fjords Boundary Bay

East Vancouver Island - Cowichan & Koksilah

East Vancouver Island- Goldstream

East Vancouver Island- Nanaimo & Chemainus Falls

South Coast - Georgia Strait

East Vancouver Island - Qualicum Puntledge Fall

Vancouver Island – Georgia Strait 31

East Vancouver Island – Nanaimo Spring

Conservation Units

Spring 4₂
STh Besette Creek
LThom spring age 4₂

Spring 5₂
LFR springs
LFR Upper Pitt
FR Canyon – Nahatlatch
MFR Springs
UFR Spring
NTh spring age 5₂

Summer 5₂
LFR Summer
MFR Portage
MFR Summers
STh summer age 5₂
NTh summer age 5₂

Summer 4₁
Maria Slough
STh summer age 4₁
Shuswap River summer age 4₁
Upper Adams River

Fraser Fall 4₁
LFR fall whites

Figure 13.1-4: Overview of Southern ISBM Chinook

ISBM management regimes apply to all Chinook salmon fisheries subject to the Pacific Salmon Treaty that are not AABM fisheries. These include marine and freshwater salmon fisheries from northern British Columbia to northern Oregon coast. ISBM fisheries in Southern BC include First Nations, recreational, and commercial net fisheries (e.g. Fraser River gill net).

Fraser Chinook

For management purposes, Fraser Chinook stocks will be managed using the Spring 4_2, Spring 5_2, Summer 5_2, Summer 4_1, and Fraser Fall 4_1 management units (MUs) employed under the PST process to align fisheries management objectives with indicator stocks, escapement, catch, and exploitation rate data used in the PST process. The relationship between current PST management units, COSEWIC designatable units (DUs), Wild Salmon Policy conservation units (CUs) and spawning locations is shown in the Table 13.1-8.

Fraser Spring 4_2 Chinook

Spring 4_2 Chinook return to spawn from early March through late July, with migration peaking in June in the lower Fraser River. These populations primarily mature as adults at age 4 (90%), with lower numbers maturing at age 5 (7%) and occasionally at age 3 (3%).

Coded-wire tagged (CWT) Nicola River Chinook released from the Spius Creek Hatchery is the PST exploitation rate indicator stock used to assess survival and exploitation rates of Spring 4_2 Chinook in Canadian and U.S. fisheries. Based on CWT recoveries from fisheries, Fraser Spring 4_2 Chinook have historically been encountered in Fraser River First Nations gill net fisheries, Fraser River and tributary recreational fisheries, marine troll fisheries (e.g. WCVI and North Coast), and recreational fisheries in the Strait of Juan de Fuca and Strait of Georgia, with lower rates in other marine recreational fisheries.

There are no in-season abundance forecasts developed for this aggregate.

Fraser Spring and Summer 5_2 Chinook

Spring 5_2 Chinook return to the Fraser River to spawn from early March through late July and migration peaks in late June in the lower Fraser River. Summer 5_2 Chinook have later timing and return to the Fraser River to spawn from late June to August with a peak in late July. These populations primarily mature as adults at age 5 (approx. 70%) and age 4 (approx. 20%) with lower numbers at age 3 and age 6.

There is historic information from past CWT recoveries (e.g. Dome Creek, a discontinued Spring 5_2 indicator) for these populations that indicates Spring 5_2 Chinook have been encountered in many of the same areas as Spring 4_2 Chinook. Summer 5_2 Chinook are also encountered in the same areas, but relative impacts among fisheries may differ given the approximately 1 month later migration timing of these Summer 5_2 stocks. A PST indicator stock for Summer 5_2 Chinook is currently under development at Chilko River, but data from this indicator is not expected to be useable for management purposes for several years.

There is an in-season projection of the terminal abundance for the combined Spring 5_2 and Summer 5_2 aggregate based on catch per unit of effort (CPUE) in the Albion test fishery and historical terminal abundance in the lower Fraser River. Details of the modelling approach can be found in a CSAS document published here: http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ResDocs-DocRech/2012/2012_150-eng.html

The pre-season forecast of the terminal return of this aggregate to the mouth of the Fraser River is 32,078 (17,588 Spring 5_2 and 14,490 Summer 5_2). These estimates were developed by the PST Chinook Technical Committee as part of their annual model calibration. In 2021, the best-performing forecast models for these MUs was based on the estimated terminal return from the previous year.

Fraser Summer 4_1 Chinook

The Summer 4_1 Chinook MU consists of several populations that spawn almost exclusively within the Thompson River watershed, and migrate through the lower Fraser River from mid-July to mid-September.

Within this stock group, CWTs from the Lower Shuswap River indicator stock are used to monitor survival and exploitation. Other systems of the aggregate are assessed visually, and work is underway to calibrate their escapement estimates. There are no in-season abundance forecasts developed for this aggregate, however the pre-season terminal return to the mouth of the Fraser River is estimated as 108,611 (80% probability to fall between 61,523 and 161,376). This estimate was developed by the PST Chinook Technical Committee as part of their annual model calibration. In 2021, the best-performing forecast models for this MU was based on the average estimated terminal return from the last 5 years.

Fraser Fall 4_1 Chinook

Fall 4_1 Chinook spawn mostly in the Harrison and Chilliwack watersheds and return to the Lower Fraser between mid-August and mid-November, with the majority of the run migrating through this area from mid-September to mid-October. The pre-season estimate for 2021 total escapement is 87,722 (45,541 Chilliwack and 42,181 Harrison Chinook). This estimate was developed by the PST Chinook Technical Committee as part of their annual model calibration. In 2021, the best-performing forecast

models for this MU varied across age classes and were based on a combination of previous age-class escapements with the same brood year (sibling regression model) and an average of recent year escapements within an age class.

ECVI and Mainland Inlets

Chinook populations in the upper part of the Strait of Georgia include both ocean- and stream-type Chinook that spawn in systems from Northeast Vancouver Island down to Campbell River and across to the Mainland Inlets.

Within this stock group, CWTs from the Quinsam River indicator stock are used to monitor survival and exploitation. In the Mainland Inlet area, Phillips River is monitored and being developed into an escapement indicator stock. Only a few other systems are monitored consistently for escapement in this area, including the Nimpkish River. There are no pre-season or in-season abundance forecasts developed for this unit.

Chinook populations in the lower Strait of Georgia are dominated by ocean-type life history (upper Nanaimo Chinook have a stream type component) and fall run timing (summers runs exist in Puntledge and Nanaimo although some fish enter earlier in the year). A summer run may exist in Cowichan as well but the current status is unknown. Mean generational time is 3 or 4 years. Most populations are enhanced to some level. There are major DFO facilities on the Puntledge, Big Qualicum, Little Qualicum, Tenderfoot and Capilano Rivers. Smaller facilities enhance stocks in the Sliammon, Lang, Chapman, Seymour, Little Campbell, Oyster, Tsable, Tsolum, Englishman, Nanaimo, Chemainus, Cowichan and Goldstream systems. Most of these systems are monitored for spawner abundance.

Coded-wire tag indicators include Cowichan and Big Qualicum (Fall run timing) and Puntledge (summer run timing). Pre-season forecasts are not produced for these systems. Some are monitored in-season and reported weekly in a bulletin.

13.1.4.2 STOCK ASSESSMENT INFORMATION

In November 2018, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) released the results for an assessment of 16 southern BC Chinook designatable units (DUs). Of these units, 13 DUs originate in the Fraser River with 7 DUs assessed as endangered, 4 threatened and 1 special concern; Southern Thompson Ocean Summer Chinook were deemed not at risk. For the other 3 DUs outside the Fraser River, 1 DU (East Vancouver Island Stream Spring; Nanaimo River) was assessed as endangered and 2 Southern Mainland DUs were data deficient. Recovery potential assessments (RPAs) are currently underway for Nanaimo and Puntledge summer stocks. A proposal to amalgamate the Nanaimo spring and summer runs into one CU is also under consideration in light of recent run timing and genetic analysis. Status information is summarized in Table 13.1-8 and at

https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/chinook-salmon-2018.html. COSEWIC submitted these assessments to the Government of Canada via the annual report in fall 2019 (https://species-registry.canada.ca/index-en.html#/documents/3543). This initiated the formal process to consider whether or not these DUs will be listed under the *Species at Risk Act* (SARA). COSEWIC assessment of the remaining southern BC Chinook populations occurred in November 2020. Of these populations, 3 DUs originate in the Fraser River and all were designated as endangered. Of the other 9 DUs outside the Fraser River, 1 DU (East Vancouver Island, Ocean, Summer) was designated endangered, 3 DUs were designated as threatened, 1 DU was designated as Special Concern, 1 DU was designated not at risk, and 3 DUs were data deficient. Status information is summarized in Table 13.1-8 and at https://www.cosewic.ca/index.php/en-ca/assessment-process/detailed-version-november-2020 COSEWIC is expected to submit these assessments to the Government of Canada via the annual report in fall 2021.

Table 13.1-8: Relationship between current Pacific Salmon Treaty fishery management units, COSEWIC designatable units (DUs), Wild Salmon Policy (WSP) conservation units (CUs) and spawning locations.

Fishery Management Unit	Designatable Unit	*COSEWIC Assessment*	CU and WSP Status no colour = TBD gray = Data Deficient orange = red/amber	Spawning Locations
Spring 4₂ Chinook	DU14 BC South Thompson Stream Summer	*Endangered*	CK-16 STh Bessette Creek	Bessette Creek, Creighton Creek; Duteau Creek; Harris Creek
	DU15 BC Lower Thompson Stream Spring	*Endangered*	CK-17 Lower Thompson Spring	Bonaparte River; Coldwater River; Deadman River; Louis Creek; Nicola River; Spius Creek
Spring 5₂ Chinook	DU3 BC Lower Fraser River Stream Spring	*Special Concern*	CK-04 LFR Spring	Birkenhead
	DU4 BC Lower Fraser River Stream Summer (Upper Pitt)	*Endangered*	CK-05 LFR Upper Pitt	Pitt River-Upper
	DU7 BC Middle Fraser River Stream Spring	*Endangered*	CK-08 FR Canyon-Nahatlatch	Anderson, Nahatlatch
	DU9 BC Middle Fraser River Stream Spring	*Threatened*	CK-10 MFR Spring	Cariboo River-upper; Chilako River; Chilcotin River upper; Chilcotin River-lower; Cottonwood River; Horsefly River; Narcosli Creek; Naver Creek; West Road River and others

Fishery Management Unit	Designatable Unit	*COSEWIC Assessment*	CU and WSP Status no colour = TBD gray = Data Deficient orange = red/amber	Spawning Locations
	DU11 BC Upper Fraser River Stream Spring	*Endangered*	CK-12 UFR Spring	Bowron River; Dome Creek; East Twin Creek; Fraser River-above Tete Jaune; Forgetmenot Creek; Goat River; Holliday Creek; Holmes River; Horsey Creek; Humbug Creek; Kenneth Creek; McGregor River; McKale River; Morkill River; Nevin Creek; Ptarmigan Creek; Slim Creek; Small Creek; Snowshoe Creek; Swift Creek; Torpy River; Walker Creek; Wansa Creek; West Twin Creek; Willow River; and others
	DU16 BC North Thompson Stream Spring	*Endangered*	CK-18 NTHOM Spring	Albreda River; Blue River; Finn Creek; Lyon Creek; Mad River
Summer 5₂ Chinook	DU5 BC Lower Fraser River Stream Summer	*Threatened*	**CK-06 LFR Summer**	Big Silver Creek; Chilliwack/Vedder River; Cogburn Creek; Douglas Creek; Green River; Lillooet River; Sloquet Creek; Tipella Cr.
	DU8 BC Middle Fraser River Stream Fall	*Endangered*	CK-09 MFR Portage	Portage
	DU10 BC Middle Fraser River Stream Summer	*Threatened*	CK-11 MFR Summer	Bridge River; Cariboo River lower; Chilko River; Endako River; Kazchek Creek; Kuzkwa River; Nechako River; Quesnel River; Seton River; Stellako River; Stuart River; and others

Fishery Management Unit	Designatable Unit	*COSEWIC Assessment*	CU and WSP Status no colour = TBD gray = Data Deficient orange = red/amber	Spawning Locations
	DU13 BC South Thompson Stream Summer	*Endangered*	CK-14 STh Summer age 5[2]	Eagle River; Salmon River
	DU17 BC North Thompson Stream Summer	*Endangered*	CK-19 NTHOM Summer	Barriere River; Clearwater River; Lemieux Creek; Mahood River; Mann Creek; North Thompson River; Raft River
Summer 4[1] Chinook	DU6 BC Lower Fraser River Ocean Summer	*Endangered*	CK-07 Maria Slough Summer	Maria Slough
	DU12 BC South Thompson Ocean Summer	*Not At Risk*	CK-13 STh Summer age 4[1]	Adams River; Little River; South Thompson River; Lower Thompson River; Lower Shuswap, Middle Shuswap
			CK-15 Shuswap River Summer	
Fraser Fall 4[1] Chinook	DU2 BC Lower Fraser River Ocean Fall	*Threatened*	CK-03 LFR Fall	Harrison
ECVI and Mainland Chinook	DU19 BC East Vancouver Island Stream Spring	*Endangered*	CK-23 East Vancouver Island – Nanaimo Spring	Nanaimo River - Upper
	DU20 BC East Vancouver Island Ocean Summer	*Endangered*	CK-83 Vancouver Island – Georgia Strait Summer	Puntledge River; Chemainus River; Nanaimo River;
	DU21 BC East Vancouver Island Ocean Fall	*Special Concern*	CK-21 East Vancouver Island – Goldstream Fall	Goldstream River; Tod Creek;

Fishery Management Unit	Designatable Unit	*COSEWIC Assessment*	CU and WSP Status no colour = TBD gray = Data Deficient orange = red/amber	Spawning Locations
			CK-22 East Vancouver Island – Cowichan & Koksilah Fall	Cowichan River; Koksilah River; Mesachie Creek; Patricia Creek; Robertson River; Shaw Creek
			CK-25 East Vancouver Island – Nanaimo & Chemanius Fall	Nanaimo River; Chemainus River; Haslam Creek; Napoleon Creek
			CK-27 East Vancouver Island – Qualicum & Puntledge Fall	Englishman River; Qualicum River; Black Creek; Little Qualicum River; Morrison Creek; Nanoose Creek; Nile Creek; Oyster River, Puntledge River; Rosewall Creek, Simms Creek; Tsable River; Tsolum River; Willow Creek; Woods Creek
	DU23 BC East Vancouver Island Ocean Fall (EVI+SFj)	***Not At Risk***	CK-29 East Vancouver Island – North Fall	Campbell River; Nimpkish River; Quinsam River; Salmon River; Adams River; Amor De Cosmos Creek; Cluxewe River; Drew Creek; Eve River; Granite Bay Creek; Keogh River; Kokish River; Mckercher Creek; Menzies Creek; Mohun Creek; Nahwitti River; Quatse River; Tsitika River; White River
West Vancouver Island Chinook	DU24 BC West Vancouver Island Ocean Fall (South)	***Threatened***	CK-31 West Vancouver Island – South Fall	Bedwell System; Kennedy River Upper; Megin River; Mayeha River; Nahmint River; Nitinat River; San Juan River; Sarita River; Somass River; Toquart River; Tranquil Creek; Atleo River; Ayum Creek; Bedwell River; Campus Creek; Canoe Pass Creek; Carnation Creek, Cataract Creek, Caycuse River; Charters River; China Creek; Upper and Lower Clayoquot River; Clemens Creek; Colemans Creek Consinka Creek; Cous Creek; Cypre River; De Mamiel

Fishery Management Unit	Designatable Unit	*COSEWIC Assessment*	CU and WSP Status no colour = TBD gray = Data Deficient orange = red/amber	Spawning Locations
				Creek; Deer Creek; Doobah Creek; Drinkwater Creek; Effingham River; Franklin River; Gordon River; Harrison Creek; Henderson Lake Creek; Ice River; Itatsoo Creek; Kennedy Lake Feeder Streams; Kennedy River Lower; Klanawa River; Lens Creek; Little Toquart Creek; Lucky Creek; Macktush Creek, Maggie River; Mercantile Creek; Muriel Lake; Pipesteam Creek; Renfrew Creek; Rocky Creek; Sand River; Smith Creek; Snug Basin Creek; Somass Sproat GC System; Sooke River; Sugsaw Creek; Sutton Mill Creek; Sydney River; Thorton Creek; Tofino Creek; Twin Rivers West Creek ; Uchuck Creek; Ursus Creek; Wallace Creek; Warn Bay Creek; Watta Creek;
	DU25 BC West Vancouver Island Ocean Fall (Nootka & Kyuquot)	***Threatened***	CK-32 West Vancouver Island – Nootka & Kyuquot Fall	Artlish River; Burman River; Caton Creek; Conuma River; Gold River; Kaouk River; Leiner River; Sucwoa River; Tahsis River; Tahish River; Tlupana River; Tsowwin River; Zeballos River; Amai Creek; Battle Bay River; Brodick Creek; Cachalot Creek; Chamiss Creek; Chum Creek; Clanninick Creek; Cougar Creek; Deserted Creek; Easy Creek; Elaine Creek; Eliza Creek; Espinosa Creek; Hammond Creek; Hoiss Creek; Houston River; Jacklah River; Jansen Lake Creek; Kapoose Creek; Kashuti River; Kauwinch River; Kendrick Creek; Kleeptee Creek; Little Zeballos River; Malkscope River; Mamat Creek; Marvinas Bay Creek; Mccurdy Creek; Mckay Cove Creek 1; Mooyah River; Muchalat River; Narrowgut Creek; Nasparti River; Oktwanch River; Ououkinsh River; Owossitsa

Fishery Management Unit	Designatable Unit	*COSEWIC Assessment*	CU and WSP Status no colour = TBD gray = Data Deficient orange = red/amber	Spawning Locations
				Creek; Park River; Porritt Creek; Power River; Ransom River; Silverado Creek; Tatchu Creek
	DU1 BC Southern Maninland Boundary Bay, Ocean, Fall	***Threatened***	CK-02 Boundary Bay Fall	Lower Campbell River; Nicomekl River; Serpentine River

The integrated biological status of Southern BC Chinook CUs has been assessed by CSAS. The Science Advisory Report is available at:
http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2016/2016_042-eng.html

Status evaluations were completed and an integrated biological status designation identified for 15 of the 35 CUs; of these 15 designations, 11 were assigned a Red status, 1 was assigned a Red/Amber status, 1 was assigned an Amber status, and 2 were assigned a Green status. For another 9 of the 35 CUs, an integrated status evaluation was not possible based on the information presented at the workshop; for these CUs, the status designation is "data deficient" and this designation is not expected to change until more information becomes available. For the remaining 11 of the 35 CUs, status evaluations were not completed. Instead, the status of these CUs was classified as "to be determined". These CUs are a component of units where the enhanced sites are predominant; consensus was not reached on how to derive a WSP status assessment for such units.

Table 13.1-9: Biological Status Designation

Integrated status evaluation completed at workshop

Integrated Status	Case #	CU ID	CU Name	Area
RED	1	CK-10	Middle Fraser River_SP_1.3	Fraser
RED	4	CK-18	North Thompson_SP_1.3	Fraser
RED	6	CK-19	North Thompson_SU_1.3	Fraser
RED	11	CK-09	Middle Fraser River-Portage_FA_1.3	Fraser
RED	24	CK-17	Lower Thompson_SP_1.2	Fraser
RED	25	CK-31	West Vancouver Island-South_FA_0.x	WCVI
RED	26	CK-12	Upper Fraser River_SP_1.3	Fraser
RED	29	CK-29	East Vancouver Island-North_FA_0.x	Inner SC
RED	30	CK-32	West Vancouver Island-Nootka & Kyuquot_FA_0.x	WCVI
RED*	3	CK-16	South Thompson-Bessette Creek_SU_1.2	Fraser
RED*	5	CK-01	Okanagan_1.x	Columbia
RED / AMBER	27	CK-14	South Thompson_SU_1.3	Fraser
AMBER	12	CK-11	Middle Fraser River_SU_1.3	Fraser
GREEN(p)	9	CK-03	Lower Fraser River_FA_0.3	Fraser
GREEN	2	CK-13	South Thompson_SU_0.3	Fraser

Integrated status evaluation not possible based on information presented at workshop

Integrated Status	Case #	CU ID	CU Name	Area
DD	7	CK-82	Upper Adams River_SU_x.x	Fraser
DD	8	CK-06	Lower Fraser River_SU_1.3	Fraser
DD	10	CK-05	Lower Fraser River-Upper Pitt_SU_1.3	Fraser
DD	28	CK-28	Southern Mainland-Southern Fjords_FA_0.x	Inner SC
DD	31	CK-08	Middle Fraser-Fraser Canyon_SP_1.3	Fraser
DD	32	CK-20	Southern Mainland-Georgia Strait_FA_0.x	Inner SC
DD	33	CK-34	Homathko_SU_x.x	Inner SC
DD	34	CK-23	East Vancouver Island-Nanaimo_SP_1.x	Inner SC
DD	35	CK-35	Klinaklini_SU_1.3	Inner SC

"(p)" means provisional, and identifies cases where some participants held divergent views.
"*" means that CU definition should be reviewed.

Integrated status evaluation not attempted at workshop due to unresolved methods

Integrated Status	Case #	CU ID	CU Name	Area
TBD**	13	CK-04	Lower Fraser River_SP_1.3	Fraser
TBD	14	CK-21	East Vancouver Island-Goldstream_FA_0.x	Inner SC
TBD	15	CK-33	West Vancouver Island-North_FA_0.x	WCVI
TBD	16	CK-22	East Vancouver Island-Cowichan & Koksilah_FA_0.x	Inner SC
TBD	17	CK-02	Boundary Bay_FA_0.3	Inner SC
TBD	18	CK-07	Maria Slough_SU_0.3	Fraser
TBD	19	CK-25	East Vancouver Island-Nanaimo & Chemainus_FA_0.x	Inner SC
TBD	20	CK-15	Shuswap River_SU_0.3	Fraser
TBD	21	CK-83	East Vancouver Island-Georgia Strait_SU_0.3	Inner SC
TBD	22	CK-27	East Vancouver Island-Qualicum & Puntledge_FA_0.x	Inner SC
TBD	23	CK-9008	Fraser-Harrison fall transplant_FA_0.3	Fraser

"**" means that CU status should be re-evaluated after review of enhancement level definition.

13.1.4.2.1 Pre-season

The pre-season forecast of the Spring 4_2 Chinook terminal return to the mouth of the Fraser River is 9,138 (80% probability to fall between 3,386 and 17,650). This estimate was developed by the PST Chinook Technical Committee as part of their annual model calibration. In 2021, the best-performing forecast model for this MU was based on the estimated terminal return from the previous year.

See Appendix 10 for the full 2021 Salmon Outlook.

Table 13.1-10: Stock outlook anticipated in ISBM Chinook fisheries

Management Unit	Preliminary Stock Outlook for 2021
Fraser Chinook - Spring 4_2	The preliminary Outlook is stock of concern (1).
Fraser River Spring and Summer 5_2 Chinook	The preliminary Outlook is stock of concern (1). The majority of Chinook returning in these MUs must migrate past the Big Bar landslide to reach spawning areas.
Fraser River Summer 4_1 Chinook	The preliminary Outlook is abundant (4), except for Maria Slough which continues to be a stock of concern (1).
Fraser Lates (Harrison)	The preliminary Outlook is low (2).

Management Unit	Preliminary Stock Outlook for 2021
Lower Strait of Georgia Chinook	The preliminary Outlook is near target (3).
Middle Strait of Georgia Chinook	The preliminary Outlook is near target (3).
Upper Strait of Georgia Chinook	The preliminary Outlook is near target (3).
North Vancouver Island/ Johnstone Strait Chinook	The preliminary Outlook is near target (3)

Harrison Chinook Pre-season Forecast

The forecast estimate of the spawner abundance (i.e. returns to the spawning grounds after all ocean and freshwater fisheries harvest and mortalities) for Harrison Chinook is available annually in the spring. The stock has been maturing at younger ages recently, which has contributed to over-forecasting errors for age 4 and age 5 fish lately (i.e. for 2018, the age-4 forecast was nearly double the observed escapement). This stock has had a declining trend in productivity, which has been influenced by the younger maturation pattern and by the pattern of decreasing size-at-age for age 4 and age 5 female fish. The biologically-based escapement goal is 75,100 spawners.

Table 13.1-11 Harrison Chinook Forecast

Age	Forecast	80% Confidence Interval
2	7,031	2,036 – 15,512
3	14,725	7,546 – 23,006
4	18,747	7,619 – 31,518
5	1,678	627 – 3,516
Total	42,181	
*Age 3, 4, 5	35,150	

*Ages typically vulnerable to fisheries

Note: Harrison forecasts using sibling cohort regression models have had substantial over-forecast errors in recent years, particularly for age-4 returns, resulting in actual spawner returns less than forecast.

13.1.4.2.2 In-season

Fraser River Spring and Summer 5_2 Chinook

An estimate of terminal abundance for these management units is determined in-season from the relationship between the cumulative catch per unit effort (CPUE) of Chinook caught in the Albion test fishery from early May to mid-June and historical terminal returns to the mouth of the Fraser River.

Updates of the predicted terminal return of Spring and Summer 5_2 Chinook, for informational purposes, are generally released in mid-May and early June, with a final in-season update in the third week of June. For 2021, updates of the predicted return will not be used in-season to adjust management measures given conservation concerns for Fraser River Spring and Summer 5_2 Chinook.

13.1.4.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

All ISBM Fisheries

In response to conservation concerns for Chinook in both countries, several changes were made to PST Chapter 3 (Chinook), including targeted harvest reductions in both Canadian and U.S. fisheries and adoption of a new metric (the calendar year exploitation rate or CYER) to manage and evaluate performance in specific Canadian and U.S. individual stock-based management (ISBM) or "inside" fisheries. The agreement identifies reductions of up to 12.5% from 2009 to 2015 average levels for specified Canadian and U.S. indicator populations in Canadian ISBM fisheries.

Fraser Spring 4_2, Spring 5_2 and Summer 5_2 Chinook

New management measures for Fraser River Chinook conservation were implemented in 2019 and continued in 2020; these measures are proposed as interim measures to start the 2021 season pending a review of the 2020 fishery management measures and completion of consultations. These management units contain most of the at-risk stocks (i.e. 7 Endangered, 3 Threatened and 1 Special Concern) and stocks that spawn above the Big Bar landslide. These populations have been affected by very poor productivity, which has resulted in steep declines in spawner abundances. The poor return of natural-origin Nicola Chinook in 2020 (preliminary escapement ~2,500) continues the concern that productivity for Spring 5_2 and Summer 5_2 Chinook returning in 2021 could also be very poor as these fish may have experienced similar freshwater and marine conditions. A suite of highly-precautionary fishery restrictions are intended to provide a high degree of protection to at-risk Fraser Spring 4_2, Spring 5_2 and Summer 5_2 Chinook returning in 2021. See management objectives for Fraser Spring 4_2, Spring 5_2 and Summer 5_2 Chinook in Section 6.4.

In addition to declines in productivity, the majority of Spring and Summer 5_2 Chinook returning in 2021 will have to pass the site of the Big Bar landslide. Work is currently underway at the site of the landslide to remediate the obstacle to fish passage. If work is not complete by the spring 2021 freshet or if discharge is high during upstream migration (similar to 2020), it is likely that Chinook populations that must migrate past the landslide may be subject to increased mortality during transit through the site of the landslide.

A zoned management approach will not be used to manage Spring and Summer 5_2 Chinook in 2021.

Fraser Summer 4_1 Chinook

In 2019, the Department initiated a precautionary reduction in fishery mortalities by at least 25% for the year to protect co-migrating Fraser Chinook stocks of concern. 2021 fisheries were planned to continue with this approach.

South Thompson Chinook were identified by COSEWIC as Not At Risk and Lower Fraser Summer Ocean Chinook (Maria Slough) were identified as Endangered. The migration of Summer 4_1 Chinook overlaps with other Fraser Chinook stocks of conservation concern, particularly Summer 5_2 Chinook.

Additional reductions in commercial and recreational fishery harvest opportunities are intended to support priority access for First Nations FSC fisheries in the Fraser River given expectations for very limited FSC fishery opportunities in 2021. See section 13.1.4.5 for specific conservation measures for each sector.

For the PST, the Department has implemented an MSY escapement objective of 12,300 for the Lower Shuswap River, which is the CWT indicator stock for the Fraser River South Thompson 4_1 Chinook aggregate. This value corresponds to the spawning escapement that would produce the maximum sustained yield (S_{MSY}). The preliminary estimate of spawning escapement in 2020 was 25,500; this was estimated using mark-recapture methods.

Limited directed fishing opportunities may occur on this stock group, provided that fisheries can be designed to limit impacts on potentially co-migrating stocks of concern, including: Spring 4_2 Chinook, Spring/Summer 5_2 Chinook, Fraser Fall 4_1 Chinook, Fraser River Sockeye, and Interior Fraser Coho.

Fraser Fall 4_1 (Harrison) Chinook

The PST-approved escapement goal for Fall 4_1 (Harrison) Chinook is 75,100 spawners. The preliminary estimate of spawning escapement in 2020 was 43,000.

Since 2012, the escapement goal has not been achieved except in 2015, and the COSEWIC designation of status is *threatened*. Given declines in productivity and recent average fishery mortalities, spawner abundance may not reach the escapement goal in 2021 (forecasted escapement is 42,181). Management

measures in Canadian ISBM fisheries in 2020 were expected to further reduce fishery mortalities compared with 2019. Information to review fishery mortalities will be available in late June 2021.

See section 13.1.4.5 for specific conservation measures for each sector.

Lower Strait of Georgia (LGS) Chinook

Conservation concerns for Lower Strait of Georgia (LGS) Chinook stocks will guide fisheries planning. The Cowichan River Chinook stock is an indicator stock of marine survival and exploitation for the LGS fall Chinook. Escapement trends for Cowichan Chinook have shown an upward trend since the low point in 2009, with recent returns being well above target.

13.1.4.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO INSIDE CHINOOK ISBM FISHERIES

ISBM fisheries are constrained in order to meet PST obligations and domestic management objectives. In some cases, full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season.

Given ongoing declines in Interior Fraser River Steelhead escapement and the designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO is implementing a comprehensive, precautionary approach to the management of all fisheries in Southern BC that are likely to impact this stock of concern. Within the Fraser River (including Subareas 29-6, 29-7, 29-9, and 29-10), a 42-day closure will apply to commercial gill net, purse seine, beach seine, and shallow seine fisheries (including EO fisheries) and a 27-day closure will apply to commercial troll fisheries. Further, a 42-day closure will apply to Fraser River recreational fisheries and a 27-day closure will apply to Fraser River FSC fisheries. Areas and dates for the window closure are identified in Appendix 9

13.1.4.5 ALLOCATION AND FISHING PLANS

13.1.4.5.1 First Nations Fisheries

The Department consults with First Nations on specific fishing plans for FSC fisheries. First Nations Food Social and Ceremonial

Marine Waters

First Nations target local and passing salmon stocks for FSC purposes throughout the Inner South Coast. FSC fisheries for Southern ISBM Chinook in marine areas will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

South Coast First Nation fisheries opportunities for mixed Chinook stocks will be permitted in marine areas with the exception of the approaches to the Fraser River (Subareas 29-6, 29-7, 29-9 and 29- 10). To improve the collective understanding of stocks of concern, in terms of their migration routes, timing and fisheries impacts, First Nations are encouraged to collaborate with the Department on shaping a catch monitoring and biological sampling plan for fisheries between April 1 and July 15 to provide stock composition information for Chinook.

Non-tidal Waters (excluding Fraser River)

Some First Nations Chinook directed fisheries occur in freshwater systems throughout Southern Inside waters.

FSC fisheries for Southern ISBM Chinook in freshwater areas outside of the Fraser River system will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

Fraser River

First Nations target Fraser River Chinook for FSC purposes throughout the Fraser River main stem and in many tributary areas.

FSC fisheries in the Fraser River, including Subareas 29-6, 29-7, 29-9, and 29-10, will be affected by 2021 Interior Fraser River Steelhead conservation measures. A 27-day rolling window closure will be applied to FSC fisheries according to the times and areas outlined in Appendix 9. These measures will not extend to marine FSC fisheries.

Refer Section 10.2 for Communal Licence Harvest Target Amount Table 10.2-1 in Southern BC/Fraser River First Nations Fisheries. Note that AABM and ISBM Chinook amounts are combined.

Specific Conservation Measures for First Nations Fisheries

Lower Strait of Georgia Chinook

Protective measures may be considered in terminal areas to reduce harvest impacts. Potential measures will be the subject of discussion with First Nations communities, and include processes such as the Cowichan Fisheries Roundtable prior to development of fishing plans.

Fraser River Chinook

Fraser River First Nations food, social and ceremonial fisheries will be restricted to unplanned events or first fish ceremonies until July 15 followed by opportunities to target healthy Summer 4$_1$ Chinook primarily in August. DFO will be working with Fraser River First Nations on specific fishing opportunities with the objective of maintaining overall very low fishing pressure when at-risk stocks may be impacted. This will result in limited and reduced fisheries openings or fishing times; actual plans will be announced in-season.

Mandatory and voluntary measures have been implemented to support prey availability and reduce disturbance to Southern Resident Killer Whales, including within Southern BC waters and key foraging areas within Strait of Juan de Fuca and the Gulf Islands. These measures are outlined in section 5.8.

Treaty Fisheries

Treaty fisheries targeting Chinook within the Fraser River (including Subareas 29-6, 29-7, 29-9, and 29-10) will be subject to closures to protect Interior Fraser River Steelhead as outlined in Appendix 9. These measures do not extend to marine Treaty fisheries.

Tsawwassen Fisheries (Domestic)

In any year, the Tsawwassen Fishing Right Allocation for Chinook salmon will be determined by an abundance-based formula, based on Canadian Total Allowable Catch that produces an average annual harvest of 625 Fraser River Chinook salmon based on Fraser River Chinook salmon returns for the 1982 to 2004 time period. The Tsawwassen Final Agreement is available at: http://www.aadnc-aandc.gc.ca/eng/1100100022703/1100100022704

Tla'amin Fisheries (Domestic)

The Domestic allocations for Chinook under the Tla'amin First Nation's Final Agreement are as follows:

Non-terminal Chinook: A maximum of 200 Chinook salmon, which are not of terminal origin, caught in the Tla'amin Fishing Area. The allocation will be determined by an abundance-based formula. The Tla'amin Fishing Area for all species of Fish and Aquatic Plants is within portions of Pacific Fisheries Management Areas 14, 15, and 16.

Terminal Chinook: A number of Chinook salmon equal to 25% of the Available Terminal Harvest for Chinook salmon stocks that originate from a Terminal Harvest Area, if the Minister determines that there is an Available Terminal Harvest for those stocks.

The Tla'amin Final Agreement is available at:

https://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-HQ-LDC/STAGING/texte-text/tla_1397237565325_eng.pdf

Fishery Monitoring and Catch Reporting

Marine Waters

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations are asked to keep records of harvest and provide catch information to DFO in a variety of formats. Under this licence, if a commercial vessel is used for fishing, First Nations are asked to provide information respecting the species and quantity of fish harvested by this vessel, to the DFO Catch Reporting Officer within 24 hours from landing harvested catch. In addition, catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where in-season management requires, catch reports are sought weekly during the respective fishing season.

The Tla'amin First Nation provides catch reports to the Department through the Aboriginal Harvest Management System (AHMS). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and biological samples.

Fraser River

In the Fraser River watershed, catch monitoring programs are managed through Activity Funding or Comprehensive Fisheries Agreements.

In the lower Fraser River (below Sawmill Creek), monitoring programs implemented typically include landing site or vessel based collection of catch and effort information paired with validation of effort by vessel patrols or overflights. Specific focus has also been placed on sampling of Chinook salmon for mark rate information and coded-wire tags (CWTs) to support the Salmon Head Recovery Program. Catch reports are received by DFO from catch monitoring programs on a weekly basis, within 48 hours of a fishery closing.

For fisheries above Sawmill Creek, catch monitoring programs range from basic census type to more enhanced programs that include collecting effort and catch rate information in creel sample programs.

13.1.4.5.2 Recreational Fisheries

Recreational Conservation Measures for Southern Inside ISBM Fisheries

Significant Chinook non-retention measures will be implemented in most South Coast Areas to address conservation concerns for Fraser River Chinook salmon. A full list of the management measures implemented by Area is provided below.

ISBM recreational Chinook fisheries in inside waters normally take place from Queen Charlotte Strait south to the Strait of Juan de Fuca throughout the year. Significant amounts of catch and effort occur in waters near Port Hardy, Campbell River, the Strait of Georgia and Southern Vancouver Island including Juan de Fuca Strait, with both catch and effort peaking during the summer months.

The recreational total annual limit for Chinook from any tidal waters was set at 10 Chinook in April 2019 as part of conservation measures to address the poor status of many Chinook stocks in BC. This annual limit remains in place for the 2021/22 season. Recreational anglers must record all Chinook retained catch either on their licence, or if mobile internet access is immediately available, the licence holder may alternatively record catch immediately in their National Recreational Licensing System (NRLS) account. DFO is also proposing to reduce the number of slots on the recreational licence to match the annual limit in effect at the time of licence issuance starting 2022.

The minimum size limit for Chinook in Queen Charlotte Strait, Johnstone Strait and the Strait of Georgia is 62 cm. The minimum size limit in waters south of Cadboro Point through Juan de Fuca Strait (Subareas 19-1 to 19-4 and 20-5 to 20-7) is 45 cm.

The Department developed an evaluation framework to inform decision making on proposed opportunities for additional Chinook fisheries in times and areas where harvest opportunities can be provided without jeopardizing conservation of Fraser River Chinook or other stocks of concern. Consultation on this work occurred in March and April 2021.

Table 13.1-12 outlines fisheries that were approved in areas outside the migration of Fraser River stocks of concern:

Table 13.1-12: Proposed MSF Fisheries - Southern ISBM

Location*	Fishery Type	Date Range	Size Restrictions	Daily Retention	Possession
• Area 12 (Broughton Archipelago) • Area 13 (Bute Inlet and Ramsay Arm)	Hybrid	April 1 to July 14	80 cm maximum unmarked; 62 cm minimum all	1 (Marked or unmarked)	2

• Area 15 (Homfray Channel and Toba Inlet) • Area 16 (Sechelt and Jervis Inlets)					
• Area 20 (Beecher Bay)	Mark Selective	April 1 to July 31	45 cm minimum marked	1 (Marked only)	2
• Subarea 28-9 (Capilano River area)	Hybrid	August 13 to December 31	No maximum size limit	1 (Marked or unmarked); 2 per day after September 1	2

The fishery openings in the above table were approved on a trial basis for 2021 and may be considered for 2022 pending evaluation of post-season information for the 2021 fishery.

A full list of the Chinook management measures for 2021, are as follows (excluding the 2021 approved areas listed above):

Queen Charlotte Strait and Johnstone Strait – Area 12 (excluding Subarea 12-14):

- *April 1 to July 14: No retention of Chinook*
- *July 15 to August 16: 1 Chinook per day, max 80 cm*
- *August 17 to August 31: 1 Chinook per day*
- *September 1 to March 31: 2 Chinook per day*

For clarity, Chinook daily limits remain at 2 per day in Area 11 and Subarea 12-14.

Strait of Georgia – North – Areas 13 to 17, Subareas 29-1 and 29-2:

- *April 1 to July 14: No retention of Chinook*
- *July 15 to August 31: 1 Chinook per day, max 80 cm*
- *September 1 to March 31: 2 Chinook per day*

Strait of Georgia – South and Juan de Fuca – Areas 18 and 19, Subareas 20-3 to 20-7, Area 28 and Subareas 29-3 to 29-5 (with the exception of those portions of Areas 28 and 29 listed below), and Subarea 29-8:

- *April 1 to July 31: No retention of Chinook*
- *August 1 to August 31: 1 Chinook per day, max 80 cm*
- *September 1 to March 31: 2 Chinook per day*

Portions of Southern Strait of Georgia, Howe Sound and Burrard Inlet – Subareas 28-7 to 28-9; Subarea 28-1; and that portion of Subarea 28-2 that lies southerly of a line drawn due east from Halkett Point on Gambier Island (49 26.735'N, 123 19.302'W) to a point (49 26.550'N, 123 14.317'W) on the mainland corresponding with the southeast point of the Lions Bay RCA; and those portions of 29-3 to 29-5 that lie east of a line from Gower Point (49 23.021'N, 123 32.166' W) near Gibsons to Shah Point on the southern tip of Valdes Island (49 01.695'N, 123 35.721'W)

- *April 1 to Aug 31: No fishing for Chinook*
- *Sept 1 to March 31: 2 Chinook per day*

Juan de Fuca Strait (West) Subareas 20-1 and 20-2

- *April 1 to July 14: No retention of Chinook*
- *July 15 to July 31: 2 Chinook per day, max 80 cm.*
- *August 1 to March 31: 2 Chinook per day*

Additional opportunities for Chinook retention may be announced in local areas or terminal locations.

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.

Fraser River Mouth (Subareas 29-6, 29-7, 29-9 and 29-10), Fraser River tidal waters (29-11 to 29-17) and the Fraser River in Region 2:

In addition to the measures to protect Chinook outlined below, Interior Fraser River Steelhead conservation measures will be implemented to the Fraser River recreational fishery following the Coho window closure. A 42-day rolling window closure will apply to Fraser River recreational fisheries in the areas and dates listed in Appendix 9 (including Subareas 29-6, 29-7, 29-9, and 29-10). These measures do not extend to marine recreational fisheries.

January 1 until August 23 – no fishing for salmon

August 23 to December 31 – no retention of Chinook salmon.

Fraser River: (some exceptions listed below under tributaries directed on Summer 4_1 Chinook in terminal areas)

Fraser River, Region 3

January 1 to July 31, no fishing for salmon.

August 1 to August 16, no fishing for Chinook salmon.

South Thompson River: August 16 to Sept. 22 – 4 per day, 2 over 50 cm

Kamloops Lake: August 28 to Sept. 22 – 4 per day, 1 over 50cm

Thompson River: August 28 to Sept. 22 – 4 per day, none over 50 cm

Fraser River, Region 5A – Fraser Watershed

No fishing for salmon, except for the following area where Sockeye salmon fisheries may be permitted if sufficient in-season abundance exists:

The waters of Horsefly Bay, no fishing for salmon from January 1 to August 21, no fishing for Chinook salmon August 22 to September 15. No fishing for salmon September 16 to December 31.

No fishing for salmon, except for the following area where Pink Salmon fisheries may be permitted if sufficient in-season abundance exists:

The waters of Quesnel River, downstream from boundary signs at the mouth of Quesnel Canyon to the Johnston Subdivision bridge near Quesnel, BC, no fishing for salmon from January 1 to September 15, no fishing for Chinook salmon September 16 to September 26. No fishing for salmon September 27 to December 31.

Fraser River, Region 7

No fishing for salmon, except in the following area where Sockeye salmon fisheries may be permitted if sufficient in-season abundance exists:

Nechako River downstream of the Foothills Bridge - No fishing for salmon January 1 to August 26. No fishing for Chinook salmon, August 27 to September 30. No fishing for salmon October 1 to December 31.

Fraser River, Region 8

January 1 to August 16, no fishing for salmon.

Mabel lake: August 16 to September 12 – 4 per day, only 2 over 50 cm.

Lower Shuswap River: August 16 to September 12 – 4 per day, only 2 over 50 cm (lower) upstream from white triangular fishing boundary signs upstream of Mara Bridge to Mabel Lake. No fishing 50 meters upstream and downstream of the Trinity Valley Road Bridge from June 15 to November 15.

Lower Georgia Strait (LGS) Chinook

Management measures are in place to protect Lower Strait of Georgia Chinook, including the Nanaimo, Chemainus, and Cowichan River Chinook stocks. In the past, seasonal time and area closures in specific locations in the northern Strait of Georgia were implemented; however, these were lifted in 2019. The management measures in the approach waters, Nanaimo to Saanich Inlet have been in place in recent years and will remain in place for the 2021 season.

A decision rule matrix for in-river angling opportunities in the Cowichan River is being developed through a subcommittee of the Cowichan Harvest Roundtable. This matrix will help define when recreational angling opportunities can be expected and further develop the draft decision guidelines.

Updates to recreational fisheries are provided via Fishery Notice and published on the recreational fisheries website at:
http://www.bcsportfishingguide.ca

Fishery Monitoring and Catch Reporting

Marine Waters

Catch monitoring programs including creel surveys, logbooks and the internet recreational effort and catch survey (iREC) are the main tools used to capture recreational catch and effort information in this fishery. South Coast stock assessment staff use these programs to provide annual estimates of the recreational harvest in each area.

Fraser Watershed

Creel surveys are conducted in portions of the lower Fraser River and select tributaries in order to estimate recreational catch and effort for the times and areas surveyed. Typically, the creel survey in the lower Fraser River mainstem begins when the mainstem is opened to recreational salmon fishing; however, over the last number of years, the survey end date has been variable (mid-September to end of November). The creel surveys conducted on the Chilliwack River and Nicomen-Norrish recreational fisheries have remained stable over the last number of years both in times and areas (Chilliwack is surveyed from mid-September to mid-November and Nicomen-Norrish is surveyed from early October to the end of November).

Similar to recent years, catch monitoring programs in the Fraser watershed upstream of Alexandria will range from no monitoring to fisher reported catch to highly-intensive creel surveys. The expected effort and catch in a fishery, harvest rate, potential bycatch, and any biological sampling requirements will be taken into account when planning the catch monitoring program for these areas.

13.1.4.5.3 Commercial Fisheries

There are no directed commercial Chinook fisheries in Southern Inside marine waters and Chinook non-retention is in place in most times and areas in fisheries directed on other species.

Allocation

Table 13.1-13: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South - Inside	11 to 20, 29	1.0%[e]	3.0%	90.0%[f]	0.0%	6.0%

Notes on Chinook allocations (south):
[e]subject review pending completion of southern BC Chinook initiative
[f]directed Fraser River Chinook fishery

Southern ISBM Commercial Chinook Fisheries

Due to concerns for Lower Strait of Georgia stocks, no directed Chinook fisheries are planned and there will be non-retention in fisheries directed at other species.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Area B Seine

There will be no directed Chinook fisheries and non-retention is in effect in fisheries directed at other species.

Area D Gill Net

There will be no directed Chinook fisheries and non-retention is in effect in fisheries directed at other species.

Area E Gill Net

There are no directed Chinook demonstration fisheries in the Fraser River due to conservation concerns for Fraser River Chinook stocks. As the pre-season forecast for Fall 4_1 Chinook is well below the escapement goal, retention of Chinook will not be permitted during Chum-directed fisheries.

Area H Troll

There will be no directed Chinook fisheries and non-retention is in effect for fisheries directed at other species.

Fishery Monitoring and Catch Reporting

There is a mandatory harvest log and in-season reporting program for catch information for all commercial fisheries.

- Mandatory requirement to file fishing reports in all commercial fisheries, including "Start/Pause/Cancel/End" Fishing reports.
- Mandatory catch reporting by phone-in with a paper harvest or electronic transmission with an electronic harvest log (E-log).

Catch reporting requirements are specific to each licence group and are detailed in the conditions of licence for each gear type. Additional requirements are in place for providing biological samples as required.

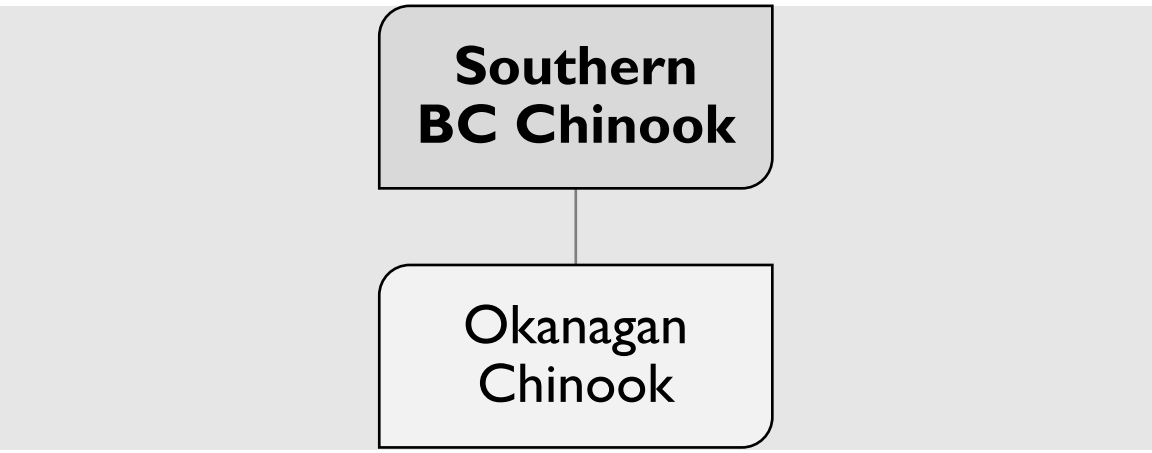
13.1.4.5.4 ESSR Fisheries

ESSR fisheries may occur at DFO hatchery facilities that have a surplus of returning hatchery Chinook. In past years, ESSR fisheries have taken place at:

- Capilano Hatchery – Mainland BC
- Chilliwack River Hatchery – Lower Fraser
- Chehalis Hatchery – Lower Fraser
- Puntledge Hatchery – Strait of Georgia
- Qualicum Hatchery – Strait of Georgia
- Nanaimo River – Strait of Georgia

13.1.5 OKANAGAN CHINOOK

13.1.5.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT



Conservation Units

Okanagan

Figure 13.1-5: Overview of Okanagan Chinook

The Okanagan Chinook population is the last remaining Columbia basin stock that resides within Canada and it is geographically and genetically distinct from Chinook populations elsewhere in Canada. The Canadian Okanagan population consists of anadromous salmon that migrate to and from the Pacific Ocean through the Columbia River to Canadian portions of the Okanagan River. The average annual number of Chinook spawning in Canada is less than 50 adults.

The Canadian portion of the Okanagan Chinook population likely has a life history similar to the life history of other Upper Columbia River summer stocks.

13.1.5.2 STOCK ASSESSMENT INFORMATION

Okanagan Chinook stock was reassessed in April 2017 and designated as “endangered” rather than “threatened" as previously assessed by the Committee of Endangered Species and Wildlife in Canada (COSEWIC).

The WSP biological status of Okanagan Chinook was assessed as in the red zone by CSAS. The Science Advisory Report is available at:
http://publications.gc.ca/collections/collection_2016/mpo-dfo/Fs70-6-2016-042-eng.pdf

13.1.5.2.1 Pre-season

Expectations for 2021 are for continued depressed abundance related to very low parental escapements, low marine and freshwater survival, and low productivity. Okanagan Chinook are part of the Columbia River Summer Chinook aggregate of which the United States produces a formal forecast.

13.1.5.2.2 In-season

An electronic counter at Zozel dam at the outlet of Osoyoos Lake can provide a preliminary indication of adult Chinook returns. A high degree of uncertainty exists with this count as an unknown number of fish likely to drop back downstream and spawn in the United States portions of the Okanagan River and/or the Similkameen River. Spawning ground assessments are done on an annual basis by the Okanagan Nation Alliance fisheries staff and are comprised of visual / dead recovery surveys to determine spawner abundance in the Okanagan River and Skaha Lake system.

Decision Guidelines and Management Actions

This stock likely has the same life history pattern as other Upper Columbia summer Chinook populations and could be intercepted in fisheries targeting these stocks. In the terminal area in Canada (Osoyoos Lake), this stock may be intercepted in FSC, commercial and recreational Sockeye directed fisheries. There are no Canadian directed fisheries on this stock.

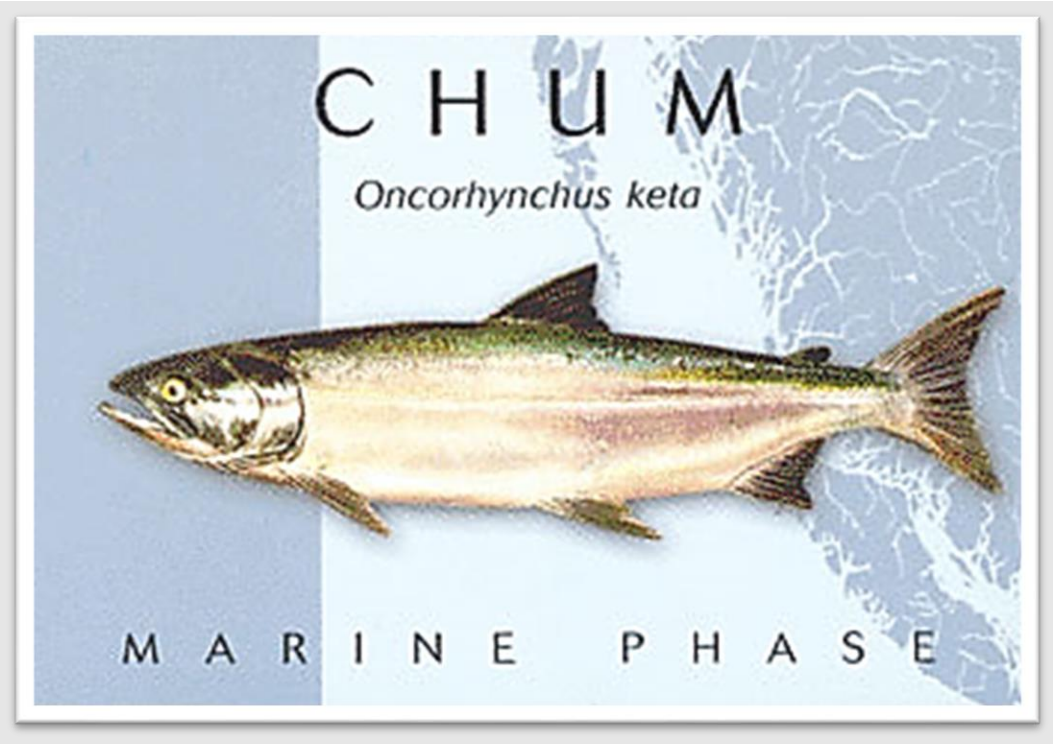
13.1.5.3 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO FISHERIES

Non-retention measures are in effect in Canadian fisheries.

13.1.5.4 ALLOCATION AND FISHING PLANS

There are no directed fisheries on this stock.

13.2 SOUTHERN CHUM SALMON FISHING PLAN



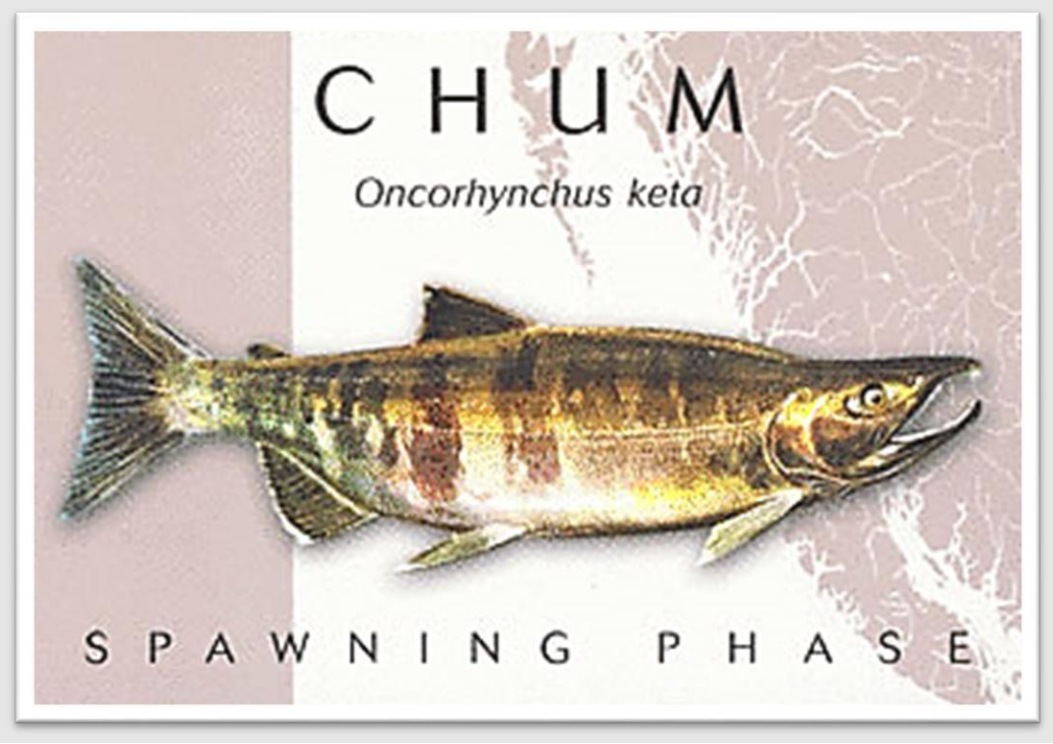


TABLE OF CONTENTS

13.2.1 SOUTHERN CHUM - OVERVIEW

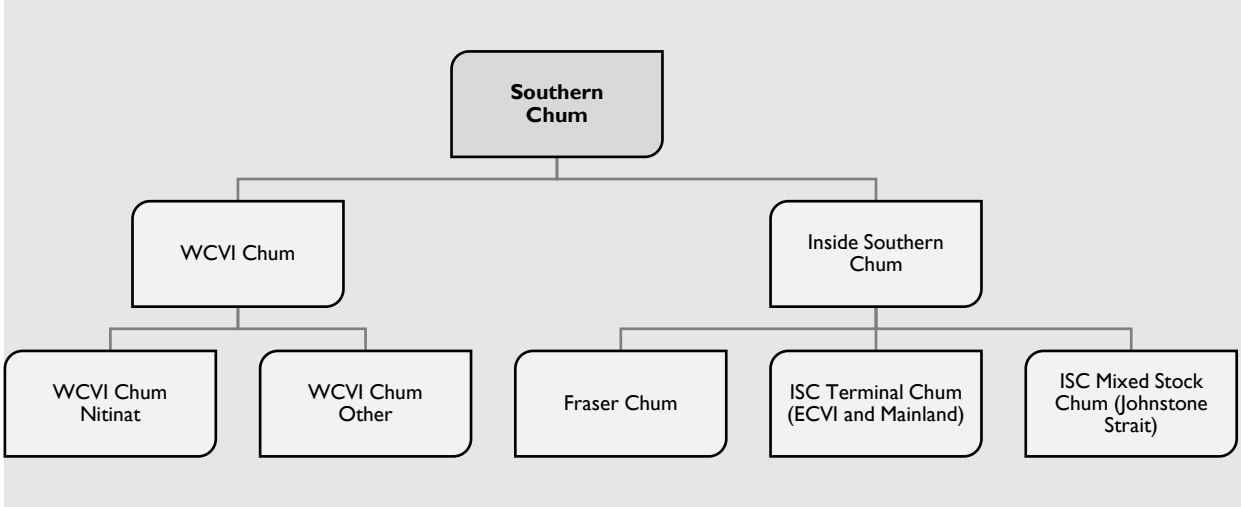


Figure 13.2-1: Overview of Southern Chum

SOUTHERN CHUM ENHANCEMENT INFORMATION:

The major DFO operation enhancement facilities that produce Chum are:

South Coast Area:

- Big Qualicum River Spawning Channel
- Conuma River hatchery
- Nitinat River hatchery
- Puntledge River hatchery

Fraser River Area:

- Capilano River hatchery
- Chehalis River hatchery
- Chilliwack River hatchery
- Inch Creek hatchery
- Tenderfoot Creek hatchery

- Weaver Spawning Channel

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 (PIP and DPI) operated by volunteers, and Aboriginal Fisheries Strategy (AFS).

There are two datasets available: Post-Season Production from the 2019 brood year (i.e. 2020 releases, and numbers on hand for 2021 release), and the Production Plan, which includes proposed targets for the upcoming 2021 brood year. These are available at the following website:

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

SOUTHERN CHUM – SEP PROPOSALS OR UPDATES FOR 2021

- The Nitinat Chum production target of 10 million fry is currently under review.

13.2.2 INSIDE SOUTHERN CHUM - OVERVIEW

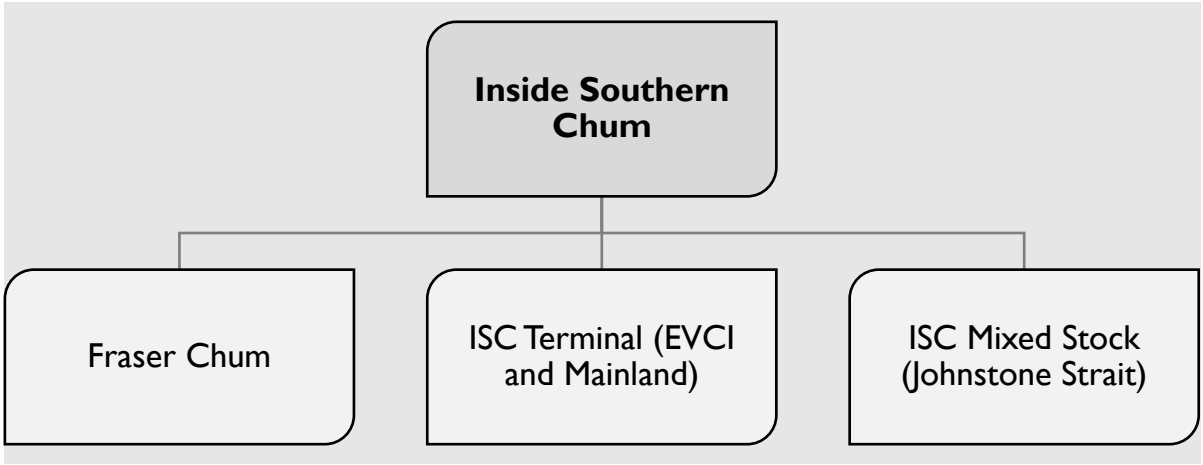


Figure 13.2-2: Overview of Inside Southern Chum

Inside Southern Chum (ISC) salmon spawn throughout Inner South Coast and in the Fraser River watershed, with Fraser stocks typically making up a significant portion of the returning abundance. ISC are managed in two distinct fall-timed (mid-September into December) groups: Fraser Chum with two Conservation Units (CUs) and ISC Terminal with 7 CUs; with ISC fisheries classified as ISC Mixed Stock (Johnstone Strait), ISC Terminal (ECVI and Mainland), and the Fraser River (Figure 13.2-2). In addition to these fall-timed populations, there are summer-timed Chum within the ISC which have distinct timing (late July through to mid-September). There are no directed fisheries on these populations and they are passively managed as bycatch in Fraser River fisheries directed on Sockeye and Pink salmon.

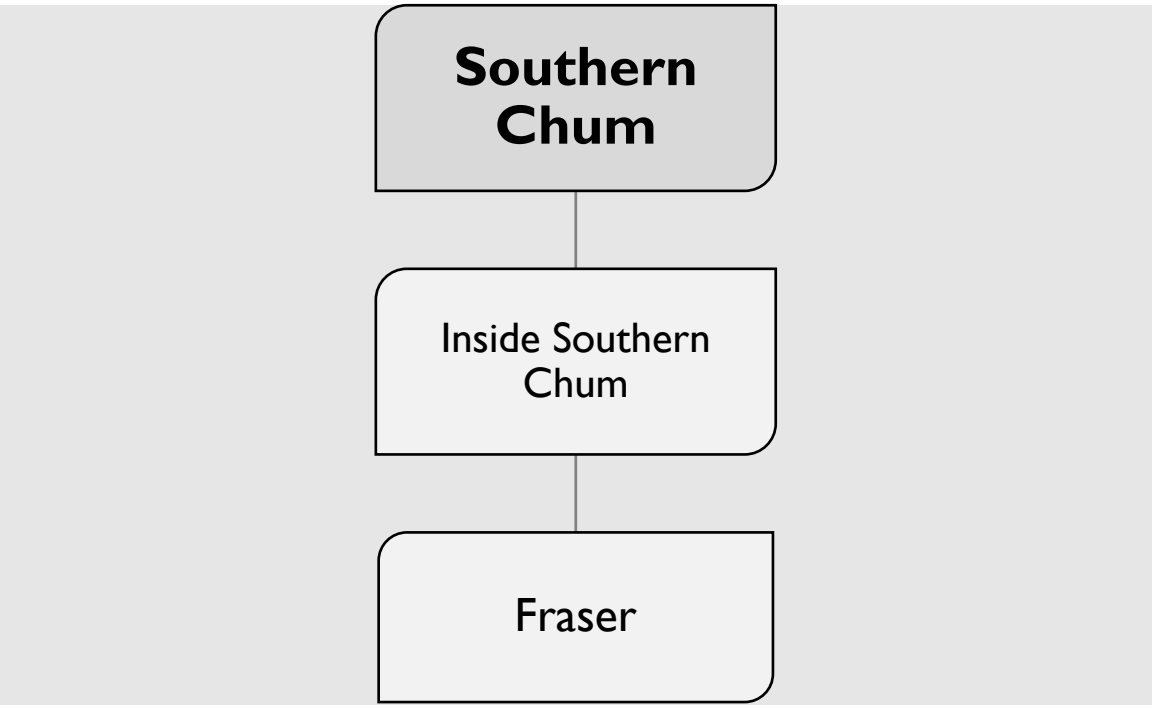
The Johnstone Strait mixed-stock fishery targets the ISC aggregate and is managed to a 20% exploitation rate. Fisheries target individual stocks in terminal fisheries throughout the ISC area and in the Fraser River. ISC terminal fisheries are managed to spawning goals at a more local level than the Conservation Units identified under the Wild Salmon Policy. The Fraser River terminal Chum salmon fishery is managed under an abundance-based harvest plan built around an aggregate spawning goal and a terminal run size, specified in the Pacific Salmon Treaty.

Assessment of Inside Southern Chum relies on in-season test fisheries (in Johnstone Strait and the Fraser River), which provide indications of relative Chum abundance, migration timing, stock compositions, and other biological information. Terminal river escapements for Inside Southern Chum populations are typically estimated through visual surveys of index systems with some higher-quality estimates from other key systems (i.e. Harrison River Chum mark-recapture and DIDSON fixed-site programs on the Cowichan and Nanaimo Rivers). Coverage of visual surveys has declined since the 1980s in terms of the number of surveyed systems, but the remaining surveys still cover most of the production for the aggregate.

Hatchery programs for ISC are mostly done to supplement harvest (Chehalis River, Chilliwack River, Inch Creek, Weaver Creek, Big Qualicum River, Little Qualicum River, Puntledge River), but there are also some rebuilding programs (e.g. Nimpkish Chum).

13.2.3 FRASER CHUM

13.2.3.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT



Conservation Units

Fraser Canyon (F)

Lower Fraser (F)

Figure 13.2-3: Overview of Fraser Chum

The Fraser Chum Management Unit includes all Chum that return to spawn in the Fraser River mainstem and Fraser River tributaries and is comprised of the WSP Lower Fraser Chum Conservation Unit (CU) and the Fraser Canyon Chum CU. The vast majority of Chum returning to the Fraser River are part of the Lower Fraser Chum CU, and spawn in the Fraser Valley downstream of Hope. Major spawning aggregations occur within the Harrison River (including Weaver Creek and Chehalis River), the Stave River and the Chilliwack River. No spawning locations have been identified upstream of Hells Gate. Chum Salmon return to the Fraser River from September through December, with the typical peak of migration through the lower river occurring from mid- to late October.

Chum-directed fisheries that harvest Fraser Chum include mixed-stock fisheries in Johnstone Strait, mixed-stock fisheries in the U.S. Strait of Juan de Fuca and San Juan Islands, and Fraser Chum-targeted fisheries occurring within the Fraser River.

Fraser Chum are assessed in-season using Albion test fishery data to estimate Chum abundance, migration timing, and other biological information. Escapement estimates provided post-season rely on visual surveys of index systems, as well as mark-recapture estimates in the Harrison River and Chilliwack River. Coverage of visual surveys has declined since the 1980s in terms of the number of surveyed systems, but the remaining surveys still cover most of the key production areas for Fraser Chum.

DFO hatchery programs in the Lower Fraser River produce Chum to supplement harvest (Chehalis River, Chilliwack River, Inch Creek, and Weaver Creek), but hatchery production is also used for population rebuilding, such as helping to establish spawning populations in areas that have benefitted from habitat improvement projects. Chum are also produced at smaller-scale community-run hatcheries for educational and stewardship purposes.

13.2.3.2 STOCK ASSESSMENT INFORMATION

13.2.3.2.1 Pre-season

Formal quantitative forecasts are not prepared for Fraser River Chum, but the qualitative Salmon Outlook for 2021 is "low". Returns in 2021 will be based largely on the brood from the 2017 escapement; escapement in 2017 was estimated at 630,055 spawners. The 2021 outlook is considered "low" due to the low Fraser River Chum returns observed since 2017, which reflected a coast-wide trend of low Chum returns. Environmental conditions have remained poor for salmon survival and productivity has been below long-term averages. Directed fisheries may be possible for the 2021 season, subject to in-season assessments.

The preliminary estimate of spawning escapement in 2020 was 625,434 Chum Salmon.

13.2.3.2.2 In-season

Terminal abundance of Fraser River Chum Salmon is estimated based on in-season information on Chum catch from the Albion Chum test fishery and a Bayesian model that incorporates prior information on terminal run size and migration timing.

The Albion Chum test fishery has operated annually since 1979 on the lower Fraser River in Area 29 at Albion (near Fort Langley). The test fishery is conducted with a drifted gill net at a specific site near the old Albion ferry crossing. The test fishery begins in early September of each year, and usually fishes until the end of November. On each day of operation, the boat fishes two sets, timed to coincide with the daily high tide. The Albion Chum test fishery normally fishes every other day from September 1st through October 20th, alternating days with the Albion Chinook test fishery (which fishes an 8" mesh gill net during this period). From October 21 through mid-November, the Chum salmon test fishery

operates daily, then every other day until late November. The gill net used in the Albion Chum test fishery is 150 fathoms long, constructed from uniform 6.75" mesh.

The first in-season estimate of terminal Fraser River Chum Salmon abundance is typically provided in mid-October. Decisions regarding fishing opportunities are based on the Albion test fishery in-season information.

Table 13.2-1: Planned Chum Test Fisheries

Test Fishery	Proposed Proponent	Test Fishery Purpose	Potential Dates (preliminary[a])	
			Start	End
Albion Gill Net	DFO	Fraser Chum abundance and biological information	01-Sep	23-Nov

[a] All dates subject to change based on in-season factors.

13.2.3.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

The current Interior Fraser Steelhead window closure overlaps with the majority of the Fraser Chum return; therefore, when FSC openings are being contemplated, or later if commercial and recreational openings are being planned, approximately one third to one quarter of the terminal Fraser Chum run size will likely be accessible to these fisheries, respectively. Consideration of the potential long-term consequences of fishing pressure on the tail end of the run may include: a shift to earlier peak timing of the entire return; shorter overall duration of the return; and, loss of genetic diversity and capacity to withstand environmental change.

To minimize the above concerns in 2021, the Department will be implementing new decision rules for mainstem Fraser River Chum fisheries to take into account the delayed start of fisheries caused by the Interior Fraser Steelhead window closure.

Specifically, new fishery end dates for all FSC, commercial and recreational fisheries will be implemented in Fraser River mainstem fisheries, and for all commercial gill net, purse seine, beach seine, and shallow seine fisheries (including EO/Demo fisheries) only a portion of the TAC will be released. The proportion of the TAC released will be based on the expected terminal return remaining available to fisheries.

DFO would like to continue discussions with all harvesters on scheduling of fisheries in order to ensure orderly and manageable fisheries (including ITQ fisheries), as well as the end dates and methods DFO will be using to release TAC in-season.

Conservation measures that were implemented in 2019 and 2020 to reduce the impact of Fraser River Chum fisheries on co-migrating Interior Fraser River Steelhead are planned to continue in 2021. These actions are described generally in Section 13.2.3.4 and detailed measures are provided for specific fisheries contained in Section 13.2.3.5.

Management of Fraser River Chum fisheries is based upon in-season information. As described in detail in the previous section, Albion test fishing data will be used to identify the abundance of Chum Salmon returning to the Fraser River. The first in-season terminal run size assessment is announced in mid-October once the peak of the return has been identified.

The in-season estimate of abundance for Fraser River Chum is used for international as well as domestic management, as outlined in Chapter 6 of the Pacific Salmon Treaty (PST). The PST stipulates that if Fraser River Chum in-season abundance (terminal run size) is estimated to be less than 900,000, the Canadian commercial Chum salmon fisheries within the Fraser River and in associated marine areas (Area 29) will be suspended. Domestic management, however, stipulates the terminal run size required to initiate these fisheries is 916,000. In U.S. Areas 7 and 7A, catch is restricted to different levels depending on how the Fraser River Chum terminal run size relates to the benchmarks of 1,050,000 or 1,600,000.

Table 13.2-2: Summary of key decision points for the management of the Fraser River Chum fishery

Terminal Run Size	Harvest Plan	Lower Fraser First Nations	Commercial	Recreational
<500,000 in Fraser	<10%	Limited (reduced hours and days/week fishing)	Closed	Mainstem Fraser River closed, restricted openings on tributaries
500,000 to 800,000 in Fraser	Directed fisheries limited to FSC	Normal	Closed	Mainstem Fraser River closed, restricted openings on tributaries
800,000 to 916,000 in Fraser	Catch not to exceed 91,800 (82,800 First Nations* and 9,000 test fishing)	Normal	Closed	Mainstem Fraser River open, restricted openings on tributaries
916,000 to 1,050,000 in Fraser	Commercial catch not to exceed 10% for Chum.	Normal	Open (TAC 35,000-105,000)	Open

Terminal Run Size	Harvest Plan	Lower Fraser First Nations	Commercial	Recreational
>1,050,000 in Fraser	Commercial catch not to exceed 15% for Chum.	Normal	Open (TAC 105,000 plus)	Open

* Note: Tsawwassen and Tla'amin Treaty domestic fishery allocations are not included here.

Commercial fishing opportunities (including First Nations Economic Opportunities) are contingent upon the identification of a commercial TAC:

- At terminal run sizes less than 916,000, no commercial TAC is available.
- At terminal run sizes from 916,000 to 1,050,000, the commercial TAC is a maximum of 10% of the terminal run size. A minimum commercial TAC of 35,000 Chum has been identified as a requirement to support Area E gill net fishery openings.
- At terminal run sizes greater than 1,050,000, the commercial TAC is a maximum of 15% of the terminal run size.

The Department intends to work with participants in the Fraser commercial Chum fisheries, including First Nations, to outline considerations that will guide planning and scheduling of in-season commercial fishery openings.

Specific details of the fisheries and target allocations will be determined as part of the in-season planning process. The involvement of the Area B seine fleet in the Fraser River Chum fishery is dependent on the Area B Seine Harvest Committee developing and implementing a limited participation fishing plan that limits the harvests of Chum to identified target allocations.

The recreational fishery within the Fraser River is usually open from mid-July or early August to December 31 annually. In-season information is used to determine fishing opportunities and is also dependent on the estimated Fraser River Chum terminal run size:

- At terminal run sizes below 800,000 the recreational fishery on the main stem Fraser will be closed and openings on tributaries would be limited to those where a surplus is likely to occur. Surpluses may be identified on hatchery enhanced systems.
- At terminal run sizes from 800,000 to 916,000 the recreational fishery will remain open on the main stem Fraser. Openings on tributaries would be limited to those where a surplus was likely to occur.
- At terminal run sizes greater than 916,000, the recreational fishery will remain open in the Fraser River main stem and tributaries.

For 2021, management of the recreational fishery will also be subject to management measures implemented to conserve IFR Steelhead. Please note general information on IFR Steelhead management measures in 13.2.3.4 and 13.2.3.5.2.

First Nations FSC fisheries typically occur in October and November, but these opportunities will be subject to management measures implemented to conserve IFR Steelhead. Please note general information on IFR Steelhead management measures in 13.2.3.4 and 13.2.3.5.1. If in-season information indicates that the Fraser Chum return is less than 500,000, FSC fisheries targeting Fraser Chum will be limited to a maximum harvest rate of 10%.

Implementation of the WSP will require the development of biological benchmarks and associated biological status zones for Fraser River Chum. When these benchmarks are identified, corresponding decision breakpoints and management actions may be reviewed. Analyses have not yet been initiated on benchmark identification for Fraser River Chum.

13.2.3.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO FRASER CHUM FISHERIES

Chum fisheries within the Fraser River will be managed to minimize bycatch of co-migrating stocks of concern, including Lower Fraser River Coho, Interior Fraser River (IFR) Coho and IFR Steelhead. In some cases, full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season.

For Chum-directed fisheries within the Fraser River, a "window closure" has been the primary tool applied in First Nations, commercial, and recreational fisheries to protect IFR Coho from non-selective fishing gear (e.g. gill nets, rod and reel fishing with bait). Selective fishing gear (e.g. beach seines, rod and reel fishing with no bait, dip nets) has been allowed to fish within these window closure dates, which span the period from early September to mid-October in the Lower Fraser River. Additional details on IFR Coho management are outlined in the Southern Coho Species Plan section (13.2.7) of Section 13.

Given ongoing declines in IFR Steelhead escapement and the designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO is continuing with a comprehensive, precautionary approach to the management of all fisheries in Southern BC that are likely to impact this stock of concern. Within the Fraser River (including Subareas 29-6, 29-7, 29-9, and 29-10), a 42-day closure will apply to commercial gill net, purse seine, beach seine, and shallow seine fisheries (including EO fisheries) and a 27-day closure will apply to commercial troll fisheries. Further, a 42-day closure will apply to Fraser River recreational fisheries and a 27-day closure will apply to Fraser River FSC fisheries. Areas and dates for the window closure are identified in Appendix 9.

In addition to the window closure, established approaches to reduce Steelhead encounters and minimize IFR Steelhead mortality will continue. For Area E Chum fisheries, this includes using shorter nets and reducing soak times—practices which have been in place since 2002. The use of revival tanks is also mandatory for commercial fisheries.

The Department continues to have an interest in finding additional ways to further reduce incidental impacts of salmon fisheries on IFR Steelhead. Discussions concerning modifications to gear or fishing methods in order to achieve such reductions are ongoing and may result in additional conservation measures in the 2021 season.

13.2.3.5 ALLOCATION AND FISHING PLANS

13.2.3.5.1 First Nations Fisheries

Food Social and Ceremonial Fisheries

FSC fisheries for Fraser Chum are culturally significant for First Nations communities in the lower Fraser River. Current proposed communal licence harvest targets for these communities total 91,800 Fraser Chum.

Refer to Section 10.2 for Table 10.2-1 - Communal Licence Harvest Target Amounts for Southern BC/Fraser River First Nations Fisheries.

At terminal run sizes below 500,000 Chum, FSC fishing opportunities may be reduced and a maximum harvest rate of 10% will be implemented. For planning purposes, returns less than 500,000 will be considered to be a conservation concern. This value may be revised in the future based on subsequent analyses.

Typically, Fraser River First Nations are provided FSC fishing opportunities for Chum as the Interior Fraser River Coho window closure ends in each area, beginning in early October. In 2019 and 2020, an additional closure period was implemented to protect IFR Steelhead (Appendix 9). Again in 2021, Chum-directed FSC fisheries will be initiated following the end of the IFR Steelhead closure in each area. Area staff will work with local First Nations communities to develop specific fishing plans that meet these conservation objectives.

Fishery Monitoring and Catch Reporting

In the lower Fraser River, catch monitoring programs are managed through Activity Funding or Comprehensive Fisheries Agreements. Monitoring programs implemented vary between Nations but typically include landing site or vessel-based collection of catch and effort information paired with validation of effort by vessel patrols or overflights. Specific focus has also been placed on sampling bycatch of Chinook and Coho salmon for mark rate information and coded-wire tags (CWTs) to support

the Salmon Head Recovery Program. Catch reports are received by DFO from catch monitoring programs on a weekly basis, within 48 hours of a fishery closing.

Treaty Fisheries

Tsawwassen Fisheries (Domestic)

In 2021, a 27-day rolling window closure will be in place to protect Interior Fraser River Steelhead that will impact Treaty fisheries in the Fraser River, as per areas and dates outlined in Appendix 9. Area staff will work with the Tsawwassen First Nation (TFN) to develop specific fishing plans that meet these conservation objectives.

As per the Tsawwassen Fisheries Operation Guidelines (TFOG), each year the Tsawwassen First Nations will develop a Tsawwassen Annual Fishing Plan (TAFP) for the harvest of salmon as per the Tsawwassen First Nations Final Agreement. The TAFP will include the Tsawwassen preference for stocks and species to be harvested, locations, timing, access to specific runs, method of harvest, catch monitoring and reporting, enforcement, etc. The TAFP is then presented to the Joint Fisheries Committee (JFC) for their review. The JFC is made up of representatives of Canada (DFO), the Province of BC and the Tsawwassen First Nation. The JFC considers the TAFP in making its recommendations to the Minister of Fisheries and Oceans about the issuance of Harvest Document(s), which in effect licence the fishing of FSC salmon during the season. Multiple harvest documents will be issued over the course of a season for each salmon species. Harvest Documents may include: species and quantity, use of fish, gear type, dates and times, area, designations, monitoring and reporting, etc.

The domestic allocation for Chum salmon under the Tsawwassen First Nations Final Agreement will be 2.58% of the Terminal Surplus of Fraser River Chum salmon to a maximum of 2,576 Fraser River Chum salmon.

Fishery Monitoring and Catch Reporting

The monitoring program for Tsawwassen Domestic fisheries includes fisher logs supplemented by validations of catch through on-water patrols and/or observations of landings and effort through on-water patrols. Details of monitoring programs in place can be found in the Tsawwassen Fisheries Operational Guidelines.

13.2.3.5.2 Recreational Fisheries

Chum retention in the Fraser River mainstem is subject to co-migrating salmon stocks and species of concern. In the tidal portion of the Fraser River (Area 29 downstream of the CPR bridge at Mission), the daily limit is 4 Chum. In non-tidal portions of the Fraser River (Region 2, from Mission to the Hope Bridge), the daily limit is 2 Chum. The fishery does not occur upstream of the Hope Bridge in order to

reduce impacts on Fraser Canyon Chum. Daily limits may be adjusted depending on in-season abundance estimates.

As part of the IFR Steelhead conservation measures continuing in 2021, a 42-day rolling window closure will be applied to recreational fisheries in the Fraser River mainstem (including Subareas 29-6, 29-7, 29-9, and 29-10). No fishing for salmon will be permitted in the areas and dates outlined in Appendix 9.

Fishery openings are published on the recreational fisheries website, http://www.bcsportfishingguide.ca/. Updates are provided in-season via fishery notices.

Fishery Monitoring and Catch Reporting

Creel surveys are conducted in portions of the lower Fraser River and select tributaries to estimate recreational catch and effort for the times and areas surveyed. Typically, the creel survey in the lower Fraser River mainstem begins when the mainstem is opened to recreational salmon fishing; however, over the last number of years, the survey end date has been variable (mid-September to end of November). The creel surveys conducted on the Chilliwack River and Nicomen-Norrish recreational fisheries have remained stable over the last number of years both in times and areas (Chilliwack is surveyed from mid-September to mid-November and Nicomen-Norrish is surveyed from early October to the end of November).

13.2.3.5.3 Commercial Fisheries

The commercial licence groups that can access Fraser Chum in the terminal area (i.e. Area 29) are Area E, Area H and Area B. Additionally, Fraser Chum are harvested in mixed-stock fisheries in Johnstone Strait by a number of commercial licence groups (see Johnstone Strait Mixed Stock Chum Section 13.2.2). Other commercial opportunities to harvest Fraser Chum include economic opportunity fisheries for First Nations in the Lower Fraser River and demonstration fisheries for First Nations and commercial licence groups.

Allocation

The following table describes the overall allocation for all Inside Southern Chum, which includes Fraser Chum (refer to Figure 13.2-2 in Section 13.2.1 - Inside Southern Chum). These allocations are used to balance overall harvest amounts in the Johnstone Strait Mixed stock, East Coast Vancouver Island and mainland, and Fraser River commercial fisheries.

Table 13.2-3: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
Inside Southern Chum	11 to 19, 28 to 29	63.0%	19.2%	12.0%	0.0%	5.8%

Fraser Commercial Chum Fisheries

***As part of the 2021 Pacific Salmon Strategy Initiative, the Area E gill net Fraser Chum commercial fishery in Area 29 will be closed. See Appendix 11 for a complete list of Southern salmon commercial fishery closures.**

Area B and Area E (Area 29)*

Seine and gill net* fishing opportunities for Chum Salmon will be confirmed in-season, based upon in-season assessment of the abundance of the Chum Salmon returns and management objectives for IFR Steelhead (see Section 6.10).

As part of the IFR Steelhead conservation measures continuing in 2021, a 42-day rolling window closure will be applied to the Fraser River commercial seine and gill net Chum fisheries. No commercial seine or gill net* Chum fisheries will be permitted within the IFR Steelhead window closure in Area 29 within the areas and dates outlined in Appendix 9.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Area H Troll (Area 29)

Mid- to Late October/Early November - Area 29

A 27-day rolling window closure will be applied to commercial troll fisheries as part of the 2021 IFR Steelhead conservation measures. No commercial troll fisheries will be permitted within the window closure in Area 29 within the areas and dates outlined in Appendix 9.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Fishery Monitoring and Catch Reporting

Fishery Monitoring and Catch Reporting includes the following:

Mandatory requirement to file fishing reports in all commercial fisheries, including "Start/Pause/Cancel/End" fishing reports.

Mandatory catch reporting by phone-in with a paper harvest log or electronic transmission with an electronic harvest log (E-log) is required in all commercial fisheries. (Catch Reporting requirements specific to each licence group are detailed in the conditions of licence for each gear type).

Vessel counts conducted to verify number of vessels (effort) in each Area E gill net opening.

Roving on-water observer coverage (DFO catch monitoring coverage and charter patrols) in each Area E gill net opening to conduct net haul observations and gather independent information on encounters of non-target species.

Partial independent on-board/at-sea observer coverage for Area B seine fisheries.

Dockside validation for Area B seine fisheries.

Demonstration Fisheries

Area B Seine Area 29 Chum Fishery

The Area B Harvest Committee has expressed an interest in continuing to explore an Area 29 directed Chum seine fishery similar to that of 2015.

Region: South Coast

Participants: All Area B licence holders (coordinated by ABHC/Area B Seine Society)

Location of Fishery: The fishing areas that may be considered are portions of Area 29 off the Fraser River mouth.

For 2021, this fishery is to be operated in times and areas outside of the rolling window closure identified to protect IFR Steelhead.

Gear Type: Seine gear using both regular seine and shallow seine nets, and the use of power skiffs is permitted. Selective fishing measures are mandatory; specified by licence conditions.

Time Frame: The fishery would occur after the IFR Steelhead window closure in November

Allocation: Fishing opportunities will be based on catch levels in relation to the overall allocation of Inside Southern Chum

The target species is Chum, retention of Pink is permitted. There will be non-retention of Sockeye, Coho, Chinook and Steelhead.

Monitoring Plan: Start, end, pause and daily catch reports will be required by phone-in or electronic logbook. There will be a requirement for observer coverage on vessels participating in this fishery. In addition to monitoring catch, observers will be available to collect any DNA sampling that is required and identified.

Area B Seine Fraser River Chum Demonstration Fishery in the Lower Fraser River

The purpose of this experimental fishery project is firstly to demonstrate the effectiveness of harvesting Fraser River Chum Salmon within the confines of the Fraser River employing the selective capabilities of a purse seine, and secondly to continue the harvest of Chum Salmon that may not be available in marine areas, due to other constraints.

Region: Lower Fraser River Area – Fraser River mainstem

Participants: All Area B licence holders will be eligible; however, as this is an experiment, effort controls will be in place to limit participation to a maximum of eight to ten vessels fishing on any given day

Location of Fishery: Area 29 in-river; Area B has indicated there are a number of potential locations around New Westminster, Glenrose, the Cement Plant, and down to the Deas Tunnel that would be suitable for seining and out of the shipping lanes

This fishery is to be operated in times and areas outside of the rolling window closure identified to protect IFR Steelhead.

Gear Type: Seine gear using shallow seine nets, the use of power skiffs and selective fishing measures are mandatory and are specified by licence conditions

Time Frame: The fishery would occur between mid-October and early November.

Consideration of other fisheries in the area will be taken into account when planning Area B in-river fishing activities. Specific fishing times would be confirmed in-season through an integrated planning process. The amount of available fishing days for this experiment will be confirmed in-season.

Allocation: Fishing opportunities will be based on catch levels in relation to the overall allocation of Inside Southern Chum

The target species is Chum, retention of Pink is permitted. There will be non-retention of Sockeye, Coho, Chinook and Steelhead.

Monitoring Plan: Start, end, pause and set-by-set catch reports will be required by phone-in or electronic logbook. There will be a requirement for observer coverage on all vessels participating in this fishery. In addition to monitoring catch, observers will collect any biological samples (including DNA samples) that are required and identified.

13.2.3.5.4 Fraser First Nations Commercial Chum Harvest

Demonstration Fisheries

2020 Harrison-Fraser River Demonstration Fishery

Region: Lower Fraser Area

Participants: Sts'ailes and Scowlitz First Nations

Location of Fishery: The waters of the Harrison River located between the outlet of Harrison Lake downstream to the orange boundary signs labelled 'Fishing Boundary HFA' approximately 1000 meters below the CN Railway Bridge; and

The waters of the Fraser River bounded on the west by a line from a white boundary sign on the upstream side of the Fraser River at the mouth of the Sumas River, thence true north to a white boundary sign on the opposite shore and bounded on the east by the downstream side of the bridge across the Fraser River at Agassiz.

For 2021, this fishery is to be operated in times and areas outside of the rolling window closure identified to protect IFR Steelhead.

Gear Type: Chum: Beach seines only. Beach seines not to exceed a maximum mesh size of 2 ¾ inches and a length of 50 fathoms or 360 feet.

Allocation:

- Chum: To be determined but will be expressed as a percentage (%) share of the Fraser River Terminal Commercial Total Allowable Catch (FRTCTAC) utilizing relinquished licences from the PICFI program
- Fraser Chinook: Fraser Chinook bycatch retention may be permitted subject to abundance.
- Hatchery Marked Coho: Hatchery-marked Coho bycatch retention may be permitted subject to abundance.

Time Frame: All fishery time frames are estimates and final dates will be determined according to in-season migration timing information.

- Chum: Mid–October to mid-November

Monitoring Plan: During any beach seining activity, a Monitor must be present with every beach seining crew during all fishing activity and provide set-by-set updates to the Sts'ailes Fishery Manager before the beach seine crews deploy their next set to ensure there is TAC available. The Sts'ailes Fishing Authority will collect all catch statistics via these monitors and report this information to DFO within 24 hours after the fishery closes.

Harvest Agreement Fisheries

***As part of the 2021 Pacific Salmon Strategy Initiative, the Tsawwassen First Nations Fraser Chum commercial fishery will be closed. See Appendix 11 for a complete list of Southern salmon commercial fishery closures**.

*Tsawwassen Fisheries (Commercial)**

In addition to the allocation of salmon for domestic harvests, TFN have an allocation for commercial catch outside of the Treaty as identified via the "Tsawwassen First Nations Harvest Agreement". The allocation in the Harvest Agreement (HA) does not affirm Aboriginal or Treaty rights. Fishing undertaken via the HA will be comparable to the requirements of the current Fraser River commercial fishery (First Nations economic opportunity (EO) fishery), or a general commercial fishery (e.g. Area E). For 2021, this means that this fishery will not operate within the period identified for the IFR Steelhead window closures for gill net, purse seine, beach seine, and shallow seine gear (see Appendix 9 for dates). Tsawwassen fishers will be expected to operate under the same rules that apply to other fishers taking part in that Fraser River commercial fishery. TFN may also prepare a HA Fishing Plan and give to the JFC for review prior to the season's commencement. Each year that the Minister authorizes a Fraser River commercial fishery in the Tsawwassen fishing area, or a general commercial fishery, the Minister will issue a communal commercial fishing licence for the Tsawwassen First Nation. The JFC set up by the Tsawwassen Final Agreement will conduct a post-season review.

Chum salmon allocation under the Harvest Agreement:

3.27% of the Terminal Commercial Catch for Fraser River Chum salmon for that year

Fishery Monitoring and Catch Reporting

The monitoring program for Tsawwassen Harvest Agreement fisheries includes a mandatory landing program (MLP) using 2 to 4 landing sites at which all fishers must land and have their catch validated

and is supplemented by effort validation by vessel patrols. If selective gear is used (e.g. purse seines) monitors are to be present during all fishing activity to record catch information on a set-by-set basis. Catch reports are received by DFO within 24 hours of the fishery close.

Economic Opportunity Fisheries

***As part of the 2021 Pacific Salmon Strategy Initiative, the Economic Opportunity Fraser Chum commercial fisheries will be closed. See Appendix 11 for a complete list of Southern salmon commercial fishery closures.**

Negotiations to provide economic opportunities to First Nations in the lower Fraser River are expected to be similar to recent years. Economic opportunity fisheries will be conducted under agreements that specify provisions for planning fisheries, allocations, catch reporting requirements as well as roles and responsibilities regarding the management of the fishery. The Department's general approach is that Aboriginal commercial harvest opportunities are managed using the same harvest decision guidelines as the commercial fishery and opportunities are only afforded if commercial TAC is available.

Aboriginal commercial harvest opportunities may be implemented with different times, areas, gears and regulations consistent with the overall management approach for the commercial fishery, including considerations to protect co-migrating stocks of concern. For 2021, these considerations include the continuation of the 42-day rolling window closure for gill net, purse seine, beach seine, and shallow seine gear to protect IFR Steelhead. No economic opportunity Chum fisheries will be permitted within the IFR Steelhead window closure (see Appendix 9 for dates). In the lower Fraser, DFO will work with First Nations and commercial harvesters to develop an approach to an integrated commercial fishery based on the principles of transparency, accountability and collaboration.

In addition to economic opportunity fisheries, the Department continues to support the development of inland fisheries with First Nations. For 2021, as in previous years, the focus with First Nations will be on experimenting mainly in terminal areas on abundant stocks. These fisheries will be conducted separately from FSC fisheries, under the same harvest decision guidelines as the commercial fishery and fish harvested will be off-set with licences that have been voluntarily relinquished from the commercial fishery.

Fishery Monitoring and Catch Reporting

While details will be finalized prior to fisheries occurring, the monitoring programs in place for 2021 are expected to be similar to recent years as follows:

> Non-selective (e.g. gill net) EO fisheries will be monitored using a mandatory landing program (MLP) with packer and land-based sites where all fishers must land and have their catch validated. This program is supplemented by effort validation by vessel patrols and overflights.

Selective (e.g. beach seine and purse seine) EO fisheries require monitors to be present during all fishing activity to record catch information on a set-by-set basis.

Catch reports for these Economic Opportunity fisheries are received by DFO from the catch monitoring programs within 24 hours of the fishery closure.

13.2.3.5.5 ESSR Fisheries

ESSR fisheries may occur at DFO hatchery facilities that have a surplus of returning hatchery Chum. In past years, ESSR fisheries have taken place at:

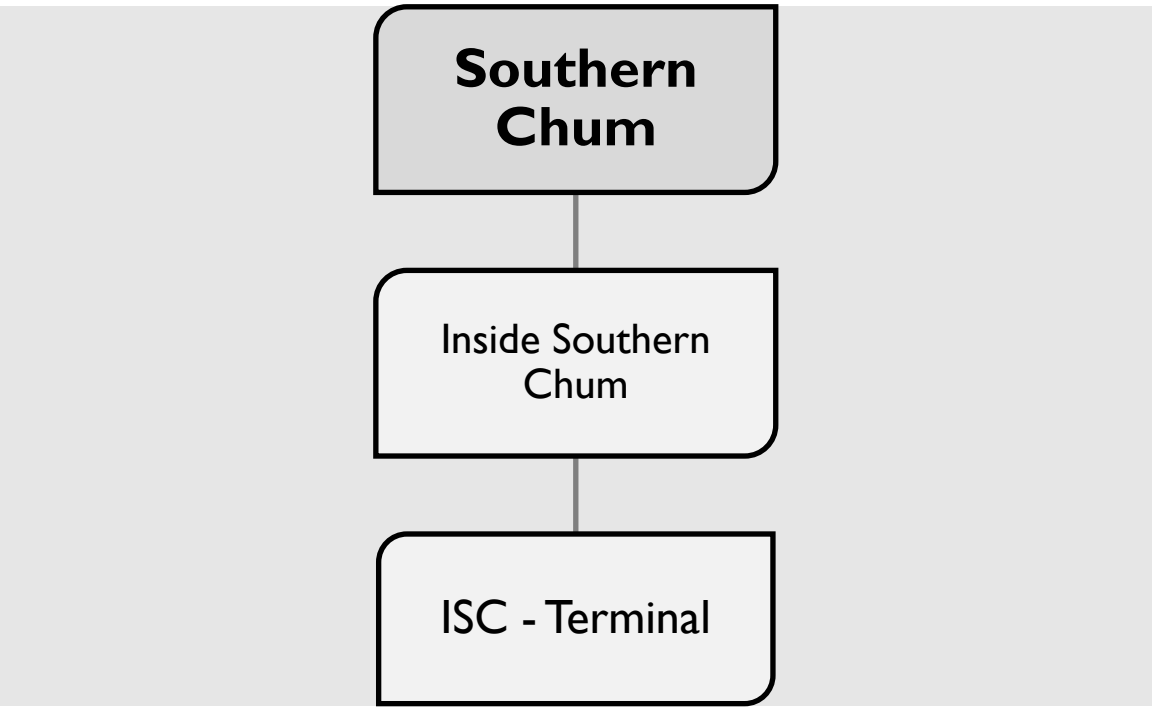
Chehalis River Hatchery – Lower Fraser

Inch Creek Hatchery – Lower Fraser

- Chilliwack River Hatchery – Lower Fraser

13.2.4 INSIDE SOUTHERN CHUM TERMINAL FISHERIES

13.2.4.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT



Conservation Units

Figure 13.2-4: Overview of Inside Southern Chum Terminal

ISC Terminal include all Chum salmon spawning in watersheds adjacent to Johnstone Strait and the Strait of Georgia (i.e. Areas 11 to 19), plus Fraser River approach areas (Howe Sound, Burrard Inlet; statistical area 28), but not the Fraser River main stem and tributaries. The major ISC Terminal systems, grouped by CU, management and PFMA are included in the following table:

Table 13.2-4: Population Structure of the ISC Terminal Chum conservation units

- Bold font indicates systems for which four or more annual escapement observations are available over the period 1998 to 2006.
- Underlined fonts are summer run timed populations.
- Italicized font with an asterisk* marks systems with active hatchery enhancement.

Methods for identifying CUs are documented in Holtby and Ciruna (2007). A complete list of sites for each Conservation Unit (CU) is available here

Conservation Unit	Management Area	PFMA	Spawning Sites
Southern Coastal Streams	Johnstone Strait	11/12	Driftwood Creek (Area 11), Waldon Creek (Area 12)
	Kingcome	12	Bughouse Creek, Charles Creek, Cohoe Creek, Embley Creek, Hauskin Creek, Jennis Bay Creek, Kenneth River, Kingcome River, Mackenzie River, Nimmo Creek, Scott Cove Creek, Shelter Bay Creek, Simoom Sound Creek, Sullivan Bay Creek, Wakeman River
	Bond/Knight	12	Ahta River, Ahta Valley Creek, , Gilford Creek, Hoeya Sound Creek, Kakweiken River, Kamano Bay Creek, Lull Creek, Maple Creek, Matsiu Creek, Mcalister Creek, Shoal Harbour Creek, Viner Sound Creek, Wahkana Bay Creek
Upper Knight	Bond/Knight	12	Ahnuhati River, Franklin River, Klinaklini River, Kwalate Creek, Sim River
Loughborough	Bond/Knight	12	Boughey Creek, Call Creek, Cracroft Creek, Glendale Creek, Port Harvey Lagoon Creeks, Protection Point Creek, Shoal Creek
	Johnstone Strait	12	Fulmore River, Potts Lagoon Creek, Robbers Knob Creek, Tuna River
	Loughborough to Bute	13	Apple River, Bachus Creek, Cameleon Harbour Creek, Chonat Creek, Elephant Creek, Fanny Bay Creek, Frazer Creek, Frederick Arm Creek, Granite Bay Creek, Grassy Creek, Gray Creek, Hanson's Creek, Hemming Bay Creek, Heydon Creek, Kanish Creek, Knox Bay Creek, Owen Creek, Phillips River, Read Creek, St. Aubyn Creek, Stafford River, Thurston Bay Creek, Village Bay Creek, Waiatt Bay Creek, Willow Creek, Wortley Creek
Northeast Vancouver Island	Upper VI	12	Cluxewe River, Keogh River, Nahwitti River, *Quatse River**, Shushartie River, Songhees Creek, Stranby River, Tsulquate River
	Johnstone Strait	12	Adam River, Hyde Creek, Kokish River, Mills Creek, New Vancouver Creek, Nimpkish River*, Tsitika River,
		13	Amor De Cosmos Creek, Hyacinthe Creek, Salmon River

Conservation Unit	Management Area	PFMA	Spawning Sites
	Mid-VI	13	Pye Creek
Strait of Georgia	Mid Vancouver Island	13	Campbell River, Kingfisher Creek, Menzies Creek, Mohun Creek, Quinsam River, Simms Creek
	Loughborough to Bute	13	Bird Cove Creek, Drew Creek, Open Bay Creek, Quatam River, Whiterock Pass Creek
Bute Inlet	Loughborough to Bute	13	Cumsack Creek, Homathko River, Orford River, Southgate River, Teaquahan River
Strait of Georgia	Mid Vancouver Island	14N	Bob Creek, Brooklyn Creek, Chef Creek, Cook Creek, Cowie Creek, Hart Creek, Kitty Coleman Creek, McNaughton Creek, Millard Creek, Morrison Creek, *Oyster River**, Portuguese Creek, *Puntledge River**, *Rosewall Creek**, Roy Creek, Sandy Creek, Storie Creek, Trent River, Tsable River, Tsolum River, Waterloo Creek, Wilfred Creek, Woods Creek
		14S	Annie Creek, Englishman River, French Creek, *Little Qualicum River**, Nile Creek, *Qualicum River**
	Toba Inlet	15	Black Lake Creek, Brem River, Brem River Tributary, Filer Creek, Forbes Bay Creek, Forbes Creek, Klite River, Little Toba River, Okeover Creek, Pendrell Sound Creek, Refuge Cove Creek, Store Creek, Tahumming River, Theodosia River, Toba River, Twin Rivers
	Jervis Inlet	15	*Lang Creek**, Lois River, *Sliammon Creek**, Whittall Creek
		16	Albion Creek, Angus Creek, Baker Creek, Brittain River, Burnet Creek, Carlson Creek, Cranby Creek, Deighton Creek, Deserted River, Doriston Creek, Earle Creek, Frock Creek, Gray Creek, Halfmoon Creek, High Creek, Hunaechin Creek, Jefferd Creek, Mill Creek, Mouat Creek, Park Creek, Pender Harbour Creeks, Ruby Creek, Sechelt Creek, , Skwawka River, Snake Bay Creek, Storm Creek, Tsuahdi Creek, Tzoonie River, Vancouver River, West Creek
Strait of Georgia (cont)	Howe Sound / Sunshine Coast	16	Dakota Creek, Mcnab Creek, Mcnair Creek, Potlatch Creek, Rainy River, Twin Creek,
	Lower Vancouver Island	17	Beck Creek, Bloods Creek, Bonell Creek, Bonsall Creek, Bush Creek, Chase River, Departure Creek, Haslam Creek, Holland Creek, Knarston Creek, Millstone River, *Nanaimo River**, Nanoose Creek, Napoleon Creek, Porter Creek, Stocking Creek, Tyee Creek, Walker Creek
	South Vancouver Island	17	*Chemainus River**
		18	Cowichan River, Fulford Creek, Koksilah River, Shawnigan Creek

Conservation Unit	Management Area	PFMA	Spawning Sites
		19	*Goldstream River**
Howe Sound – Burrard Inlet	Jervis Inlet	16	Bishop Creek, Shannon Creek
	Howe Sound / Sunshine Coast	16	Wilson Creek
		28A	Avalon Creek, Centre Creek, Eagle Creek, Hutchinson Creek, Langdale Creek, Long Bay Creek, Mannion Creek, Nelson Creek, Ouillet Creek, *Terminal Creek**, West Bay Creek, Whispering Creek
	Burrard Inlet	28A	Brothers Creek, *Capilano River**, Hastings Creek, Indian River, Lynn Creek, Mackay Creek, Maplewood Creek, McCartney Creek, Mosquito Creek, Mossom Creek, Noons Creek, Richards Creek, Seymour River
Strait of Georgia	Howe Sound / Sunshine Coast	28A	Chapman Creek, Chaster Creek, Flume Creek, Roberts Creek, Wakefield Creek,
		28B	Ashlu Creek, B.C. Rail Spawning, Branch 100 Creek, Brennan Channel, Brohm River, *Cheakamus River**, Chuk-Chuk Creek, Dryden Creek, Fries Creek, Hop Ranch Creek, July Creek, Lower Paradise Channel, Mamquam River, Mashiter Creek, Mashiter Spawning Channel, Meighan Creek, Mission Creek, Moody Channel, Pillchuck Creek, Raffuse Creek. Shovelnose Creek, Spring Creek, Squamish River, Stawamus River, Stawamus Spawning Channel, Tenderfoot Creek, Thirty Seven Mile Creek, Thirty-Six Mile Creek, Tiempo Spawning Channel, Twenty Eight Mile Creek, Upper Paradise Channel, Wildwood Spawning Channel
	Burrard Inlet	29B	*Serpentine River**

ISC Terminal fry emerge from the gravel as early as February and migrate downstream shortly after emergence, primarily in March and April. The juvenile Chum rear near the estuary and in near-shore areas until approximately late May, and subsequently enter the major marine water bodies (i.e. Strait of Georgia) where they gradually migrate northward through Johnstone Strait. The juvenile migration continues to more off-shore waters and towards the Gulf of Alaska beginning in June and July and continues through the summer months. In the first year, Chum are primarily located along the coast of North America and into the Gulf of Alaska (Salo, 1991).

Return migrations are of considerable distance, and the beginning of return migrations is not well documented. For ISC populations, some summer Chum are first observed in streams in August (Ahnuhati River) while the vast majority of fall Chum spawn starting in early October with the peak of spawning occurring mid to late October and ending as late as mid-December.

13.2.4.2 STOCK ASSESSMENT INFORMATION

13.2.4.2.1 Pre-season

Table 13.2-5: Inside Southern Chum Terminal 2021 Salmon Outlook

Management Area	Stock Outlook
Johnstone Strait and Mainland Inlets (Area 12 and 13)	Expectations for Fall Chum in 2021 are below average (Outlook Category '2'). This is based on below average parental brood abundances in 2017 and 2018 and a 4 year decline in Chum productivity. Expect more variability in Chum returns. Summer Chum stocks in 2021 will likely continue to be below average throughout the area; similar to 2020.
Areas 14 to 19	Escapement enumeration data for 2020 indicated lower abundances and below target escapements for systems in mid to northern Strait of Georgia and Jervis Inlet. Returns were only above target in Nanaimo River. For 2021, abundance is expected to follow a similar pattern or improve slightly with stocks in the southern part of the Strait of Georgia such as Cowichan, Nanaimo, and Goldstream forecast near to above target escapement. Mid-Island systems (Puntledge, Little Qualicum, Big Qualicum) and Jervis Inlet Stocks are expected to be below target escapement levels in 2021.

13.2.4.2.2 In-season

Refer to Table 13.2-5: Inside Southern Chum Terminal 2021 Salmon Outlook and Table 13.2-6 and Table 13.2-7 for in-season assessment information. There are no planned Chum Test fisheries in ISC Terminal areas

13.2.4.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

13.2.4.3.1 **Structure of Harvest** Management Decision

Overall Inside Southern Chum Terminal are managed under a precautionary harvest approach to fisheries management, with a focus on identifying fishing opportunities in terminal areas of Johnstone Strait, Strait of Georgia and Mainland Inlets based on in-season abundance estimates and observed escapements into the natal streams. In terminal fisheries, smaller stocks are protected through time and area closures, and targeted stocks are managed to escapement goals.

The primary management tool is to control fishing effort and catch through restricting the area, the duration of the fishery, the number of licensed vessels fishing within an area (i.e. limited participation) and, recently through share-based demonstration fisheries (some areas and gear types). Other tools include altering gear efficiency or fishing power through manipulation of permitted gears (e.g. net length or depth, mesh sizes). Any available surplus stocks are harvested by nets and troll terminally, adjacent to natal streams using knowledge of run timing as a management tool to limit bycatch of non-

target stocks and species. Time and area closures, as well as selective fishing techniques, are used to protect specific non-target populations or species of concern.

13.2.4.3.2Harvest Approach for ISC Terminal Fisheries

Management Escapement Goals (MEG) are in place for most Chum bearing systems within the ISC Terminal Area. All terminal Chum fisheries are managed under a general fixed escapement strategy (i.e. target harvest is any surplus to the MEG), but implementation details differ by area.

Table 13.2-7 and Table 13.2-8 summarize the fishery reference points and harvest guidelines for the Strait of Georgia terminal fisheries.

Annual implementation of the harvest guidelines follows the general approach below:

- Terminal fisheries are managed based on escapement with fisheries initiated to harvest abundances in terminal areas.
- Terminal Chum fisheries are generally implemented with shorter, low impact openings early in the run, and then expanded as warranted by in-season information. For example, terminal Chum fisheries in the Strait of Georgia typically have short initial openings, and are either extended or closed depending on in-season escapement data and catch information from the initial opening.
- Harvest opportunities in terminal fisheries are typically based on the lower quartile of the probability distribution for the abundance estimate (i.e. estimated 3 out of 4 chance that abundance is larger; 25th percentile).

Table 13.2-6: Management Escapement Goals (MEG) and Harvest Plans for Terminal Chum Fisheries in the Strait of Georgia

	Area 14 (Puntledge, Little Qualicum and Big Qualicum)	Area 16 (aggregate escapement Goal)
MEG	240,000 (incl. 10K hatchery broodstock)	85,000
Based on	These are interim targets based on stock recruit relationships for each of these populations	Habitat area and Chum spawning densities in the various rivers, combined for the aggregate
Major Systems	Puntledge (60K goal), Little Qualicum (85K), Big Qualicum (85k)	Tzoonie, Deserted, Brittain, Vancouver and Skwawka Rivers

	Area 14 (Puntledge, Little Qualicum and Big Qualicum)	Area 16 (aggregate escapement Goal)
In-season Assessment	Early catches, visual observations at river estuaries and escapement counts in the three river systems completed by hatchery and stock assessment staff.	Visual surveys by, DFO Stock Assessment and Sechelt Indian Band staff.
Implementation strategy	Manage early-season fisheries to meet aggregate spawner goal but also avoid large surpluses (>100k). If forecast exceeds 340k (240k escapement goal plus 100k to account for forecast uncertainty), then target for early fisheries is 65% of the surplus, and remaining fisheries occur once abundance is confirmed in-season. If forecast falls below 240k, then river-specific escapement levels for the 3 major systems must be almost achieved (70% of Puntledge, 75% of Little Qualicum and of Big Qualicum)	Fisheries would occur after aggregate goal is achieved (i.e. fish observed in-river and inside a designated sanctuary area), but there have been no commercial openings in recent years. Potential implementation of a weekly assessment fishery with limited fleet size (3-5 vessels) in conjunction with river escapement assessments is being explored.

Table 13.2-7: Management Escapement Goals (MEG) and Harvest Plans for Terminal Chum Fisheries in the Strait of Georgia

	Area 17 (Nanaimo River)	Area 18 (Cowichan)	Area 19 (Goldstream)
MEG	40,000	160,000	15,000
Based on	This is an interim target based on stock recruit relationship	Habitat area and Chum spawning densities in the Cowichan River	Habitat area and Chum spawning densities in the Goldstream River
Major Systems	Nanaimo River	Cowichan	Goldstream
In-season Assessment	Historically a variety of visual survey methods were employed to estimate escapement into the Nanaimo. Since 2013 a joint Snuneymuxw/DFO fixed site DIDSON counter program has been used. If weather permits, hatchery staff conducts swim surveys to help validate and provide species composition for the DIDSON program, as well as enumerate chum spawning below the DIDSON site.	In past approaches Chum abundance has been evaluated through a variety of techniques from a test fishing program to over flight visual surveys. In river Chum escapement estimates are provided by a DIDSON counter ran jointly with the Cowichan Tribes and DFO located in the lower river since 2006.	Visual surveys via stream walks by hatchery staff.
Implementation strategy	Commercial openings occur only if in-season observations indicate high probability of meeting the spawning goal. A small TAC fisheries is considered after 15,000 chum past the DIDSON counter dependent on date. Further commercial opportunities are based on abundance/date triggers.	Commercial openings occur only if in-season observations indicate high probability of meeting the spawning goal. A small TAC fishery is triggered at approx. 40,000 chum past the DIDSON dependent on date. Further commercial opportunities are based on abundance/date triggers as discussed and agreed upon at the Cowichan Harvest Roundtable.	Commercial openings occur only if in-season observations indicate high probability of meeting the spawning goal. A small TAC fishery is triggered at 10,000 chum in-river dependent on date. Further commercial opportunities are based on abundance/date triggers as discussed and agreed upon with Harvest committees and local First Nations.

13.2.4.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO INSIDE SOUTHERN CHUM FISHERIES

Refer to Table 13.2-8 for management actions specific to ISC Terminal fisheries. If there are fisheries proceeding in 2021, they will be occurring in terminal areas outside of the migratory path of IFR

Steelhead and thus, will not be impacted by 2021 IFR Steelhead conservation measures. The areas are outlined in Appendix 9.

Table 13.2-8: Incidental Harvest, Bycatch and Constraints to ISC Terminal Fisheries

Area	Incidental Harvest, Bycatch and Constraints to Inside Southern Chum Fisheries
Nimpkish (Area 12-19)	Observations in recent years have shown consistently low abundance of Chum returning to the Nimpkish River. Low brood year returns in 2016 and no significant improvements in marine survival leave expectations for Nimpkish Chum well below target in 2021. The timing of Nimpkish River Chum is later than most ISC terminal stocks. The ISC Mixed Stock fisheries are complete prior to the historical peak of the Nimpkish Chum return. Furthermore, during these fisheries, the near terminal approach area and area adjacent to the mouth of the river are closed to fishing.
Area 14	Fishery boundaries are in place during the Steelhead window closure to protect migrating IFR Steelhead. Beach boundaries are generally in effect to protect Coho and Chinook. Boundaries may range from zero to one and a half miles depending upon bycatch concerns and time of year. A Fillongley Creek radius boundary and Baynes Sound closures are in effect to protect wild Chum and Coho stocks. Coho conservation measures are in effect until November 10, including non-retention, maximum soak times for gill nets, barbless hooks for trollers and mandatory brailing and sorting for seines. The gill net fishery may be restricted to daylight hours only if there are significant levels of non-target species catch (e.g. Coho). The presence of sea lions in Area 14 appears to have reduced net and troll CPUE, reduced escapement in some streams, and altered migration and holding behaviour which has impacted assessment capabilities. These impacts will be considered in the management of the fishery, and may include exploring new assessment techniques.
Area 16	There is mandatory non-retention of Coho. Fishing is limited to terminal areas to minimize impacts on passing stocks.

Area	Incidental Harvest, Bycatch and Constraints to Inside Southern Chum Fisheries
Area 17	Fishery boundaries are in place to protect migrating stocks such as Fraser River Chum and IFR Steelhead and to confine the fishery to the Nanaimo River stock. Coho and Chinook conservation measures in effect until November 10 include non-retention and barbless hooks for troll. The gill net fishery may be restricted to daylight hours and maximum soak times if Coho encounters are high. Restrictions would be implemented after consultation with the Chum Advisory Committee. The gill net fleet will be allowed to use 90 mesh Alaska twist in Area 17 based on previous work conducted in Area 14. The two areas are similar with respect to target species and incidental catch issues, and therefore the results from Area 14 are applicable to Area 17.
Area 18	There is a half a nautical mile boundary in effect off Cherry Point to protect Coho holding in this area. Beach boundaries may be in effect to protect Coho and Chinook. Cowichan Bay is usually closed to protect Coho and Chinook and to provide a refuge for holding Chum; however, if Chum escapement targets are reached and timing is such that Chinook escapement is complete this area could be opened to access surplus Chum. This would occur following consultation with the Cowichan Roundtable and the Chum Advisory Committee. Other Coho conservation measures in effect include non-retention, barbless hooks for troll, and mandatory brailing and sorting for seines. The gill net fishery is restricted to daylight hours. Maximum soak times for gill nets could be implemented if high Coho bycatch occurs.
Area 19	Subarea boundaries may be put into effect to protect Chinook and Coho holding in Squally Reach. Coho and Chinook conservation measures in effect until November 10 include non- retention and barbless hooks for troll. The gill net fishery is restricted to daylight hours and maximum soak times if Coho encounters are high. Restrictions would be implemented after consultation with the Chum Advisory Committee.

13.2.4.5 ALLOCATION AND FISHING PLANS

13.2.4.5.1 First Nations Fisheries

Food Social and Ceremonial Fisheries

FSC fisheries for local Chum stocks will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

First Nations target local salmon stocks for FSC purposes throughout the Inner South Coast. First Nations harvest of Chum salmon can fluctuate depending on individual areas, preference, strength of Chum return, and also status and availability of other salmon species annually. Refer to Section 10.2 for Table 10.2-1 - Communal Licence Harvest Target Amounts in Southern BC/Fraser River First Nations Fisheries.

Mandatory and voluntary measures have been implemented to support prey availability and reduce disturbance to Southern Resident Killer Whales, including within Southern BC waters and key foraging areas within Strait of Juan de Fuca and the Gulf Islands. These measures are outlined in section 5.8.

Fishery Monitoring and Catch Reporting

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations are asked to keep records of harvest and provide catch information to DFO in a variety of formats. Under this licence, if a commercial vessel is used for fishing, First Nations are asked to provide information respecting the species and quantity of fish harvested by this vessel, to the DFO Catch Reporting Officer within 24 hours from landing harvested catch. In addition, catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where in-season management requires, catch reports are sought weekly during the respective fishing season.

Treaty Fisheries

Tla'amin Fisheries (Domestic)

Tla'amin Domestic fisheries for local Chum stocks will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

The Tla'amin Fishing Area for all species of Fish and Aquatic Plants is within portions of Pacific Fisheries Management Areas 14, 15, and 16.

The Domestic allocations for Chum salmon under the Tla'amin First Nation's Final Agreement are as follows:

Sliammon River Chum

- When the Available Terminal Harvest for Sliammon River Chum salmon is less than or equal to 7,400, a number of Sliammon River Chum salmon equal to the Available Terminal Harvest for Sliammon River Chum salmon; or
- When the Available Terminal Harvest for Sliammon River Chum salmon is greater than 7,400, then 7,400 Sliammon River Chum salmon plus 25% of that portion of the Available Terminal Harvest of Sliammon River Chum salmon that is greater than 7,400.

Terminal Chum

- A number of Chum salmon equal to 25% of the Available Terminal Harvest for the Chum salmon stocks that originate from a Terminal Harvest Area, other than Sliammon River Chum salmon stocks, if the Minister determines that there is an Available Terminal Harvest for those stocks.

The Tla'amin First Nation provides catch reports to the Department through the Aboriginal Harvest Management System (AHMS). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and biological samples.

13.2.4.5.2 Recreational Fisheries

Marine recreational fisheries will not impacted by 2021 conservation measures to protect Interior Fraser River Steelhead.

Marine recreational fisheries targeting ISC Terminal stocks take place in tidal and non-tidal waters and angler effort is focused on terminal Chum returning to the Puntledge, Qualicum, Nanaimo and Cowichan River systems.

Chum recreational fisheries are open year round, with the majority of marine recreational Chum harvest occurring in Areas 13 and 18 from late September to late October. The normal daily limit is four. For 2021 in Southern BC tidal waters, it is anticipated that normal Chum opportunities will be provided for Southern BC Chum.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

In non-tidal waters, Chum retention is typically permitted based on observed abundances, and primarily occurs in hatchery systems. Subject to in-season assessment information, freshwater

recreational fisheries can retain Chum in several of the watersheds (e.g. Puntledge, Cowichan, and Nanaimo). Total (marine and freshwater) recreational harvests have ranged from about 5,000 to about 20,000 in recent years.

Fishery Monitoring and Catch Reporting

Catch monitoring programs including creel surveys, logbooks and the internet recreational effort and catch survey (iREC) are the main tools used to capture recreational catch and effort information in this fishery. South Coast Stock Assessment staff use these programs to provide annual estimates of the recreational harvest in each area.

13.2.4.5.3 Commercial Fisheries

Canadian commercial fisheries are managed to try and achieve allocation targets in the commercial allocation implementation plan. Commercial fishery allocations take into account catches of Inside Southern Chum including: Johnstone Strait Mixed-Stock fisheries, terminal area fisheries, and the Fraser River fisheries. In the ISC Terminal, fishing effort focuses on terminal harvests in a few larger systems (some of them with substantial hatchery supplementation).

Allocation

Table 13.2-9: Commercial Allocation Implementation Plan (from the 2015–current period).

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South Inside	11 to 19, 28 to 29	63.0%	19.2%	12.0%	0.0%	5.8%

ISC Terminal Commercial Chum Fisheries

For 2021, an average to below average return is expected to most Strait of Georgia systems. Trends in recent productivity have continued to be variable with stocks in the southern part of the Strait of Georgia (Cowichan, Nanaimo, Goldstream) near escapement targets, and mid-Island and mainland stocks well below target abundance.

Chum fishing opportunities in terminal areas will be determined in-season and discussed through pre-season meetings and the in-season Chum Advisory Committee. The following opportunities may be available but will be subject to additional conservation measures being implemented in 2021 to protect IFR Steelhead. For Johnstone Strait and Strait of Georgia, a 42-day rolling window closure will apply to commercial gill net and purse seine fisheries and a 27-day rolling window closure will apply to commercial troll fisheries. Closure dates and areas are outlined in Appendix 9. Terminal fisheries

targeting terminal abundances that are understood to not be on the migratory route of IFR Steelhead will remain open. Proposed areas for exclusion are also described in Appendix 9.

The fisheries in each area are managed as follows:

- Mainland Inlet Terminal fisheries: Any Mainland Inlet terminal fisheries targeting Chum would be managed in-season based on terminal abundance, and harvesting would be by seine, gill net or troll gear. Fishery openings would be confined to minimize incidental harvest of other passing Chum stocks and species.
- Johnstone Strait Terminal fisheries: No fishing opportunities directed at Nimpkish River Chum are anticipated due to both recent trends of poor returns and 2021 management measures for IFR Steelhead. In-season assessment will confirm the potential for any harvest opportunities; however, there have been no opportunities in recent years.
- Strait of Georgia Terminal fisheries: Managed in-season based on terminal abundance. Chum harvests focus on terminal stocks listed below; however, there may be incidental retention of some other minor local stocks in the terminal areas as well. The major systems are:
    - **Area 14** - Puntledge, Big Qualicum and Little Qualicum: The fishery is directed at the enhanced stocks of these three river systems. Chum returning to this area have been enhanced since the late 1960s and terminal fisheries have occurred in October and November since the 1970s. ESSR fisheries are possible on enhanced stocks. Terminal Chum fisheries in Area 14 will take place only in those waters exempt from the 2021 IFR Steelhead conservation measures as described in Appendix 9.
        - Area D gill net openings are possible starting in October. Further gill net openings are subject to overall abundance in Area 14 and escapements in the Puntledge, Little Qualicum and Big Qualicum Rivers.
        - Area B seine limited effort opportunities may be available in late October dependent on escapement levels, abundance and allocation status. Full fleet opportunities may also be available.
        - Area H troll openings are possible starting in October. Further troll openings are subject to overall abundance in Area 14 and escapements in the Puntledge, Little Qualicum and Big Qualicum Rivers.
    - **Area 15** – Malaspina Inlet: No targeted commercial fisheries for Chum are anticipated.
    - **Area 16** - Jervis Inlet: The terminal fishery targets wild Chum stocks returning to river systems in the Jervis Inlet area. The main systems are Tzoonie, Deserted and Skwawka

Rivers. Commercial opportunities are not anticipated due to the continued recent trend of poor returns; this will be confirmed in-season. Openings in this area generally take place in late-October to mid-November.

- **Area 17** – Nanaimo: The fishery is directed primarily at Nanaimo River stocks. The Nanaimo River Chum stocks are supplemented by the Nanaimo River Hatchery on poor return years. Openings usually occur in October and early November. Terminal Chum fisheries in Area 17 will take place only in those waters exempt from the 2021 IFR Steelhead conservation measures as described in Appendix 9.
- **Area 18** – Cowichan: The fishery is directed primarily at Cowichan River stocks. Cowichan Chum and to some extent Goldstream Chum are also harvested. Chemainus River stocks are also impacted but likely to a lesser extent. Openings generally occur in late October to late November. Commercial net fisheries in Satellite Channel are possible. Openings are subject to in-season abundance estimates for the Cowichan River.
    - Terminal Chum fisheries in Area 18 will take place only in those waters exempt from the 2021 IFR Steelhead conservation measures as described in Appendix 9.
- **Area 19** – Goldstream (Saanich Inlet): The fishery is directed primarily at Goldstream River Chum stocks, but some Cowichan River Chum are harvested incidentally. Openings generally occur in late October to early December with possible commercial net fisheries in Satellite Channel and Saanich Inlet. Openings are subject to in-season abundance estimates for the Cowichan and Goldstream Rivers.
- **Other Considerations**:
    - Area E gill net opportunities are subject to in-season abundance estimates and licence area allocation status.
    - Area B seine opportunities are subject to in-season abundance estimates and licence area allocation status.
    - Area H troll opportunities are subject to in-season abundance estimates and licence area allocation status.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Fishery Monitoring and Catch Reporting

There is a mandatory harvest log and in-season reporting program for catch information for all commercial fisheries.

Mandatory requirement to file fishing reports in all commercial fisheries, including "Start/Pause/Cancel/End" Fishing reports.

Mandatory catch reporting by phone-in with a paper harvest or electronic transmission with an electronic harvest log (E-log).

Catch reporting requirements are specific to each licence group and are detailed in the conditions of licence for each gear type. Additional requirements are in place for providing biological samples as required.

Demonstration Fisheries

The Area H Harvest Committee has submitted demonstration fishery proposals for Mainland Inlet Chum (Area 12), Bute Inlet Chum, Area 14 (Cape Lazo) Terminal Chum and Areas 14, 17 and 18 (Qualicum, Nanaimo and Cowichan) Terminal Chum under the Commercial Salmon Allocation Framework process. See Appendix 6 for more details.

The Area D Harvest Committee has submitted a demonstration fishery proposal for Mainland Inlet Chum and Area 14 SCVI Chum, under the Commercial Salmon Allocation Framework process. See Appendix 6 for more details.

For 2021, these fisheries are to be operated in times and areas outside of the rolling window closures identified to protect IFR Steelhead outlined in Appendix 9. The duration of the window closures will be 42 days for commercial gill net and purse seine fisheries and 27 days for commercial troll fisheries. These terminal fisheries targeting terminal abundances that are understood to not be on the migratory route of IFR Steelhead will remain open. Areas proposed for exemption are also listed in Appendix 9.

ISC Terminal First Nations Commercial Chum Harvest

The First Nations Salmon Coordinating Committee have submitted demonstration fishery proposals for Nanaimo, Cowichan and Goldstream Chum under the Commercial Salmon Allocation Framework process. See Appendix 6 for more details.

For 2021, these fisheries are to be operated in times and areas outside of the rolling window closures identified to protect IFR Steelhead outlined in Appendix 9. The duration of the window closures will be 42 days for commercial gill net and purse seine fisheries and 27 days for commercial troll fisheries. These terminal fisheries targeting terminal abundances that are understood to not be on the migratory route of IFR Steelhead will remain open. Areas proposed for exemption are also listed in Appendix 9.

13.2.4.5.4 ESSR Fisheries

ESSR fisheries may be considered in the following Rivers: Little Qualicum, Big Qualicum, Puntledge, Nanaimo, Cowichan, Goldstream and Sliammon.

13.2.5 INSIDE SOUTHERN CHUM MIXED STOCK FISHERIES

13.2.5.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT

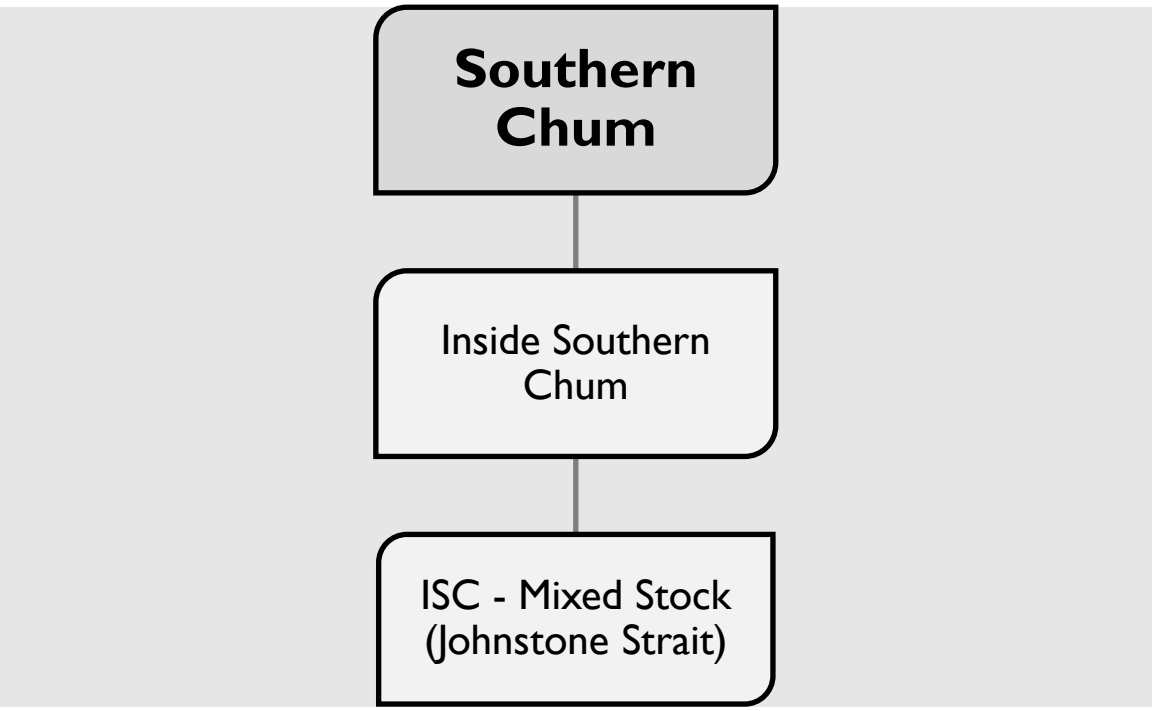


Figure 13.2-5: Overview of Inside Southern Chum Mixed Stock Fisheries

The Inside Southern Chum mixed stock fishery targets fall run Chum stocks that migrate through Johnstone Strait. Most of these fish spawn in systems adjacent to Johnstone Strait, the Strait of Georgia, and in the Fraser River, though a small component is bound for Washington State systems. The main components of the harvest are the Mid-Vancouver Island (MVI) and the Fraser River stock groupings. This fishery intercepts enhanced Chum from Big Qualicum hatchery, Little Qualicum hatchery, Puntledge hatchery, Chehalis hatchery, Chilliwack hatchery, Inch Creek hatchery, and Weaver Creek spawning channel.

The migration timing of these fall Chum stocks in the Johnstone Strait fishing area ranges from September to November with the peak typically early to mid-October. Mixed-stock fisheries occur in Areas 12 and 13, with terminal opportunities where surpluses are identified. Harvesters include First Nations (FSC fisheries), recreational, and commercial (seine, gill net and troll).

Canadian conservation units that may be encountered in this fishery include:

Fraser Canyon (F)

Lower Fraser (F)

Bute Inlet

Loughborough

Northeast Vancouver Island

Southern Coastal Streams

Upper Knight

Howe Sound - Burrard Inlet

Strait of Georgia

13.2.5.2 STOCK ASSESSMENT INFORMATION

13.2.5.2.1 Pre-season

Table 13.2-10: ISC Mixed Stock 2021 Salmon Outlook

Management Area	Stock Outlook
Johnstone Strait and Mainland Inlet (Area 11 to 13)	Expectations for Fall Chum in 2021 are below average (Outlook Category '2'). This is based on below average parental brood abundances in 2017 and 2018, and a 4 year decline in Chum productivity. Expect more variability in Chum returns. Summer Chum stocks in 2021 will likely continue to be below average throughout the area; similar to 2020.
Strait of Georgia	For 2021, abundance of age 4 Chum is expected to be below average given observations of variable but poor overall survival for Coho and Pink from the 2017 ocean entry year. Expect below average Chum returns to Mid-Island and South Island systems in 2021, with variability similar to recent years. For Jervis Inlet, stocks are forecast to be well below target in 2021.
Fraser River **(CUs: Fraser Canyon and Lower Fraser)**	2021 Outlook Category '2'. Fraser River Chum Salmon spawning escapement in 2017 fell below the 800,000 goal for the first time since 2010. Returns in 2021 will be dominated by 4 year old brood from the 2017 escapement (660,000 spawners). With the exception of the unusually high escapement in 2016 (1.98 mil spawners), spawning escapement has trended down since the 2012 return. Spawning escapement in 2019 was estimated at 300,000 Chum; this is the lowest recorded escapement in over 20 years.

13.2.5.2.2 In-season

The upper Johnstone Strait (Area 12) Chum seine test fishery uses standardized methods of test fishing, based on specific set locations. Two vessels, one fishing the Blinkhorn area (Subareas 12-3 & 12-4) of the Vancouver Island shoreline and the other fishing the Double Bay (Subareas 12-5 & 12-6) area are used to

assess abundance and biologically sample the stocks passing through the upper Johnstone Strait area. Test fishery information is used to determine whether stocks are at or above the Lower Fishery Reference Point (LFRP), and is also used for post season representation of the timing and spread of the aggregate return.

Table 13.2-11: Planned Chum Test Fisheries

Test Fishery	Proposed Proponent	Test Fishery Purpose	Potential Dates (preliminary[a])	
			Start	End
Area 12	Namgis/A-Tlegay	ISC Mixed Stock Chum	15-Sept	3-Nov

[a] All dates subject to change based on in-season factors. In-season information from initial TFs important to determining timing of subsequent TFs.

13.2.5.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

Conservation measures implemented in 2020 are proposed for 2021 to reduce the impact of commercial Chum fisheries on co-migrating Interior Fraser River Steelhead. These actions are described generally in Section 13.1.4 and detailed measures are provided for specific fisheries contained in Section 13.2.5.5.

Harvest Approach for Mixed-Stock Chum Fisheries in Johnstone Strait

In Johnstone Strait, a fixed harvest rate approach was initiated in 2002. It was agreed that the exploitation would be limited to a more cautious level of 20% implemented through a fixed effort approach, with two seine openings and limited gill net and troll opportunities through the month of October. This implementation approach was assessed through modeling and testing of assumptions by in-season mark-recapture (conducted in 2000-2002) to estimate harvest rates, fleet efficiencies, and migration rates of Chum through the mixed stock fishing area. Many of the parameters (run-timing and spread) required for the planning of these fisheries were obtained through the existing Chum test fishery. While cautious in the mixed stock areas, this approach provides a more stable marketing opportunity compared to the previous stepped harvest rate approach (also known as Clockwork).

The level of exploitation in Johnstone Strait and a critical abundance threshold of 1.0 million Inside Southern Chum used to manage both Canadian and U.S. fisheries is identified within the Pacific Salmon Treaty (PST) revised Annex IV Chapter 6. The critical abundance threshold for the ISC aggregate including Fraser stocks provides a reference point to either initiate (>1.0 million) mixed stock fisheries in Johnstone Strait and U.S. waters or suspend (<1.0 million; Table 13.2-12). Of the overall 20% exploitation rate, commercial fisheries are organized using historic catch and effort fishing data to plan fisheries targeting 15% of passing stocks and the remaining 5% is set aside for FSC, test fishing, recreational and

a commercial harvest buffer. The 15% commercial harvest is allocated between the purse seine, gill net and troll fisheries following commercial salmon allocation arrangements. The implementation of the management strategy in Johnstone Strait has three distinct benefits:

1. To minimize potential impacts on less productive stocks that are not following the aggregate abundance pattern;
2. To improve stability and predictability for harvesters; and
3. In periods of high abundance, increased terminal opportunities will develop focusing harvest on those abundant stocks.

The harvest plan is designed to achieve the provisions of the PST, which specifies a run size reference point of 1 million for the Inside Southern Chum aggregate (Johnstone Strait, Strait of Georgia and Fraser). The PST defines this as a critical threshold, and it is used as a Limit Reference Point (LRP) for commercial fisheries.

Table 13.2-12: Fishery Reference Points and Harvest Plan for Mixed-Stock Chum Fisheries in Johnstone Strait

Management Zone	Run Size Range*	Harvest Guideline	Exploitation Rate Range**
1 – Critical	0 – 1 Million	Non-commercial fisheries only	up to 5%
Limit Reference Point for Commercial Fisheries = 1 Million run size			
2 – Very Low **3 – Low** **4 - Moderate** **5 - High**	More than 1 Million	Commercial harvest up to 15% ER, and non-commercial fisheries at 5% ER.	up to 20%

* Run size is defined as aggregate abundance of Chum.
** Exploitation rate is defined as % of the aggregate abundance caught in Canadian fisheries.

The harvest guidelines for mixed-stock fisheries in Johnstone Strait are used for pre-season planning, in-season implementation, and post-season review:

Pre-Season: The preseason planning model takes into account average migration timing and spread of the Inside Southern Chum aggregate, historic gear efficiencies and anticipated effort and distribution of effort by gear type (Area B purse seine, Area D gill net, and Area H troll).

- Outputs from the model illustrate the exploitation (differing harvest strategies) by gear type and are presented as scenarios to the Chum Working Group. Participants in the Chum Working Group finalize a pre-season fishing plan.
- New decision rules and fisheries plans for the Mixed-stock Chum commercial fisheries taking place in Johnstone Strait will take into account the delayed start due to the 2021

IFR Steelhead measures and associated reduced ER approach will be developed in consultation with local First Nations and stakeholders.

In-season: Test fishing catch per unit effort data is tracked daily and compared to previous years of estimated run sizes. Fisheries are conducted as per the pre-season fishing plan if test fishery catches indicate a run size greater than the LFRP.

Post-Season: Test fishery information is used for post season representation of the timing and spread of the aggregate return.

13.2.5.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO ISC MIXED STOCK FISHERIES

For Inside Southern Chum salmon a critical threshold (or Lower Fishery Reference Point), where little or no harvesting occurs, is defined as 1.0 million in Chapter 6 of the PST.

Commercial opportunities for Chum may be constrained prior to late September to achieve Coho management objectives.

Given ongoing declines in IFR Steelhead escapement, and the recent designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO is implementing a precautionary approach to the management of those fisheries in southern BC that are likely to impact this stock of concern. In Johnstone Strait, a rolling window closure of 42 days will apply to all commercial gill net and purse seine fisheries and a 27-day closure will apply to commercial troll fisheries.

The implementation of the management strategy minimizes impacts on less productive stocks that are not tracking the aggregate abundance pattern.

Schedules and fishing dates will be confirmed pre-season following consultation with industry, First Nations, and stakeholders through the Chum Working Group process.

13.2.5.5ALLOCATION AND FISHING PLANS

13.2.5.5.1First Nations Fisheries

Food Social and Ceremonial

FSC fisheries for mixed stock Chum will not be impacted by 2021 Interior Fraser River Steelhead conservation measures.

First Nations target local salmon stocks for FSC purposes throughout the Inner South Coast. Inner South Coast First Nations harvest of Chum salmon is typically small with an aggregate communal licence harvest target of 155,000 for the South Coast, including the West Coast of Vancouver Island.

Fishery Monitoring and Catch Reporting

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations are asked to keep records of harvest and provide catch information to DFO in a variety of formats. Under this licence, if a commercial vessel is used for fishing, First Nations are asked to provide information respecting the species and quantity of fish harvested by this vessel, to the DFO Catch Reporting Officer within 24 hours from landing harvested catch. In addition, catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where in-season management requires, catch reports are sought weekly during the respective fishing season.

Treaty Fisheries

Tla'amin Fisheries (Domestic)

Tla'amin Domestic fisheries for mixed stock Chum will not be impacted by 2021 Interior Fraser River Steelhead conservation measures.

The Tla'amin Fishing Area for all species of Fish and Aquatic Plants is within portions of Pacific Fisheries Management Areas 14, 15, and 16.

The Domestic allocation for Chum salmon under the Tla'amin First Nation's Final Agreement is a maximum of 2,000 Chum salmon that are not of terminal origin, caught in the Tla'amin Fishing Area. The allocation will be determined by an abundance-based formula.

The Tla'amin First Nation provides catch reports to the Department through the Aboriginal Harvest Management System (AHMS). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and biological samples.

13.2.5.5.2 Recreational Fisheries

Marine recreational fisheries will not be impacted by 2021 conservation measures to protect Interior Fraser River Steelhead.

Chum recreational fisheries are open year round, with the majority of marine recreational Chum harvest occurring in lower Area 13 (Deepwater Bay) from late September to late October. Updates are provided via Fishery Notice and published on the recreational fisheries website (http://www.bcsportfishingguide.ca). The normal daily limit is four. For 2021 in Southern BC tidal waters, it is anticipated that normal Chum opportunities will be provided for Southern BC Chum.

Fishery Monitoring and Catch Reporting

Catch monitoring programs including creel surveys, logbooks and the internet recreational effort and catch survey (iREC) are the main tools used to capture recreational catch and effort information in this fishery. South Coast Stock Assessment staff use these programs to provide annual estimates of the recreational harvest in each area.

13.2.5.5.3Commercial Fisheries

Allocation

Canadian commercial fisheries are managed to try and achieve allocation targets between fleets for all Inside Southern Chum harvests (Table 13.2-14). Commercial fishery allocations take into account catches from: Johnstone Strait mixed-stock fisheries and terminal area fisheries in inside waters, including the Fraser River. Commercial allocation sharing arrangements in Johnstone Strait are: seine Area B – 77%; gill net Area D – 17%; and troll Area H – 6%. The Johnstone Strait Chum allocations are used to guide pre-season fishing effort inputs into the fishery planning model. As the fishery is managed based on effort, actual catch has not been used to adjust fisheries for the mixed stock Johnstone Strait Chum fishery. Where abundance permits, terminal area fishing opportunities are used to try and balance the overall ISC allocations below.

Table 13.2-13: Commercial Allocation Implementation Plan (from the 2015–current period).

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South Inside	11 to 19, 28 to 29	63.0%	19.2%	12.0%	0.0%	5.8%

Inside Southern Chum - Mixed-Stock (Johnstone Strait) Commercial Fisheries

ISC Mixed-Stock fisheries (Areas 12/13): Target fall run Chum, with seine, gill net and troll gear. Specific fishing plans will be determined pre-season following consultation with the Chum Working Group. A Chum Working Group meeting will be scheduled during July to begin this planning process. The fishing plan for Johnstone Strait mixed-stock fishery will follow the general outline:

- **Area B Seine**
    - A 42-day rolling window closure will be implemented in 2021 to protect co-migrating IFR Steelhead.
    - Openings may be scheduled following the IFR Steelhead closure (preliminary fishing dates will be determined at the pre-season Chum working group meeting).

***As part of the 2021 Pacific Salmon Strategy Initiative, the Area D gill net Inside Southern Chum Mixed-Stock commercial fishery will be closed. See Appendix 11 for a complete list of Southern salmon commercial fishery closures.**

Area D Gill Net*

- A 42-day rolling window closure will be implemented in 2021 to protect co-migrating IFR Steelhead.
- Openings may be scheduled following the IFR Steelhead closure (preliminary fishing dates will be determined at the pre-season Chum working group meeting).
- Duration of each fishing period is generally 41 hours and will be confirmed in-season based on effort.
- Fishing times are scheduled separate from the seine fishery when and where possible.
- Fishing opportunities on the weekend are generally not planned in order to minimize any potential gear interactions with the recreational fishery in lower Area 13 and to minimize any processing issues on weekends.

Area H – Troll

- A 27-day rolling window closure will be implemented in 2021 to protect co-migrating IFR Steelhead.
- Troll fisheries may be scheduled following the IFR Steelhead closure (preliminary fishing dates will be determined at the pre-season Chum working group meeting).
- This fishery is planned to occur as Individual Transferable Effort (ITE) demonstration fishery (see details below in demonstration fishery section). Troll fisheries in Johnstone Strait are not planned during regular Area B seine openings when and where possible.

Inside Southern Chum - Mixed-Stock Demonstration Fisheries

Area H Troll Johnstone Strait Chum Individual Transferable Effort (ITE) Demonstration Fishery

Region: South Coast

Participants: All Area H troll licence holders

Location of Fishery: Johnstone Strait (portions of Areas 12 and 13).

This fishery will be subject to the 27-day rolling window closure to be implemented in 2021 to protect co-migrating IFR Steelhead.

Gear Type: Troll, barbless hooks and revival tanks are mandatory

Time Frame of Fishery: Fishing plans and start dates will be confirmed prior to the season through the Chum Working Group consultation process.

Allocation: Boat day allocations are based on the anticipated amount of effort and the distribution of that effort in order to stay within the Area H share of the harvest rate.

Boat days will be permitted to be transferred between other Area H licence holders.

The target species is Chum, retention of Pink is permitted. There will be non-retention of Sockeye, Coho, Chinook and Steelhead.

Monitoring Plan: Start, end, pause and daily catch reports will be required by phone-in or electronic logbook. Over flights will be conducted and charter patrol will monitor the fishery.

Mixed-Stock First Nations Commercial Chum Harvest

There are no First Nations commercial fisheries for mixed-stock Chum.

13.2.5.5.4ESSR Fisheries

ESSR fisheries are identified in the Fraser and ECVI/Mainland Chum sections.

13.2.6 WEST COAST VANCOUVER ISLAND CHUM – OVERVIEW

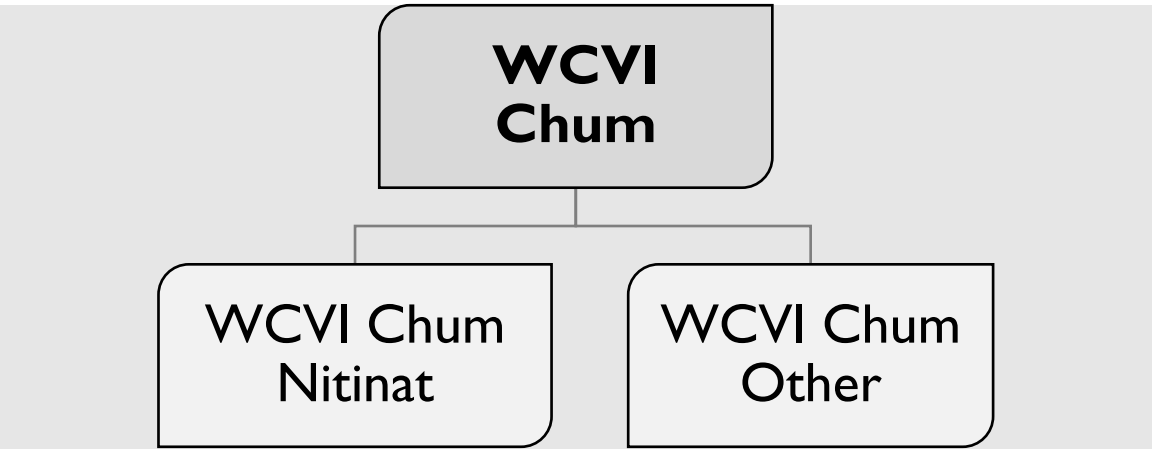


Figure 13.2-6: Overview of West Coast Vancouver Island Chum

13.2.7 WCVI CHUM - NITINAT

13.2.7.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT

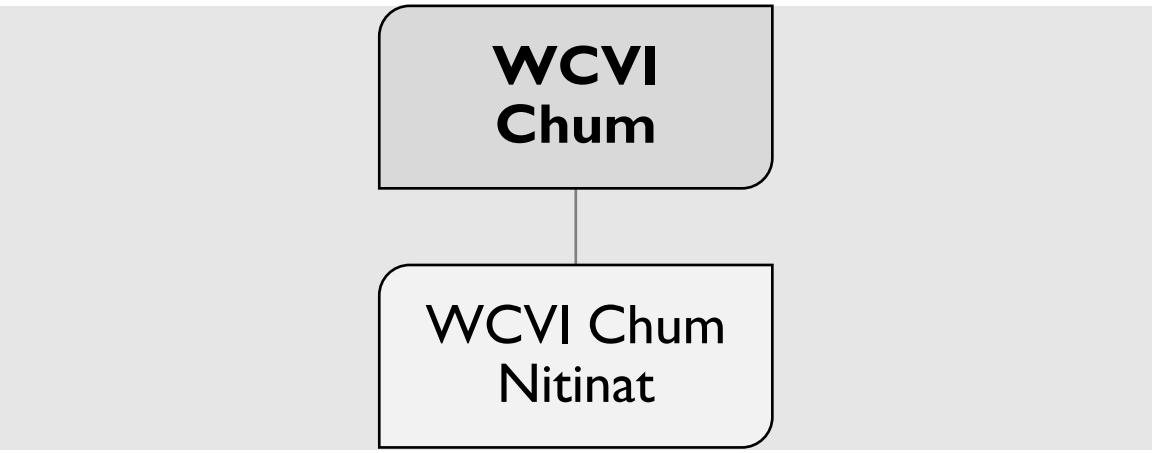


Figure 13.2-7: Overview of WCVI Chum – Nitinat

13.2.7.2 STOCK ASSESSMENT INFORMATION

13.2.7.2.1 Pre-season

Annual pre-season forecasts for the Nitinat system (predominantly enhanced) are based on brood year escapements, hatchery smolt output and estimated survival rates.

13.2.7.2.2 In-season

Location	PFMA	2021 Forecast	Forecast Range	Lower Fishery Reference Point	Target Fishery Reference Point
Nitinat Hatchery/Lake*	21/22	163,000	(23000 - 303000)	225,000	325,000
Barkley	23	38,000	(6000 - 70000)	48,000	146,000
Clayoquot	24	23,000	(13000 - 33000)	42,000	75,000
Conuma (Tlupana Inlet)*	25	22,000	(12000 - 32000)	TBD	
Nootka	25	14,000	(5000 - 24000)	26,000	53,000
Esperanza	25	82,000	(25000 - 139000)	24,000	50,000
Kyuquot	26	46,000	(15000 - 76000)	25,000	68,000

* Hatchery stock.

Nitinat Hatchery staff work in cooperation with the Ditidaht First Nations fishery program to assess escapement of Chum into Nitinat Lake and area. Through a combination of observations gathered from river surveys (swims, boat-based, and helicopter), brood collection activities and in-lake gillnet fisheries by Ditidaht First Nations; an in-season estimate of abundance is generated. Although there is high degree of uncertainty in the abundance estimate, it is generated from consistently applied survey methods, by observers with significant local knowledge and experience. Therefore, it provides a general gauge of the observed escapement relative to in-season escapement benchmarks defined for Nitinat Lake and area.

A scientific licence may be issued to the Ditidaht First Nations to provide biological samples and additional information on stock status and movement in Nitinat Lake.

In addition to the Ditidaht Nitinat Lake fishery, an Area E gill net limited-effort commercial assessment fishery, designed to achieve a maximum harvest rate of 15%, provides in-season assessment information. This fishery occurs in the approach waters to Nitinat Lake in Area 21 and 121.

A test fishery occurred in Nitinat Lake in the past; however, it has been replaced with the assessment fishery mentioned above.

13.2.7.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

Conservation measures are being implemented in 2021 to reduce the impact of commercial Chum fisheries on co-migrating Interior Fraser River Steelhead. These actions are described generally in Section 13.2.7.4 and detailed measures are provided for specific fisheries contained in Section 13.2.

The lower fishery reference point for Nitinat Chum is based on a gross escapement goal to Nitinat Lake of 225,000 Chum, including 175,000 into the rivers, 10,000 for Ditidaht First Nations FSC, and a minimum of 40,000 into the Nitinat hatchery. The upper fishery reference point is based on an escapement target of 325,000. The additional 100,000 Chum salmon are partly utilized as hatchery brood stock and to increase the distribution of spawners in the Nitinat River and to other Nitinat Lake tributaries.

In-season Commercial Fishery Decision Guidelines

New decision rules for the Nitinat Chum commercial fishery considering the delayed start due to the 2021 IFR Steelhead measures will be developed in consultation with local First Nations and stakeholders.

13.2.7.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO NITINAT CHUM FISHERIES

Given ongoing declines in IFR Steelhead escapement, and the recent designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO is implementing a precautionary approach to the management of those fisheries in southern BC that are likely to impact this stock of concern. In Areas 21 and 121, no commercial gill net or purse seine fishing will take place from September 11 to October 22 to address IFR Steelhead bycatch concerns. Following the window closure, fisheries are permitted within a two-mile boundary of the shoreline between Bonilla Point and Pachena Point.

Retention of Steelhead in commercial fisheries is prohibited. Boundaries at Cheewhat River, Klanawa River and Carmanah Creek are in place to protect local Chum and Coho stocks.

13.2.7.5 ALLOCATION AND FISHING PLANS

13.2.7.5.1 First Nations Fisheries

Food Social and Ceremonial Fisheries

FSC fisheries for Nitinat Chum will not be impacted by 2021 Interior Fraser River Steelhead conservation measures.

Ditidaht First Nations target Chum stocks for FSC purposes in Areas 21, 22 and 121. Most harvest occurs in Nitinat Lake (Area 22).

Refer to Section 10.2 for Table 10.2-1 - Communal Licence Harvest Target Amounts in Southern BC/Fraser River First Nations Fisheries.

Mandatory and voluntary measures have been implemented to support prey availability and reduce disturbance to Southern Resident Killer Whales, including within Southern BC waters and key foraging areas within Strait of Juan de Fuca and the Gulf Islands. These measures are outlined in section 5.8.

Fishery Monitoring and Catch Reporting

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations keep records of harvest and provide catch information to DFO in a variety of formats. If a commercial vessel is used for fishing under this licence, First Nations are asked to provide information respecting the species and quantity of fish harvested by the vessel to the DFO Catch Reporting Officer within 24 hours of the landing of fish harvested from that vessel. Catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where in-season management requires, catch reports are sought weekly during the respective fishing season.

Treaty Fisheries

There are no treaty fisheries for Nitinat Chum.

13.2.7.5.2 Recreational Fisheries

Marine recreational fisheries will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

Marine recreational fisheries targeting Nitinat Chum take place primarily in Nitinat Lake (Area 22). Chum recreational fisheries are open year-round. The normal daily limit is four. In the

Nitinat River, retention for Chum opens October 15 with a daily limit of two. Opening the freshwater recreational fishery is contingent on achieving escapement goals and mitigating concerns for impacts on spawning fish. There is a finfish closure at mouth of the Nitinat River to prevent foul hooking.

For 2021 in Southern BC tidal waters, it is anticipated that Chum opportunities will be provided for Nitinat Chum. Updates are provided via Fishery Notice and published on the recreational fisheries website: http://www.bcsportfishingguide.ca

Fishery Monitoring and Catch Reporting

Catch monitoring programs including creel surveys, logbooks and the internet recreational effort and catch survey (iREC) are the main tools used to capture recreational catch and effort information in this fishery. South Coast stock assessment staff use these programs to provide annual estimates of the recreational harvest in each area.

13.2.7.5.3 Commercial Fisheries

Allocation

The overall fishery allocation targets are outlined below.

Table 13.2-14: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
Nitinat	21 to 22	65.5%	0.0%	34.5%	*	0.0%

* bycatch provision

WCVI – Nitinat Commercial Chum Fisheries

As part of the 2021 Pacific Salmon Strategy Initiative, the Nitinat Chum commercial fisheries will be closed. See Appendix 11 for a complete list of Southern salmon commercial fishery closures.

No commercial gill net or seine fishing will take place from September 11 to October 22 to address IFR Steelhead bycatch concerns. New decision rules for the Nitinat Chum commercial fishery considering the delayed start due to 2021 IFR Steelhead conservation measures will be developed in consultation with local First Nations and stakeholders.

The minimum escapement target of 225,000 must be reached before commercial fisheries occur on October 23. Commercial gill net and Seine fisheries will operate inside a 2 mile nautical line

from Pachena Point to Bonilla Point. In the last two years plans were developed between Area E and Area B representatives and DFO when abundances allow to start with a two day gillnet fishery prior to seines opening. All fisheries will be decided at the weekly planning meetings between DFO and Area E and B representatives.

Retention of Steelhead in commercial fisheries is prohibited. Boundaries at Cheewhat River, Klanawa River and Carmanah Creek are in place to protect local Chum and Coho stocks.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Area G (Troll)

Chum may be retained as bycatch in fisheries targeting other stocks (e.g. AABM Chinook fishery). There are no directed troll fisheries on Nitinat Chum. No Area G troll fishing in Areas 21 and 121 will take place from September 18 to October 14 to address IFR Steelhead bycatch concerns.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Fishery Monitoring and Catch Reporting

There is a mandatory harvest log and in-season reporting program for catch information for all commercial fisheries.

Mandatory requirement to file fishing reports in all commercial fisheries, including "Start/Pause/Cancel/End" Fishing reports.

Mandatory catch reporting by phone-in with a paper harvest or electronic transmission with an electronic harvest log (E-log).

Catch reporting requirements are specific to each licence group and are detailed in the conditions of licence for each gear type. Additional requirements are in place for providing biological samples as required.

WCVI –First Nations Commercial Chum Harvest

There are currently no First Nations commercial fisheries for Nitinat Chum.

13.2.7.5.4 ESSR Fisheries

ESSR fisheries in Nitinat Lake can occur when surpluses to escapement goals and broodstock egg targets are anticipated to be exceeded. The Ditidaht First Nations participates in the ESSR fishery in coordination with Nitinat Hatchery staff and broodstock collection activities.

13.2.8 WCVI CHUM - OTHER

13.2.8.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT

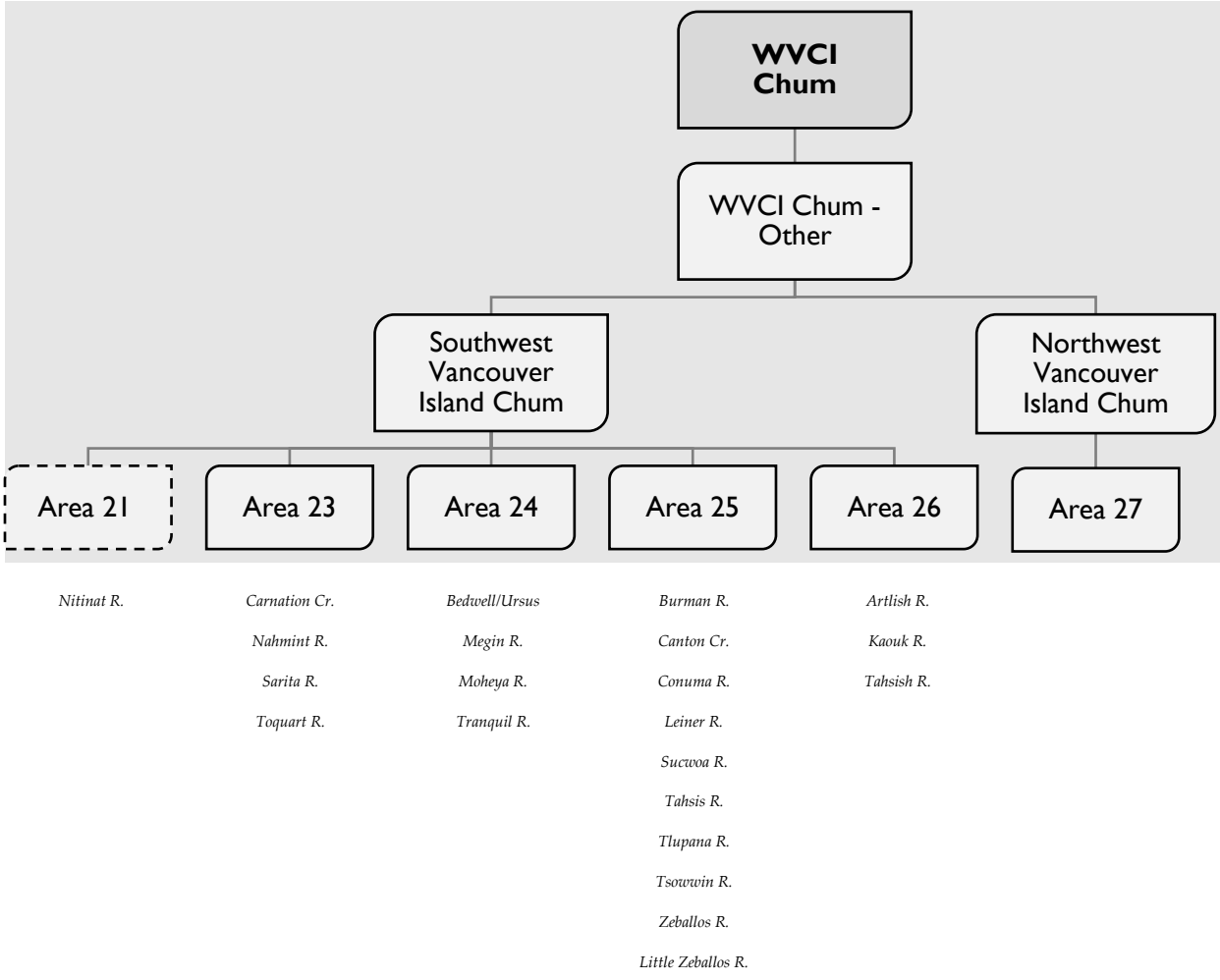


Figure 13.2-8: Overview of WCVI Chum - Other

Note that the management approach for enhanced Nitinat Chum is described separately in the WCVI Chum – Nitinat section (13.2.3).

Figure 13.2-9: Map of WCVI Chum - Other Fisheries

Population Structure of WCVI Chum

Chum salmon occur throughout the West Coast of Vancouver Island (WCVI) and have been grouped into 2 Conservation Units (CU) under the Wild Salmon Policy (WSP):

1. Southwest Vancouver Island (SWVI) with roughly 170 distinct spawning sites
2. Northwest Vancouver Island (NWVI) with roughly 60 distinct spawning sites

Major runs of Chum salmon originate in the following systems:

Area 20: De Mamiel Cr., Sooke R.

Area 22: Nitinat R. (enhanced). Note: The management approach for Nitinat Chum is described separately in the WCVI Chum – Nitinat section (13.2.3).

Area 23: Cous Cr., Effingham R., Little Toquart Cr., Nahmint R., Sarita R., Toquart R.

Area 24: Atleo River, Moyeha River, Tranquil Creek, Warn Bay Creek.

Area 25: Black Creek, Burman River, Canton Creek (enhanced), Conuma River (enhanced), Deserted Creek , Espinosa Creek, Leiner River, Sucwoa River, Tahsis River, Tlupana River (enhanced),Tsowinn River, Zeballos River

Area 26: Chamiss Creek, Kaouk River

Area 27: Colonial / Cayeghle Creeks

13.2.8.2 STOCK ASSESSMENT INFORMATION

13.2.8.2.1 Pre-season

Method: WCVI Chum mature and return to the terminal area as mainly 3, 4 and 5 year old fish. For naturally spawning stocks, expected returns for each contributing brood year are forecast based on observed spawner abundance and average recruitment and maturation rates. For hatchery stocks, expected returns for each contributing brood year are forecast based on hatchery releases and average marine survival rate. For both naturally spawning and hatchery stocks, observed returns of younger age classes are used to adjust forecasts of older age classes from the same brood year. Additionally, for naturally spawning stocks, forecast returns of index populations within each terminal area are expanded based on their average historical contribution to production within the area.

Sources of Uncertainty: Likely, as a function of lower quality assessment data (i.e. age data available for few stocks, estimates of spawner abundance are low quality) and also resulting from the highly volatile lower river spawning habitat that Chum favor, the performance of Chum forecasts is relatively poor. For WCVI areas, the mean absolute percentage error (MAPE) in recent year forecasts averages about 60%; meaning the observed returns are typically about 60% higher or lower than the forecast returns. Some of the key sources of uncertainty include: incomplete age data across stocks, uncertainty in spawner abundance, uncertainty in relative levels of production among index and non-index stocks.

2021 forecasted returns of WCVI Chum for the majority of stocks are below lower fishery reference points with the exception the Esperanza and Kyuquot terminal stock management units

Location	PFMA	2021 Forecast	Forecast Range	Lower Fishery Reference Point	Target Fishery Reference Point
Barkley	23	38,000	(6000 - 70000)	48,000	146,000
Clayoquot	24	23,000	(13000 - 33000)	42,000	75,000
Conuma (Tlupana Inlet)*	25	22,000	(12000 - 32000)	TBD	
Nootka	25	14,000	(5000 - 24000)	26,000	53,000
Esperanza	25	82,000	(25000 - 139000)	24,000	50,000
Kyuquot	26	46,000	(15000 - 76000)	25,000	68,000

* Hatchery stock.

The forecast return of Conuma hatchery (Tlupana Inlet area) Chum remains low at 22,000 (range 12,000 to 32,000). Spawner abundances for wild indicator stocks in some areas (Barkley, Nootka Sounds) within the WCVI Conservation Unit have been below the upper biological benchmark in many recent years, and below the lower biological benchmark in 2018 and 2019. Considering this result and the high level of uncertainty in the assessment data (and forecasts) fishing opportunities will be precautionary.

13.2.8.2.2 In-season

When the catch-per-unit effort in fisheries is related to run size, fishery data can be used to provide in- season stock assessment information. This approach is responsive to in-season abundances rather than pre-season forecasts that are highly uncertain, particularly for Chum stocks. In the case that fishery results suggest the abundances are relatively low as expected, the resulting harvest rate will not significantly impede stock rebuilding. Alternatively, if results suggest the abundance is higher than expected, harvest opportunities are not unnecessarily foregone.

13.2.8.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

The Decision Guidelines in this plan are under construction and will be updated as local plans are developed.

For naturally spawning WCVI Chum stocks, upper and lower fishery reference points were developed using the "sustainable escapement goal" or "SEG" approach described in Bue and Hasbrouck (2001). This method uses escapement estimates to set fishery reference points and is suitable for stocks with relatively low quality assessment data, such as WCVI Chum. The SEG

algorithm was determined by relating MSY reference points with time series derived benchmarks for model populations with more reliable data sets for which stock-recruit analysis is feasible. Conservative "SEGs" were defined as the 25% and 75% of a long-term escapement time series. The lower SEG is estimated to represent approximately 0.8 S_{MSY} (i.e. size of spawning population at 80% maximum sustained yield), which is similar to an "upper biological benchmark", or healthy state, described for salmon populations. (Fishery reference points are used to trigger fisheries, in contrast to biological reference points which are used to assess the conservation status of stocks). Use of precautionary fishery reference points to set abundance-based limits on harvest supports Marine Stewardship Council (MSC) third-party eco-certification of the fishery and also an objective of Canada's Wild Salmon Policy.

Within each WCVI management area, SEGs were calculated for index populations with higher quality escapement data. To develop fishery reference points for the entire area, index SEGs were summed and this value is expanded based on their average historical contribution to escapement within the area. (Note: forecasts of abundance for each area are estimated from index populations using the same expansion factor). For WCVI hatchery populations, the lower and upper fishery reference points are determined by the needs of the hatchery and spawning objectives for nearby rivers.

Although more work is required to finalize the reference points for natural systems and associated harvest strategy and management plan for WCVI Chum, reference points have been applied in recent years to set target levels for commercial fisheries. That is, commercial fisheries have been curtailed when forecast abundance is below the lower fishery reference point in order to comply with the conditions of MSC certification.

Commercial fisheries for WCVI Chum employ a two-tiered harvest strategy for controlling removals; either a constant harvest rate strategy or a surplus-to-escapement goal strategy:

Fixed Harvest Rate Strategy (fisheries targeting natural origin stocks, hatchery stocks at low abundance): For those fisheries where a significant component of the target stock is from naturally spawning populations, a constant harvest rate strategy of 10-20% is implemented. The maximum harvest rate is set at a precautionary level relative to stock-recruit derived optimal exploitation rates for WCVI Chum; which are in the order of 30-40%. This approach allows limited harvest while protecting the biodiversity of Chum stocks and permitting rebuilding when the population is low. In areas of low quality data or only naturally spawning stocks, including Barkley (Area 23), Clayoquot (Area 24), Esperanza Inlet (Area 25) and Kyuquot Sound (Area 26), the maximum allowable harvest rate is 10 to 15%. In Nootka Sound, up to 20% harvest is permitted given the prevalence of hatchery origin stock in the area.

Surplus-to-Escapement Goal Strategy (fisheries targeting hatchery stocks at high abundance): This strategy only applies to Area 25 (Nootka Sound) fisheries that target hatchery surpluses. The allowable harvest rate is determined by the escapement goal when the stock is forecasted in-season to be above the Upper Fishery Reference Point and broodstock capture targets have been or will be met. This fishery occurs only in the Tlupana Inlet portion of Area 25 where little or no interception of non-enhanced stocks occurs.

All Conuma hatchery Chum are thermally marked, which allows for assessment of the hatchery contribution to fisheries and spawning.

Stage 1 fisheries are Limited Entry Assessment Fisheries that may occur when the pre-season forecast indicates the run size is below the lower fishery reference point. They require increased monitoring and are designed to provide in-season information about the run size within a low-risk fishing strategy (i.e. limit overall mortality to less than 15%).

Further work on developing assessment criteria needs to occur prior to proceeding with stage 1 assessment fisheries and is contingent on additional consultation with First Nations and stakeholders.

Stage 2 fisheries are Limited Entry or Limited Effort fisheries that may occur when the pre-season forecast or Stage 1 fisheries indicate the run size is above the lower fishery reference point, but below the upper fishery reference point. They are designed to be lower risk and limit mortality to a precautionary level through a fixed harvest rate strategy.

Stage 3 fisheries are Full Fleet fisheries that may occur when the pre-season forecast or Stage 1 and/or 2 fisheries indicate the run size is above the upper fishery reference point. They are designed to be relatively low risk and limit mortality to a precautionary level through a fixed-harvest rate strategy.

Table 13.2-15: Table on Fishery Triggers of Each Harvest Strategy

Fishery Trigger	Harvest Strategy	Nootka (Enhanced)	Barkley, Clayoquot, Esperanza, Kyuquot
Pre-season forecast below Lower Fishery Reference Point	Assessment Fishery	Stage 1: Assessment Fishery	Stage 1: Assessment Fishery
Pre-season forecast between Lower and Upper Fishery Reference Point	Fixed Harvest Rate	Stage 2: Limited Entry / Limited Effort Fishery	Stage 2: Limited Entry / Limited Effort Fishery

Fishery Trigger	Harvest Strategy	Nootka (Enhanced)	Barkley, Clayoquot, Esperanza, Kyuquot
In-season forecast above Upper Fishery Reference Point	Fixed Harvest Rate	Stage 3: Full Fleet/Limited Effort Fishery	Stage 3: Full Fleet / Limited Effort Fishery
In-season forecast above Upper Fishery Reference Point and broodstock capture near target	Surplus to Escapement Goal	Full Fleet terminal fishery	n/a

Local Harvest Committee's (Roundtables), that include representatives from First Nations, commercial and recreational sectors, conservation groups, local governments and DFO on the West Coast of Vancouver Island are in various stages of developing local detailed Chum fishing plans, including management guidelines and assessment criteria for all fishery stages.

13.2.8.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO WCVI CHUM - OTHER FISHERIES

Bycatch of wild Chinook is a concern for these Chum fisheries. To reduce Chinook encounters, commercial fisheries will start no earlier than September 25 in Kyuquot Sound, Esperanza Inlet and Nootka Sound and no earlier than October 1 in Barkley Sound and October 15 in Clayoquot Sound. In addition, commercial fisheries will be daylight only to reduce encounters of non-target species.

In general, fishing area and the timing of openings are also designed to avoid specific areas where non-target stocks are prevalent:

> In Area 25, Hisnit Inlet is closed during Tlupana Inlet fisheries to protect Deserted River Chum as they are no longer enhanced. A stream mouth boundary at Marvinas Bay will protect local stocks adjacent to fishing area.
>
> Given ongoing declines of IFR Steelhead escapement and the designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO is implementing a comprehensive, precautionary approach to the management of all fisheries in Southern BC that are likely to impact this stock of concern. Closed periods for commercial gill net, seine, and troll WCVI Chum-Other fisheries will be applied in Areas and portions of Areas with the potential to encounter these Steelhead stocks. See sections below for further details.

13.2.8.5 ALLOCATION AND FISHING PLANS

13.2.8.5.1 First Nations Fisheries

FSC fisheries for WVCI Chum will not be impacted by 2021 Interior Fraser River Steelhead conservation measures.

Food Social and Ceremonial Fisheries

WCVI First Nations target Chum stocks for FSC purposes throughout NW and SW Vancouver Island.

Refer to Section 10.2 for Table 10.2-1 - Communal Licence Harvest Target Amounts in Southern BC/Fraser River First Nations Fisheries.

Mandatory and voluntary measures have been implemented to support prey availability and reduce disturbance to Southern Resident Killer Whales, including within Southern BC waters and key foraging areas within Strait of Juan de Fuca and the Gulf Islands. These measures are outlined in section 5.8.

5.6.Fishery Monitoring and Catch Reporting

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations keep records of harvest and provide catch information to DFO in a variety of formats. If a commercial vessel is used for fishing under this licence, First Nations are asked to provide information respecting the species and quantity of fish harvested by the vessel to the DFO Catch Reporting Officer within 24 hours of the landing of fish harvested from that vessel. Catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where in-season management requires, catch reports are sought weekly during the respective fishing season.

Treaty Fisheries

Treaty fisheries for WVCI Chum will not be impacted by 2021 Interior Fraser River Steelhead conservation measures.

Maa-nulth Fisheries (Domestic)

The annual Domestic allocations for Chum salmon under the Maa-nulth First Nations Final Agreement are as follows:

3,000 pieces, when the return of Terminal Chum Salmon is critical;

6,500 pieces, when the return of Terminal Chum Salmon is low;

10,000 pieces, when the return of Terminal Chum Salmon is moderate;

14,000 pieces, when the return of Terminal Chum Salmon is abundant;

17,500 pieces, when the return of Terminal Chum Salmon is very abundant.

The Maa-nulth First Nations provides catch reports to the Department through the Maa-nulth Electronic Reporting Program (MERP). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and pieces of salmon harvested.

13.2.8.5.2 Five Nations (Ahousaht, Ehattesaht, Hesquiaht, Mowachaht / Muchalaht, and Tla-o-qui-aht First Nations) Multi-species Fishery

The Five Nations multi-species fishery for WVCI Chum will not be impacted by 2021 Interior Fraser River Steelhead conservation measures.

Five Nuu-chah-nulth First Nations located on the west coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht (the Five Nations) – have an aboriginal right to fish for any species, with the exception of Geoduck, within their court-defined fishing territories and to sell that fish. For further information please see Section 10.3.1.

13.2.8.5.3 Recreational Fisheries

The recreational fishery for WVCI Chum will not be impacted by 2021 Interior Fraser River Steelhead conservation measures.

Marine recreational fisheries targeting Southern Chum take place in inshore and offshore waters of the west coast of Vancouver Island (Areas 21 to 27 and 121 to 127). These fisheries are open year round, with the majority of the catch and effort taking place in September to November in terminal areas. The normal daily limit is four. Tidal recreational limits will be changed to non-retention in WCVI inshore areas where pre-season forecasts are below the lower fishery reference point. These limits may be adjusted subject to in-season abundance indicators. In non-tidal waters, Chum retention is typically permitted based on observed abundances, and primarily occurs in hatchery systems.

Updates are provided via Fishery Notice and published on the recreational fisheries website: http://www.bcsportfishingguide.ca

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing

restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Fishery Monitoring and Catch Reporting

Catch monitoring programs including creel surveys, logbooks and the internet recreational effort and catch survey (iREC) are the main tools used to capture recreational catch and effort information in this fishery. South Coast stock assessment staff use these programs to provide annual estimates of the recreational harvest in each area.

13.2.8.5.4 Commercial Fisheries

Allocation

Table 13.2-16: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South Outside	23 to 27	0.0%[d]	98.0%	0.0%	2.0%	0.0%

[d] potential for future re-negotiation if Chum populations re-build

WCVI Chum – Other Commercial Chum Fisheries

Earliest anticipated gill net start dates:

Barkley Sound – Oct. 1

Clayoquot Sound – Oct. 15

Nootka Sound – Sept. 25

Esperanza Inlet – Sept. 25

Kyuquot Sound – Sept. 25 (Area 26-11 will remain closed for IFR Steelhead conservation until October 12)

Detailed planning for any potential Area D Chum fisheries will occur with local First Nations and the Roundtables established in each area. Fishery planning will be dependent on pre-season forecasts and any adjustments to which have occurred in previous years may be considered

depending on post-season assessments of the 2020 fisheries relative to their estimated achieved harvest rates.

Coho retention in net fisheries may be permitted when abundance permits.

There are separate approach area and terminal fisheries to facilitate bio-sampling for age and hatchery contribution.

Area G (Troll)

Chum salmon may be retained as bycatch in other directed fisheries, such as the AABM Chinook fishery in Areas 23 to 27, and 123 to 127.

To support conservation of IFR Steelhead, a 27-day rolling window closure will be applied to commercial Chinook troll fisheries off of WVCI. These measures are outlined in Table 13.2-17 below.

Table 13.2-17: Interior Fraser River Steelhead Closure Dates by Area for the Area G Troll Fishery.

Area Details	Start	End
Area 123	16-Sep	12-Oct
Area 124	13-Sep	9-Oct
Area 125	11-Sep	7-Oct
Area 26-11	8-Sep	4-Oct
Area 126	8-Sep	4-Oct
Areas 27-1 and 27-2 westerly of a line from Cape Parkins (50 26.6395 N, 128 02.8157 W) to Kwakiutl Point (50 21.0552 N, 127 59.4362 W), 27-4 to 27-6)	6-Sep	2-Oct
Area 127	6-Sep	2-Oct

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Fishery Monitoring and Catch Reporting

There is a mandatory harvest log and in-season reporting program for catch information for all commercial fisheries.

Mandatory requirement to file fishing reports in all commercial fisheries, including "Start/Pause/Cancel/End" Fishing reports.

Mandatory catch reporting by phone-in with a paper harvest or electronic transmission with an electronic harvest log (E-log).

Catch reporting requirements are specific to each licence group and are detailed in the conditions of licence for each gear type. Additional requirements are in place for providing biological samples as required.

WCVI Chum - Other - Chum Demonstration Fisheries

None

Economic Opportunities

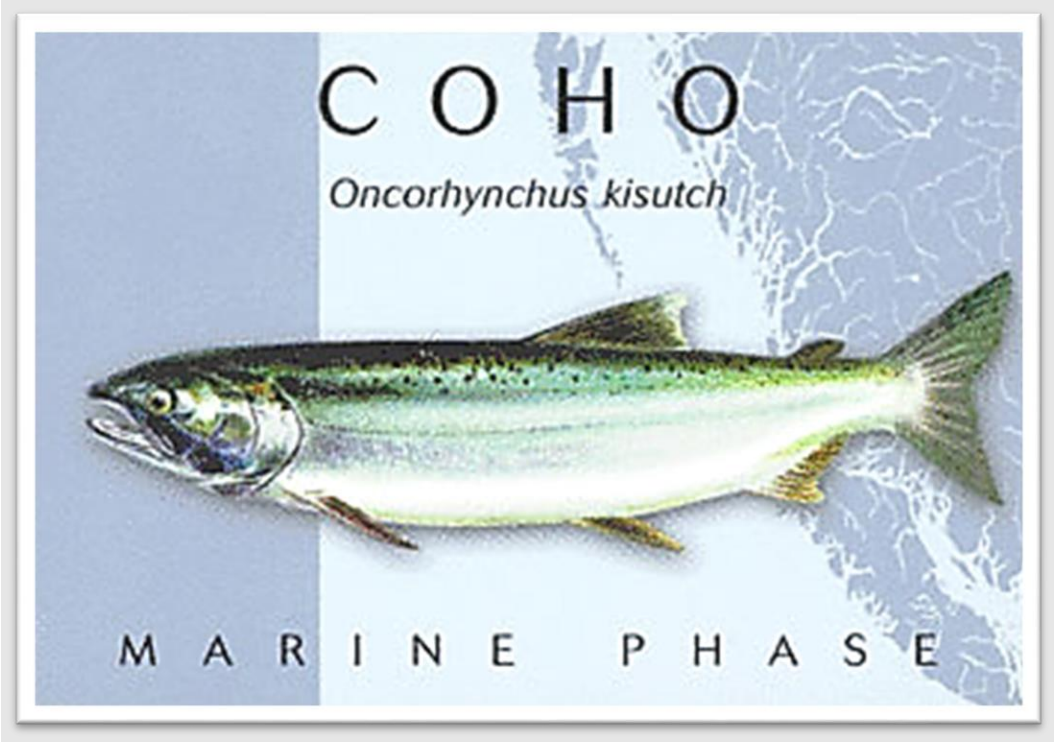
Potential Area 23 Economic Opportunity Chum fisheries will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

Economic Opportunity fisheries will be conducted under agreements that specify provisions for planning fisheries, allocations, catch reporting requirements as well as roles and responsibilities regarding the management of the fishery. Economic opportunity agreements are in place with the Tseshaht and Hupacasath First Nations for the 2021 season. The Department's general approach is that Aboriginal commercial harvest opportunities are managed using comparable rules to the commercial fishery. Chum abundances in Area 23 have been too low to support regular commercial or EO fisheries in recent years.

13.2.8.5.5 ESSR Fisheries

No ESSR opportunities are expected for WCVI – Other Chum stocks. There is however the potential for a Surplus to Escapement fishery on Conuma Chum for the Five Nations under the Multi-Species Fishery Management Plan.

13.3 SOUTHERN COHO SALMON FISHING PLAN



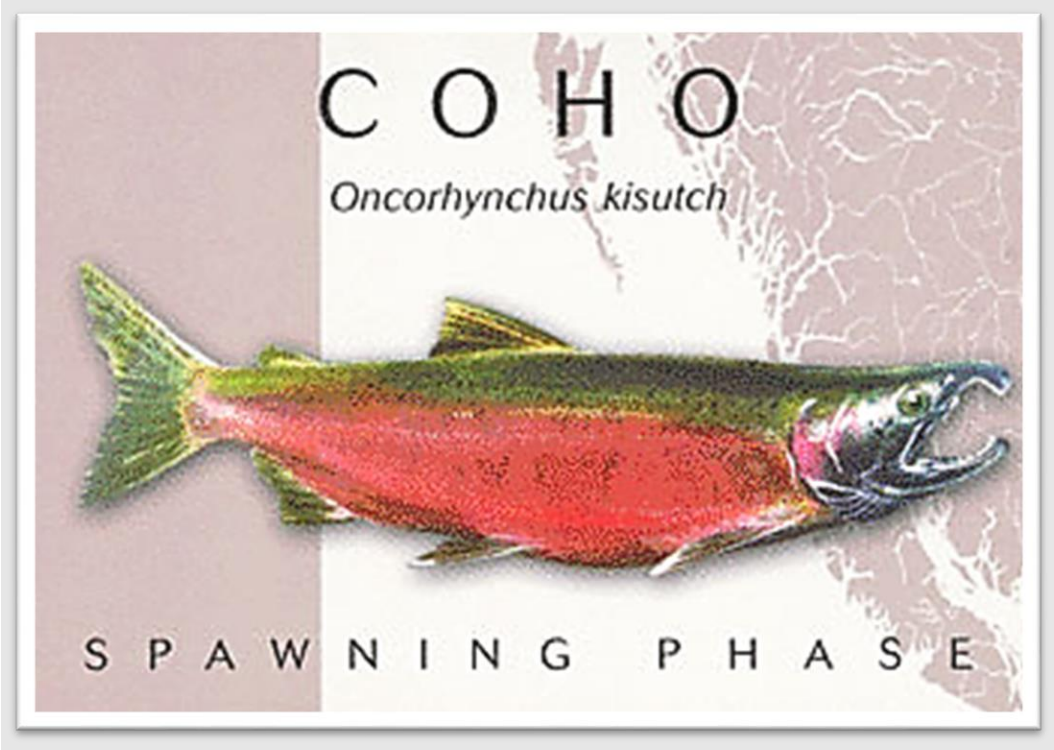


TABLE OF CONTENTS

13.3.1 SOUTHERN COHO - OVERVIEW

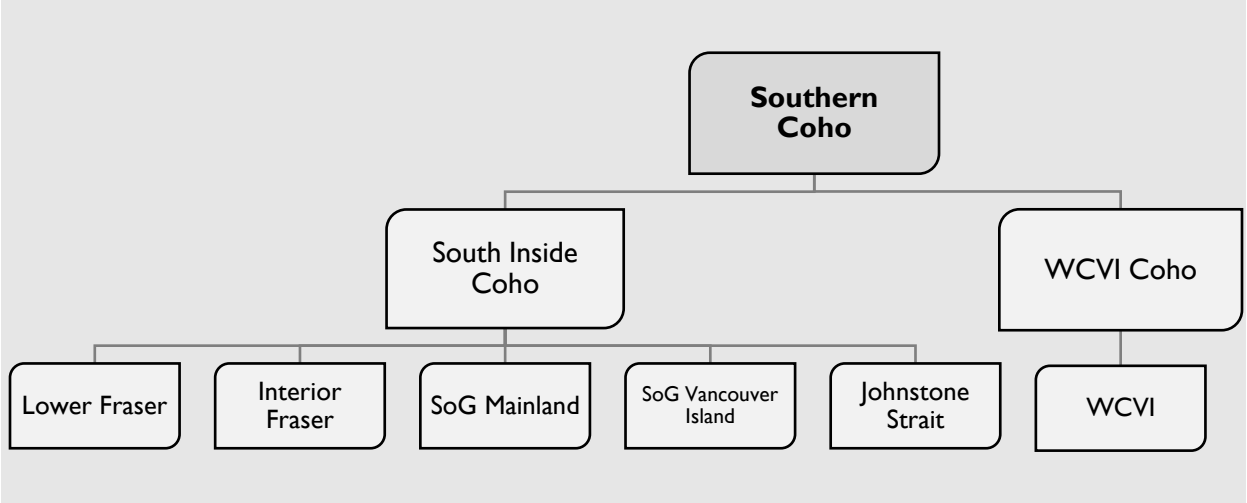


Figure 13.3-1: Overview of Southern Coho

Coho fisheries in southern BC are managed in a manner consistent with the umbrella of the PST, with considerations for Canadian stocks of concern resulting in a range of measures to reduce fisheries impacts, including selective fishing practices.

PST COHO ABUNDANCE BASED MANAGEMENT FRAMEWORK

The basis for managing fisheries impacting wild Coho originating from southern BC, Washington State, and Oregon is set out in the PST. This abundance based management (ABM) system was adopted in 2002 and will define harvests of Southern Coho through 2019.

The ABM plan constrains total fishery exploitation of key stock management units, including Strait of Georgia Mainland, Strait of Georgia Vancouver Island, Lower Fraser, and Interior Fraser.

Conservation units in the WCVI and Johnstone Strait are managed domestically.

In the United States, the management units relevant to the agreement include the Skagit River, the Stilliguamish, the Snohomish, Hood Canal, tributaries to the Strait of Juan de Fuca, the Quillayute, the Hoh, Queets, and Grays Harbour.

For each of these management units, annual limits of fishing mortality will be established based on the level of abundance and the health of the wild stocks. The text of the agreement and formulae for sharing between the two countries can be found on the PSC website at: http://www.psc.org/publications/.

Under the principles of Coho ABM management, as stocks become less abundant, more stringent fishery management actions will be implemented. As stocks become more abundant, increased fishing opportunities will be considered.

SOUTHERN COHO ENHANCEMENT INFORMATION:

The major DFO operation enhancement facilities that produce Coho are:

South Coast Area:

- Big Qualicum River hatchery
- Conuma River hatchery
- Nitinat River hatchery
- Puntledge River hatchery
- Quinsam River hatchery
- Robertson Creek hatchery

Fraser River Area:

- Capilano River hatchery
- Chehalis River hatchery
- Chilliwack River hatchery
- Inch Creek hatchery
- Spius Creek hatchery
- Tenderfoot Creek hatchery

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 (PIP and DPI) operated by volunteers, and Aboriginal Fisheries Strategy (AFS).

There are two datasets available: **Post-Season Production** from the 2019 brood year (i.e. 2020 releases, and numbers on hand for 2021 release), and the **Production Plan**, which includes proposed targets for the upcoming 2021 brood year. These are available at the following website:

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

SOUTHERN COHO – SEP PROPOSALS OR UPDATES FOR 2021

- Ongoing conservation/rebuilding Coho enhancement:
    - Salmon River Coho (Spius Creek hatchery)
    - Deadman River Coho (Dunn Creek hatchery)

- Puntledge River has produced 100,000 mass marked coho smolts since the 2016 brood year, proving to have a better survival rate than the lake release of fed fry, which will be reduced in 2021 from 800,000 to 200,000, with 80,000 clipped and tagged and 120,000 clipped. Transport of adult spawners to habitat above the dam will continue to support rebuilding of this population in the upper watershed.

- Quinsam River will continue delayed release group of 100,000 yearling smolts

13.3.2 SOUTHERN INSIDE COHO

13.3.2.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT

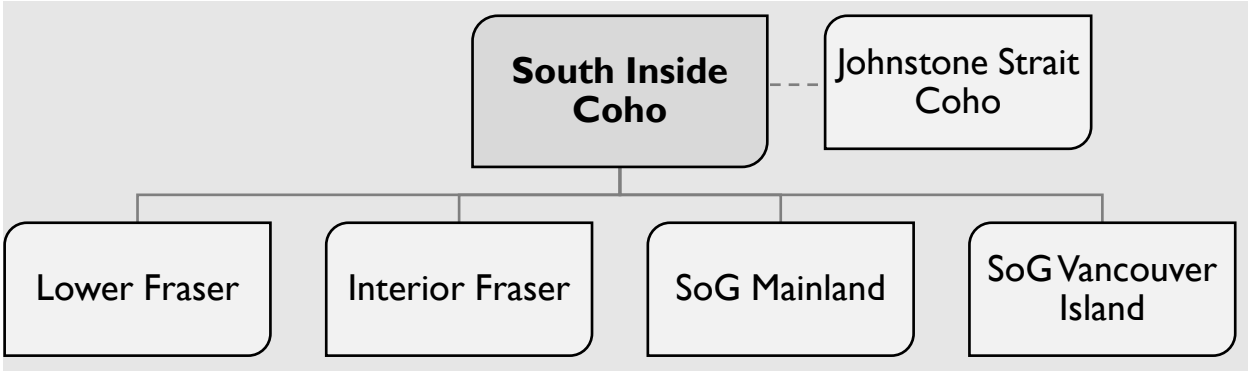


Figure 13.3-2: Overview of Southern Inside Coho

There are three Management Units identified in the Pacific Salmon Treaty – Southern Coho Management Plan in Annex IV, Chapter 5 - Coho Salmon including: Lower Fraser, Interior Fraser, and Strait of Georgia. In addition, there are also four Conservation Units in the Johnstone Strait area including: Homathko-Klinaklini Rivers; Nahwitti Lowland; East Vancouver Island-Johnstone Strait-Southern Fjords; and Southern Coastal Streams-Queen Charlotte Strait- Johnstone Strait-Southern Fjords. These Conservation Units are not actively managed.

Coho may be encountered as bycatch in fisheries directed at other stocks. Depending on the location, First Nations FSC fisheries are generally directed at more abundant stocks and species with retention of hatchery or hatchery and wild Coho bycatch considered where abundances permit. Limited First Nations FSC directed fisheries may also be permitted in terminal areas where abundances permit. Most commercial and recreational fisheries in Southern BC do not permit retention of wild Coho in times and areas where Interior Fraser Coho may be prevalent. However, mark-selective fisheries have been implemented in most Southern BC recreational

fisheries and some commercial fisheries permit retention of hatchery-enhanced stocks, while minimizing impacts on wild stocks.

13.3.2.2 STOCK ASSESSMENT INFORMATION

The WSP biological status of the five Interior Fraser River Coho CUs has been assessed by CSAS. The Science Advisory Report is available at: http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2015/2015_022-eng.html

Up to and including the 2013 return year, three CUs were determined to have an integrated WSP status of AMBER (Middle Fraser, Fraser Canyon, South Thompson) and two were determined to have an integrated status of AMBER/GREEN (Lower Thompson, North Thompson). Integrated status has not been re-evaluated since this assessment.

This assessment found no evidence that smolt-to-adult survival has improved or returned to the higher productivity regime. Because the productivity is low, the sustainable harvest that can be expected from the management unit is also low relative to historic levels.

The *Conservation Strategy for Coho Salmon (Oncorhynchus kisutch), Interior Fraser River Populations* was published in 2006 (http://publications.gc.ca/collections/collection_2007/dfo-mpo/Fs23-517-2007E.pdf) and contains the following recovery objectives:

> **Objective 1:** The 3-year average escapement in at least half of the sub-populations within each of the five populations is to exceed 1,000 wild-origin spawning Coho salmon, excluding hatchery fish spawning in the wild. This represents a total Interior Fraser Coho spawning escapement of 20,000 to 25,000 wild-origin Coho. This objective is designed to provide the abundance and diversity required to satisfy the recovery goal.
>
> **Objective 2:** Maintain the productivity of Interior Fraser Coho so that recovery can be sustained. This objective is designed to ensure that the threats to recovery are addressed. This objective may be met by addressing the causes for the decline that were identified by COSEWIC:
>
> - Development of a harvest management plan to ensure that exploitation rates are appropriate to changes in productivity caused, for example, by fluctuations in ocean conditions.
> - Identification, protection, and, if necessary, rehabilitation of important habitats.
> - Ensure that the use of fish culture methods is consistent with the recovery

The CSAS stock assessment advice from 2014 interpreted the above recovery objectives for Interior Fraser Coho as follows:

> **Short Term Objective 1:** 3 year geometric mean[1] escapement in at least half of the subpopulations within each of the 5 CUs to exceed 1000 natural spawners, excluding hatchery fish spawning in the wild; approximately 20,000 wild spawners; and
>
> **Longer Term Objective 1:** 3 year geometric mean escapement in all of the subpopulations within each of the 5 CUs to exceed 1000 natural spawners, excluding hatchery fish spawning in the wild; approximately 40,000 wild spawners

(Note 1: Using geometric means provides more precautionary generational averages and recognizes the concern (through heavier weighting) that smaller escapements may impact genetic diversity.)

The implementation plan for the 2019 PST brings an opportunity to improve Coho assessment and management. The PST Chapter 5 Southern Coho management framework is based on assessment of Interior Fraser River (IFR), Lower Fraser River (LFR), and Strait of Georgia (GST) Coho Management Units (MUs) into one of three status zones (Low, Moderate, and Abundant), which have commensurate total exploitation rate (ER) caps and sharing of this ER cap between the US and Canada. Currently, only the IFR Coho MU has an abundance-based approach in place for setting MU status. To support the development of status information for Georgia Basin Coho the Department is proposing additional fishery sampling to support determination of the status of natural-origin Coho. Specifically, fishery sampling and analysis using new Parental-Based Tagging (PBT) along with regular DNA will allow accurate determination of hatchery-origin Coho from natural-origin Coho within a management or assessment unit. Application of these tools is proposed using September fishery data from the northern Strait of Georgia area and escapement information from ECVI hatcheries. A single troll vessel attempted to collect samples with little success in 2020. For 2021, the Department is proposing to consider FN FSC and/or recreational fishery opportunities that permit the retention of marked and unmarked Coho in the northern GST in September 2021 to obtain higher sample rates.

13.3.2.2.1 Pre-season

The description of the forecast models used can be found in Simpson *et al.* (2004). The processes used have been modified annually based on model performance and development of new models although the underlying methods are unchanged. Marine survival forecasts are derived for Qualicum, Quinsam, Inch, and Robertson Hatchery stocks, and Black and Carnation Creek wild stocks. Abundance forecasts are derived for Interior Fraser and Thompson River aggregates, and selected aggregates from Areas 12 and 13.

Expectations in 2021 for Area 12 and 13 Coho are to see improvements in survival but still below average returns. Returns in 2020 showed some improvement, but still below average escapements in many of the systems surveyed. The Keogh River indicator, which saw an improvement in escapement over the previous 4 years but lower than the long term average. Estimated escapement has steadily increased from that observed in 2016 (230), despite relatively stable but high juvenile recruitment, indicating improving marine survival. The return in 2020 stems from an above average smolt abundance of 72K. 2020 out migration was also strong (87K smolts). This improved freshwater productivity may continue to buffer adult returns against continued poor marine survival.

The formal forecast for Coho can be found in https://waves-vagues.dfo-mpo.gc.ca/Library/40978680.pdf.

Strait of Georgia Coho

The 2020 escapements in the Strait of Georgia were variable between systems. The 12 year average was exceeded in Puntledge and Big Qualicum, while Little Qualicum, Nanaimo and Englishman fell below the 12 year average. Black Creek was also slightly below the 12 year average, but above the 4 year average. All other Coho systems also saw returns below the 12 year average, including Theodosia, Shawnigan and Colquitz. Smolt production in 2020 at Black Creek was above average and an improvement over 2019 with 83K. Hatchery indicator for the Area 13-North outlook unit is the Quinsam. In 2020 Quinsam saw better than average returns. For other monitored systems in the area, large variations in escapement were encountered but in general better than forecasted returns across the area. As expected, Coho marine survivals continue to be low with some improvement evident in the more consistently monitored populations. Similar conditions are expected through 2021; consequently, a continued trend of low escapement is anticipated next year.

Lower Fraser Coho

The 2021 outlook classifies Lower Fraser Coho as likely to be in the *critical zone* (red zone under the WSP) due to current marine conditions. Fall/winter 2020/2021 escapement surveys are now underway; however, it is too early to determine trends. Sustained improvement in marine conditions will be required to improve outlook.

Interior Fraser Coho

The 2021 Salmon Outlook is in the *critical zone* (red zone under the WSP). A 2014 CSAS paper determined that Interior Fraser Coho have been in a low productivity (i.e. low Coho survival rate) regime since 1994, and the recently published Science Advisory Report from the Recovery Potential Assessment for IFR Coho indicated this trend has continued through 2017 (DFO 2019).

In relation to the Pacific Salmon Treaty reference points for Interior Fraser River Coho, the moderate aggregate MU escapement goal was met in each of 2018-2020; Preliminary estimates suggest IFR Coho marine survival continues to be less than 3%, which results in the MU remaining in Low status for 2021. Sustained improvement in marine conditions will be required to improve outlook and rebuild abundance.

The pre-fishery abundance forecast for IFR Coho is 43,882 (80% confident that the abundance will fall between 36,969 and 52,087).

The Thompson River aggregate, which is encompassed within the Interior Fraser aggregate, is no longer required for domestic management purposes and therefore it will no longer be part of the Coho Forecast.

13.3.2.2.2 In-season

At this time, there is no in-season assessment on Southern Inside Coho stocks, with the exception of some programs to assess local abundance in some terminal areas. In particular, in 2020 a collaborative pilot assessment fishery developed by DFO, LGL Ltd., and the Lower Fraser Fisheries Alliance began operation with the goal of estimating abundance of Lower Fraser River Coho Salmon. There are plans to continue and expand the sample collections in 2021 based on the information collected in 2020.

13.3.2.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

Annex IV, Chapter 5 of the Pacific Salmon Treaty establishes the international management regime for southern BC and southern U.S.-origin Coho based on the status of defined Management Units (MUs) in each country. Each MU is to be managed to constrain exploitation rates based on the status of the MU, or groups of MUs in the case of the U.S. Until such time as the Parties provide specific maximum exploitation rate targets for each MU that originates within its jurisdiction consistent with attainment of maximum sustained harvest levels, Canada and the U.S. will manage their fisheries consistent with the maximum exploitation rate ranges for three status levels – *Low*, *Moderate* and *Abundant*.

Table 13.3-1: Pacific Salmon Treaty abundance-based exploitation rate limits on Coho Salmon stocks in fisheries harvesting Southern BC Coho.

	Low	Moderate	Abundant
Survival	S <= 0.03	Three consecutive years 0.03 < S <= 0.06	Three consecutive years S > 0.06
		and	and
Escapement	Monitored in CUs and subpopulations but no thresholds	Three consecutive years: Half of subpopulations in each CU > 1000; or Moderate Aggregate MU escapement objective	Three consecutive years: All IFR subpopulations in each CU > 1000; or Abundant Aggregate MU escapement objective
ER cap (US/Can)	0.20 (0.10/0.10)	0.30 (0.12/0.18)	0.45 (0.15/0.30)

In addition, within the *Low* status zone, each country is expected to implement additional fishery management measures as may be necessary to address conservation needs for MUs within its jurisdiction. For most years since 1998 (except 2014 and 2015) Canada has done this by planning on reducing its share of the total exploitation rate on IFR Coho to approximately 3% to 5% or less.

The Coho Management Units used by the PST under the Southern Coho management plan are:

Lower Fraser

Interior Fraser

Strait of Georgia (The previous MUs of SoG Vancouver Island and SoG Mainland have been combined)

Domestic Canadian Management

In response to large declines in total returns and escapements of IFR Coho in the mid-nineties, exploitation rates in Canadian fisheries were significantly reduced, and for many years, with the exception of 2014 and 2015, the maximum Canadian exploitation rate (ER) has been set at

3% to 5%. Since 1998, this level of exploitation has led to significant fisheries management restrictions for fisheries in times and areas where IFR Coho may be encountered. These management actions have generally ranged from non-retention of wild Coho to time and area closures. Non-retention or time and area closures may be in place in the following fisheries:

West Coast Vancouver Island (WCVI) troll (commercial and First Nations) and recreational fisheries in offshore areas from June until early September;

Commercial net and recreational fisheries in the Strait of Juan de Fuca from June until early October;

Commercial, recreational and First Nations fisheries in Johnstone and Queen Charlotte Straits from early June until late August;

Commercial, recreational and First Nations fisheries in the Strait of Georgia from June until early October;

Commercial, recreational and First Nations fisheries both off the mouth of, and in, the Fraser River from early June until mid-October; and,

Commercial, recreational and First Nations fisheries in the Fraser River upstream of Sawmill Creek from mid- to late September until late October.

Management measures for IFR Coho are generally in place from January to September when these populations are expected to be encountered in Southern BC waters. These measures are expected to also limit impacts on other Southern Inside Coho populations.

For fishery planning purposes, IFR Coho fishing mortality is estimated pre-season using a variety of domestic models. Exploitation rates in the marine fisheries are estimated using a harvest rate spreadsheet model, which is based on the historical relationship between fishing effort and associated exploitation rates in the period 1986 to 1997 as determined from coded-wire tag recoveries of IFR Coho and release mortality rates as identified in the South Coast Integrated Fisheries Management Plan (IFMP).

Food, social and ceremonial, commercial, and recreational impacts from the Fraser River mouth to Sawmill Creek are estimated using results from a decay model. Results are based on: the number of Coho encounters (kept and released) in fisheries directed on other species; the proportion of IFR to LFR Coho present in the river at the time of the particular fishery; and, release mortality rates as identified in the IFMP. Coho encountered in tributary and mainstem Fraser River fisheries upstream of Sawmill Creek are assumed to be 100% IFR Coho.

For the purpose of implementing the PST arrangements in the Annex 4 Coho Chapter, Canada works with the United States to estimate fishery impacts on Southern BC Coho using a

bilaterally-agreed Fisheries Regulation Assessment Model (FRAM). The FRAM model is used pre-season by the United States to plan fisheries within stock-specific constraints associated with MU status as identified in the Agreement. FRAM-estimated impacts on IFR Coho may not match the estimates projected by Canadian domestic models as FRAM is based on a shorter base period of CWT data (1986-1992, instead of 1986-1997 used in Canadian domestic models), impacts in Fraser River in-river fisheries are accounted for differently, and the model includes other impacts associated with natural and drop-out mortalities.

Post-season, FRAM reconstructs cohort abundance(s) to estimate fishery-stock-specific ERs. The post-season application of the FRAM model has recently been updated to incorporate Fraser River freshwater fisheries impacts.

For 2021, based on poor marine conditions and on-going low productivity regime, the Department is planning to manage Canadian fisheries in a highly precautionary manner with fisheries management measures similar to those in place prior to 2014.

Fraser River Fisheries

Within the Fraser River, a "window closure" has been the primary tool applied in First Nations, commercial, and recreational fisheries to protect IFR Coho from non-selective fishing gear (e.g. gill nets, rod and reel fishing with bait). Selective fishing gear (e.g. beach seines, modified shallow seines, rod and reel fishing with no bait, dip nets, fish wheels) has been allowed to proceed within these window closure dates. The window closure is implemented on subsequent dates in upstream areas of the Fraser and Thompson Rivers, depending on when the peak migration of IFR Coho is expected to pass through each area.

In the past decade, with the exception of 2014, the start and end dates of the window closure have been selected to protect approximately 90% of the Interior Fraser Coho migration from exposure to non-selective fishing gear, with adjustments made on an annual basis to initiate the closure period following the Labour Day weekend. The objective of protecting 90% of the run was developed when IFR Coho were in critically low status, and was aligned with other domestic management measures to meet an overall domestic management objective of limiting the total Canadian exploitation rate on Interior Fraser Coho to 3% to 5% or less.

For 2021, the window closure dates are identified below. During the times and areas specified below, fisheries will be closed for non-selective fishing gear, and only selective or limited experimental fisheries will be permitted.

Table 13.3-2: 2021 Window Closure Dates for non-selective fishing gear

Subareas 29-6, 29-7, 29-9 and 29-10	September 7 to October 8
Fraser River - Below Mission	September 7 to October 9
Fraser River - Mission to Hope	September 9 to October 11
Fraser River - Hope to Sawmill Creek	September 11 to October 16
Fraser River - Sawmill Creek to Lytton	September 16 to December 31
Fraser River - Lytton to Williams Lake River	September 23 to December 31
Fraser River - Upstream of Williams Lake River	October 1 to December 31
Thompson River Downstream of the confluence of the North and South Thompson Rivers	September 23 to December 31
Thompson River Upstream of the confluence of the North and South Thompson Rivers	October 1 to December 31

13.3.2.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO SOUTHERN INSIDE COHO FISHERIES

All fisheries where IFR Coho are known to be prevalent will be conducted with a non-retention restriction for unmarked Coho, except for an extremely limited number of FSC fisheries conducted in terminal areas by First Nations in Fraser and Thompson River tributaries.

Fisheries for other salmon species will be managed taking into consideration the anticipated incidental mortalities of IFR Coho which may result in reduced harvest opportunities for other salmon species.

Given ongoing declines in IFR Steelhead escapement and the designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO will again implement a rolling window closure throughout Southern BC to help protect IFR Steelhead in 2021. Areas and dates for the window closure are identified in Appendix 9.

13.3.2.5 ALLOCATION AND FISHING PLANS

Based on the IFR Coho management objective, the following fishing plan considerations have been identified.

13.3.2.5.1 First Nations Fisheries

Food Social and Ceremonial

Marine Waters

FSC fisheries for Southern Inside Coho in marine areas will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

First Nations target local salmon stocks for FSC purposes throughout the Inner South Coast. Sockeye salmon are a priority species for First Nations, but the overall objective expressed by many First Nations in consultation is to access a diversity of fishing opportunities throughout the season and across species. Coho salmon make up part of that diversity.

2021 management measures include:

> Retention of wild Coho salmon is permitted in portions of southern Queen Charlotte Sound, Queen Charlotte Strait, northern Johnstone Strait, and Mainland Inlets (Kingcome, Knight, and Bute).
>
> In other Management Areas of Southern BC, all efforts and attempts shall be made to return all wild Coho to the water alive and unharmed. After all efforts and attempts to return wild Coho to the water alive and unharmed have been made, wild Coho that are dead may be retained. All Coho missing an adipose fin (with a healed over scar) may be retained.

Non-tidal Waters (excluding Fraser River)

Some First Nations Coho-directed fisheries may occur in freshwater systems throughout Southern Inside waters subject to local abundance.

FSC fisheries for Coho in freshwater systems outside of the Fraser River system will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

Fraser River

Due to recent trends of poor abundances of Fraser Coho stocks, there have been no First Nations fisheries in the lower Fraser River that target Coho Salmon (with the exception of terminal ESSR harvests in hatchery-enhanced systems). With the exception of 2014 and 2015, First Nations have been asked to release incidentally-caught unmarked Coho Salmon alive and unharmed, where possible, prior to the end of the non-selective window closure dates.

Marked Coho Salmon may be retained for FSC purposes. Where applicable, First Nations may retain unmarked Coho Salmon for FSC purposes following the window closure dates noted above.

Directed harvest may be permitted in specific areas or terminal systems where abundance permits. These fisheries are generally for very small numbers of Coho. Fishing plans are discussed and agreed upon between DFO and the appropriate First Nations once Coho have begun to return to the area and terminal abundance sufficient to support some small-scale FSC harvest can be assessed.

FSC fisheries in the Fraser River, including Subareas 29-6, 29-7, 29-9, and 29-10, will be affected by the 2021 IFR Steelhead conservation measures. A 27-day rolling window closure will be applied to FSC fisheries according to the times and areas outlined in Table 13.3-3 below. These measures will not extend to marine FSC fisheries.

Table 13.3-3 Dates and Area for the Interior Fraser River Steelhead 27-day Rolling Closure for FSC Fisheries in the Fraser River system.

Fishery Location	Start	End
Area 29: 29-6, 29-7, 29-9, and 29-10	26-Sep	22-Oct
Mouth to Port Mann Bridge	26-Sep	22-Oct
Port Mann Bridge to Mission	28-Sep	24-Oct
Mission to Hope	29-Sep	25-Oct
Hope to Sawmill Creek	3-Oct	29-Oct
Sawmill Creek to Lytton (Thompson Confluence)	5-Oct	31-Oct
Lytton to Texas Creek	8-Oct	3-Nov
Texas Creek to Kelly Creek	10-Oct	5-Nov
Kelly Creek to Deadman Creek	13-Oct	8-Nov
Deadman Creek to Chilcotin River	16-Oct	11-Nov
Chilcotin River	19-Oct	14-Nov
Thompson River – Thompson Confluence to Bonaparte	8-Oct	3-Nov
Thompson River – Bonaparte River to Kamloops Lake	12-Oct	7-Nov

Refer to Section 10.2 for Table 10.2-1 - Communal Licence Harvest Target Amounts in Southern BC/Fraser River First Nations Fisheries.

Mandatory and voluntary measures have been implemented to support prey availability and reduce disturbance to Southern Resident Killer Whales, including within Southern BC waters and key foraging areas within Strait of Juan de Fuca and the Gulf Islands. These measures are outlined in section 5.8.

5.6.Fishery Monitoring and Catch Reporting

Marine Waters

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations are asked to keep records of harvest and provide catch information to DFO in a variety of formats. Under this licence, if a commercial vessel is used for fishing, First Nations are asked to provide information respecting the species and quantity of fish harvested by this vessel, to the DFO Catch Reporting Officer within 24 hours from landing harvested catch. In addition, catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where in-season management requires, catch reports are sought weekly during the respective fishing season.

Fraser River and Tributaries

In the Fraser River watershed, catch monitoring programs are managed through Activity Funding or Comprehensive Fisheries Agreements.

In the lower Fraser River (below Sawmill Creek), monitoring programs implemented typically include landing site or vessel based collection of catch and effort information paired with validation of effort by vessel patrols or overflights. Specific focus has been placed on sampling of Chinook and Coho salmon for mark rate information and coded-wire tags (CWTs) to support the Salmon Head Recovery Program. Catch reports are received by DFO from catch monitoring programs on a weekly basis, within 48 hours of a fishery closing.

For fisheries above Sawmill Creek, catch monitoring programs range from basic census type to more enhanced programs that include collecting effort and catch rate information in creel sample programs.

Treaty Fisheries

Treaty fisheries targeting Coho within the Fraser River (including Areas 29-6, 29-7, 29-9, and 29-10) will be subject to closures to protect Interior Fraser River Steelhead as outlined in Table 13.3-3. These measures do not extend to marine Treaty fisheries.

Tsawwassen Fisheries (Domestic)

As per the Tsawwassen Fisheries Operation Guidelines (TFOG), each year the Tsawwassen First Nations (TFN) will develop a Tsawwassen Annual Fishing Plan (TAFP) for the harvest of salmon as per the Tsawwassen First Nations Final Agreement.

The treaty outlines that in any year, the Tsawwassen Allocation for Coho salmon is an amount of Fraser River Coho Salmon that will result in an annual average harvest of 500 Fraser River Coho salmon and will be harvested a) incidentally in fisheries that target other species; or b) using selective harvesting techniques to capture specific Coho stocks.

http://www.aadnc-aandc.gc.ca/eng/1100100022703/1100100022704

The monitoring program for Tsawwassen Domestic fisheries includes fisher logs supplemented by validations of catch through on-water patrols and/or observations of landings and effort through on-water patrols. Details of monitoring programs in place can be found in the Tsawwassen Fisheries Operational Guidelines.

Tla'amin Fisheries (Domestic)

The Domestic allocations for salmon under the Tla'amin First Nation's Final Agreement for Coho are as follows:

> **Non-terminal Coho**
> A number of Coho salmon equal to 2.1% of the total amount of Coho Salmon, as determined by the Minister, harvested by all other mixed-stock Coho fisheries in Management Area 15.
>
> **Terminal Coho**
> A number of Coho Salmon equal to 25% of the Available Terminal Harvest for Coho Salmon stocks that originate from a Terminal Harvest Area, if the Minister determines that there is an Available Terminal Harvest for those stocks.

The Tla'amin First Nation provides catch reports to the Department through the Aboriginal Harvest Management System (AHMS). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and biological samples.

13.3.2.5.2 Recreational Fisheries

Conservation measures to protect Coho will be in place in a number of areas and times.

Marine Waters

Recreational fisheries for Coho in marine areas will not affected by the 2021 Interior Fraser River Steelhead conservation measures.

Marine recreational fishing opportunities for inside Coho take place in Johnstone Strait (Areas 11/12/13), the Strait of Georgia (Areas 13 to 19) and Juan de Fuca Strait (Areas 19 to 20). Inside Coho fishing opportunities in the South Coast are largely dependent on the stock status of Interior Fraser Coho and Strait of Georgia Coho, and fishing opportunities are based on minimizing impacts on wild Coho with opportunities for retention of hatchery-marked Coho. Wild Coho retention opportunities are provided in Areas 19 and 20 beginning in October, after Interior Fraser Coho are considered to have migrated through the area. Marine recreational Coho fisheries are typically open from June 1 to December 31, and updates are provided via Fishery Notice and published on the recreational fisheries website: http://www.bcsportfishingguide.ca. Normal limits are 2 per day for hatchery-marked fish in most areas. Wild retention and increased daily limits may be considered in some terminal areas of the South Coast where fisheries are targeting local Coho stocks. In non-tidal waters, Coho retention is permitted based on observed abundances and escapement targets being met. These occur mainly in hatchery systems.

Anglers must release with the least amount of harm any fish caught that may not legally be retained; when releasing a fish, anglers must immediately return it to the water where it was caught.

Wild Coho opportunities may be permitted consistent with pre-2014 management measures with greater restrictions in place than in 2014 and 2015; changes to fishery management actions will be announced by Fishery Notice.

Fraser River and Tributaries

Recreational fishing for Coho will be closed in the tidal waters of the Fraser River and in non-tidal waters of the Fraser River in Region 2 from January 1 until November 3. The end date of November 3 takes into account the IFR Steelhead conservation closure. Additionally, in this same area, there will be a ban on using bait while fishing for salmon. See Table 13.3-2 for the complete IFR Coho window closure dates.

For 2021, IFR Steelhead conservation measures will again be in effect in the Fraser River recreational fishery following the Coho window closure. A 42-day rolling window closure will be in effect according to the times and areas outlined in

Table 13.3-4 below.

Table 13.3-4: IFR Steelhead Rolling Window Closure Dates for the Fraser River Recreational Fishery

Fishery	Start	End
Area 29: 29-6, 29-7, 29-9, and 29-10	19-Sep	30-Oct
Mouth to Port Mann Bridge	19-Sep	30-Oct
Port Mann Bridge to Mission	21-Sep	1-Nov
Mission to Hope	22-Sep	2-Nov
Hope to Sawmill Creek	26-Sep	6-Nov
Sawmill Creek to Lytton (Thompson Confluence)	28-Sep	8-Nov
Lytton to Texas Creek	1-Oct	11-Nov
Texas Creek to Kelly Creek	3-Oct	13-Nov
Kelly Creek to Deadman Creek	6-Oct	16-Nov
Deadman Creek to Chilcotin River	9-Oct	19-Nov
Chilcotin River	12-Oct	22-Nov
Thompson River – Thompson Confluence to Bonaparte	1-Oct	11-Nov
Thompson River – Bonaparte River to Kamloops Lake	5-Oct	15-Nov

In Region 2, opportunities for hatchery-marked Coho may be provided after the IFR Steelhead closure. Opportunities on tributaries to the Fraser River may be provided in those systems where hatchery production can support a Coho fishery, and where IFR Steelhead will not be impacted.

In Regions 3, 5A, 7 and 8, there are no recreational fisheries that target Coho. Fisheries for other species may be limited after September 16 if they potentially have impacts on co-migrating Coho.

Fishery Monitoring and Catch Reporting

Marine Waters

Catch monitoring programs including creel surveys, logbooks and the internet recreational effort and catch survey (iREC) are the main tools used to capture recreational catch and effort information in this fishery. South Coast stock assessment staff use these programs to provide annual estimates of the recreational harvest in each area.

Fraser River and Tributaries

Creel surveys are conducted in portions of the lower Fraser River and select tributaries to estimate recreational catch and effort for the times and areas surveyed. Typically, the creel survey in the lower Fraser River mainstem begins when the mainstem is opened to recreational salmon fishing; however, over the last number of years, the survey end date has been variable (mid-September to end of November). The creel surveys conducted on the Chilliwack River and Nicomen-Norrish recreational fisheries have remained stable over the last number of years both in times and areas (Chilliwack is surveyed from mid-September to mid-November and Nicomen-Norrish is surveyed from early October to the end of November).

The catch monitoring program in the Fraser watershed upstream of Alexandria will range from no monitoring to fisher-reported catch to highly intensive creel surveys. The expected effort and catch in a fishery, harvest rate, potential bycatch, and any biological sampling requirements will be taken into account when planning the catch monitoring program.

13.3.2.5.3 Commercial Fisheries

Commercial fisheries are managed to avoid impacts to Southern Inside Coho. Generally all Coho caught incidentally during fisheries targeting other species must be released in a manner that causes the least harm. Estimates of release mortality are calculated post-season. Fisheries targeting other salmon species may be constrained if potential impacts to IFR Coho cannot be reduced to an acceptable level.

Allocation

Table 13.3-5: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
Southern Inside Coho	11 to 20, 29	TBD	TBD	TBD	TBD	TBD

Notes on Coho allocations (south):
TBD currently no directed fisheries in this area. Will be reviewed should future directed opportunity develop.

Southern Inside Coho Commercial Fisheries

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Area B Seine

There are no directed Southern Inside Coho fisheries and Coho non-retention is in place in fisheries directed at other species.

Area D Gill Net

There are no directed Southern Inside Coho fisheries and Coho non-retention is in place in fisheries directed at other species.

Area E Gill Net

There are no directed Southern Inside Coho fisheries. During the times specified in 13.2-2, fishing will be restricted to limited selective and/or demonstration fisheries only. To protect IFR Steelhead, gill net demonstration fisheries will be subject to a 42-day rolling window closures as identified in Appendix 9. The retention of Coho (hatchery-marked only) bycatch during Chum-directed fisheries may be permitted.

Area H Troll

There are no directed Southern Inside Coho fisheries and Coho non-retention is in place in fisheries directed at other species.

Fishery Monitoring and Catch Reporting

There is a mandatory harvest log and in-season reporting program for catch and release information for all commercial fisheries.

> Mandatory requirement to file fishing reports in all commercial fisheries, including "Start/Pause/Cancel/End" Fishing reports.
>
> Mandatory catch reporting by phone-in with a paper harvest or electronic transmission with an electronic harvest log (E-log).

Catch reporting requirements are specific to each licence group and are detailed in the conditions of licence for each gear type. Additional requirements are in place for providing biological samples as required.

Southern Inside Coho Demonstration Fisheries

There are no demonstration fisheries targeting Southern Inside Coho.

Southern Inside First Nations Commercial Coho Harvest

There is no First Nations commercial harvest targeting Southern Inside Coho.

Harvest Agreements

There are no harvest agreements for Coho-directed fisheries on Southern Inside Coho. Harvest Agreements typically include provisions for fishing under the same or comparable rules as commercial fisheries operating in the same areas.

Economic Opportunities

There are no economic opportunity fisheries targeting Southern Inside Coho.

13.3.2.5.4 ESSR Fisheries

ESSR fisheries may occur at DFO hatchery facilities that have a surplus of returning hatchery Coho. In past years, ESSR fisheries for Southern Inside Coho have taken place at:

Big Qualicum Hatchery

Nanaimo River

Chapman Creek

Capilano Hatchery

Chehalis Hatchery

Chilliwack Hatchery

Inch Creek Hatchery

13.3.3 WCVI COHO

13.3.3.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT

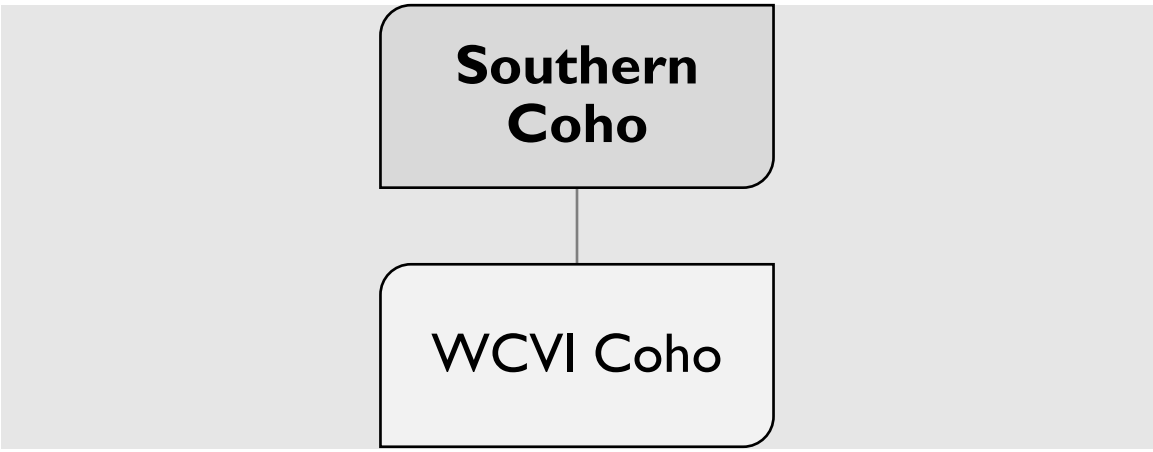


Figure 13.3-3: Conservation Units within the WCVI Coho Management Unit

WCVI Coho originate from streams along the West Coast of Vancouver Island. Three major hatchery facilities, including Nitinat (Area 22), Conuma (Area 25), Robertson (Area 23), as well as production from smaller enhancement facilities also contribute to Coho returns. Coho harvest opportunities for these populations are provided for First Nations, recreational and commercial fisheries in inshore waters depending on local abundance.

13.3.3.2 STOCK ASSESSMENT INFORMATION

13.3.3.2.1 Pre-season

The outlook for WCVI Coho is 'low returns' in 2021, based on forecast marine survival of Robertson Creek Hatchery stock as well as Carnation Creek wild Coho. The marine survivals for Robertson Hatchery (brood 2018, ocean entry year 2020, returning in 2021) is forecast to increase to 5.5%, a 21% increase relative to the previous brood year – return. The marine survival for the wild indicator at Carnation Creek is forecast to be 1.3%.

The forecasts are based on relationships between trends in survival and ocean environmental indicators during the ocean entry years. For the Robertson (Stamp) indicator the forecast was

based on the North Pacific Gyre Oscillation (see Attachment 1). The forecast for Carnation Creek wild coho indicator was based on the El Nino Southern Oscillation (ENSO) index (see Attachment 1).

Note that the most recent observed marine survival of 4.5% for the Robertson (Stamp) indicator (returns in 2020) was slightly lower from the previous year (-2%) and higher than the forecast (+68%). The marine survival of the wild indicator at Carnation Creek was less than 1%.

13.3.3.2.2 In-season

At this time, there is no in-season assessment of abundance done on WCVI Coho stocks.

13.3.3.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

Fisheries taking place in offshore waters (Areas 121 and 123 to 127) are constrained by Interior Fraser Coho decision guidelines. Fisheries taking place in near shore waters (Areas 23 to 27) are managed based on pre-season assumptions of returns to the area.

13.3.3.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO WCVI COHO FISHERIES

All fisheries where IFR Coho are known to be prevalent will be conducted with a non-retention restriction for unmarked Coho.

Fisheries for other salmon species will be managed taking into consideration the anticipated incidental mortalities of IFR Coho, resulting in many cases, in reduced harvest opportunities for other salmon species until such time as IFR Coho are assumed to have migrated out of the area.

Given ongoing declines in IFR Steelhead escapement and the designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO is implementing a rolling window closure throughout Southern BC to protect IFR Steelhead in 2021. Areas and dates for the window closure are identified in Appendix 9.

13.3.3.5 ALLOCATION AND FISHING PLANS

13.3.3.5.1 First Nations Fisheries

Food Social and Ceremonial

FSC fisheries for WCVI Coho will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

Management measures to protect stocks of concern, including Interior Fraser Coho may constrain WCVI FSC fisheries in the offshore area. Offshore WCVI conservation measures for IFR Coho will be a part of pre-season planning discussions.

Bycatch or incidental retention may be permitted during fisheries for abundant species or stocks. Directed harvest may be permitted in specific areas or terminal systems where abundance permits.

Mandatory and voluntary measures have been implemented to support prey availability and reduce disturbance to Southern Resident Killer Whales, including within Southern BC waters and key foraging areas within Strait of Juan de Fuca and the Gulf Islands. These measures are outlined in section 5.8.

5.6.Fishery Monitoring and Catch Reporting

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations keep records of harvest and provide catch information to DFO in a variety of formats. If a commercial vessel is used for fishing under this licence, First Nations are asked to provide information respecting the species and quantity of fish harvested by the vessel to the DFO Catch Reporting Officer within 24 hours of the landing of fish harvested from that vessel. Catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where in-season management requires, catch reports are sought weekly during the respective fishing season.

Treaty Fisheries

Treaty fisheries for WCVI Coho will not be affected by 2021 Interior Fraser River Steelhead conservation measures. Offshore WCVI conservation measures for IFR Coho will be a part of pre-season planning discussions.

Maa-nulth Fisheries (Domestic)

Each year, the Maa-nulth Fish Allocation for Coho salmon is a) an amount of Ocean Coho Salmon equal to 7,000 pieces; and b) An amount of Terminal Coho Salmon equal to:

1,200 pieces, when the return of Terminal Coho Salmon is critical;

1,850 pieces, when the return of Terminal Coho Salmon is low;

3,050 pieces, when the return of Terminal Coho Salmon is moderate; and

3,630 pieces, when the return of Terminal Coho Salmon is abundant.

The Maa-nulth First Nations provide catch reports to the Department through the Maa-nulth Electronic Reporting Program (MERP). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and pieces of salmon harvested.

Five Nations (Ahousaht, Ehattesaht, Hesquiaht, Mowachaht / Muchalaht, and Tla-o-qui-aht First Nations) Multi-species Fishery

The Five Nations Multi-species fishery will not be affected by 2021 Interior Fraser River Steelhead conservation measures. Offshore WCVI conservation measures for IFR Coho will be a part of pre-season planning discussions.

Five Nuu-chah-nulth First Nations located on the west coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht (the Five Nations) – have an aboriginal right to fish for any species, with the exception of Geoduck, within their court-defined fishing territories and to sell that fish. For further information please see Section 10.3.1.

13.3.3.5.2 Recreational Fisheries

Recreational fisheries for Coho in marine areas will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

Marine recreational fisheries targeting outside Coho take place in inshore and offshore waters of the west coast of Vancouver Island (Areas 21 to 27, 121 to127). Outside Coho fishing opportunities are largely dependent on the stock status of Interior Fraser Coho and WCVI

Coho, and fishing opportunities are largely based on minimizing impacts on wild Coho and mark-selective fishing for hatchery-marked Coho. Management measures are often required in order to meet conservation objectives for Interior Fraser Coho, and include non-retention of wild Coho in many areas in the South Coast at certain times of the year when they are vulnerable to fisheries. Offshore WCVI conservation measures for IFR Coho will be a part of pre-season planning discussions.

Marine recreational Coho fisheries typically operate June 1-Dec 31, and updates are provided via Fishery Notice and published on the recreational fisheries website: http://www.bcsportfishingguide.ca. Normal limits are 2/day and 4 in possession for hatchery-marked fish in most areas. Wild retention and increased daily limits are permitted in most inshore areas on the west coast of Vancouver Island where fisheries are targeting local Coho stocks. In non-tidal waters, Coho retention is permitted based on observed abundances; escapement targets being met, and primarily occurs in hatchery systems.

For 2021 in Southern BC tidal waters, it is anticipated that some wild Coho retention opportunities will be provided in inshore areas of the west coast of Vancouver Island. Based on the 2021 WCVI Inshore Coho outlook, most areas will be limited to 1 wild Coho per day. Any changes will be announced via Fishery Notice.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Coho produced by the Robertson Creek (Area 23) and Conuma River (Area 25) hatcheries are all marked with adipose fin clips. Increased daily limits (e.g. 4/day) for hatchery marked Coho will be provided in some terminal portions of these areas during the part of the season when these fish are expected to be present while daily limits for wild Coho may be lower (e.g. 1/day) in these areas.

Fishery Monitoring and Catch Reporting

Catch monitoring programs including creel surveys, logbooks and the internet recreational effort and catch survey (iREC) are the main tools used to capture recreational catch and effort information in this fishery. South Coast stock assessment staff use these programs to provide annual estimates of the recreational harvest in each area.

13.3.3.5.3 Commercial Fisheries

Allocation

Table 13.3-6: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South Outside	21 to 27, 121 to 127	9.5%	9.5%	1.0%	80.0%[b]	0.0%

Notes on Coho allocations (south):
[b] Coho taken primarily in offshore fisheries

Southern Outside Commercial Coho Fisheries

Given ongoing declines in IFR Steelhead escapement and the designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO is implementing a rolling window closure throughout Southern BC to protect IFR Steelhead in 2021. Areas and dates for the window closure are identified in Appendix 9.

Area B Seine

No directed offshore Coho fisheries. Near shore fisheries may permit bycatch retention in fisheries targeting other species based on pre-season forecasts of abundance. Coho directed fisheries may be permitted in terminal locations on enhanced stocks.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Area D Gill Net

No directed offshore Coho fisheries. Near shore fisheries may permit bycatch retention in fisheries targeting other species based on pre-season forecasts of abundance. Coho directed fisheries may be permitted in terminal locations on enhanced stocks.

Area E Gill Net

No directed southern outside Coho fisheries and Coho non-retention in fisheries directed at other stocks.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing

restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Area G Troll

Management measures to protect stocks of concern, including Interior Fraser River Coho will constrain WCVI fisheries in the offshore area. However, there may be potential opportunities available for retention of Coho (hatchery marked or hatchery marked and wild) bycatch during directed Chinook fisheries. In previous years, any fishery that allows Coho retention occurred after mid-September to minimize possible impacts on Interior Fraser Coho. The 27-day rolling window closure will continue to be applied to the Area G troll fishery to protect Interior Fraser River Steelhead. Areas and dates for this window closure are listed in Section 13.1.2.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Fishery Monitoring and Catch Reporting

There is a mandatory harvest log and in-season reporting program for catch information for all commercial fisheries.

Mandatory requirement to file fishing reports in all commercial fisheries, including "Start/Pause/Cancel/End" Fishing reports.

Mandatory catch reporting by phone-in with a paper harvest or electronic transmission with an electronic harvest log (E-log).

Catch reporting requirements are specific to each licence group and are detailed in the conditions of licence for each gear type. Additional requirements are in place for providing biological samples as required.

WCVI Coho Demonstration Fisheries

There are no proposed demonstration fisheries that meet the essential CSAF criteria targeting Southern Outside Coho.

Economic Opportunities

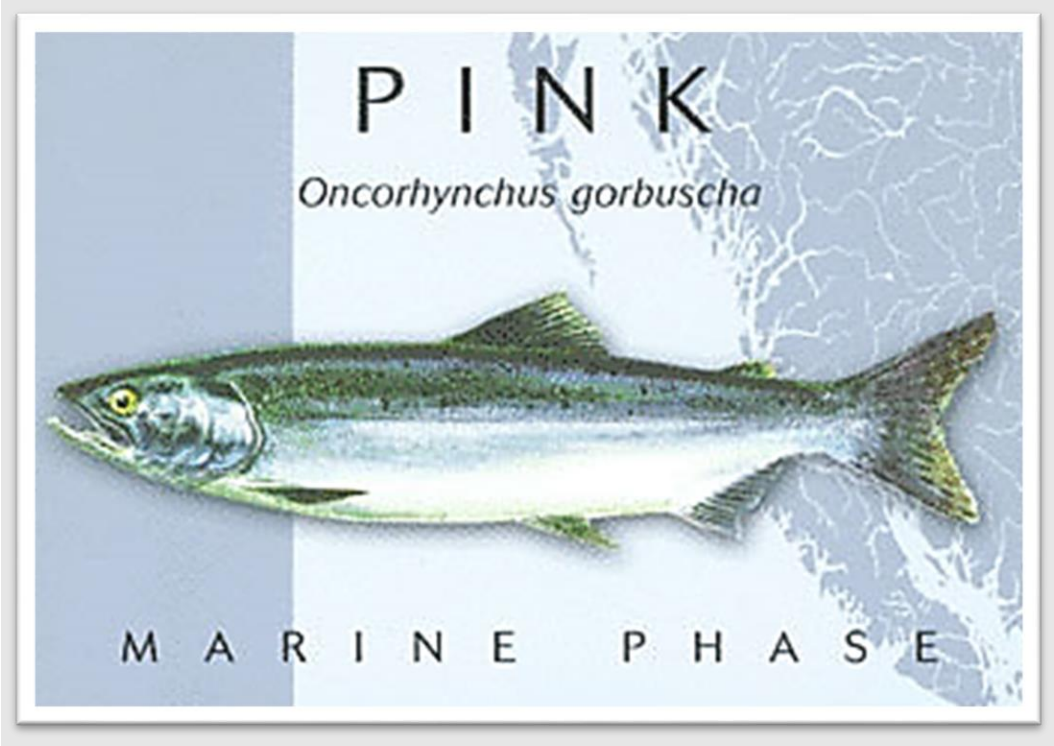
Potential Area 23 Economic Opportunity Coho fisheries will not be affected by 2021 Interior Fraser River Steelhead conservation measures.

Economic opportunity fisheries may be conducted under agreements that specify provisions for planning fisheries, allocations, catch reporting requirements as well as roles and responsibilities regarding the management of the fishery. Economic opportunity agreements are in place with the Tseshaht and Hupacasath First Nations for the 2021 season. The Department's general approach is that Aboriginal commercial harvest opportunities are managed using the same harvest decision guidelines as the commercial fishery. Aboriginal commercial harvest opportunities may be implemented with different times, areas, gears and regulations consistent with the overall management approach for the commercial fishery. These economic opportunity fisheries are based on local abundances, estimated by the Salmon Outlook and in-season information if available.

13.3.3.5.4 ESSR Fisheries

ESSR fisheries may occur at DFO hatchery facilities that have a surplus of returning hatchery Coho. These fishery opportunities are provided to the local First Nations. In past years, ESSR fisheries have taken place at the Roberson Creek Hatchery and Nitinat Hatchery.

13.4 SOUTHERN PINK SALMON FISHING PLAN



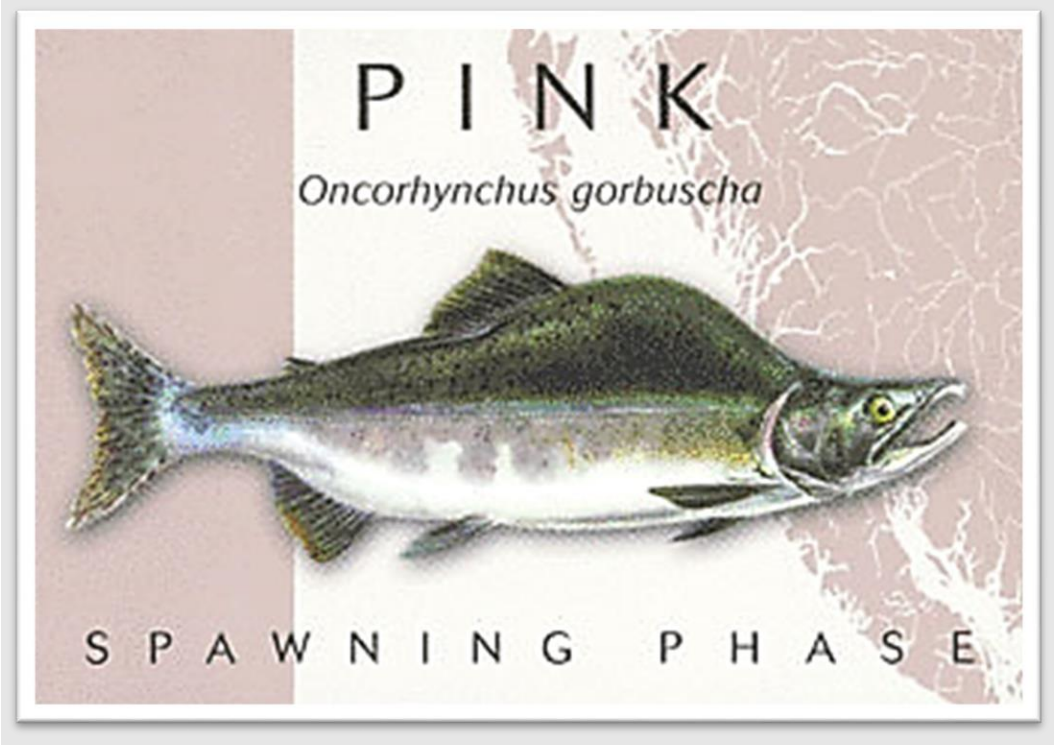


TABLE OF CONTENTS

13.4.1 SOUTHERN PINK - OVERVIEW

In southern BC, Pink salmon stocks are found primarily in tributaries of the Fraser River and in streams on the East Coast of Vancouver Island and the Mainland. Pink returns on the WCVI are small and are not actively managed. Most Pink fisheries in southern BC target Fraser River origin Pink salmon in odd years; Pink harvests in other areas primarily occur near terminal areas. Detailed information is provided below outlining management of Fraser River, ECVI and Mainland populations.

Information on smaller WCVI Pink populations is under development and further information will be provided in a subsequent year.

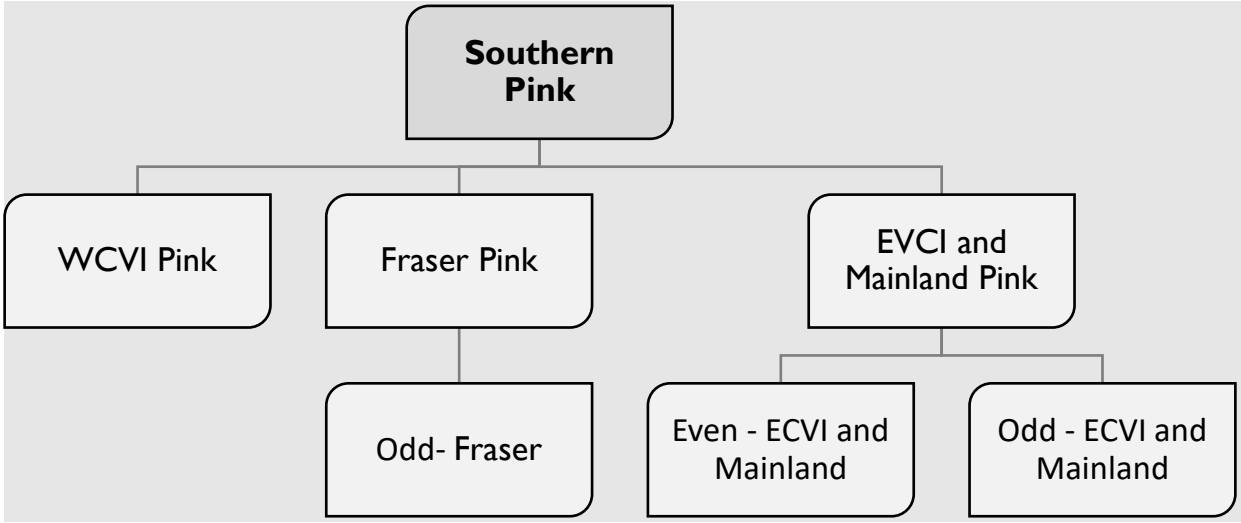


Figure 13.4-1: Overview of Southern Pink Salmon

SOUTHERN PINK SALMON ENHANCEMENT INFORMATION:

The major DFO operation enhancement facilities that produce Pinks are:

South Coast Area:

Quinsam River hatchery

Fraser River Area *(odd year run only):*

Capilano River hatchery

Chehalis River hatchery

Tenderfoot Creek hatchery

Weaver Spawning Channel

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 (PIP and DPI) operated by volunteers, and Aboriginal Fisheries Strategy (AFS).

There are two datasets available: Post-Season Production from the 2019 brood year (i.e. 2020 releases, and numbers on hand for 2021 release), and the Production Plan, which includes proposed targets for the upcoming 2021 brood year. These are available at the following website:

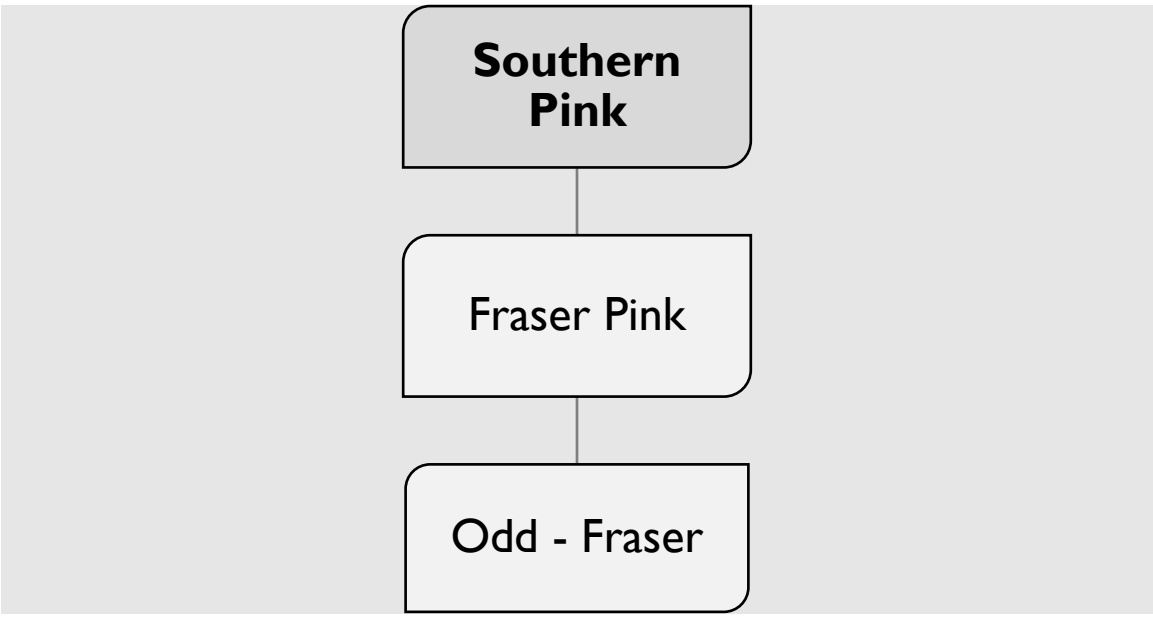
http://www.pac.dfo-mpo.gc.ca/sep-pmvs/projects-projets/ifmp-pgip-eng.html

SOUTHERN PINK - SEP PROPOSALS OR UPDATES FOR 2021

- Dependent upon 2021 escapement, 2021 Cheakamus Pink production targets from Tenderfoot Creek hatchery involve planned releases for harvest (Squamish watershed), rebuilding (Elaho), and a pilot project involving releases to Capilano as a potential future broodstock source for North Shore community involvement projects.

13.4.2 FRASER PINK SALMON

13.4.2.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT



Conservation Units

Fraser Pink

Figure 13.4-2: Conservation Units in the Fraser Pink Salmon Management Unit (1 CU)

Fraser Pink salmon migrate up the Fraser system from early August through early October, peaking in early to mid-September. Returns occur on a two year cycle, almost entirely in odd numbered calendar years only. Minimal numbers of Fraser River Pink salmon return in even years and no directed harvest occurs in these years.

13.4.2.2 STOCK ASSESSMENT INFORMATION

13.4.2.2.1 Pre-season

The total 2021 forecast of Fraser Pink Salmon ranges from 1.7 million to 5.3 million at the 10% and 90% probability-levels, with a median (50% probability level) forecast of 3.0 million. The median forecast is below the long term average (11.5 million). Due to restrictions in place in response to the COVID-19 pandemic in early 2020, the out-migration of Pink salmon fry from the brood year (2019) was not assessed. As the brood year fry abundance is typically used to forecast returning adult abundance, different methodology was required to forecast returns for

2021. In the absence of juvenile data, an escapement time-series (1957-2019) was used for forecasting, however this escapement data has been inconsistently assessed, and as such the forecast should be treated with exceptional caution.

Detailed information pertaining to the Fraser Pink forecast is anticipated to be published later in 2021.

Table 13.4-1: 2021 Pre-season Fraser Pink return forecasts (DFO, 2021).

Forecast Model	Mean Run Size	Probability that Return will be at/or Below Specified Run Size				
		10%	25%	50%	75%	90%
Ricker with discharge, SST, and SSS	11,500,000	1,701,000	2,229,000	3,009,000	4,051,000	5,375,000

2021 Pre-season Fraser River Pink and Sockeye Run Timing Curves:

The Fraser Pink timing estimate is based on the median timing observed in recent years. The pre-season timing estimate of August 25 (Area 20 date) is expected to be 3 days earlier than the long term median. As shown in Figure 13.4-3 it is expected that there will be considerable overlap between the Pink and Fraser Summer and Late run Sockeye in 2021.

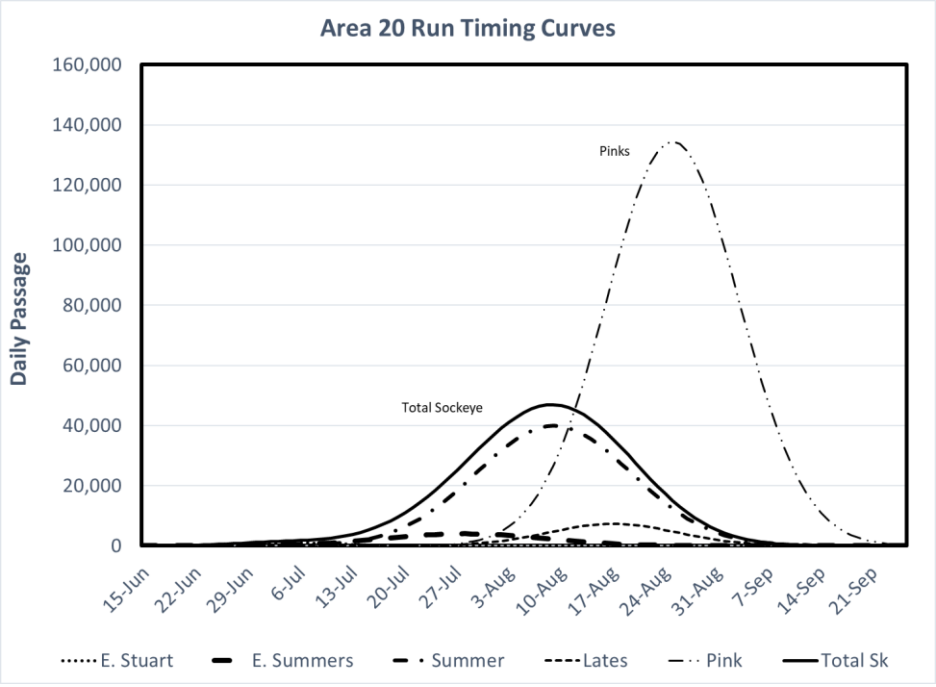


Figure 13.4-3 Pre-season Area 20 Run Timing Curve for 2021 Fraser Sockeye and Pink Salmon.

A landslide in the Big Bar area on the Fraser River upstream of Lillooet was discovered on June 23, 2019 and is thought to have occurred sometime between October and November 2018. It

created a 5 meter high waterfall/cascade that posed a migration passage challenge to salmon migrating to rivers and streams upstream of the slide. The Big Bar landslide had notable impacts to fish passage to the spawning grounds in 2019, especially prior to late August when high water flow impeded natural migration above the slide. It is unknown what proportion of Fraser Pinks were expected to migrate past the Big Bar slide, however expert opinion suggests approximately 5%. In 2019 the natural passage of Pink Salmon was observed, though mainstem spawning was prevalent directly downstream of the slide. For those Pink Salmon that did successfully spawn above the slide in 2019 (the brood year for the 2021 return), it is unknown what kind of impact the slide would have on juvenile outmigration in the spring of 2020.

Due to uncertainty surrounding the implications of the Big Bar landslide and the very low in-season Sockeye return estimates in 2019 and 2020, the Department planned fisheries directed on species other than Sockeye, including Pink salmon, in a way that allowed as many Sockeye to reach the spawning grounds as possible. This included measures to minimize Sockeye bycatch impacts such as requiring the use of selective fishing gear like shallow seines, beach seines, and fish wheels.

Potential impacts of the Big Bar rock slide on fish passage in 2021 will continue to be evaluated pre-season and in-season, and may result in changes to management approaches as new information becomes available. Substantial mitigation work has occurred at the slide site since 2019, and preliminary analysis has indicated that salmon passage at the site has improved, but it is still appears to be a barrier at high discharge.

13.4.2.2.2 In-season

In odd years, assessment of Fraser Pink run size is conducted by the Pacific Salmon Commission. Estimates of abundance, run timing, stock composition, and other technical information are used to assess potential fishing opportunities relative to pre-season fishing plans.

In even years, there is no in-season assessment for Fraser River Pink salmon.

13.4.2.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

Prior to each fishing season the Fraser Pink Salmon Decision Guidelines (Table 13.4-2) are used to develop the spawning escapement plan (Table 13.4-3). A pre-season fishing plan is then developed by DFO and the Fraser River Panel (FRP) that takes into consideration conservation concerns for other species, pre-season forecasts of abundance, timing, and diversion rate.

In even years, there are no fisheries planned to target directly on Fraser Pink salmon.

In odd years, Pink salmon are managed to the decision guidelines in the table below.

Table 13.4-2: Fraser Pink Salmon Odd Year Decision Guidelines

Run Size	Escapement Plan
Less than 7.059 M	The allowable exploitation rate (ER) increases linearly from zero percent at a run size of zero to 15% at a run size of 7.059M. (For run sizes less than 7.059M, the allowable % ER is the run size expressed in millions multiplied by (15%/7.059)
between 7.059M & 20M	The allowable ER increases from 15% to 70%. The escapement goal is 6M, the remainder is harvestable surplus.
Greater than 20M	The allowable ER is 70%. The escapement goal increases as the run size increases beyond 20M.

Table 13.4-3: 2021 Fraser Pink Salmon Draft Escapement Plan

2021 Fraser Pink Escapement Plan

Run Size	Escapement Plan
Less than 7.059M	Exploitation rate increases linearly from 0% at run size =0 to 15% at run size = 7.059M
Between 7.059M-20M	Fixed Escapement. Escapement goal = 6,000,000
Greater than 20M	Exploitation Rate Cap = 70%

	2019 Pre-season Forecast Return				
	p10	p25	**p50**	p75	p90
forecast	1,701,000	2,229,000	**3,009,000**	4,051,000	5,375,000
escapement target	1,640,000	2,123,000	**2,817,000**	3,702,000	4,761,000
allowable ER	4%	5%	**6%**	9%	11%
Available Harvest (TF, US, CDN)	61,000	106,000	**192,000**	349,000	614,000

13.4.2.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO FRASER PINK FISHERIES

Harvest of Fraser Pink salmon in odd years may be constrained by the management objectives for Fraser Sockeye and for other species of concern, particularly Interior Fraser (IFR) Coho salmon and Steelhead. In some cases, full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season.

Fisheries targeting Fraser Pink may be affected in 2021 by conservation measures to protect IFR Steelhead. Dates and areas for rolling window closures can be found in Appendix 9.

13.4.2.5 ALLOCATIONS AND FISHING PLANS

In-season information including estimates of abundance, run timing, stock composition, and other technical information are used to assess potential fishing opportunities relative to pre-season fishing plans.

The Fraser River Panel meets regularly from early July to mid-September to review information as it becomes available over the course of the Sockeye and Pink migrations. In-season information including fishery openings are posted on the Internet regularly throughout the fishing season by the DFO and the PSC at the following web sites:

Weekly PSC News Release:
http://www.psc.org/news_frpnews.htm

Aboriginal, Commercial and Recreational Fishery Notices:
http://www-ops2.pac.dfo-mpo.gc.ca/fns-sap/index-eng.cfm?

13.4.2.5.1 First Nations Fisheries

Food Social and Ceremonial Fisheries

First Nations target local salmon stocks for FSC purposes throughout the south coast. Catches are typically higher in odd years when Fraser River Pink are on their dominant cycle year. Minimal Pink catch is thought to occur in even years.

First Nations opportunities to harvest salmon for food, social and ceremonial purposes is provided through communal licences issued by DFO. Refer to Section 10.2 for Table 10.2-1 - Communal Licence Harvest Target Amounts for Southern BC/Fraser River First Nations Fisheries.

FSC fisheries will be planned to maximize the use of selective gear types and reduce bycatch where possible.

To support IFR Steelhead conservation, a rolling window closure will apply to all FSC salmon fisheries in the Fraser River within the times and areas identified in Table 13.4-4 (including Subareas 29-6, 29-7, 29-9, and 29-10) and in Appendix 9. This closure does not extend to marine FSC fisheries targeting Fraser Pink Salmon.

Table 13.4-4: Dates and Area for the Interior Fraser River 27-day Rolling Closure for FSC Fisheries in the Fraser River system.

Fishery Location	Start	End
Area 29: 29-6, 29-7, 29-9, and 29-10	28-Sep	24-Oct
Mouth to Mission	28-Sep	24-Oct
Mission to Hope	29-Sep	25-Oct
Hope to Sawmill Creek	3-Oct	29-Oct
Sawmill Creek to Lytton (Thompson Confluence)	5-Oct	31-Oct
Lytton to Texas Creek	8-Oct	3-Nov
Texas Creek to Kelly Creek	10-Oct	5-Nov
Kelly Creek to Deadman Creek	13-Oct	8-Nov
Deadman Creek to Chilcotin River	16-Oct	11-Nov
Chilcotin River	19-Oct	14-Nov
Thompson River – Thompson Confluence to Bonaparte	8-Oct	3-Nov
Thompson River – Bonaparte River to Kamloops Lake	12-Oct	7-Nov

In some cases, full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season.

In addition to these FSC fisheries, local First Nations access Pink salmon through ESSR harvests at several hatchery facilities (refer to Section 13.4.2.5.7).

Fishery Monitoring and Catch Reporting

Marine waters

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations are asked to keep records of harvest and provide catch information to DFO in a variety of formats. Under this licence, if a commercial vessel is used for fishing, First Nations are asked to provide information respecting the species and quantity of fish harvested by this vessel, to the DFO Catch Reporting Officer within 24 hours from landing harvested catch. In addition, catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where

in-season management requires, catch reports are sought weekly during the respective fishing season.

Fraser River and tributaries

First Nations catch monitoring programs are managed through Activity Funding or Comprehensive Fisheries Agreements.

In the lower Fraser River (below Sawmill Creek), monitoring programs implemented vary between Nations but typically include landing site or vessel based collection of catch and effort information paired with validation of effort by vessel patrols or overflights. Catch reports are received by DFO from catch monitoring programs on a weekly basis, within 48 hours of a fishery closing.

For fisheries in the Fraser watershed above Sawmill Creek, catch monitoring programs typically range from basic census type to more enhanced programs that include collecting effort and catch rate information in creel sample programs.

Treaty Fisheries

Treaty fisheries will be planned to maximize the use of selective gear types and reduce bycatch where possible.

In some cases, full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season. See Section 13.4.2.4 for information on Incidental Harvest, Bycatch and Constraints to Fraser Pink Fisheries.

To support IFR Steelhead conservation, a rolling window closure will apply to all Treaty salmon fisheries in the Fraser River within the times and areas identified in Table 13.4-4 (including Subareas 29-6, 29-7, 29-9, and 29-10) and Appendix 9. This closure does not extend to marine Treaty fisheries targeting Fraser Pink Salmon.

Tsawwassen Fisheries (Domestic)

In any year, the Tsawwassen Fishing Right Allocation for Pink salmon will be that number of fish caught incidentally in the harvest of Tsawwassen Allocation for Sockeye salmon, up to a maximum of 2,500 Fraser River Pink salmon.

The monitoring program for Tsawwassen Domestic fisheries includes fisher logs supplemented by validations of catch through on-water patrols and/or observations of landings and effort through on-water patrols. Details of monitoring programs in place can be found in the Tsawwassen Fisheries Operational Guidelines.

Tla'amin (Domestic)

The Domestic allocations for Pink salmon under the Tla'amin First Nation's Final Agreement are as follows:

In any year, the Tla'amin Fish Allocation for Pink salmon is a maximum of 5,000 Pink salmon. The allocation will be determined by an abundance-based formula.

The Tla'amin First Nation provides catch reports to the Department through the Aboriginal Harvest Management System (AHMS). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and biological samples.

Maa-nulth (Domestic)

The Maa-nulth Domestic allocation for Pink salmon under the Maa-nulth First Nations Final Agreement are in each two year period following the effective date of the Agreement (2009): a maximum of 7,250 Pink salmon (some or all of which may be Fraser Pink).

The Maa-nulth First Nations provides catch reports to the Department through the Maa-nulth Electronic Reporting Program (MERP). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and pieces of salmon harvested.

Five Nations (Ahousaht, Ehattesaht, Hesquiaht, Mowachaht / Muchalaht, and Tla-o-qui-aht First Nations) Multi-species Fishery

Five Nuu-chah-nulth First Nations located on the west coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht (the Five Nations) – have an aboriginal right to fish for any species, with the exception of Geoduck, within their court-defined fishing territories and to sell that fish. For further information please see Section 10.3.1.

The Five Nations Multi-species fishery for Fraser River Pink salmon will not be affected by 2021 IFR Steelhead conservation measures.

13.4.2.5.2 Recreational Fisheries

In most south coast tidal waters, the limit in recreational fisheries is four (4) Pink salmon per day. Marine recreational Pink fisheries typically take place in August and September. Updates are provided via Fishery Notice and published on the recreational fisheries website: http://www.bcsportfishingguide.ca.

In some cases, recreational fisheries may be reduced or closed due to conservation concerns and management considerations that are identified in-season. See Section 13.4.2.4 for information on Incidental Harvest, Bycatch and Constraints to Fraser Pink Fisheries.

Non-tidal, Fraser River opportunities may be anticipated for Fraser River Pink salmon in odd numbered years and fishing decisions will be dependent on in-season information, including co-migrating species of constraint.

Mandatory and voluntary measures have been implemented to support prey availability and reduce disturbance to Southern Resident Killer Whales, including within Southern BC waters and key foraging areas within Strait of Juan de Fuca and the Gulf Islands. These measures are outlined in section 5.8.

5.6.

Fraser River, Region 5A – Fraser Watershed

Quesnel River: September 16 to September 26 – downstream from boundary signs at the mouth of Quesnel Canyon to the Johnston Subdivision Bridge near Quesnel, BC.

In some cases, recreational fisheries may be reduced or closed due to conservation concerns and management considerations that are identified in-season. See Section 13.4.2.4 for information on Incidental Harvest, Bycatch and Constraints to Fraser Pink Fisheries.

As part of Chinook management measures, Fraser River recreational fisheries will remain closed to salmon fishing until open. Opportunities for species other than Chinook will be informed by in-season abundance and other conservation issues (Coho, Steelhead, etc.). Reduced Fishing opportunities may be provided in tributary areas during times and locations at-risk Chinook stocks would not be encountered. See Section 13.1.4 for more information.

As part of the IFR Steelhead conservation measures being implemented in 2021, a rolling window closure will be applied to the recreational fishery in the Fraser River (including Areas 29-6, 29-7, 29-9 and 29-10). No fishing for salmon will be permitted within the times and areas in the Fraser River identified in Table 13.4-5 and in Appendix 9. Note that these recreational closures do not apply to marine recreational fisheries.

Table 13.4-5: IFR Steelhead Rolling Window Closure Dates for the Fraser River Recreational Fishery

Fishery	Start	End
Area 29: 29-6, 29-7, 29-9, and 29-10	19-Sep	30-Oct
Mouth to Port Mann Bridge	19-Sep	30-Oct
Port Mann Bridge to Mission	21-Sep	1-Nov

Mission to Hope	22-Sep	2-Nov
Hope to Sawmill Creek	26-Sep	6-Nov
Sawmill Creek to Lytton (Thompson Confluence)	28-Sep	8-Nov
Lytton to Texas Creek	1-Oct	11-Nov
Texas Creek to Kelly Creek	3-Oct	13-Nov
Kelly Creek to Deadman Creek	6-Oct	16-Nov
Deadman Creek to Chilcotin River	9-Oct	19-Nov
Chilcotin River	12-Oct	22-Nov
Thompson River – Thompson Confluence to Bonaparte	1-Oct	11-Nov
Thompson River – Bonaparte River to Kamloops Lake	5-Oct	15-Nov

Fishery Monitoring and Catch Reporting

Marine Waters

Catch monitoring programs including seasonal creel surveys, logbooks and the internet recreational effort and catch survey (iREC) are the main tools used to capture recreational catch and effort information in this fishery. South Coast and Lower Fraser stock assessment staff use these programs to provide annual estimates of the recreational harvest in each area.

Fraser River

Creel surveys are conducted in portions of the lower Fraser River and select tributaries in order to estimate recreational catch and effort for the times and areas surveyed. Typically, the creel survey in the lower Fraser River mainstem begins when the mainstem is opened to recreational salmon fishing; however, over the last number of years, the survey end date has been variable (mid-September to end of November). The creel surveys conducted on the Chilliwack River and Nicomen-Norrish recreational fisheries have remained stable over the last number of years both in times and areas (Chilliwack is surveyed from mid-September to mid-November and Nicomen-Norrish is surveyed from early October to the end of November).

Catch monitoring programs in the Fraser watershed upstream of Alexandria will range from fisher reported catch to highly intensive creel surveys; however, some times and areas are unmonitored. Expected effort and catch, harvest rates, potential bycatch, and any biological

sampling requirements are taken into account when planning the catch monitoring program for these areas.

13.4.2.5.3 Commercial Fisheries

Allocation arrangements for Fraser Pink salmon within the commercial fleet is as follows:

Table 13.4-6: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
Fraser	11 to 20, 29, 121, 123 to 127	82.5%	4.0%*	3.0%*	0.5%[c]	10.0%

Notes on Pink allocations (south):

[*] Pink bycatch provision required for fisheries on more abundant species

[c] potential for future re-negotiation. Pink bycatch required for fisheries on more abundant species

Fraser Commercial Pink Fisheries

Returns of Fraser Pink Salmon are highly uncertain; normal brood year outmigration assessments did not occur in 2020 due to the COVID-19 pandemic restrictions, and forecasts for this year relied upon an inconsistent escapement time series. Though 2021 is an odd year, given high Fraser River discharge (for juvenile out-migration) and poor early marine conditions in 2020, directed commercial fisheries on Fraser Pink are expected to be limited.

If fishing opportunities are available, in some cases full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season. See Section 13.4.2.4 for information on Incidental Harvest, Bycatch and Constraints to Fraser Pink Fisheries.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

To support Interior Fraser River Steelhead conservation, a rolling window closure will apply to all commercial fisheries in the Fraser River and marine areas. A 42-day closure will apply to commercial gill net and seine fisheries within the times and areas identified in Table 13.4-4.

Area B Seine and Area H Troll

Similar to other Fraser Pink cycle years, Area B seine and Area H troll have submitted an ITQ demonstration fishery for Fraser Sockeye and Pink salmon (see South Coast Fraser Pink Demonstration Fishery below). Area B seine and Area H troll fishing opportunities will depend on in-season information.

The table below outlines possible scenarios for consideration when planning Fraser River Pink and Sockeye commercial ITQ fisheries. These scenarios are developed based on the availability of TAC, with consideration for cycle and off cycle years for Pinks and release mortalities for Sockeye. Where possible examples are provided for reference to years when similar ITQ fisheries management approaches were applied.

		Fraser Pinks		
		TAC Available	**No TAC Available (Cycle Year)**	**No TAC Available (Off Cycle Year)**
Fraser Sockeye	**TAC Available**	-Pink Quota -Sockeye Quota (eg. 2011; note needed to release Sockeye in order to access large Pink quota)	-***No*** Pink Quota -Sockeye Quota (no examples of this scenario; likely Sockeye fisheries to occur in JST to reduce impacts on Fraser Pinks)	-***No*** Pink Quota -Sockeye Quota (e.g. 2010, 2014, 2018; pink retention permitted)
	Release Mortalities Available	-Pink Quota -Sockeye Quota set to manage *release mortalities only*. *Sockeye non-retention in effect.* (eg. 2013; note need low Sockeye encounters in JST & A29 (i.e. 1% Mortality Rule))	No Fisheries	No Fisheries
	No Release Mortalities Available	-Pink Quota -***No*** Sockeye Quota. Areas closed to avoid Sockeye encounters. (eg. similar to 2013; propose a delayed A29 terminal fishery with limited participation and sockeye releases managed to a Sockeye mortality CAP)	No Fisheries	No Fisheries

The table above references the 1% Mortality Rule which has been used to guide harvest planning decisions in previous years for both marine and non-tidal commercial, economic and demonstration fisheries.

The "1% rule" as applied to pink directed fisheries is when the expected total sockeye mortalities associated with a fishery is less than 1% for sockeye. To calculate whether a fishery falls within the "1% rule":

(% sockeye) x (release mortality rate) <= *1%*

where:
% sockeye = the proportion of sockeye expected to be encountered by the fishing gear in the fishing area
release mortality rate = gear and area specific release mortality rate

To calculate what the sockeye proportion must be for a particular gear to be able to begin fishing under the "1% rule":

1% ÷ release mortality rate

The above calculation applied to a range of release mortality rates in the IFMP:

Rel. Mort	SK% needs to be below
3%	33.33%
3.5%	28.57%
5%	20.00%
10%	10.00%
15%	6.67%
25%	4.00%
60%	1.67%

Area D/E (Gill Net)

The Area E Harvest Committee's CSAF proposal to transition available Area E Fraser Pink TAC to individual transferable quota based (ITQ) management was not approved for 2021. Fraser Pink salmon are generally caught incidentally during Fraser Sockeye gill net fisheries as there are typically no directed Fraser Pink gill net fisheries due to co-migrating species of concern. The Department will continue to work with First Nations and commercial harvesters on future CSAF demonstration fishery proposals.

Area G Troll

Fishing opportunities will depend on in-season information. Bycatch provisions may apply.

South Coast Fraser Pink Demonstration Fisheries

Area B Seine and Area H Troll Fraser River Pink Individual Transferable Quota (ITQ) Demonstration Fishery

Please see Appendix 7 for more information on the Area B and Area H Fraser Pink ITQ demonstration fishery guidelines for 2021

This demonstration fishery will be similar to the quota based ITQ Fraser River Sockeye fishery that was planned for 2009-2020. Note that a separate demonstration fishery proposal is provided for a demonstration – experimental seine fishery in the lower Fraser River.

- **Region:** South Coast and Lower Fraser River Areas

- **Participants: All Area B seine and H troll licence holders**

- **Location of Fishery:** Seine fishing areas that will be considered in the fishery include: Johnstone Strait (portions of Area 12 and 13), Juan de Fuca (portions of Area 20), portions of Areas 16 and 18, and portions of Area 29 off the Fraser River mouth, which may include depths shallower than 45 m.

  In Area 20, additional measures may be in place to minimize impacts on Coho. Consideration for seine fishing opportunities in Area 20 will also be dependent on diversion rate estimates.

  Troll fishing areas that will be considered in the fishery include; Johnstone Strait (portions of Areas 12 and 13), portions of Areas 16 and 18, and portions of Area 29 off the Fraser River mouth.

  In Areas 12, 13 and 20 additional restrictions will be identified around test-fishing locations to minimize impacts on test-fishery assessment requirements.

- A 42-day rolling window closure will be applied to commercial seine fisheries and a 27-day closure will apply to commercial troll fisheries within the times and areas identified in Table 13.4-4.

- **Gear Type:** Seine and Troll gear, selective fishing measures are mandatory and are specified by licence conditions.

  Power skiffs may be used where conditions of licence permit. Shallow seine nets may be used in areas off the mouth of the Fraser.

  Time Frame: This fishery is planned to occur when Fraser River Pink Canadian Commercial TAC is identified. It is anticipated that this fishery will take place within the time period of mid-August to mid-September.

  The Area H troll fishery is anticipated to be open on a 7 day per week basis as TAC permits. The Area B seine fishery is expected to be open 5 to 7 days per week and will be dependent on the amount of available TAC and the available time frame for the fishery.

  It is expected that Area B seine fishing opportunities in Area 20 and Area 29 will also be managed to a boat day limit to control impacts on Interior Fraser Coho.

- **Allocation:** The fishery will be based on available Fraser River Pink commercial TAC. Shares for each fleet will be based on the commercial allocation plan.

  The Fraser River Pink quota (ITQ) will be determined by DFO by dividing the respective Area B and Area H Fraser River Pink allocations by the total number of licences for Area B and Area H multiplied by the available commercial Fraser River Pink Total Allowable Catch (TAC) determined in-season.

  The quota share will be expressed as a percentage of the TAC and the percentage will remain fixed in-season subject to amendments for in-season quota transactions. The TAC may be distributed over the course of the fishery in increments. The TAC will be announced by fishery notice and adjusted as required. Updates will typically be announced following Fraser River Panel meetings (usually Tuesday and Friday).

  Quota will be transferable within each licence area (e.g. Area B to Area B; or, Area H to Area H) as well as between licence areas (e.g. Area B to Area H; or vice versa).

  Transfers to or from other commercial fisheries is currently under review by the Department.

The target species is Pink and bycatch retention of Chum is permitted (except Chum retention is not permitted in Area 20). Sockeye retention will be subject to pre-season management decision regarding use of available Sockeye TAC. If Sockeye TAC is available, individual license holders will have the flexibility to decide how to use their available quotas (ITQs) of Sockeye and Pink salmon. Accounting for ITQ's of Fraser River Sockeye will be based on total mortalities, including retained catch and assessed release mortalities. Two examples of how Sockeye mortalities are calculated are calculated are provided below. For a detailed explanation on how Sockeye total mortalities are assessed refer to Area B and Area H Fraser Sockeye and Pink ITQ Demonstration Fishery 2019 Guidelines in Appendix 7. There will be non-retention of Coho, Chinook and Steelhead.

Examples of total Sockeye mortality calculations:

1) A troll vessel landing 400 Pink salmon and no Sockeye from Area 12 on August 20 with a fleet-wide Sockeye encounter rate from observer data of 15% Sockeye for that day and area would be assessed a release mortality of 6 Sockeye against their quota as follows:

400 Pinks x 0.15 encounter rate x 0.10 release mortality = 6 Sockeye mortalities

2) A seine vessel landing 10,000 Pink salmon and 400 Sockeye from Area 12 on August 28 with a fleet-wide sockeye encounter rate from observer data of 7% Sockeye for that day and area would be assessed 475 Sockeye against their quota as follows:

10,000 Pinks x 0.07 encounter rate = 700 expected Sockeye encounters
700 expected Sockeye – 400 landed Sockeye = 300 releases
300 releases x 0.25 release mortality = 75 Sockeye release mortality
400 landed Sockeye + 75 Sockeye release mortality = 475 total Sockeye mortalities.

- **Monitoring Plan:** Start, end, pause and daily catch reports will be required by phone-in or electronic logbook. Verification of Sockeye encounter rates in this fishery is essential. Encounter rate data will be collected by third party, on-grounds observers. An observer

plan will be developed pre-season to estimate the fleet-wide Sockeye encounter rates, by area fished, for Area B and Area H vessels similar to the approach used in 2013. When developing a pre-season plan, the Department will determine the levels of observer coverage for Area B and Area H, based on information collected during the 2011 and 2013 fisheries. There is a requirement for 100% third-party dockside validation of the catch at designated landing locations. Over flights will be conducted and charter patrol will monitor the fishery.

Additional on-grounds observer coverage/monitoring may be required to assess the releases of non-target species in Area B and H Sockeye fisheries. Observer requirements will be determined in-season, subject to areas fished and effort.

Additional monitoring requirements are required and in place for the Area 20 seine fishery including on-grounds management, set by set reporting in established grid zones and observer coverage.

Fishery Monitoring and Catch Reporting

There is a mandatory harvest log and in-season reporting program for catch and other fishing information for all commercial fisheries. , including "Start/Pause/Cancel/End" fishing reports. Mandatory catch reporting by phone-in is required with a paper harvest log OR electronic transmission is required with an electronic harvest log (E-log). Catch reporting requirements are specific to each licence group and are detailed in the conditions of licence for each gear type. Additional requirements are in place for providing biological samples as required. Partial independent on-board/at-sea observer coverage and/or mandatory dockside validation may be required for Area B seine fisheries.

13.4.2.5.4 Fraser First Nations Commercial Pink Harvest

Demonstration Fisheries

Even if fishing opportunities are available, in some cases full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season. See Section 13.4.2.4 for information on Incidental Harvest, Bycatch and Constraints to Fraser Pink Fisheries.

As part of the IFR Steelhead conservation measures previously implemented, a rolling window closure will be applied to all commercial fisheries in the Fraser River and marine approach areas. See Appendix 9 for details information on window closures that apply to commercial fisheries.

13.4.2.5.5 Harvest Agreements

Fishing opportunities will depend on in-season information. Full harvest targets may not be harvestable due to conservation concerns, rolling window closures, management considerations that are identified in-season.

Tsawwassen

TFN have an allocation for commercial catch outside of the Treaty as identified via the "Tsawwassen First Nations Harvest Agreement". The allocation in the Harvest Agreement (HA) does not affirm Aboriginal or Treaty rights. Fishing undertaken via the HA will be comparable to the requirements of the current Fraser River commercial fishery (First Nations economic opportunity (EO) fishery), or a general commercial fishery (e.g. Area E). For 2020, the HA will be comparable to the EO fishery.

Tsawwassen fishers will be expected to operate under the same rules that apply to other fishers taking part in that Fraser River commercial fishery. For 2020, this means that this fishery will not operate within the times and areas 42-day closure period identified for the IFR Steelhead window closures for gill net, purse seine, beach seine, and shallow seine gear (see Appendix 9). TFN may also prepare a HA Fishing Plan and give to the JFC for review prior to the season's commencement. Each year that the Minister authorizes a Fraser River commercial fishery in the Tsawwassen fishing area, or a general commercial fishery, the Minister will issue a communal commercial fishing licence for the Tsawwassen First Nations. The JFC set up by the Tsawwassen Final Agreement will conduct a post season review.

Salmon allocation under the Harvest Agreement:

Pink: 0.78% of the Commercial Allowable Catch for Fraser River Pink salmon for that year.

13.4.2.5.6 Economic Opportunities

Even if fishing opportunities are available, in some cases full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season. See Section 13.4.2.4 for information on Incidental Harvest, Bycatch and Constraints to Fraser Pink Fisheries.

Mandatory and voluntary measures have been implemented to support prey availability and reduce disturbance to Southern Resident Killer Whales, including within Southern BC waters and key foraging areas within Strait of Juan de Fuca and the Gulf Islands. These measures are outlined in section 5.8.

5.6.As part of the IFR Steelhead conservation measures previously implemented, a rolling window closure will be applied to all commercial fisheries in the Fraser River and marine approach areas. See Appendix 9 for details information on window closures that apply to commercial fisheries.

Demonstration Fisheries

2021 Harrison-Fraser River Demonstration Fishery- In River Pink Fisheries

Harrison Salmon Producers (Sts'ailes and Scowlitz First Nations)

Region: Lower Fraser Area

Participants: Sts'ailes and Scowlitz First Nations

Location of Fishery:

The waters of the Harrison River located between the outlet of Harrison Lake downstream to the orange boundary signs labelled 'Fishing Boundary HFA' approximately 1000 meters below the CN Railway Bridge; and

The waters of the Fraser River bounded on the west by a line from a white boundary sign on the upstream side of the Fraser River at the mouth of the Sumas River, thence true north to a white boundary sign on the opposite shore and bounded on the east by the downstream side of the bridge across the Fraser River at Agassiz.

Gear Type:

Pink: Set nets, drift nets or beach seines. Beach seines not to exceed a maximum mesh size of 2 ¾ inches and a length of 50 fathoms or 360 feet.

Allocation: Allocation to be determined but will be expressed as a percentage (%) share of Commercial Total Allowable Catch (CCTAC) of Fraser Pinks stocks utilizing relinquished licences from the PICFI program.

Time Frame: All fishery time frames are estimates and final dates will be determined according to in-season migration timing information.

- Fraser Pinks: This fishery would be planned to take place once a Fraser River Pink Canadian Commercial TAC is identified, potentially late August thru Sept.

Monitoring Plan: During any set net or drift net fishing activity the fishers will transport their catch to a predetermined Sts'ailes /Scowlitz landing site to have their catch monitored. During any beach seining activity a Monitor will be present with every beach seining crew during all fishing activity and provide set by set updates to the Sts'ailes Fishery Manager, before the beach

seine crews deploy their next set to ensure there is TAC available. The Sts'ailes Fishing Authority will collect all catch statistics via these monitors and report this information to DFO immediately after the fishery closes.

Upper Fraser Indigenous Sustainable Harvesters (UFISH) – In-River Pink Fisheries

The UFISH Commercial Fishing Enterprise focuses on viable and sustainable fishing practices. The 2021 demonstration fishery will build on previous years' experiences to implement successful fisheries and address constraints and challenges to harvesting allocations, marketing, processing and acquiring infrastructure required for the emerging inland fisheries. Fisheries opportunities will be dependent on in-season information.

PARTICIPANTS - UFISH Partnership – Northern Shuswap Tribal Council (NSTC); Tsilhqot'in National Government (TNG)/Xeni Gwet'in First Nations Government.

North Shuswap Tribal Council

Location: Quesnel River, Chilcotin River and mainstem Fraser

Gear Type: Beach seine, dip nets, and fish wheels

Time frame: Fishery will target Fraser Pinks; potential start date is Sept. 5 for a four week fishery

Tsilhqot'in National Gov't / Xeni'Gwet'in First Nations Government

Location: Chilko River, Chilcotin River and mainstem Fraser

Gear type: Beach seine, dip net, partial weir/fish trap, and fish wheel

Time frame: Fishery will target Fraser Pinks. Potential start date August 25 for a three to four week fishery

ALLOCATION – All

Allocation to be determined but will be expressed as a percentage (%) share of Commercial Total Allowable Catch (CCTAC) of Fraser Pinks stocks utilizing relinquished licences from the PICFI program.

MONITORING PLAN – All

Fishery will be monitored using designated landing sites, electronic logbook system (ELOG) and validation of catch at either landing site or plant.

Fishery Monitoring and Catch Reporting

Lower Fraser

In the Lower Fraser, catch monitoring programs are managed through Activity Funding Agreements and Comprehensive Fisheries Agreements. While details will be finalized prior to fisheries occurring, the monitoring programs in place in recent years are as follows:

- Non-selective (e.g. gill-net) EO fisheries have been monitored using a mandatory landing program (MLP) with packer and land-based sites where all fishers must land and have their catch validated. This program is supplemented by effort validation by vessel patrols and overflights.
- Selective (e.g. beach seine and purse seine) EO fisheries have required monitors to be present during all fishing activity to record catch information on a set-by-set basis.

13.4.2.5.7 ESSR Fisheries

There are no anticipated ESSR fisheries for Fraser Pink salmon. Even if fishing opportunities are available, in some cases full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season. See Section 13.4.2.4 for information on Incidental Harvest, Bycatch and Constraints to Fraser Pink Fisheries.

13.4.3 EAST COAST VANCOUVER ISLAND AND MAINLAND PINKS

13.4.3.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT

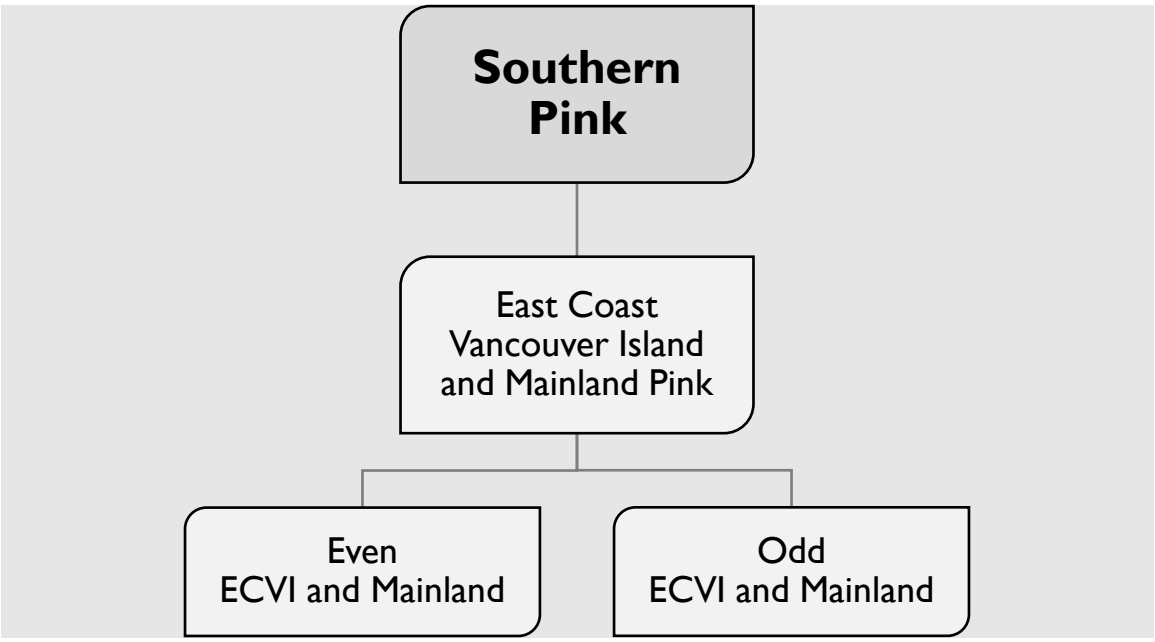


Figure 13.4-4: Conservation Units in the ECVI and Mainland Pink Salmon Management Unit (8 CUs)

East Coast Vancouver Island (ECVI) and Mainland Pinks are grouped into 8 conservation units (CUs) that extend over the entire East Coast of Vancouver Island as well from Seymour Inlet South to Burrard inlet on the Mainland of British Columbia. All Pink salmon mature at 2 years of age which results in the reproductive isolation of even and odd year brood lines. Within the ISC region there are many systems that support both even and odd year brood lines and the methods for identifying CUs take that into account. The cycle lines tend to be more even-year

dominant as you shift North within the management unit and more odd-year dominant as you move shift South.

These stocks are mainly harvested incidentally or as bycatch during mixed-stock Johnstone Strait Fraser River Sockeye and Pink directed fisheries. In addition, these stocks can be harvested in Johnstone Strait test fisheries. Directed fisheries have occurred in some terminal areas, for instance portions of Howe Sound, Jervis Inlet, and Knight Inlet. Historically, the majority of commercial harvests have occurred by purse seine. Opportunities are also available for First Nations and recreational harvesters; however, effort is generally low.

The migration of these stocks to the terminal areas normally begins in early to mid-August and is usually complete by the middle to the end of September. These stocks may be managed as an aggregate early in the season (provided surpluses are expected for stocks) and then separately as they enter the terminal areas.

13.4.3.2 STOCK ASSESSMENT INFORMATION

13.4.3.2.1 Pre-season

See Appendix 10 for the full 2021 Salmon Outlook.

Table 13.4-7: 2021 Outlook for ECVI and Mainland Pink stocks.

Outlook Unit	2021 Outlook Category	Comments
Squamish - Odd only (CUs: East Howe Sound-Burrard Inlet; and, Georgia Strait)	ND	Squamish Pink salmon are rebuilding; however, no target run size has been developed and available quantitative assessment information has not been reviewed. (2019 Outlook Category was 'ND'.).

Outlook Unit	2021 Outlook Category	Comments
Areas 11 to 13 - Odd & Even	1 (NEVI and Area 12 Mainland Inlets); 3 (Area 13)	Since 2019, there have been observations of some key Area 12 Mainland Inlet systems. Even Year: 2020 saw varied returns throughout South Coast with poor returns in Northern Vancouver Island and generally improved/strong returns to the systems from Adam River south to Campbell River on the Island. Very poor (well below average) returns to Area 12 Mainland Inlets and very strong recovery and returns observed on the Philips River in Area 13 Mainland Inlets. Migration into the rivers/timing of pinks was much earlier than normal in many systems (i.e. Quinsam) Odd Year: In the 2019 brood year, returns were similar to what was observed in 2020, with very poor escapements in Northern Vancouver Island and across to the Mainland and much better returns to the lower portions of Area 12 and into 13 on the Island. For 2021, it is anticipated that we will likely see a similar distribution of abundance as the last 2 years. Expectations for 2021 are well below average returns to NEVI and Mainland Inlets and average returns to the Southern Portions of the area on ECVI. Pink fry outmigration numbers from Quinsam in 2020 (~15 million) was the third largest abundance since 1997 and should convert to strong returns in 2021. Historically, Pink returns to this area have been highly variable and expectations continue to be highly uncertain. (2020 Outlook Category was '2/3'; 2019 Outlook Category was '2/3')
Georgia Strait - West - Odd & Even	3	These are primarily odd year dominant pink stocks. Returns in 2019 were below to well below the odd-year 3 generation average and generally lower than brood returns in 2017 with the exception of Puntledge River and Big Qualicum River. Assuming similar marine survival, the outlook for 2021 is for near average returns. Due to the high variability of Pink Salmon, these expectations are highly uncertain. (2020 Outlook Category was 2; 2019 Outlook Category was 2/3)

Outlook Unit	2021 Outlook Category	Comments
Georgia Strait - East - Odd & Even	2	These are primarily odd year dominant stocks. Assessment information on Pink Salmon in this area is limited. Returns in 2019 were 1 to 2 orders of magnitude lower than the odd-year 3 generation average and much lower than brood returns in 2017 with the exception of Sechelt Creek. Assuming continuation of poor marine survival, results for 2021 returns are expected to be below average. Due to the high variability of Pink Salmon, these expectations are highly uncertain. (2019 Outlook Category was '2/3'; 2018 Outlook Category was '2')

Historically Pink returns have been highly variable and expectations are highly uncertain.

13.4.3.2.2 In-season

Historically, weekly assessments to determine abundance and potential fishing opportunities have been based on over-flights, on-grounds surveys of the terminal areas and in some years, limited effort seine, gill net, and troll assessment fisheries. Assessment plans for the upcoming season have not yet been developed and are typically dependent on funding availability, outlook category and early in-season indications of abundance through other programs such as Fraser Sockeye directed test fisheries.

13.4.3.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

13.4.3.3.1 In-season Decisions

Commercial representatives are consulted in-season through area harvest committee advisory bodies. The following considerations will guide commercial fisheries management decisions:

Commercial fishing opportunities are generally not considered until at least 30% to 40% of target escapements are in the river or are identified in terminal sanctuary areas, and there is evidence that a significant proportion of the return has not yet entered the river or sanctuary area.

A cautious approach to managing Pink stocks in terminal areas will continue based on uncertainty in returns. There may be the requirement for increased monitoring subject to in-season information.

Pink directed fisheries will generally be restricted to approach waters and terminal areas.

Fishing occurs during daylight hours only.

Fishing boundaries may be established to minimize encounters of Chinook, Coho, Sockeye and Chum, and to ensure escapement targets are reached.

A boundary may be implemented in Upper Knight Inlet to conserve weaker Pink stocks.

Limited participation commercial fisheries may occur. This will be confirmed in-season based on assessment information.

13.4.3.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO ECVI AND MAINLAND PINK FISHERIES

The abundance of these stocks can be highly variable and there are difficulties in assessing these stocks due to glacial water conditions and limitations of available assessment methods. The funding for in-season assessment of ECVI and mainland Pink stocks is currently uncertain; fisheries directed on these stocks are contingent on in-season assessment information.

13.4.3.5 ALLOCATION AND FISHING PLANS

13.4.3.5.1 First Nations Fisheries

Food Social and Ceremonial Fisheries

The majority of the Pink harvest occurs incidentally while harvesting co-migrating Sockeye salmon and in years of low Sockeye abundance.

First Nations opportunities to harvest salmon for food, social and ceremonial purposes are provided through communal licences issued by DFO. The allocation for Pink salmon (Fraser and Mainland Inlets combined) from South Coast marine waters is 60,000. In addition to these FSC fisheries, First Nations access Pink salmon through ESSR harvests at hatchery facilities. In recent years, harvest opportunities have been available at Big Qualicum and Quinsam River Hatchery facilities.

Refer to Section 10.2 for Table 10.2-1 - Communal Licence Harvest Target Amounts in Southern BC/Fraser River First Nations Fisheries.

Fishery Monitoring and Catch Reporting

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations are asked to keep records of harvest and provide catch information to DFO in a variety of formats. Under this licence, if a commercial vessel is used for fishing, First Nations are asked to provide information respecting the species and quantity of fish harvested by this vessel, to the DFO Catch Reporting Officer within 24 hours from landing harvested catch. In addition, catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where in-season management requires, catch reports are sought weekly during the respective fishing season.

Treaty Fisheries

Tla'amin (Domestic)

The Domestic allocations for Pink salmon under the Tla'amin First Nation's Final Agreement are as follows:

In any year, the Tla'amin Fish Allocation for Pink salmon is a maximum of 5,000 Pink salmon. The allocation will be determined by an abundance-based formula.

The Tla'amin First Nation provides catch reports to the Department through the Aboriginal Harvest Management System (AHMS). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and biological samples.

13.4.3.5.2 Recreational Fisheries

The Pink return to the Mainland Inlets provide recreational fishing opportunities in inside waters of the South Coast. Mainland Pinks typically return in dominant even-year cycles, and fisheries targeting Mainland Pinks take place primarily in Johnstone Strait and terminal areas in the Mainland Inlets.

East Coast Vancouver Island stocks are less abundant and little effort and harvest takes place on these stocks, apart from the Quinsam and Campbell Rivers where Pinks can return in abundance. Freshwater recreational fishery effort has increased in recent years, in particular at the Quinsam and Campbell Rivers where high returns have occurred.

Marine recreational Pink fisheries typically take place in August, and updates are provided via Fishery Notice and published on the recreational fisheries website: http://www.bcsportfishingguide.ca. The normal daily limit is 4.

Recreational Pink fisheries targeting Mainland Pink stocks and hatchery returns to the Quinsam and Campbell Rivers are anticipated.

Fishery Monitoring and Catch Reporting

Catch monitoring programs including creel surveys, logbooks and the internet recreational effort and catch survey (iREC) are the main tools used to capture recreational catch and effort information in this fishery. South Coast and Lower Fraser stock assessment staff use these programs to provide annual estimates of the recreational harvest in each area.

13.4.3.6 COMMERCIAL FISHERIES

13.4.3.6.1 Allocations

Table 13.4-8: Commercial Allocation Implementation Plan for the 2015–current period

Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
12 to 13 (mainland inlets only)	73.0%	9.0%	0.0%	0.0%	18.0%

ECVI and Mainland Commercial Pink Fisheries

Fishing opportunities may be considered if stocks appear to be returning in sufficient abundance. Commercial harvest opportunities are dependent on run timing, but typically occur between mid-August and mid-September. The areas typically fished are outlined below and may be updated in-season.

If there are fisheries proceeding in 2021, they will be occurring in terminal areas outside of the migratory path of IFR Steelhead and will thus not be impacted by 2021 IFR Steelhead conservation measures. These areas are outlined in Appendix 9.

Area B Seine

Fishing areas in Thompson Sound, Bond Sound and Jervis Inlet.

Area D Gill Net

Fishing in the approach areas to Thompson Sound and Bond Sound (details to be determined in-season).

Area E Gill Net

Fishing areas in Jervis Inlet.

Area H Troll

Fishing areas in Jervis Inlet and the terminal approach areas of Thompson Sound, however boundaries will be determined in-season. Coho sensitive areas may remain closed.

Fishery Monitoring and Catch Reporting

There is a mandatory harvest log and in-season reporting program for catch information for all commercial fisheries.

Mandatory requirement to file fishing reports in all commercial fisheries, including "Start/Pause/Cancel/End" fishing reports.

Mandatory catch reporting by phone-in is required with a paper harvest OR electronic transmission is required with an electronic harvest log (E-log).

Catch reporting requirements are specific to each licence group and are detailed in the conditions of licence for each gear type. Additional requirements are in place for providing biological samples as required.

ECVI and Mainland Pink Demonstration Fisheries

If there are fisheries proceeding in 2021, they will be occurring in terminal areas outside of the migratory path of IFR Steelhead and will thus not be impacted by 2021 IFR Steelhead conservation measures. These areas are outlined in Appendix 9.

ECVI and Mainland First Nations Commercial Pink Harvest

None at this time.

13.4.3.6.2 Economic Opportunities

There are no economic opportunity arrangements or harvest agreements in this area.

13.4.3.6.3 ESSR Fisheries

ESSR fisheries may occur at DFO hatchery facilities that have a surplus of returning hatchery Pinks. In recent years, Pink ESSR fisheries have taken place at:

Quinsam Hatchery

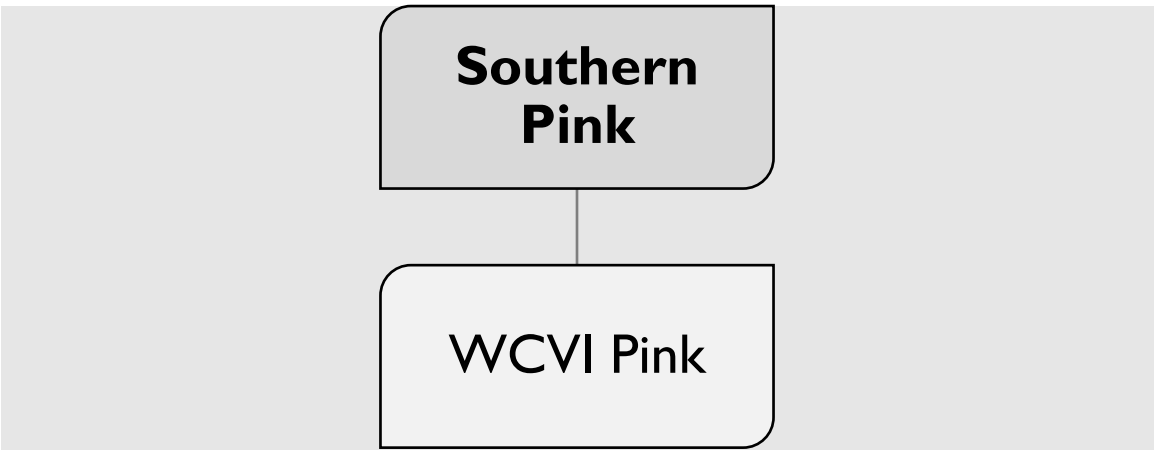
Weaver Spawning Channel

Big Qualicum

13.4.4 WCVI PINK SALMON

13.4.4.1.1 Snapshot Overview and Map of Management Unit

This section of the IFMP is under development and further information will be provided in a future year. There are no directed commercial fisheries on WCVI Pink salmon planned for 2021 Pink non-retention in recreational fisheries is in place for in-shore areas of the WCVI.

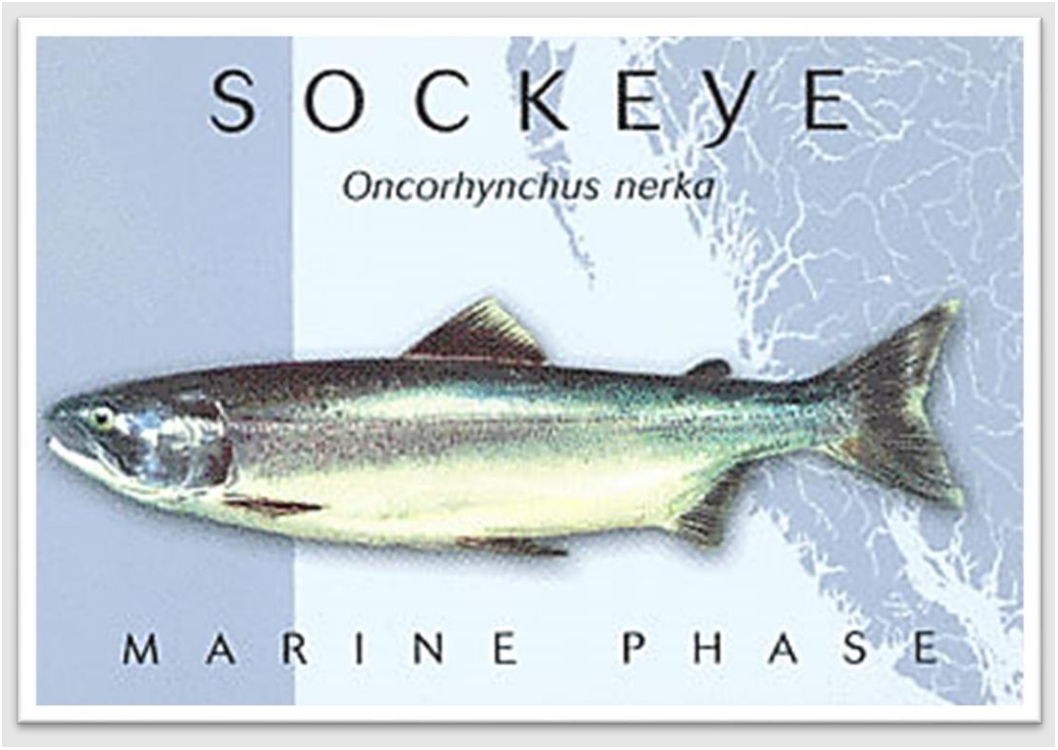


Conservation Units

Northwest Vancouver Island - Even

Figure 13.4-5: Overview of WCVI Pink Salmon

13.5 SOUTHERN SOCKEYE SALMON FISHING PLAN



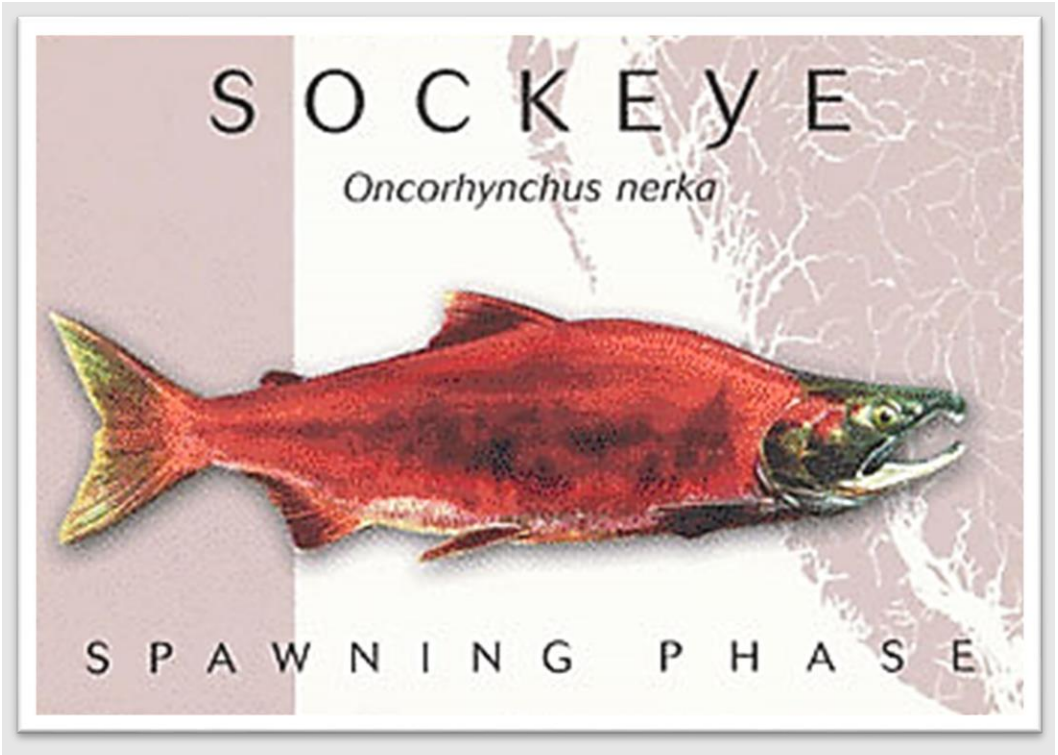


TABLE OF CONTENTS

13.5.1 SOUTHERN SOCKEYE - OVERVIEW

In Southern BC, Sockeye salmon stocks are found primarily in tributaries of the Fraser River and in streams throughout Vancouver Island and the mainland. For Southern Sockeye, returns to Barkley/Somass (WCVI), Fraser River and Okanagan are actively managed and detailed information is provided below outlining management of these populations. Information on smaller Sockeye populations in the WCVI-other Sockeye unit is under development and further information will be provided in a subsequent year.

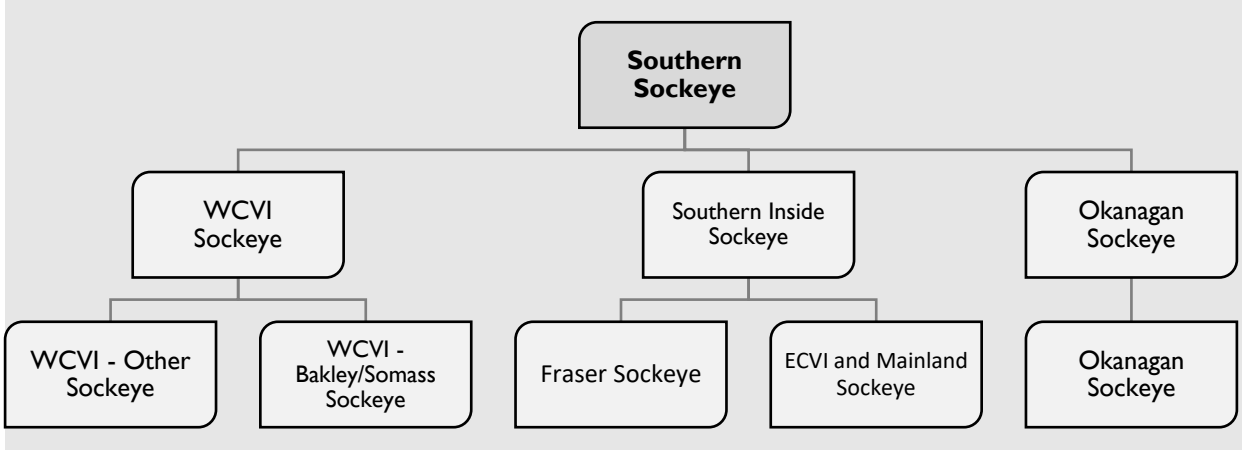


Figure 13.5-1: Southern Sockeye Overview

SOCKEYE ENHANCEMENT INFORMATION

The major DFO operation enhancement facilities that produce Sockeye are:

South Coast Area:

- Rosewall Creek hatchery

Fraser River Area:

- Inch Sockeye Satellite
- Gates Spawning Channel – *currently not operating*
- Horsefly Spawning Channel
- Nadina Spawning Channel
- Weaver Spawning Channel
- Shuswap Falls hatchery

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 (PIP and DPI) operated by volunteers, and Aboriginal Fisheries Strategy (AFS).

There are two datasets available: **Post-Season Production** from the 2019 brood year (i.e. 2020 releases, and numbers on hand for 2021 release), and the **Production Plan**, which includes proposed targets for the upcoming 2021 brood year. These are available at the following website:

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

FRASER RIVER SOCKEYE – SEP PROPOSALS OR UPDATES FOR 2021

- Big Bar Contingency Planning
    - The DFO Big Bar Response Team in cooperation with the Upper Fraser Fisheries Conservation Alliance (UFFCA) are completing the final stages of the 2021 brood year enhancement planning to support conservation of stocks impacted by the Big Bar slide. For sockeye, early enhancement activities will focus on Early Stuart Sockeye. Brood will be captured in Lillooet BC, by a fish wheel operated by the UFFCA. The fish wheel will operate through the early Sockeye migration period with the objective of catching and trucking approximately 1000 adult Sockeye to Cultus Lake Labs (CLL) for long-term holding. Stock ID will be verified genetically. Bowron sockeye may also be captured in-river and transported to CLL for maturing and spawning. Additional brood stock collection efforts are being planned for Early Stuart, Bowron, and Taseko with space reserved at SEP facilities for these stocks.
- If Fraser water levels are low and migration is partially successful, natal stream collection of Bowron and Early Stuart may occur, with incubation and rearing taking place at Shuswap Falls hatchery.
- Horsefly Channel will be operational in 2021, based on brood year size and expected run strength.
- Yearling releases in addition to fed fry releases represented by groups of PIT tags from Sakinaw Lake, as well as a yearling release from a remote site are intended to investigate factors limiting recovery.
- Gates Spawning Channel was not operational in 2020, and will not operate in 2021. Planning for required channel upgrades is currently taking place.

13.5.2 OVERVIEW OF WCVI SOCKEYE

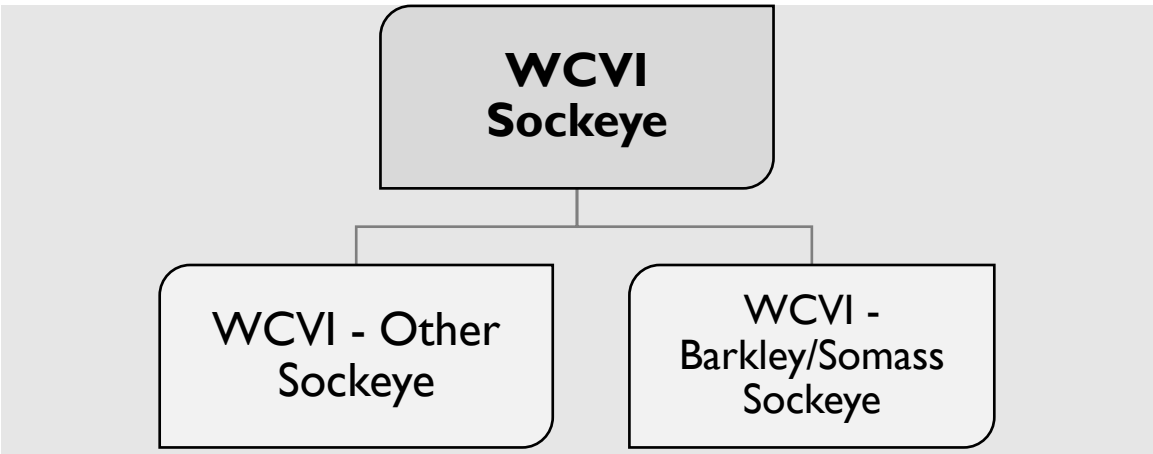
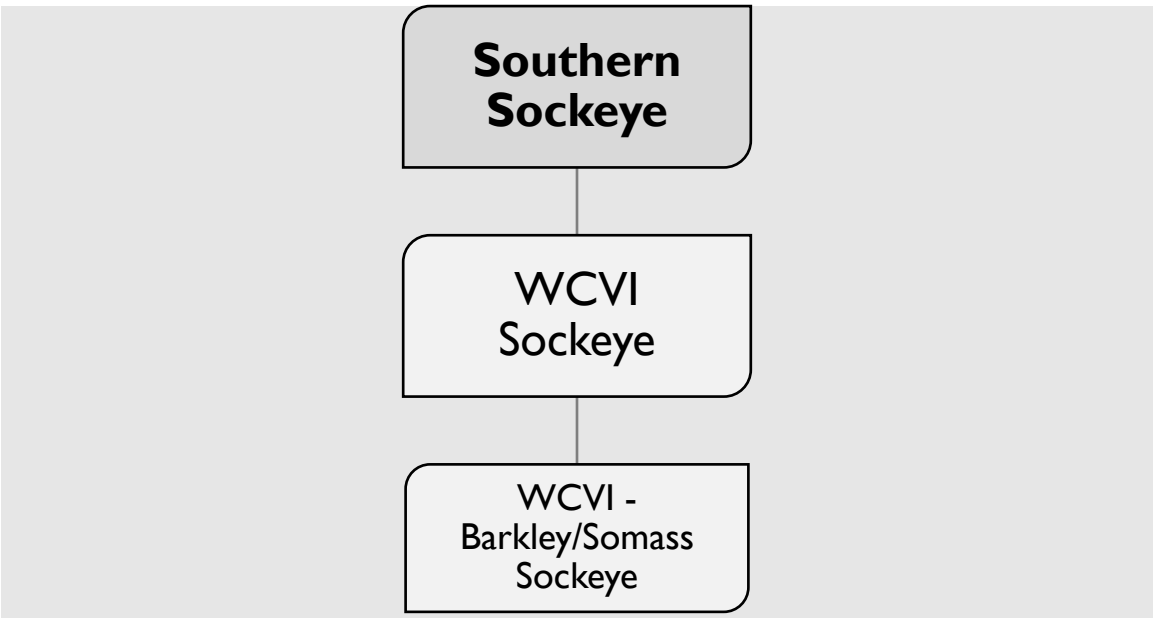


Figure 13.5-2: Overview of WCVI Sockeye

The WCVI Sockeye Management Unit consists of several Sockeye conservation units; including 'lake- type' and 'river type Sockeye. Area 23 stocks are currently the only Sockeye populations in the WCVI management unit with sufficient production to support directed fisheries from all sectors. Some other stocks are harvested by local First Nations for domestic use.

13.5.3 WCVI BARKLEY/SOMASS SOCKEYE

13.5.3.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT



Conservation Units

Great Central Lake

Sproat Lake

Henderson Lake

Figure 13.5-3: Overview of WCVI Barkley/Somass Sockeye

There are three major Sockeye stocks in Area 23, of which Great Central and Sproat Lake stocks are the largest. The combined production from these two lakes averages about 760,000 annually and accounts for more than 90% of the total Sockeye run to the area. Henderson Lake supports a smaller but substantial Sockeye run averaging about 30,000 over the past 30 years. However, in many recent years the abundance of Henderson Sockeye has been low and fisheries are managed to limit interceptions of this stock. There is a much smaller lake-type population in Maggie Lake as well as small populations of 'creek-type' Sockeye observed in Carnation Creek, Effingham River, Nahmint River, Sarita River and Toquart River.

Area 23 Sockeye fisheries are managed through a "co-management" process via the Area 23 Harvest Committee. Members of the Area 23 Harvest Committee include representatives from local First Nations, fishery advisory committees and local stewardship groups. The Area 23

Harvest Committee serves both a plenary function and a decision–making function. This format allows for improved planning of local fisheries and better conflict resolution among harvesters. The Area 23 Harvest Committee has developed a detailed Area 23 Sockeye Local Integrated Fisheries Management Plan that describes the basis of the management and assessment of the Area 23 Sockeye fisheries and harvest plans for each sector. This plan is used to guide an in-season decision making process during which assessment results are reviewed and weekly harvest plans are determined. An overview of the fishery implementation is provided below.

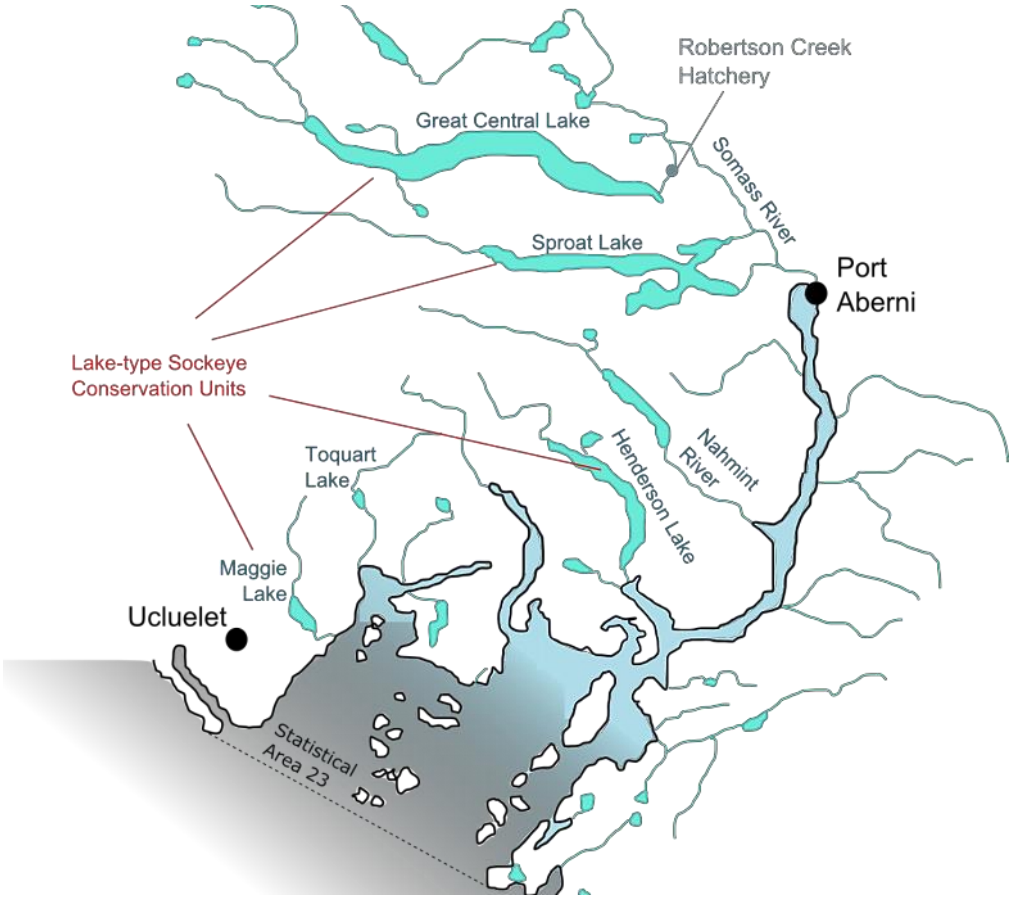


Figure 13.5-4: Barkley Sound and Alberni Inlet - Major features and salmon conservation units

13.5.3.2 ENHANCEMENT INFORMATION

For two of the major stocks, enhancement activities have been used to increase production. Great Central Lake was fertilized initially from 1970 to 1973 and then annually since 1977. Henderson Lake was fertilized from 1979 to 1999. Sproat Lake was fertilized once in 1985; however the program was discontinued due to resulting algae blooms. In addition to lake fertilization efforts, a hatchery at Henderson Lake operated by the Uchucklesaht First Nation released fed Sockeye fry annually from 1992 to 2007. Total hatchery production ranged from

about 70,000 to 2,300,000 fry depending on the year. The contribution of the hatchery to the Henderson Lake Sockeye return was not assessed annually. However, for two brood years when the population was marked the hatchery contribution was variable.

Stable funding for stewardship activities such as habitat restoration and lake fertilization was identified as a priority by the Harvest Committee. In support of this priority, the commercial sector currently provides the proceeds from 10K Sockeye out of the commercial harvest to support stewardship activities annually.

There is currently no hatchery supplementation of these stocks.

13.5.3.3 STOCK ASSESSMENT INFORMATION

13.5.3.3.1 Pre-season

Statistical models are used to forecast Sockeye returns to Great Central and Sproat Lakes using correlates of early marine survival and observations of brood year survival (i.e. from earlier returning age classes).

Forecasts generated from all methods are compared and based on their correspondence, their relative accuracy at predicting past returns, and other relevant information a single management forecast is produced for both stocks. The management forecast is used to guide early season fisheries until the run size is estimated based on in-season observations.

For 2021 fishery management purposes, the Area 23 Roundtable has agreed to begin fisheries in the "Low" zone (350,000–500,000) for early season harvest management. Based on the forecast models considered, the forecast adopted for management purposes is 350,000 adult Sockeye. Henderson Lake Sockeye remain a stock of concern in the "Very Low" zone.

There is uncertainty in the 2021 forecast. The model predictions (Table 3) vary between 324,000 (Sea Surface Temperature), 367,000 (Sibling model), 523,000 based on Coho survivals in the same ocean entry year (CLI model), 680,000 (Sea Surface Salinity model), and 370,000 for a multivariate model, which takes into account the environmental co-variates sea surface temperature and salinity as well as the sibling returns. Model forecasts for the 2021 aggregate Somass Sockeye return are described in Appendix A.

A return to more equal abundance of Sproat and Great Central in 2020, and as forecasted for 2021, supports management of the aggregate abundance into the Somass. However, the Sea Surface Temperature and Sea Surface Salinity models suggest Great Central returns may dominate; in-season assessment should be aware and ensure adequate sampling to determine stock proportions. A precautionary management approach for early season fisheries is

proposed until the total run size and stock composition can be more accurately determined. The first reforecast is expected 24 June. Management may adapt sooner if in-season assessment data indicates larger or small returns, or a dominant return to one Somass lake over the other.

The recommended management outlook for Henderson Sockeye is the "Very Low" zone for harvest management, corresponding to an expected return of less than 15,000 (Table 4). The key factors influencing this outlook are the low spawner abundances in the main contributing brood years (2016, 2017), as well as potentially low marine survival rates. There were no surveys in Henderson Lake to estimate juvenile production from either of the main contributing brood years.

13.5.3.3.2 In-season

Stock assessments are conducted during the migration period using data compiled from escapement counts and fisheries. The objectives of the assessments are to 1) update pre-season run size forecasts for Great Central and Sproat Lake (Somass) Sockeye based on in-season observations and 2) evaluate harvest and escapement levels relative to targets. The assessments are conducted weekly starting from mid-June to early August. While there is typically not enough in-season information to revise the outlook for Henderson Lake Sockeye, catch of Henderson Sockeye in Area 23 fisheries is monitored using stock composition analysis from DNA samples.

Table 13.5-1: Planned Sockeye Test Fisheries.

All dates subject to change based on in-season factors. In-season information from initial TF is important for determining timing of subsequent TFs.

Test Fishery	Proposed Proponent	Test Fishery Purpose	Potential Dates (preliminary)	
			Start	End
Barkley Sound SN	Hupacasath / Tseshaht	Somass Sockeye	June 7	August

See Section 7.2.3 for entire table for the 2021 proposed test fisheries.

13.5.3.4 DECISION GUIDELINES AND MANAGEMENT ACTIONS

Annual harvest plans are developed to meet the following objectives:

Achieve the escapement (and corresponding harvest rate) associated with the forecast run size;

Limit impacts on non-target stocks and species and stocks of concern;

Meet allocation priorities;

Distribute the TAC over the duration of the fishing season to maintain the biological diversity of the population (i.e. to maintain a diverse contribution of various age and run timing classes);

Reduce gear conflict among harvest sectors;

Maximize the value of harvest;

Provide for stability and predictability of harvest opportunities;

Provide assessment information (e.g. catch-per-unit-effort (CPUE) abundance indices, stock and age composition sampling);

Allow sufficient flexibility to respond to changes in fish behavior / migration caused by environmental conditions through the Area 23 Harvest Committee in-season decision-making process.

The Area 23 local Sockeye management plan further details management assumptions, actions and scenarios used to guide in-season decision-making.

13.5.3.5 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS

Environmental Conditions

In-season harvest planning is complicated by environmental conditions such as low water levels and high-water temperatures that impact migration timing and behavior of the fish.

Henderson Lake Sockeye

With the exception of Maa-nulth Treaty Nations, Henderson Sockeye are not targeted in Area 23 Sockeye fisheries although they are intercepted. The status and TAC of Henderson Sockeye determines the allowable interception rate of Henderson Sockeye in Area 23 Sockeye fisheries. In-season adjustments to reduce impacts to Henderson Sockeye may be necessary if higher harvest rates occur.

13.5.3.6 ALLOCATION AND FISHING PLANS

Assessment results and management issues are reviewed weekly through the Area 23 in-season assessment and management process. Fishing plans are developed based on the Area 23 Sockeye Local Integrated Fisheries Management Plan. The management table for the Somass

stocks below shows the escapement and harvest rate targets and allocations by run size. The management table for Henderson Sockeye below defines fishery reference points for that stock.

All fisheries are managed to achieve the harvest rate that will result in the escapement target associated with the forecast run size. Methods used to control the harvest rate of the fisheries depend on the gear type. The primary method used to manage catch of First Nations and commercial net fisheries is limiting effort (i.e. the duration of the opening and/or number of participating vessels). The level of effort is determined by an overall weekly catch target. Secondary controls may also be used in net fisheries, such as closing an area with a concentration of holding fish that are particularly vulnerable to the gear. The primary control to manage the catch of recreational fisheries is through daily limits, which vary according to run size. Secondary controls, such as time and area closures, are also used.

For all fisheries, seasonal closures are in place and in years of low abundance the opening time may be delayed or shortened.

Table 13.5-2: Somass Sockeye management table

MANAGEMENT ZONE	RUN SIZE	REFERENCE POINT	ESCAPEMENT GOAL	HARVEST RATE	MAANULTH FIRST NATIONS	RECREATIONAL (expected catch)	TSUMASS ECONOMIC OPPORTUNITY	COMMERCIAL SEINE	COMMERCIAL GILLNET
1 - Critical	Less than 170,000		Up to 170,000	0	0	0	0	0	0
2 - Very Low	200,000 to 350,000	low end	170,000	15%	6,000	4,000	16,000	0	4,000
		high end	262,500	25%	13,572	21,000	28,757	11,503	7,669
3 - Low	350,000 to 500,000	low end	262,500	25%	13,572	21,000	28,757	11,503	7,669
		high end	325,000	35%	16,083	45,000	49,013	35,943	23,962
4 - Moderate	500,000 to 700,000	low end	325,000	35%	16,083	45,000	49,013	35,943	23,962
		high end	350,000	50%	21,105	63,000	84,445	102,870	68,580
5 - High	700,000 to 1,000,000	low end	350,000	50%	21,105	63,000	84,445	102,870	68,580
		high end	400,000	60%	22,886	90,000	128,821	208,976	139,317
6 - Abundant	1,000,000 to 1,800,000	low end	400,000	60%	22,886	90,000	128,821	208,976	139,317
		high end	540,000	70%	22,886	100,000	302,971	491,486	327,657

Table 13.5-3: Management zones for Henderson Lake Sockeye

MANAGEMENT ZONE	RUN SIZE	REFERENCE POINT	ESCAPEMENT TARGET	HARVEST RATE
1 - Very Low	up to 15,000		up to 12,750	<15%*
2 - Low	15,000 to 25,000	low end	12,750	15%
		high end	20,000	20%
3 - Moderate	25,000 to 45,000	low end	20,000	20%
		high end	31,500	30%
4 - High	45,000 to 60,000	low end	31,500	30%
		high end	36,000	40%
5 - Abundant	60,000 to 150,000	low end	36,000	40%
		high end	75,000	50%

* incidental catch only

13.5.3.6.1 First Nations Fisheries

Food Social and Ceremonial

The Tseshaht and Hupacasath First Nations target Somass Sockeye for FSC purposes in Area 23. Harvest occurs in the Somass River and upper Alberni Inlet.

Refer to Section 10.2 for Table 10.2-1 - Communal Licence Harvest Target Amounts in Southern BC/Fraser River First Nations Fisheries.

Mandatory and voluntary measures have been implemented to support prey availability and reduce disturbance to Southern Resident Killer Whales, including within Southern BC waters and key foraging areas within Strait of Juan de Fuca and the Gulf Islands. These measures are outlined in section 5.8.

5.6.Treaty Fisheries

Maa-nulth Nations Domestic Harvest

Maa-nulth First Nations (Huu-ay-aht, Toquaht, Uchucklesaht, Yu?łu?iɬ?aṯḥ (Ucluelet), Ka:'yu:'k't'h'/Che:k:tles7et'h' (Kyuquot Sound)) are allocated a portion of the catch of Sockeye returning to Henderson Lake as well as the Somass River through a modern treaty (the Maa-nulth First Nations Final Agreement). Individuals within the Nations are designated to harvest using a variety of gear; from smaller vessels using hook and line to larger, higher capacity vessels using commercial type gear (e.g. gill net and seine). The Maa-nulth may also designate vessels operated by non-members (e.g. commercial vessels) to fish on behalf of the Nations. The Maa-nulth fishery protocols are reported in the Fisheries Operational Guidelines and the Supporting Documents associated with the Final Agreement.

The Domestic allocations for salmon under the Maa-nulth First Nations Final Agreement are as follows:

Sockeye salmon

- Each year, the Maa-nulth Fish Allocation for Sockeye salmon is an amount of Somass Sockeye salmon equal to:
  - When the Somass Sockeye Canadian Total Allowable Catch is 50,000 or less, 20% of the Somass Sockeye Canadian Total Allowable Catch;
  - When the Somass Sockeye Canadian Total Allowable Catch is greater than 50,000 and less than or equal to 85,000, then 10,000 plus 10% of that portion of the Somass Sockeye Canadian Total Allowable Catch that is greater than 50,000 and less than or equal to 85,000;
  - When the Somass Sockeye Canadian Total Allowable Catch is greater than 85,000 and less than or equal to 412,421, then 13,500 plus 2.87% of that portion of the Somass Sockeye Canadian Total Allowable Catch that is greater than 85,000 and less than or equal to 412,421; and
  - When the Somass Sockeye Canadian Total Allowable Catch is greater than 412,421, then 22,886
- An amount of Henderson Lake Sockeye salmon equal to 26.85% of the Henderson Lake Total Allowable Catch up to a maximum of 17,055 pieces.

Fishery Monitoring and Catch Reporting

Maa-nulth Nations Domestic Harvest

The Maa-nulth First Nations have developed a harmonized catch monitoring system based on complete catch accounting and reporting using standardized catch reporting books and the Maa-nulth Electronic Reporting Program (MERP) developed by DFO. Catch is estimated by summing individual logbook catch from each harvester as reported through the MERP database. Catch estimates are stratified by time (duration of the opening) and by area (DFO Subarea 23-1 and 23-2). Effort is estimated by summing individual fishing trips as reported through the MERP database. Effort estimates are stratified by time (duration of the opening) and by area (Subarea 23-1 and 23-2).

13.5.3.6.2 Recreational Fisheries

In most years, Somass Sockeye returns support Sockeye directed recreational fishing opportunities in Barkley Sound, Alberni Inlet and the Somass River. Recreational Sockeye fisheries typically commence May 1. The normal daily limit is 4 Sockeye per day in marine waters and 2 Sockeye per day in the tidal portions of the Somass River. A small portion of the freshwater section of the Somass River typically opens to one per day. Initial daily limits for 2021 recreational fisheries will be determined based on the pre-season forecast; fishing opportunities are subject to in-season management changes depending on abundance. Fishery updates are provided via Fishery Notice and published on the recreational fisheries website: http://www.bcsportfishingguide.ca

Recreational harvesters in possession of a valid tidal waters recreational license and salmon stamp may participate in the fishery.

The average daily participation is about 150 vessels per day over the duration of the fishing season (e.g. June through July). However, the level of effort varies depending on the timing and catch-per-unit effort. In moderate to abundant run size years and during the peak of the migration, daily effort is typically between 250 to 450 individual vessels with observations of up to 600 vessels during peak weekend periods. There are typically 2 to 3 individual harvesters on each vessel.

Fishery Monitoring and Catch Reporting

The WCVI Creel Survey generates recreational catch and effort statistics by area and species. Unlike logbook-based catch and effort estimates, which require full reporting, the creel survey employs sampling techniques using independent creel surveyors. In order to estimate catch and

effort within a coefficient of variation (CV) of 10%, the survey objective is to interview 10% of the landings and conduct a minimum of 8 effort counts per month per area.

The WCVI Creel survey does not cover fisheries in non-tidal waters.

Fishery Monitoring Plan

The creel survey combines angler surveys and aerial boat counts to estimate recreational catch.

Anglers are interviewed at the end of fishing trips to provide both average catch by species and average fishing times, while the aerial counts from chartered aircraft capture 'instantaneous' snapshots of the number of recreational boats fishing at the time of the flight. The fishing times obtained through angler interviews are used to generate a daily profile of fishing activity which is used to expand the 'instantaneous' aerial counts of boats fishing to an estimate of the total number of boats fishing that day. In the most basic sense, the estimate of the number of boats fishing is multiplied by the average catch by species to estimate the total catch by species on that day.

By adopting a stratified random sampling design for angler interviews and aerial counts, unbiased estimates of daily catch rate are obtained and then expanded to generate monthly estimates. The estimates are stratified by day type (weekday vs. weekend), location (by creel sub-area) and time (monthly and time of the day).

For the Area 23 Sockeye fishery, designated survey sites include Clutesi Ramp, China Creek (plus others in Barkley Sound). The survey operates from mid-June to mid-September.

13.5.3.6.3 Commercial Fisheries

Allocation

Table 13.5-4: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South Local	23	60.0%	40.0%	0.0%	0.0%[c]	0.0%

Notes on Sockeye allocation (south):
[c] potential for future re-negotiation

WCVI Barkley/Somass Commercial Sockeye Fisheries

Commercial harvesters in possession of an Area B seine net licences or Area D gill net licences may participate in this fishery. Opportunities for directed harvest are anticipated in 2021.

Normally, fishing opportunities for all net fleets in Area 23 occur from mid-June to Early August.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Area B Seine

Since 2002, Area B harvesters have fished Area 23 Sockeye with a weekly catch target that is shared among the Area B licence holders. The number of vessels participating in any given opening is limited and depends on the weekly quota available. The intention of defining a weekly catch target is to provide opportunities for seine harvest that otherwise would not be available under a derby fishery model (i.e. for smaller run sizes or during early season fisheries). Prior to any scheduled opening, the Area B Seine Association provides the local area fishery manager with a list of harvesters designated to fish in that opening. The list is determined based on Area B Association protocol. The opening will not proceed if vessels outside the designated list are present in the fishing area due to the risk of additional effort exceeding the allowable harvest rate.

Area D Gill Net

The Area D Sockeye fishery operates throughout Area 23 (notwithstanding conservation closures). However, typically early season commercial gill net fisheries are restricted to the "outside" portion (Barkley Sound) seaward of Pocahontas Point to reduce gear conflict within Alberni Inlet. In early to mid-July, the fishery is restricted to the "inside" portion (Alberni Inlet) in order to reduce interceptions of later migrating Henderson Sockeye, which are vulnerable in the outside area.

Scheduled openings occur typically during the day between the hours of 06:00 and 20:00 in June. In July when the fleet is moved inside Alberni Inlet openings are more variable in timing depending on weekly catch targets. The fishing area and allowable effort (timing, number and length of openings) are used as harvest controls.

Fishery Monitoring and Catch Reporting

Area B Seine

Catch is estimated by summing individual harvest log catch from each harvester as reported through the FOS (Fishery Operating System) database. Catch estimates are stratified by time (duration of the opening) and by area (Subarea 23-1 and 23-2). Effort is estimated by summing

individual phone in reports from each harvester as reported through the FOS database. Effort estimates are stratified by time (duration of the opening) and by area (Subarea 23-1 and 23-2).

All Area B catch landed in the Area 23 Sockeye fishery is validated by an independent Observer Service Provider through a dockside monitoring program. Validated catch reported are submitted weekly (by COB Wednesday) to the local fishery manager by the Observer Service Provider.

Area D Gill Net

Catch is estimated by summing individual harvest log catch from each harvester as reported through the FOS (Fishery Operating System) database. Catch estimates are stratified by time (duration of the opening) and by area (Subarea 23-1 and 23-2). Effort is estimated by summing individual phone in reports from each harvester as reported through the FOS database. Effort estimates are stratified by time (duration of the opening) and by area (Subarea 23-1 and 23-2).

13.5.3.6.4 WCVI – Barkley/Somass Sockeye Demonstration Fisheries

There are currently no demonstration fisheries planned on these stocks.

13.5.3.6.5 WCVI Barkley/Somass First Nations Commercial Sockeye Harvest

Demonstration Fisheries

There are currently no demonstration fisheries planned on these stocks.

Harvest Agreements

Maa-nulth Fisheries (Commercial)

In addition to the allocation of salmon for domestic purposes, Maa-nulth has an allocation for commercial catch outside of the Treaty as identified in the "Maa-nulth First Nations Harvest Agreement". Fishing under the HA will be managed with requirements comparable to the regular commercial fisheries.

Under the Harvest Agreement, the allocation for Henderson Lake Sockeye Salmon in a portion of Area 23 will be for 20% of the Terminal Commercial Total Allowable Catch after accounting for the Maa-nulth Domestic harvest allocation from the total CTAC.

Economic Opportunities

Economic opportunities for the Tseshaht and Hupacasath First Nations are expected with agreements in place for both Nations for the 2021 season. Opportunities for directed harvest are

anticipated. Economic opportunity fisheries will be conducted under agreements that specify provisions for planning fisheries, allocations, catch reporting requirements as well as roles and responsibilities regarding the management of the fishery. These fisheries will be conducted separately from FSC fisheries, under the same harvest decision guidelines as the commercial fishery and fish harvested have been off-set with licences voluntarily relinquished from the commercial fishery. Communal licences are issued weekly to both the Tseshaht and Hupacasath First Nations following the development of an Annual Harvest Plan and through the in-season decision-making process.

The Tseshaht and Hupacasath First Nations share an allocation of Somass Sockeye for economic opportunity (EO) fisheries as defined in the Tsu-mu-ass Fishery Agreement. There are two distinct types of fisheries that operate. The first provides for designated communal fishing days, when harvest occurs through a collective effort such as using a drag seine net off one vessel at the Paper Mill Dam site in the lower Somass River. The harvest is distributed among members of the Nations. The second type of fishery is a traditional, artisanal net fishery. Typically, harvest occurs from relatively small vessels using gill nets. However, the bands may also designate vessels operated by non-members (e.g. commercial vessels) to fish on behalf of the nation. These vessels require a separate licence.

Fishery Monitoring and Catch Reporting

Catch is verified by monitors at mandatory designated landing sites. Monitors count the fishers catch, and issue a landing slip after validation. Catch is estimated by summing landing slip information as collected by First Nations monitors stationed at the designated landing sites. Monitors at stationed at landing sites for the full duration of the fishery opening. Catch estimates are stratified by time (duration of the opening) and by area. A landing slip identifies the catch attributed to each designated harvester. More than one landing slip may be attributed to a single vessel (i.e. more than one designated harvester fishing on the vessel and catch is shared among the harvesters).

Effort will be estimated by summing individual landing events from each harvester as reported through the FOS reporting system. The E-logs will be maintained by First Nations monitors stationed at the designated landing sites. Effort estimates will be stratified by time (duration of the opening) and by area (Inlet/Lower River (as delimited by the “green lights” at the pilings)/Paper mill Dam). A landing event refers to the landing of a vessel at a designated landing site. As described above, there may be more than one landing slip associated with a landing event.

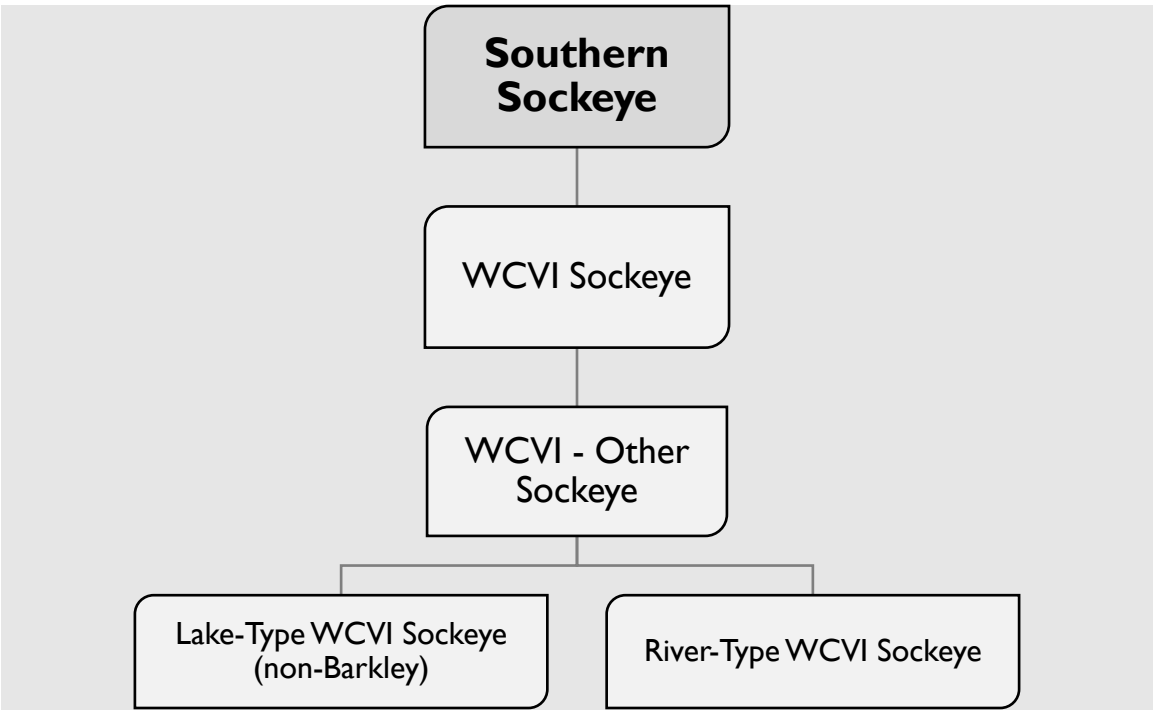
13.5.3.6.6 ESSR Fisheries

An ESSR for Sockeye is rare but may occur at Robertson Creek Hatchery.

13.5.4 WCVI – OTHER SOCKEYE

This section of the IFMP is under development and further information will be provided in a subsequent year. There are no commercial or recreational directed fisheries on these Sockeye planned for 2021. However, there are directed First Nations FSC and treaty harvests that occur on many of these stocks.

13.5.4.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT



Conservation Units		***Conservation Units***
Alice	*Kennedy*	*River – West Vancouver Island*
Canoe Creek	*Maggie*	*River – NW Vancouver Island*
Cecilia	*Megin*	
Cheewat	*Muchalat*	
Deserted	*Muriel*	
Fairy	*Nitinat*	
Hesquiat	*O'Connell*	
Hobiton	*Owossitsa*	
Jansen	*Park River*	

Figure 13.5-5: Overview of WCVI - Other Sockeye

13.5.5 OVERVIEW OF SOUTHERN INSIDE SOCKEYE

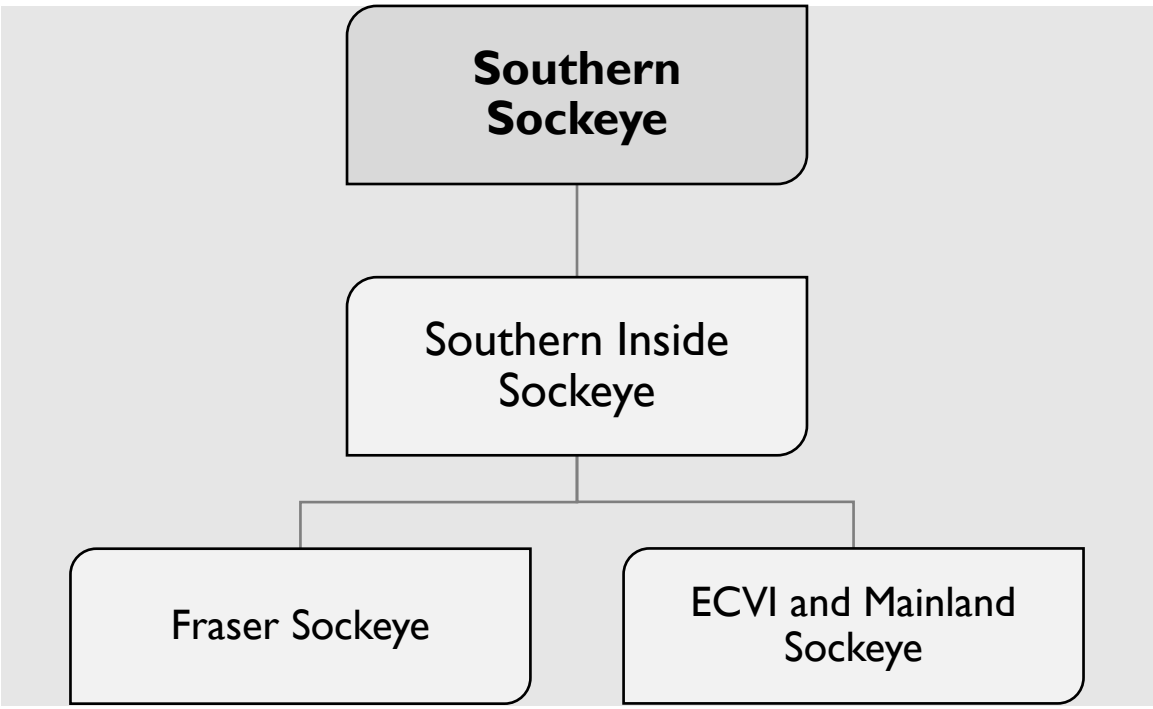
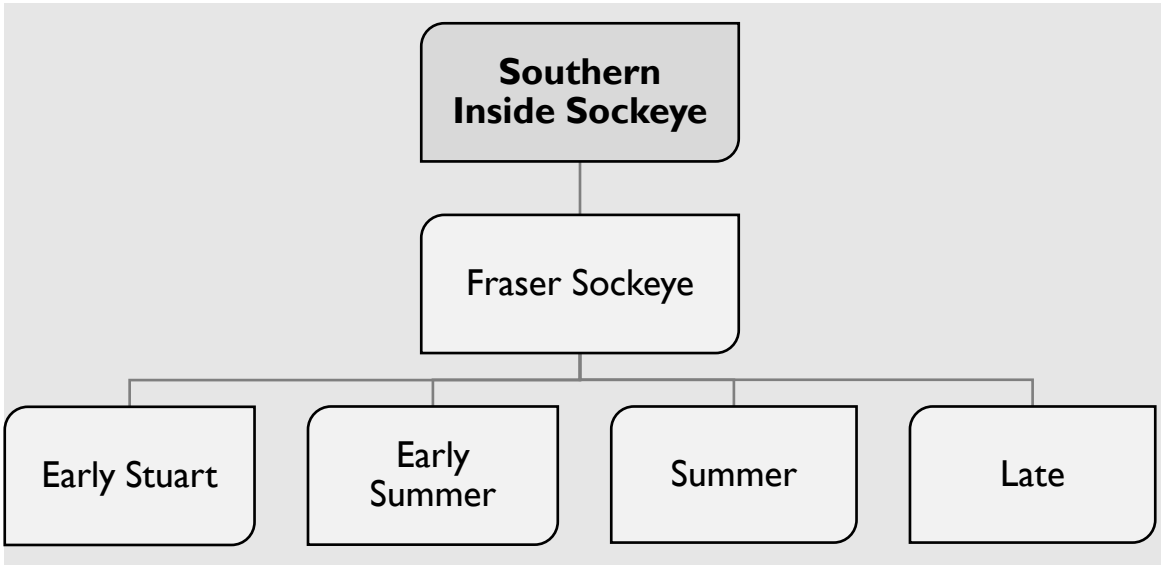


Figure 13.5-6: Overview of Southern Inside Sockeye

13.5.6 FRASER SOCKEYE

13.5.6.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT



Early Stuart	Early Summer	Summer	Late
Conservation Units	***Conservation Units***	***Conservation Units***	***Conservation Units***
Takla-Trembleur-Estu	*North Barriere - ES*	*Chilko-S*	*Cultus-L*
	Shuswap Complex – ES	*Takla-Trembleur-Stuart-S*	*Seton-L*
	Anderson-Seton-ES	*Francois-Fraser-S*	*Shuswap-Complex-L*
	Bowron – ES	*Quesnel-S*	*Lillooet-Harrison-L*
	Chilko-ES	*Harrison - River Type*	*Harrison (D/S)-L*
	Francois- First Run-ES	*Kamloops-ES*	*Harrison (U/S)-L*
	Francois- Second Run-ES	*Widgeon- River Type*	
	Indian/Kruger-ES		
	Nadina/Francois-ES		
	Taseko-ES		
	Chilliwack – ES		
	Nahatlatch-ES Pitt - ES		

Figure 13.5-7: Overview of Fraser Sockeye

13.5.6.2 STOCK ASSESSMENT INFORMATION

In 2017, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) published an assessment and status report on 24 designatable units of Fraser Sockeye. COSEWIC status reports are used to assign risk status to wildlife species. COSEWIC classified 8 designatable units as endangered, 2 as threatened, 5 as special concern, and 9 as not at risk for Group 1 Assessment. The report is available online at:

https://www.sararegistry.gc.ca/virtual_sara/files/cosewic/srSockeyeSalmon2017e.pdf

Recovery Potential Assessments (RPAs) for Group 1 Fraser Sockeye are available for Cultus Lake Sockeye (https://cat.fsl-bsf.scitech.gc.ca/record=b4087614~S1) and for habitat, threats and limiting factors for nine designatable units (https://cat.fsl-bsf.scitech.gc.ca/record=b4087615~S1). Further work on RPAs are underway in 2021, and will be publicly available online once they are completed.

COSEWIC is currently assessing the status of several additional Fraser Sockeye designatable units; they are expected to release their findings in April 2021. Their planned timeline is available online at:

https://www.cosewic.ca/index.php/en-ca/reports/status-reports-preparation

The Canadian Science Advisory Secretariat (CSAS) also assessed the integrated biological status of Fraser River Sockeye salmon CUs was assessed in 2012 and more recently 2017 (see Section 5.3.6). The CSAS publication and Science Advisory Report are available at:

2012: https://waves-vagues.dfo-mpo.gc.ca/Library/349836.pdf

2017: http://waves-vagues.dfo-mpo.gc.ca/Library/40712163.pdf

Table 13.5-5 Status Evaluations for 24 Fraser Sockeye CUs – 2017 relative to 2012

2017	2012	Conservation Unit	Cyclic	Stock
R	R	Bowron-ES	-	Bowron
R	R	Cultus-L	-	Cultus
R	R	Takla-Trembleur-EStu	cyclic	Early Stuart
R	R*	Taseko-ES	-	Miscellaneous Early Summers
R	R	Widgeon – River*	-	Miscellaneous Lates
R	A	Harrison (U/S)-L	-	Weaver
R	UD	Seton-L	-	Portage
R A	R A	Quesnel-S	cyclic	Quesnel
R A	R A	Takla-Trembleur-Stuart-S	cyclic	Late Stuart
A	R	Nahatlatch-ES	-	Miscellaneous Early Summers
A	A	North Barriere-ES	-	Fennel and Miscellaneous Early
A	A	Kamloops-ES	-	Raft and Miscellaneous Early
A	A G	Shuswap-ES	cyclic	Scotch, Seymour, Mis. Early Summer
A	G*	Lillooet-Harrison-L	-	Birkenhead
A G	R	Nadina-Francois-ES	-	Nadina
A G	R A	Chilliwack-ES	cyclic	Miscellaneous Early Summers
A G	R A	Francois-Fraser-S	-	Stellako
A G	A	Anderson-Seton-ES	-	Gates
A G	G	Harrison (D/S)-L	-	Miscellaneous Lates
A G	G	Shuswap Complex-L	cyclic	Late Shuswap
G	A G	Pitt-ES	-	Pitt
G	G*	Chilko-S and Chilko-ES agg.	-	Chilko
G	G	Harrison River – River Type	-	Harrison
DD	DD	Chilko-ES	-	Chilko

Abbreviations: EStu: Early Stuart; ES: Early Summer; S: Summer; L: Late; Mis: miscellaneous;
**Widgeon (river-type) CU has a small distribution, therefore, this CU will be consistently in the Red status zone;*

Fraser River Sockeye are managed based on four management groups (Early Stuart Run, Early Summer Run, Summer Run, and Late Run). However, management actions for specific populations within the four management groups may be considered. Spawning escapement targets and harvest rules are developed annually for each management group.

The Fraser River Sockeye Spawning Initiative process was initiated in 2006 as a Wild Salmon Policy project and is used to inform escapement strategy options. Further to this, the Wild Salmon Policy 2018-2022 Implementation Plan was announced in 2018. Refer to DFO's Wild Salmon Policy website for details:
http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especes/salmon-saumon/wsp-pss/index-eng.html

Fisheries targeting on Fraser Sockeye may also encounter some ECVI and Mainland Sockeye and Pink salmon. Terminal fisheries on ECVI and Mainland Sockeye and Pink populations are

escapement goal driven. Targeted terminal fisheries on ECVI and Mainland Pinks will be determined in-season, while directed Sockeye fisheries on ECVI stocks are not anticipated in 2021.

13.5.6.2.1 Pre-season

Prior to each fishing season, conservation constraints and a spawning escapement plan are determined through the Salmon Outlook and IFMP consultations. A pre-season fishing plan is then developed by the bilateral US-Canada Fraser River Panel (FRP) that takes into consideration pre-season forecasts of abundance, timing, diversion rate and environmental conditions and/or values based on historical data. Final forecasts of timing and diversion rate are not completed until June.

2021 Pre-season Fraser River Sockeye Run Size Forecast:

Pre-season forecasts of run size at a range of probability levels are developed for all individual Fraser Sockeye stocks, and then aggregated into the four management (run timing) groups. Fraser Sockeye run size forecasts are highly uncertain, largely due to the wide variability in annual survival rates, and observation error in the stock-recruitment data. Fraser Sockeye survival for most stocks have been variable. Following the record low return in 2019 (1893-2019), Fraser Sockeye survivals fell to another record low in 2020 and have experienced overall declines in survival since 2010.

In addition to the record low return in 2020, early season migration challenges from high discharge levels and the Big Bar landslide contributed to later timing and poor returns to the spawning grounds to some of the earlier arriving stocks (Early Stuart, Bowron and Taseko). Preliminary passage estimates past the slide were estimated to be very low during the early part of sockeye migration and improved greatly as water levels dropped. A detailed analysis of Big Bar slide salmon passage is currently being reviewed.

Work to improve passage at the Big Bar landslide continues, along with plans for assessment, transport, enhancement and long term mitigation (eg. permanent fishway). Potential impacts of the Big Bar landslide on fish passage in 2021 will continue to be evaluated pre-season and in-season, and may result in changes to management approaches as new information becomes available.

Given recent poor ocean survival and persisting poor environmental conditions the 2021 run size forecast model selection approach deviated significantly from past forecasts in order to attempt to better align with recent productivity observations. Although the model selection process has changed to accommodate recent productivity, where the actual return will fall within the forecast distribution is still very uncertain. Although the 2021 forecast distribution

aligns better with recent productivity estimates the recent productivity observation falls somewhere between the p25 and p50 forecast distribution but closer to the p25 forecast. This will be an important consideration for pre and in-season planning.

The forecast uses a suite of models, which were selected on a stock-specific basis based on their ability to predict true returns given low productivity associated with the recent stock-recruitment time series. The forecast is highly uncertain as represented by the cumulative probabilities, which largely represent uncertainty in stock survival. If survivals fall outside a stock's historic stock-recruitment time series, then returns could fall outside the forecast distribution. It is more appropriate to reference individual stock forecast distributions, versus the total Fraser Sockeye forecast, since not all stocks will exhibit the same survival in a particular year. Therefore, the total forecast distribution from 313,000 to 5,496,000 at the 10% to 90% probability levels will likely under-estimate or over-estimate total returns at the ends of the probability distribution. The median or 50% probability (p50) of the total 2021 forecast distribution is 1,330,000 (there exists a one in two chance the return will be at or below this value). Forecast returns (p50) are dominated by Summer run stocks, with Quesnel accounting for 25%, Chilko accounting for 23%, and Late Stuart accounting for 21% of the total Fraser Sockeye forecast.

The effects of extremely warm water temperatures on survival have been incorporated quantitatively into the forecasts for 12 stocks where temperature covariate models historically perform well. Although the effect of the warm coastal temperatures on Fraser Sockeye survival is highly uncertain, forecasts for these stocks using temperature covariate models were in most cases smaller than forecasts produced by models that exclude these covariates. These stocks account for 57% of the total forecast at the median forecast level. Moreover, forecasts for 13 stocks include environmental co-variates, representing 58% of the total forecast at the median forecast level. Given that the warm ocean conditions that developed in late 2013 and persisted through 2017, as well as the marine heat wave in 2019, and continued warming in 2020, median (50% probability level) forecasts in previous years, based on models that do not include indices of environmental conditions tended to overestimate returns. Based on the latter information, the approach with many of these stocks differed in 2021, with the use of naïve models to reflect recent low productivity in some cases.

In recent years (2015-2017, 2019 and 2020), total Fraser Sockeye returns fell at the low end (~10% probability level) of the forecast range. However, in 2018, total returns were better, i.e. between the 25% and 50% probability levels of the forecast range. Due to the below average survival observed for many stocks, sibling models were used to forecast age 5 returns for 7 stocks in 2019, and the majority of stocks in 2020 (i.e. 15 stocks representing 84% of the forecasted returns at p50). The approach in 2021 incorporated the latter approach with 9 stocks forecasted using

sibling models representing 13% of the forecasted p50 returns. In recent years, although total returns have fallen at lower probability levels, the exact response between individual stocks has varied (source: DFO).

In response to recent declining productivity, climate change and the increased variability that accompanies it, as well as low Sockeye abundances (the three lowest returns on record occurred in 2016, 2019 and 2020), the Department plans to review forecast model methods as part of adaptive management. DFO will also be reviewing potential adjustments/improvements to current harvest control rules, alternative strategies that take into account changing conditions and key uncertainties, and what implications there may be for future advice. Initial work began in 2019 through the Fraser River Sockeye Spawning Initiative (FRSSI) and is anticipated to be ongoing in 2021 and 2022.

For further details, refer to the Fraser Stock Assessment Technical Memo Pre-season Run Size Forecasts for Fraser River Sockeye (*Oncorhynchus nerka*) and Pink (*Oncorhynchus gorbuscha*) Salmon in 2021; this document is anticipated to be published in mid-2021.

Run sizes for Fraser Sockeye will be updated in season.

Table 13.5-6: 2021 Pre-season Sockeye return forecasts by stock and timing group (DFO, 2021)

Run timing group Stocks	Forecast Model [a]	Probability that Return will be at/or Below Specified Run Size				
		10%	25%	50%	75%	90%
Early Stuart	*Ricker (Pi)*	8,000	12,000	18,000	30,000	47,000
Early Summer Total		33,000	59,000	108,000	207,000	375,000
Total excluding misc. stocks		26,000	46,000	83,000	158,000	280,000
Bowron [h]	*Ricker (Pi)*	100	200	400	700	1,000
Upper Barriere (Fennell) [h]	*Ricker (Pi)4/Sibling5*	300	500	1,000	3,000	5,000
Gates	*RS8yr*	2,000	4,000	9,000	19,000	39,000
Nadina	*PowerJuvFrD-peak4 /Sibling5*	6,000	10,000	19,000	37,000	68,000
Pitt	*Ricker(Ei)4 /Sibling5*	14,000	23,000	40,000	69,000	108,000
Scotch	*Ricker(Pi)4 /Sibling5*	1,000	3,000	6,000	13,000	28,000
Seymour	*Ricker(Ei)*	3,000	5,000	8,000	16,000	31,000
Misc (EShu) [b]	*R/S*	1,000	3,000	6,000	11,000	19,000
Misc (Taseko) [c & h]	*R/S*	30	60	100	200	300
Misc (Chilliwack)	*Power4/Sibling5*	4,000	6,000	10,000	21,000	44,000
Misc (Nahatlatch) [d]	*R/S*	2,000	4,000	8,000	17,000	32,000
Summer Total		232,000	474,000	1,046,000	2,225,000	4,502,000
Total excluding misc. stocks		228,000	464,000	1,024,000	2,181,000	4,412,000
Chilko	*RS8yr*	71,000	142,000	311,000	677,000	1,366,000
Late Stuart	*Power (Pi)*	62,000	128,000	285,000	600,000	1,241,000
Quesnel	*Ricker(Ei)*	69,000	147,000	331,000	708,000	1,425,000
Stellako	*Larkin4/Sibling5*	21,000	35,000	68,000	128,000	229,000

Harrison [e]	*Ricker(Ei)Odd3/Sibling4*	3,000	8,000	21,000	52,000	120,000
Raft [e]	*Ricker(Pi)4/Sibling5*	2,000	4,000	8,000	16,000	31,000
Misc (N. Thomp. Tribs) [e,f,h]	*R/S*	800	2,000	4,000	9,000	18,000
Misc (N. Thomp River) [e & f]	*R/S*	3,000	8,000	17,000	34,000	70,000
Misc (Widgeon) [g & h]	*R/S*	90	300	700	1,000	2,000
Late Total		40,000	79,000	159,000	313,000	572,000
Total excluding misc. stocks		37,000	67,000	134,000	267,000	492,000
Cultus [h]	*PowerJuv (Pi)4/Sibling5*	200	500	900	2,000	4,000
Late Shuswap	*Ricker(Ei)*	8,000	16,000	35,000	78,000	149,000
Portage [h]	*RS8yr*	400	800	2,000	4,000	9,000
Weaver	*RS8yr*	23,000	40,000	74,000	136,000	235,000
Birkenhead	*RS8yr*	5,000	10,000	22,000	47,000	95,000
Misc Harrison/Lillooet [g]	*R/S*	3,000	12,000	25,000	46,000	80,000
TOTAL SOCKEYE SALMON		313,000	624,000	1,330,000	2,775,000	5,496,000
Total sockeye excluding misc. stocks		299,000	589,000	1,259,000	2,636,000	5,231,000
TOTAL PINK SALMON	*Ricker(FrD-peak _MayPi_JulSepSSS)*	1,701,000	2,229,000	3,009,000	4,051,000	5,375,000

a. See Table 4 for model descriptions
b. Misc. Early Shuswap uses Scotch & Seymour R/EFS
c. Misc. Taseko uses Chilko R/EFS
d. Misc. Nahatlach uses Early summer-run stocks R/EFS
e. Raft, Harrison, Misc. North Thompson stocks moved to Summer run-timing group
f. Misc. North Thompson stocks use Raft & Fennell R/EFS
g. Misc. Late Run stocks (Harrison Lake down-stream migrants including Big Silver, Cogburn, etc.), and river-type Widgeon use Birkenhead R/EFS
h. Results above 1,000 have been rounded to the nearest 1,000. Between 100 and 1000 have been rounded to 100. Between 10 and 100 have been rounded to 10.

Table 13.5-7: Age composition of 2021 forecasted returns for each stock at the 50% probability level

Sockeye stock/timing group	2021 Fraser Sockeye Forecasts				
	Four-year-old return 50%[a]	Five-year-old Return 50%[a]	Total Return 50%	Four-Year-Old Proportion	Five-Year-Old Proportion
Early Stuart	16,000	2,000	18,000	89%	11%
Early Summer					
Bowron	300	100	400	75%	25%
Upper Barriere (Fennell)	600	400	1,000	60%	40%
Gates	6,000	3,000	9,000	67%	33%
Nadina	13,000	6,000	19,000	68%	32%
Pitt	11,000	29,000	40,000	28%	73%
Scotch	5,800	200	6,000	97%	3%
Seymour	7,900	100	8,000	99%	1%
Misc (EShu)	5,940	60	6,000	99%	1%
Misc (Taseko)	40	60	100	40%	60%
Misc (Chilliwack)	5,000	5,000	10,000	50%	50%
Misc (Nahatlatch)	7,000	1,000	8,000	88%	13%

Summer					
Chilko	285,000	26,000	311,000	92%	8%
Late Stuart	274,000	11,000	285,000	96%	4%
Quesnel	330,800	200	331,000	100%	0%
Stellako	53,000	15,000	68,000	78%	22%
Harrison[a]	20,000	1,000	21,000	95%	5%
Raft	5,000	3,000	8,000	63%	38%
Misc (N. Thomp. Tribs)	3,500	500	4,000	88%	13%
Misc (N. Thomp River)	13,000	4,000	17,000	76%	24%
Misc (Widgeon)	400	300	700	57%	43%
Late					
Cultus	890	10	900	99%	1%
Late Shuswap	35,000	0	35,000	100%	0%
Portage	2,000	0	2,000	100%	0%
Weaver	73,900	100	74,000	100%	0%
Birkenhead	13,000	9,000	22,000	59%	41%
Misc(Non-Shuswap)	19,000	6,000	25,000	76%	24%
Total	1,207,000	123,000	1,330,000	79%	21%

2021 Pre-season Fraser River Sockeye Run Timing Curves:

Preliminary run timing estimates shown in the figure below are based on 2017 cycle year timing or historical/all years' median timings. For some individual stocks using the all years' median timings, the 2020 cycle line was excluded due to earlier timing. All timing estimates may be updated for pre-season planning once timing forecasts are developed for Early Stuart and Chilko Sockeye. As shown below (Figure 13.5-8) it is expected that there will be considerable overlap between the timing groups in 2021, along with Fraser Pink salmon.

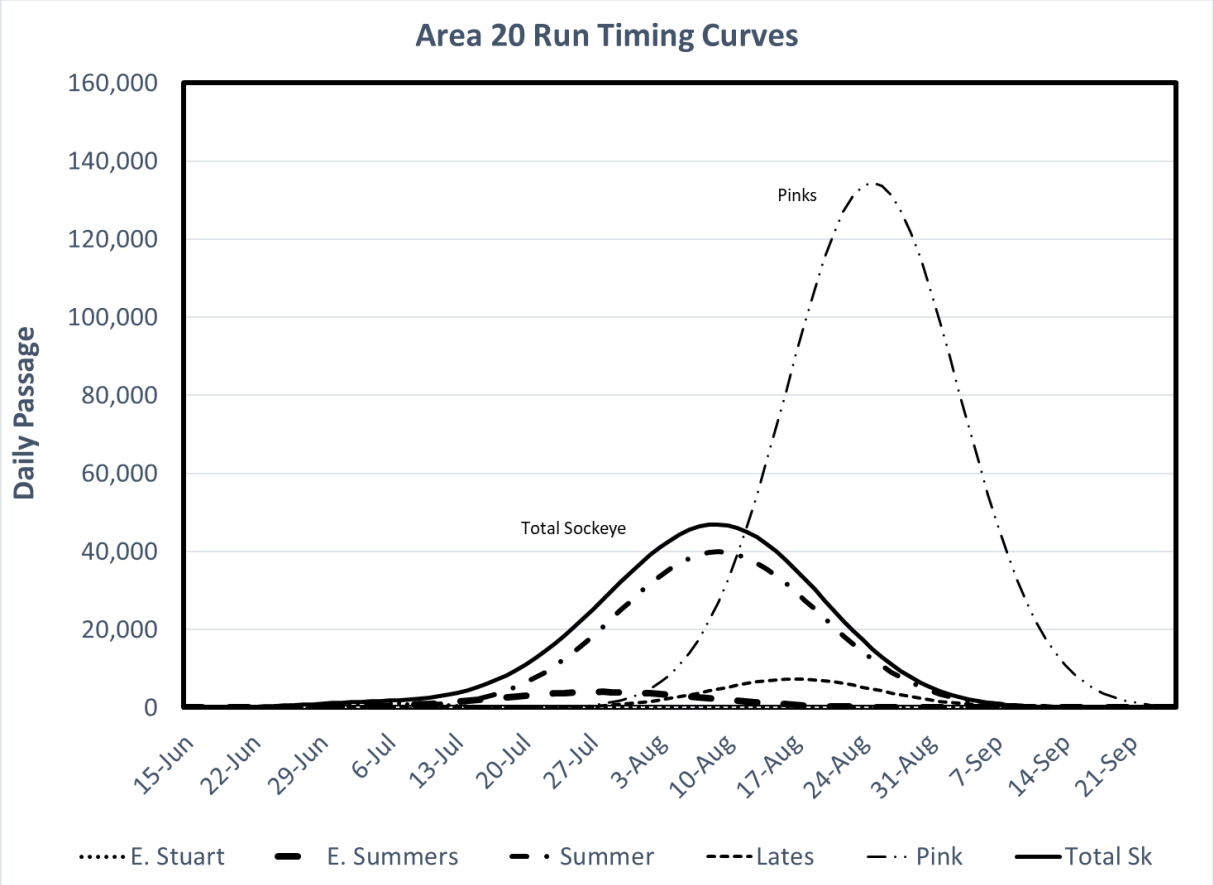


Figure 13.5-8: Pre-season Area 20 Run Timing Curves for 2021 Fraser Sockeye Salmon

Test fishery plans to assess in-season abundances of Fraser Sockeye are developed annually by the FRP. The plan will take into account conservation concerns for all stocks and species, assessments required for in-season management, total allowable catch and cost. The pre-season planned test fishing schedule will be responsive to in-season information.

13.5.6.2.2 In-season

In-season information including estimates of abundance, run timing, stock composition, and other technical information are used to assess potential fishing opportunities relative to pre-season fishing plans.

In-season information derived from catch in test and other fisheries, and in-river hydro-acoustic estimates of salmon passage are provided by the Pacific Salmon Commission (PSC) staff to the DFO and FRP for consideration when planning fisheries.

The FRP meets regularly from early July to mid-September to review information as it becomes available over the course of the Sockeye migration. During this period, in-season information is

regularly updated by the FRP to set spawning escapement objectives, management adjustments, and calculate Total Allowable Catch (TAC). The availability of the TAC to harvesters will be affected by other factors, including migration pathways and conservation requirements for co-migrating stocks or species.

In-season information including fishery openings is posted on the Internet regularly throughout the fishing season by the DFO and the PSC at the following web sites:

Weekly PSC News Release:
http://www.psc.org/news_frpnews.htm

Aboriginal, Commercial and Recreational Fishery Notices:
http://www-ops2.pac.dfo-mpo.gc.ca/fns-sap/index-eng.cfm

Sockeye Test Fisheries:

- FRP approved test fishery results are available from the PSC at: http://www.psc.org/publications/fraser-panel-in-season-information/test-fishing-results/
- Other test fishery results are available from DFO at: http://www.pac.dfo-mpo.gc.ca/fm-gp/fraser/index-eng.html

13.5.6.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

Fraser Sockeye Run Timing Groups

The four run timing groups (Early Stuart, Early Summer, Summer and Late Run) identified under the Pacific Salmon Treaty Annex generally contain stocks with similar timing in the marine area.

Proportional Management Adjustments & Proportional Difference Between Estimates

Proportional management adjustments (pMA) and/or proportional difference between estimates (pDBEs) may be adopted by the FRP to assist in the achievement of escapement goals. Management adjustments (pMA x escapement goal) are added to the escapement goal when necessary to account for historic differences between Mission hydroacoustic estimates of fish passage (plus catch upstream of the hydroacoustics site) and spawning ground escapement estimates. That is, sometimes additional fish are allowed to pass upstream of Mission (in the lower Fraser River) than is required by the escapement goal (plus expected catch upstream of Mission) in order to achieve the escapement goal on the spawning grounds. Differences

between estimates at Mission and the spawning grounds (DBEs) occur for many reasons, including measurement errors in the number of fish estimated at Mission, on the spawning grounds, caught along the way, stock ID error, en-route losses due to migration difficulties, and unaccounted for removals (e.g. predation). DBEs expressed as a proportion (pDBE) can be interpreted as the percentage of fish estimated to pass Mission that would not be expected to be enumerated by the spawning ground assessment programs, assuming no additional catch.

The pre-season pMAs shown in the escapement plan are comprised of historical median pDBEs. Prior to the start of the season in 2016, a change was made by the FRP regarding how pMAs are calculated to better reflect the pDBE of individual stocks. Within the management groups, the pDBEs for some individual stocks (e.g., Chilliwack, Pitt, Harrison and Birkenhead type stocks) were weighted with the pDBEs from the remaining aggregated stocks in their respective timing groups over the range of forecast values. This results in different pMAs within a management group across the range of forecast run sizes. When combining pMAs and escapement goals that both change across the range of forecast run sizes, the resulting allowable exploitation rate can sometimes decrease as the run size increases. However, as expected, the number of fish that can be harvested does increase with run size in these instances.

When forecasts or in-season information on temperature, discharge and/or timing is available, the pMA and pDBE for each management group can be estimated based on historical relationships between the temperature and discharge or the timing of a particular run timing group, and the discrepancy between the number of fish estimated at Mission and the spawning grounds.

The Fraser Panel may update the pMAs and/or pDBEs pre-season and in-season as methods are finalized and information on environmental conditions, return timing, return strength and fish health becomes available.

2021 Escapement Strategy

The Fraser River Sockeye Spawning Initiative (FRSSI) was undertaken to develop escapement strategies for Fraser River Sockeye.

A range of harvest rules (also called Total Allowable Mortality or "TAM" rules) have been evaluated in the Fraser River Sockeye Spawning Initiative (FRSSI) model. An illustration of the harvest rules, taken from the Pestal *et al.* 2011 CSAS paper, is shown below.

It is important to note that each harvest or TAM rule is characterized by Lower Fishery Reference Points (vertical dashed line through the No-Fishing Point) and Upper Fishery Reference Points (vertical dashed line through the Cut-Back Point) to describe the shape of the Total Allowable Mortality (TAM) rule for each management group (Figure 13.5-9). The TAM

cap and the Low Abundance Exploitation Rate (LAER) describe the upper and lower ranges of exploitation rates, respectively. These four values define the harvest rule for each management group in the escapement plan, and once finalized, do not change in-season. During the fishing season, in-season estimates of run size and pMAs are used in conjunction with the escapement plan to determine the total allowable harvest for a given management group at a given time.

Note, in response to recent declining productivity, climate change and the increased variability that accompanies it, DFO will also be reviewing potential adjustments/improvements to current harvest control rules, alternative strategies that take into account changing conditions and key uncertainties, and what implications there may be for future advice. Initial work began in 2019 through the Fraser River Sockeye Spawning Initiative (FRSSI) and is anticipated to be ongoing in 2021 and 2022. In the meantime, existing harvest control rules and strategies outlined here will be used in 2021 planning and management.

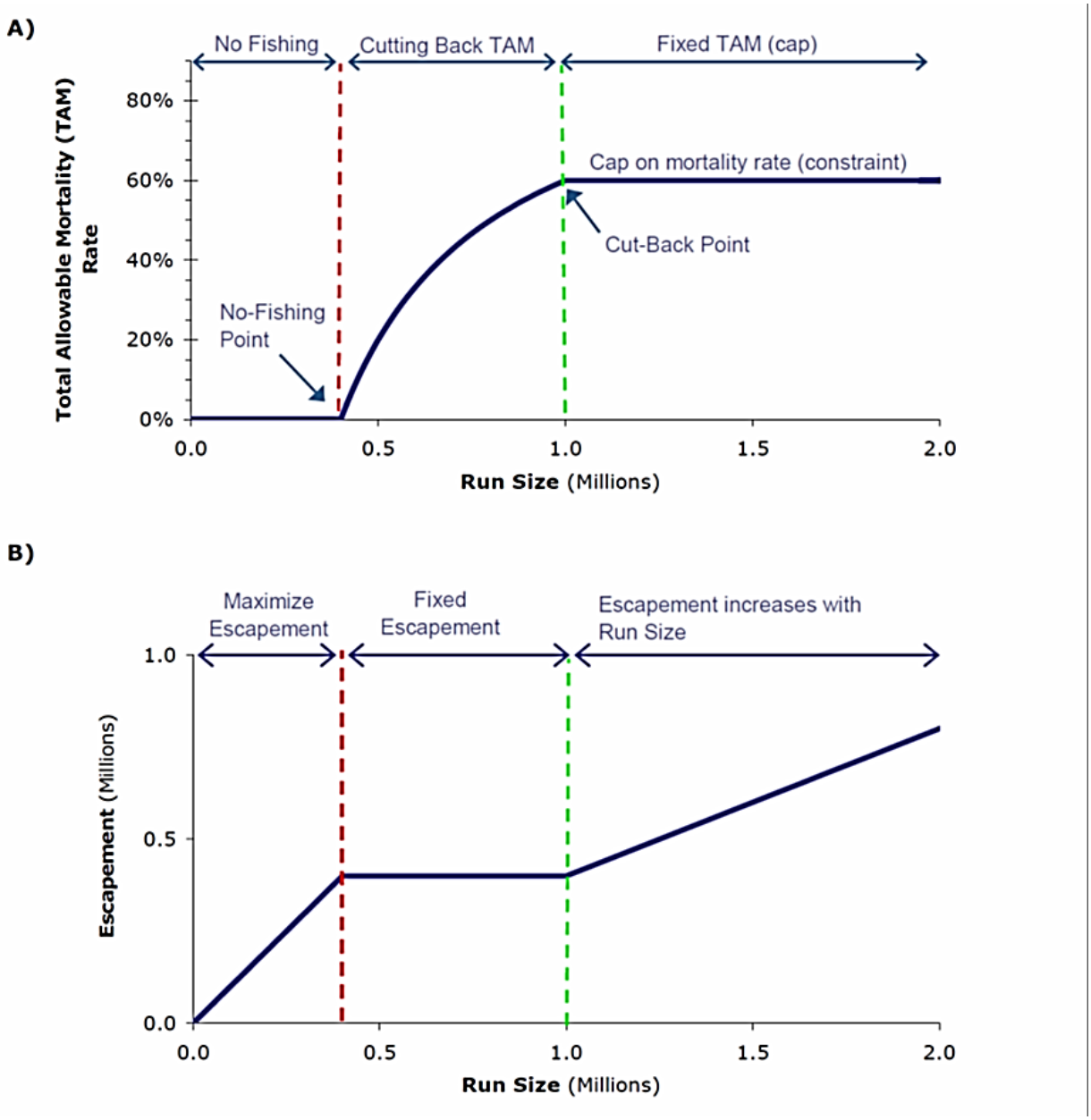


Figure 13.5-9: Shape of Total Allowable Mortality (TAM) rule.

Note: the Low Abundance Exploitation Rate (LAER) is applied after the TAM rule and is not shown in the figure.

The Lower & Upper Fishery Reference Points interact with the TAM cap to describe the shape of the TAM rule:

The Upper Fishery Reference Point describes the run size above which the TAM plateaus at the TAM cap (e.g. 60%) and the remaining proportion goes to escapement (e.g., 40% of the run at run sizes above the Upper Fishery Reference Point).

The Lower Fishery Reference Point describes the numerical escapement target when the run size is between the Upper and Lower Fishery Reference Points.

When the run size is below the Lower Fishery Reference Point, the escapement target is the run size, but it is recognized that there will be some low incidental harvest in the form of low abundance exploitation rates (LAERs) to allow for fisheries directed on co-migrating stocks and species.

In 2020, the LAERs for the Run timing groups were as follows: a maximum of 10% for the Early Stuart, Early Summer, Summer and Late (including Cultus Lake) Run Sockeye. The LAER for Late Run Sockeye would increase to a maximum of 20% at and above an overall return at the p75 forecast level. When a LAER is implemented, to the extent possible the objective is to allow as many fish to pass to the spawning grounds while keeping the exploitation rates as low as possible. Recently, due to very low returns and migration concerns due to high discharge levels and challenges to fish passage to the spawning grounds due to the Big Bar landslide, the Department continued to manage well below the LAER limits identified in the escapement plan to maximize the number of Sockeye arriving on the spawning grounds. Due to the low in-season return estimates, the Department did: (i) Not licence Sockeye-directed fisheries as no in-season TAC was identified, and (ii) plan fisheries directed on other species in a way that allowed as many Sockeye to reach the spawning grounds as possible by minimizing bycatch impacts to levels well below the LAER limits identified in the escapement plan.

2021 Escapement Plan

For the 2021 escapement plan, the Department sought input on two escapement options and their components (see Table 13.5-8 a&b). Consistent with other years, the Department considered input provided on the two draft options during final escapement plan development. Feedback on the proposed options widely recommended a more conservative approach to the 2021 management of Fraser River Sockeye. The final escapement plan for 2021 is the more conservative Option 2 presented in the draft IFMP. The Option 2 escapement plan is modified from the 2020 escapement plan and is described in Table 13.5-8. This escapement plan optimizes escapement to the spawning grounds throughout the entire forecast range. Unless stocks return at the upper end of the forecast abundance, it is anticipated that Fraser Sockeye will be managed in a LAER situation for all four management groups. For stocks groups in a LAER situation the objective will be to plan fisheries directed on other species in a way that allows as many Sockeye to reach the spawning grounds as possible by minimizing Sockeye by-catch impacts. The fishery reference points shown in the table are evaluated for the stocks that have a long term stock-recruitment relationship. For the Early Summer run Management Unit the fishery reference points are scaled up to account for the expected contribution of the

unforecasted, or "miscellaneous" stocks to the run timing group over the entire forecast range (see Table 13.5-10).

Table 13.5-8: 2021 Fraser Sockeye Escapement Plan – modified 2020 escapement plan – Low TAMs and LAERs (max 10%) with an increase Summer run LFRP

	Harvest Rule Parameters				
Management Unit	Low Abundance ER (LAER)	TAM Cap	Lower Fishery Reference Point	Upper Fishery Reference Point	Pre-season pMA @p50
Early Stuart	10%	50%	108,000	216,000	0.69
Early Summer (w/o misc)	10%	50%	100,000	200,000	0.39
Summer (w/o misc)	10%	50%	1,250,000	2,500,000	0.09
Late (w/o misc)	10%	50%	300,000	600,000	0.96

Table 13.5-10 shows, at the management group level, the range of expected outcomes (e.g. exploitation rates, available harvest, management adjustments and expected numbers of spawners to the grounds) for the range of the abundance forecast and fisheries reference points for the escapement plan. Note that these values do not take into account the pre-spawn mortality which can occur after adult salmon reach spawning grounds. We currently do not have any methods to predict pre-spawn mortality rates. Table 13.5-9 provides an example of descriptions of the information presented in Table 13.5-10.

Table 13.5-9: Description example of information shown in Table 13.5-10

From Escapement Options Table		Description
	p10	run size forecast probability level being used for calculations in this column
forecast	8,000	forecast associated with p-level (above) and this management group
TAM Rule (%)	0%	total allowable mortality (TAM) at this run size forecast
Escapement Target	8,000	escapement goal at this run size
MA	5,500	management adjustment (MA=pMA x escapement target)
Esc. Target + MA	13,500	adds up escapement target and management adjustment
LAER	10%	low abundance exploitation rate
ER at Return	0%	exploitation rate given TAM rule, run size, escapement target, & MA
Allowable ER	10%	larger of the values in the two previous rows
available harvest	800	harvest available for test fish, US, and Canada (=allowable ER x run size)
Performance		
Projected S (after MA)	4,200	projected adult spawners to the grounds (NOT accounting for pre-spawn mortality (PSM))
BY Spawners	15,433	number of adult spawners four years previous (compare to line above)
Proj. S as % BY S	27%	projected spawners as a percentage of brood year spawners
cycle avg S	204,064	average number of spawners on this cycle line (NOT accounting for PSM)
Proj. S as % cycle S	2%	projected spawners as a percentage of cycle line average spawners

Table 13.5-10 : 2021 Escapement Plan (modified from 2020 Escapement Plan) for the Fraser River Sockeye management groups over a range of pre-season forecasts. For a description of the values in this table, refer to Table 13.5-9. Note, the bolded columns represent the pre-season planning values anticipated to be used to start the 2021 season.

Management Unit		Pre-season Forecast Return				
		p10	p25	**p50**	p75	p90
	lower ref. pt. (w misc)	108,000	108,000	**108,000**	108,000	108,000
	upper ref. pt. (w misc)	216,000	216,000	**216,000**	216,000	216,000
Early Stuart	forecast	8,000	12,000	18,000	30,000	47,000
	TAM Rule (%)	0%	0%	**0%**	0%	0%
	Escapement Target	8,000	12,000	**18,000**	30,000	47,000
	MA	5,500	8,300	**12,400**	20,700	32,400
	Esc. Target + MA	13,500	20,300	**30,400**	50,700	79,400
	LAER	10%	10%	**10%**	10%	10%
	Available ER at Return	0%	0%	**0%**	0%	0%
	Allowable ER	10%	10%	**10%**	10%	10%
	Allowable Harvest	800	1,200	**1,800**	3,000	4,700
	2021 Performance					
	Projected S (after MA)	4,200	6,400	**9,600**	15,900	25,000
	BY Spawners	15,433	15,433	**15,433**	15,433	15,433
	Proj. S as % BY S	27%	41%	**62%**	103%	162%
	cycle avg S	204,064	204,064	**204,064**	204,064	204,064
	Proj. S as % cycle S	2%	3%	**5%**	8%	12%

Management Unit		Pre-season Forecast Return				
		p10	p25	**p50**	p75	p90
Early Summer (w/o RNT)	*lower ref. pt. (w misc)*	126,600	128,600	**128,900**	131,200	134,000
	upper ref. pt. (w misc)	253,300	257,200	**257,800**	262,400	268,100
	forecast (incl. misc)	33,430	58,760	**107,500**	206,900	375,300
	TAM Rule (%)	0%	0%	**0%**	37%	50%
	Escapement Target	33,430	58,760	**107,500**	131,200	187,650
	MA	12,400	21,700	**41,900**	53,800	80,700
	Esc. Target + MA	45,830	80,460	**149,400**	185,000	268,350
	LAER	10%	10%	**10%**	10%	10%
	Available ER at Return	0%	0%	**0%**	11%	28%
	Allowable ER	10%	10%	**10%**	11%	28%
	Allowable Harvest	3,300	5,900	**10,800**	21,900	107,000
	2021 Performance					
	Projected S (after MA)	22,000	38,300	**69,700**	131,900	188,900
	BY Spawners	68,477	68,477	**68,477**	68,477	68,477
	Proj. S as % BY S	32%	56%	**102%**	193%	276%
	cycle avg S	94,107	94,107	**94,107**	94,107	94,107
	Proj. S as % cycle S	23%	41%	**74%**	140%	201%

Management Unit		Pre-season Forecast Return				
		p10	p25	**p50**	p75	p90
Summer (w. RNT & Har)	*lower ref. pt. (w misc)*	1,250,000	1,250,000	**1,250,000**	1,250,000	1,250,000
	upper ref. pt. (w misc)	2,500,000	2,500,000	**2,500,000**	2,500,000	2,500,000
	forecast	231,890	474,300	**1,045,700**	2,225,000	4,502,000
	TAM Rule (%)	0%	0%	**0%**	44%	50%
	Escapement Target	231,890	474,300	**1,045,700**	1,250,000	2,251,000
	MA	20,900	42,700	**94,100**	112,500	225,100
	Esc. Target + MA	252,790	517,000	**1,139,800**	1,362,500	2,476,100
	LAER	10%	10%	**10%**	10%	10%
	Available ER at Return	0%	0%	**0%**	39%	45%
	Allowable ER	10%	10%	**10%**	39%	45%
	Allowable Harvest	23,189	47,430	**104,570**	862,500	2,025,900
	2021 Performance					
	Projected S (after MA)	191,400	391,200	**861,900**	1,247,000	2,264,600
	BY Spawners	788,761	788,761	**788,761**	788,761	788,761
	Proj. S as % BY S	24%	50%	**109%**	158%	287%
	cycle avg S	1,611,409	1,611,409	**1,611,409**	1,611,409	1,611,409
	Proj. S as % cycle S	12%	24%	**53%**	77%	141%

Management Unit		Pre-season Forecast Return				
		p10	p25	**p50**	p75	p90
Late (w/o Har)	*lower ref. pt. (w misc)*	300,000	300,000	**300,000**	300,000	300,000
	upper ref. pt. (w misc)	600,000	600,000	**600,000**	600,000	600,000
	forecast	39,600	79,300	**158,900**	313,000	572,000
	TAM Rule (%)	0%	0%	**0%**	4%	48%
	Escapement Target	39,600	79,300	**158,900**	300,000	300,000
	MA	42,800	79,300	**152,500**	288,000	288,000
	Esc. Target + MA	82,400	158,600	**311,400**	588,000	588,000
	LAER	10%	10%	**10%**	10%	10%
	Available ER at Return	0%	0%	**0%**	0%	0%
	Allowable ER	10%	10%	**10%**	10%	10%
	Allowable Harvest	3,960	7,930	**15,890**	31,300	57,200
	2021 Performance					
	Projected S (after MA)	17,100	35,900	**72,800**	143,400	263,500
	BY Spawners	83,120	83,120	**83,120**	83,120	83,120
	Proj. S as % BY S	21%	43%	**88%**	173%	317%
	cycle avg S	184,910	184,910	**184,910**	184,910	184,910
	Proj. S as % cycle S	9%	19%	**39%**	78%	143%
Allowable Harvest (TF, US, CDN)		31,249	62,460	**133,060**	918,700	2,194,800
Total projected spawners		234,700	471,800	**1,014,000**	1,538,200	2,742,000

Table 13.5-11 shows the projected escapement for each forecasted stock over the range of forecast probability levels (i.e. the "projected S" (after MA) from Table 13.5-10 are distributed to the component stocks) for the Escapement Plan. Note, this makes the additional assumption that the exploitation rate will be distributed evenly within a management group.

Table 13.5-11a&b: Projected spawners by forecasted stock over the forecast range, applying 2021 TAM rules and historical pMAs. Colour code shows comparison of p50 abundance forecast outcomes compared to cycle average and brood year escapement (green = greater than 125%, no colour = between 75%- 125%, yellow = between 25% - 74%, red = less than 25%).

Run timing group / Stocks	Total Escapement		Comparisons @p10		Comparisons @p25		Comparisons @p50		Comparisons @p75	
	Cycle Ave	Brood Year	Cycle Ave	Brood Year	Cycle Ave	Brood Year	Cycle Ave	Brood Year	Cycle Ave	Brood Year
Early Stuart	**204,064**	**15,433**	**2%**	**27%**	**3%**	**41%**	**5%**	**62%**	**8%**	**103%**
Early Summer	**94,107**	**68,477**	**23%**	**32%**	**41%**	**56%**	**74%**	**102%**	**140%**	**193%**
Bowron	5,470	244	1%	25%	2%	49%	4%	94%	7%	164%
Upper Barriere	3,086	678	6%	25%	9%	43%	19%	86%	56%	254%
Gates	10,079	7,040	11%	16%	23%	33%	51%	74%	108%	154%
Nadina	21,222	5,322	16%	65%	27%	108%	52%	206%	100%	398%
Pitt	28,490	34,159	38%	31%	62%	51%	107%	90%	184%	154%
Scotch	7,568	5,654	8%	10%	23%	31%	46%	61%	98%	132%
Seymour	8,035	3,949	22%	44%	36%	73%	57%	117%	114%	232%
Misc (EShu)	1,361	2,737	43%	21%	127%	63%	253%	126%	462%	230%
Misc (Taseko)	1,043	20	2%	100%	3%	150%	6%	300%	11%	550%
Misc (Chilliwack)	4,792	6,746	51%	36%	76%	54%	126%	89%	263%	186%
Misc (Nahatlatch)	2,961	1,928	39%	60%	78%	119%	156%	239%	329%	505%
Summer	**1,611,409**	**788,761**	**12%**	**24%**	**24%**	**50%**	**53%**	**109%**	**77%**	**158%**
Chilko	296,918	372,212	20%	16%	40%	32%	87%	69%	128%	102%
Late Stuart	366,198	147,470	14%	35%	29%	72%	64%	160%	92%	229%
Quesnel	804,835	115,618	7%	49%	15%	105%	34%	237%	50%	345%
Stellako	59,872	91,391	29%	19%	48%	32%	94%	62%	120%	79%
Harrison	60,142	49,983	3%	4%	9%	10%	23%	27%	38%	46%
Raft	8,069	4,518	21%	37%	41%	73%	82%	147%	112%	199%
Misc (N. Thomp. Tribs)	593	1,458	111%	45%	280%	114%	558%	227%	855%	348%
Misc (N. Thomp River)	13,336	5,697	19%	44%	50%	116%	106%	247%	144%	336%
Misc (Widgeon)	1,446	414	4%	14%	13%	46%	31%	109%	30%	106%
Late	**184,910**	**83,120**	**9%**	**21%**	**19%**	**43%**	**39%**	**88%**	78%	**173%**
Cultus	5,549	681	1%	12%	3%	28%	6%	50%	14%	112%
Late Shuswap	71,442	22,644	4%	13%	8%	27%	19%	58%	41%	130%
Portage	4,687	1,265	3%	12%	6%	24%	16%	60%	32%	119%
Weaver	31,830	32,881	27%	26%	48%	46%	88%	85%	162%	156%
Birkenhead	68,862	18,636	5%	17%	9%	35%	21%	77%	44%	163%
Misc. non-Shuswap	2,540	7,013	76%	28%	306%	111%	638%	231%	1174%	425%

13.5.6.4 HARVEST CONSTRAINTS INCLUDING INCIDENTAL SOCKEYE CATCH, BYCATCH, AND LAER

Although unlikely, fisheries targeting late-run Fraser Sockeye may be affected in 2021 by conservation measures to protect Interior Fraser River Steelhead. Dates and areas for rolling window closures can be found in Appendix 9.

Harvest Constraints: Fishing plan options are evaluated for a range of possible Fraser Sockeye run sizes and return timing. In-season run size and timing estimates form the basis for management once these estimates are available. There is significant overlap between Fraser run timing groups as well as stocks and species of concern (e.g. Cultus Sockeye, Interior Fraser Coho). The overlap of one timing group may constrain harvest opportunities on another timing group and the directed harvest of one species may be constrained by another. In some cases, full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season.

Incidental Catch, Bycatch Constraints, and LAER: Though total allowable catch (TAC) may be identified for various Fraser Sockeye management groupings in most years, conservation and management constraints on co-migrating stocks, management groups, or other species can affect harvest opportunities. In recent years the less abundant Fraser Sockeye management groups (i.e. Early Stuart, Early Summer and Late Run Sockeye), Spring 4_2 and Spring and Summer 5_2 Chinook, IFR Coho and IFR Steelhead have been the primary harvest constraints when planning directed Fraser Sockeye fisheries.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

5.6.**If in-season assessment information indicates that the escapement targets in the Fraser Sockeye escapement plan are not going to be achieved then the priority is conservation.** In cases when the total allowable mortality minus any management adjustment results in a zero or very low total allowable mortality for a timing group, the Department may consider measures to protect 80-90% of the return of that Fraser Sockeye timing group while allowing directed harvest of co-migrating stock groups or species. In the escapement plan table, this concept is expressed as the **low abundance exploitation rate (LAER)**. For example, in 2020 the LAER was 10% for Early Stuart, Early Summer, Summer, and Late Run Sockeye, with the LAER for Late

Run Sockeye increasing to a maximum of 20% if the overall return was at or above the p75 forecast level.

The low abundance exploitation rate (LAER) is not a target. The objective of the LAER is to allow as many fish to pass to the spawning grounds as possible while allowing some limited incidental mortality, and in some cases some limited directed harvest when there is little opportunity for harvest directed on other Fraser Sockeye stock groups or species.

Fisheries are only considered if they provide scientific information necessary for conservation (test fisheries) or have reasonably low catch impacts on Fraser Sockeye. **All fishery impacts, including test fisheries, are to be accounted for under the LAER.** Additional considerations under LAER management necessary for fishery planning include: current and projected catch accounting for all United States and Canadian fisheries, the distribution of impacts between gear groups, gear selectivity, release mortality rates, Sockeye mortality relative to target species, compliance with licence regulations and environmental conditions.

For First Nations FSC fisheries, the LAER is not a harvest target, the above considerations apply, and a sharing plan may be required to enable a fair distribution of impacts between marine and Fraser River First Nations. When FSC fisheries are prosecuted using the LAER, the licence amounts by area (South Coast, Lower Fraser, Middle/Upper Fraser) are generally used to guide low impact fisheries for other species or stocks.

Early Stuart Management

The 2021 Early Stuart return represents an off-cycle year. The main contributor to the 2021 return is forecasted to be age four fish from the 2017 brood year. The 2021 p50 forecast (18,000) is much lower than the cycle average (204,064).

Similar to the management of all timing groups the implications of the escapement strategy for Early Stuart fishing plans will be influenced by in-season run size estimates and management adjustments which may be adjusted based on water temperature and discharge conditions in the Fraser River, and considerations for Big Bar landslide, during the return migration. Based on the escapement option, the pre-season forecast and long term median management adjustments, Early Stuart Sockeye remain in a low abundance exploitation rate (LAER) situation if the actual return falls within the entire forecast range.

In recent years, window closures and other fishing restrictions have been required in commercial, recreational and First Nations fisheries to stay within the LAER objectives identified in the escapement plan. Management measures in 2021 will include a rolling window closure based on the run timing of the Early Stuart migrations through various fishing areas until arrival at the spawning grounds.

Table 13.5-12 shows the 2021 4-week window closure dates to protect Early Stuart and the early-timed Early Summer Run Sockeye. Typically a 3-week closure has been implemented to protect the Early Stuart Run. However, since 2019 a one week extension of the typical 3-week closure (resulting in a 4-week closure in total) has been implemented to also provide protection to weak early-timed stocks of the Early Summer Run management group (e.g. Bowron, Taseko). The Department sought feedback during the draft IFMP review period on the proposed closure dates for fishery planning and management, and based on the responses, a 4-week rolling window closure has been implemented for 2021. (see Table 13.5-12. However, **note that the actual closure dates and duration may be revised pre-season or in-season based on updated timing or other in-season information.**

Table 13.5-12: Dates for the 2021 Early Stuart window closure (3-weeks) plus 1-week extension to provide additional protection for earlier timed stocks of the Early Summer run Sockeye (i.e. 4-week total closure).

Area	Start Date	4-Week End Date	Management Actions[3]
Areas 111, 121, 123 to 127	19-Jun	22-Jul	No Fraser Sockeye directed fisheries before July 22 (Sn, Gn, Tr).
Area 11	19-Jun	22-Jul	No Fraser Sockeye directed fisheries before July 22 (Gn, Tr), July 25 (Sn)[1,2].
Area 12	19-Jun	22-Jul	No Fraser Sockeye directed fisheries before July 22 (Gn, Tr), July 25 (Sn)[1,2].
Area 13	19-Jun	22-Jul	No Fraser Sockeye directed fisheries before July 22 (Gn, Tr), July 25 (Sn)[1].
Areas 14 to 16	19-Jun	22-Jul	No Fraser Sockeye directed fisheries before July 22 (Gn, Tr), August 15 (Sn)[1].
Areas 17, 19, 20 and 21	19-Jun	22-Jul	No Fraser Sockeye directed fisheries before July 22 (Sn, Gn, Tr).
Areas 18 and 29	28-Jun	27-Jul	No Fraser Sockeye directed fisheries before July 27.
Steveston-Mission Bridge	28-Jun	27-Jul	
Mission Bridge-Sawmill Cr	30-Jun	29-Jul	No Fraser Sockeye directed fisheries before July 29.
Sawmill Cr-Texas Cr	3-Jul	1-Aug	No Fraser Sockeye directed fisheries before August 1.
Texas Cr-Kelly Cr	3-Jul	1-Aug	
Kelly Cr-Deadman	3-Jul	1-Aug	
Deadman-Chilcotin	8-Jul	6-Aug	No Fraser Sockeye directed fisheries before August 6.
Chilcotin-Quesnel	8-Jul	6-Aug	
Quesnel-Hixon	8-Jul	6-Aug	
Hixon-Prince George	11-Jul	9-Aug	No Fraser Sockeye directed fisheries before August 9.
Prince George-Stuart R	13-Jul	11-Aug	No Fraser Sockeye directed fisheries before August 11 except for potential First Nations FSC allowable harvest in terminal areas.

[1] Gear restrictions remain in place to protect Sakinaw Sockeye until July 25 (Queen Charlotte and Johnstone Straits) and August 15 (northern Strait of Georgia).

[2] Additional sockeye closures will remain in place in portions of Areas 11 and 12 until late July in waters north of Lewis Point to protect Nimpkish Sockeye.

[3] Management actions described here are just for Fraser River Sockeye-directed fisheries. Any fisheries directed on other stocks or species in the areas and times described may also have measures to limit impacts on Fraser-bound Sockeye (e.g. gear restrictions in licence conditions).

Early Summer Management

Forecast returns for stocks within this management group are variable but generally lower than average given the lower than average escapements in the brood year.

Based on the approved escapement option, the pre-season forecast range and long term median management adjustment values, Early Summers may be in a LAER up to p75 forecast levels. Directed harvest opportunities on Early Summer Run Sockeye are anticipated to be limited and potentially only available if the return falls in the upper levels of the forecast distribution. Harvest may be limited by constraints on co-migrating groups (e.g. Early Stuart, Summer, and Late Run) and stocks of concern. In 2021, the Department sought feedback and received support for adding an additional week to the typical 3-week Early Stuart window closure (i.e. 4-weeks total closure) to provide protection for the early component of the Early Summer Run Sockeye (e.g. Bowron, Taseko). **For fishery planning and management, see Table 13.5-12 for the 2021 4-week window closure dates, however note that the actual closure dates and duration may change pre-season or in-season based on updated timing or other in-season information.**

Summer Run Management

The Summer Run Sockeye make up approximately 79% of the total return at the median forecast. Quesnel, Chilko, and Late Stuart are the largest contributors to the Summer run stocks (87%) and to the overall 2021 forecast (70%). Based on the approved escapement plan, the pre-season forecast range and long term median management adjustment values, the Summer Run is anticipated to be in a LAER situation unless returns exceed the p50 forecast. Harvests, if any, may be very limited, and additionally limited by constraints on co-migrating groups (e.g. Early Stuart, Early Summer and Late Run) and stocks of concern (e.g. Cultus Lake Sockeye, Interior Fraser Coho).

Late Run and Cultus Lake Sockeye Management

The Late Run return in 2021 represents an off-cycle line and is expected to be below the cycle line average at the midpoint of the forecast distribution. Similar to the contribution to the forecast in 2020, the Late Run Sockeye make up approximately 12% of total return at the median forecast in 2021.

Historically, the ocean migration timing of Late Run Sockeye was similar to Summer Run Sockeye, however, Late Run Sockeye typically delayed entering the Fraser River by 4 to 6 weeks. Beginning in the mid-1990s, Late Run Sockeye entered the Fraser River much earlier, and experienced very high levels of en-route and/or pre-spawn mortality. More recently, the trend towards shorter periods of delay and earlier upstream timing, appears to be reversing.

While a range of studies have been undertaken to understand the cause and impact of this phenomenon, no causal factors have been identified. Planning for 2021 may take timing into account specifically when calculating in-season management adjustments for this group.

Based on the pre-season forecast, directed harvest opportunities on Late Run Sockeye are not expected throughout the forecast range (p10 to p90) as Late Run Sockeye remain in a LAER situation. Late Run Sockeye harvest will likely be in fisheries directed on Early Summer or Summer Run Sockeye and they will be subject to constraints on co-migrating stocks of concern such as Cultus Lake Sockeye and Interior Fraser Coho.

Cultus Lake Sockeye

Management of Cultus Lake Sockeye will be based on the Cultus Lake Sockeye recovery objectives and an assessment of in-season information for the Late Run Sockeye stock aggregate. For more information on the recovery objectives, refer to Section 6.7 of the IFMP under Fishery Management Objectives for Stocks of Concern.

Due to the low numbers of Cultus Lake Sockeye compared to co-migrating stocks, the abundance and exploitation rate for Cultus Lake Sockeye cannot be calculated directly. For management purposes, the Cultus abundance, exploitation rate and en-route mortality will be assumed to be the same as the abundance (relative to run size forecast p-values), exploitation and en-route mortality rate for similarly timed Late Run stocks caught seaward of the confluence of the Fraser and Vedder Rivers. Exploitation rates are based on DNA analysis of Sockeye sampled either directly from fisheries or indirectly, from nearby test fisheries. En-route mortality estimates are based on the Late Run management adjustment which may be updated in-season.

Assessment of the Cultus population shown in Table 13.5-13 is sensitive to assumptions about en-route and pre-spawn mortality. Assuming the average estimated pre-spawn mortality (PSM) since the early upstream migration of Late Run began in 1996 (approximately 40%), the Late Run (excluding Birkenhead) pDBE, and the p10 to p90 pre-season forecast abundance range, the short term minimum recovery objectives 1 & 2 (see below and Section 6.7 of the IFMP under Fishery Management Objectives for Stocks of Concern) for the Cultus population are unlikely to all be met in 2021. The values in the table are also limited to the maximum exploitation rate permissible for Late Run Sockeye based on the escapement plan (i.e. LAER), abundance and management adjustment. In-season, these maximum exploitation rates for Cultus Sockeye may be higher or lower than indicated, due to interactions between run size, management adjustment, pre-spawn mortality, Late Run escapement plan and Cultus recovery objectives. These exploitation rates are not intended to be used as management targets and in-season fishery management planning will take into account a range of considerations including

updated assumptions based on in-season information as well as objectives for other Fraser Sockeye management groups and/or other stocks/species. Table 13.5-13 shows how the projected successful spawners compared to Objectives 1 & 2 across the middle forecast range, with pre-season assumptions of en-route and pre-spawn mortalities. Objectives 3 & 4 are longer term objectives and the performance of Cultus in relation to these objectives is not being assessed in Table 13.5-13.

Objective 1 - Ensure the genetic integrity of the population by exceeding a four-year arithmetic mean of 1,000 successful adult spawners with no fewer than 500 successful adult spawners on any one cycle. This objective secures genetic variability.

- 1a. 4 year average successful spawners > 1,000
- 1b. minimum of 500 successful spawners in each of the last 4 years

Objective 2 - Ensure growth of the successful adult spawner population for each generation (that is, across four years relative to the previous four years), and on each cycle (relative to its brood year) for not less than three out of four consecutive years. This objective ensures the population is growing.

- 2a. 4 year average spawners > previous 4 year average spawners
- 2b. current year spawners > brood year spawners

Objective 3 - Rebuild the population to the level of abundance at which it can be delisted (designated Not at Risk) by COSEWIC.

Objective 4 - Rebuild the population to a level of abundance (beyond that of Objective 3) that will support ecosystem function and sustainable use. This long term objective proposes candidate benchmarks for Cultus Sockeye that correspond to our current understanding of the dynamics of Cultus Sockeye.

Table 13.5-13: Assessment of Cultus population performance compared to management objectives 1 & 2, based on the escapement plan, a range of pre-season run sizes and management adjustments to account for en-route losses.

2021 projected Cultus successful spawners

		p10			p25			p50			p75			p90		
run size		200			500			900			2,000			4,000		
exploitation rate (ER)		20%	10%	0%	20%	10%	0%	20%	10%	0%	20%	10%	0%	20%	10%	0%
pDBE	-0.58															
projected adults to the fence		67	76	84	168	189	210	302	340	378	672	756	840	1,344	1,512	1,680
brood stock (excluded from calculations)	38															
potential spawners		29	38	46	130	151	172	264	302	340	634	718	802	1,306	1,474	1,642
pre-spawn mortality (PSM)*	40%															
projected successful adult spawners		20	20	30	80	90	100	160	180	200	380	430	480	780	880	990

Cultus Management Objectives - projected 2021 evaluation

Management Objectives	value	p10			p25			p50			p75			p90		
1a. 4 year avg successful spawners **		88	88	90	103	105	108	123	128	133	178	190	203	278	303	330
	> 1000	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
1b. minimum 500 in each year (2017-2020)**		no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
2a. 4 year avg > previous 4 year avg	> 1,303	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
2b. current year > brood year	> 424	no	no	no	no	no	no	no	no	no	no	yes	yes	yes	yes	yes

* PSM value of 40% used in these calculations are based on the average PSM since 1996, some of which were not directly attained through stock assessment programs - see note below

** successful spawners estimates are highly dependent on PSM assumptions, which can be difficult to assess due to difficulties in retrieving Cultus sockeye carcasses after spawning

The 2021 calculations assume the average pre- spawn mortality rate since 1996 of approximately 40%. Note, exploitation rates range from 0-20%, but the 2021 escapement plan includes a Late Run LAER of up to 10%.Table 13.5-13 illustrates the potential differences in outcomes based on varying levels of exploitation, including a zero percent (no harvest) scenario. Also, brood stock removals are set at a level to remove half of the projected adults to the fence at a return similar to the p10 forecast level and the 10% exploitation (equivalent to the 10% LAER escapement plan).

13.5.6.5 ALLOCATION AND FISHING PLANS

13.5.6.5.1 First Nations Fisheries

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Food Social and Ceremonial

FSC fisheries in the Fraser River, including Subareas 29-6, 29-7, 29-9, and 29-10, could be affected by 2021 IFR Steelhead conservation measures. A 27-day rolling window closure will be applied to FSC fisheries according to the times and areas outlined in Appendix 9. These measures will not extend to marine FSC fisheries.

First Nations opportunities to harvest salmon for food, social and ceremonial (FSC) purposes is provided through communal licenses issued by DFO. These licenses support the effective

management and regulation of First Nations fisheries. These licenses are typically issued to individual bands or tribal groupings, and describe the details of the FSC fishery including the dates, times, methods, and locations of harvest. Communal licenses for Southern Coastal First Nations are typically multi-species and are issued on an annual basis. Shorter duration amendments to licenses are also issued on occasion. For Fraser River First Nations, licenses are typically of shorter duration, and are issued to provide for specific First Nations' salmon fisheries openings.

Actual opportunities and catches will be dependent on, among other factors: in-season stock strength, management measures taken to ensure conservation of individual stocks, community needs of First Nations, and alternative sources of salmon if preferred species are not available locally due to low abundance. For these reasons, in some cases, groups may not be able to harvest their full shares. FSC fisheries will be planned to maximize the use of selective gear types and reduce bycatch where possible.

Refer to Section 10.2 for Table 10.2-1 - Communal Licence Harvest Target Amounts in Southern BC/Fraser River First Nations Fisheries.

Specific Conservation Measures for First Nations Fisheries

Early Stuart Sockeye

Refer to Section 13.5.6.3, and LAER for details.

Cultus Lake and Late Run Sockeye

Refer to Section 13.5.6.3, and LAER for details.

Fishery Monitoring and Catch Reporting

Marine Waters

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations are asked to keep records of harvest and provide catch information to DFO in a variety of formats. Under this licence, if a commercial vessel is used for fishing, First Nations are asked to provide information respecting the species and quantity of fish harvested by this vessel, to the DFO Catch Reporting Officer within 24 hours from landing harvested catch. In addition, catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where in-season management requires, catch reports are sought weekly during the respective fishing season.

Fraser River and tributaries

Catch monitoring programs are managed through Activity Funding or Comprehensive Fisheries Agreements.

In the lower Fraser River (below Sawmill Creek), monitoring programs implemented vary between Nations but typically include landing site or vessel based collection of catch and effort information paired with validation of effort by vessel patrols or overflights. Catch reports are received by DFO from catch monitoring programs on a weekly basis, within 48 hours of a fishery closing.

For fisheries on the Fraser watershed above Sawmill Creek, catch monitoring programs typically range from basic census type to more enhanced programs that include collecting effort and catch rate information in creel sample programs.

Treaty Fisheries

Treaty fisheries in the Fraser River, including Subareas 29-6, 29-7, 29-9, and 29-10, could be affected by 2021 IFR Steelhead conservation measures. A 27-day rolling window closure will be applied to Treaty fisheries according to the times and areas outlined in Appendix 9. These measures will not extend to marine Treaty fisheries.

Tsawwassen Fisheries (Domestic)

The domestic allocation for Sockeye salmon under the Tsawwassen First Nations Final Agreement is as follows:

When the Canadian Total Allowable Catch for Fraser River Sockeye salmon is 500,000 or less, 1.0% of the Canadian Total Allowable Catch for Fraser River Sockeye salmon;

When the Canadian Total Allowable Catch for Fraser River Sockeye salmon is greater than 500,000 and less than 3.0 million, then 5,000 Fraser River Sockeye salmon plus 0.40904% of that portion of the Canadian Total Allowable Catch for Fraser River Sockeye that is greater than 500,000 and less than 3.0 million; and

When the Canadian Total Allowable Catch for Fraser River Sockeye salmon is equal to or greater than 3.0 million, then 15,226 Fraser River Sockeye salmon.

The monitoring program for Tsawwassen Domestic fisheries includes fisher logs supplemented by validations of catch and effort through on-water patrols and/or observations of landings.

Details of monitoring programs in place can be found in the Tsawwassen Fisheries Operational Guidelines.

Tla'amin Fisheries (Domestic)

The Domestic allocations for Fraser River Sockeye salmon under the Tla'amin First Nation's Final Agreement are as follows:

In any year, the Tla'amin Fish Allocation for Sockeye salmon is: a number of Fraser River Sockeye salmon equal to:

When the CTAC for Fraser River Sockeye salmon is less than or equal to 2.0 million, 0.5% of the CTAC for Fraser River Sockeye salmon; or

When the CTAC for Fraser River Sockeye salmon is greater than 2.0 million and less than or equal to 6.5 million, 10,000 Fraser River Sockeye salmon plus 0.1% of that portion of the CTAC for Fraser River Sockeye salmon that is greater than 2.0 million and less than or equal to 6.5 million; or

When the CTAC for Fraser River Sockeye salmon is greater than 6.5 million, 14,500 Fraser River Sockeye salmon plus 0.048% of that portion of the CTAC for Fraser River Sockeye salmon that is greater than 6.5 million.

The Tla'amin First Nation provides catch reports to the Department through the Aboriginal Harvest Management System (AHMS). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and biological samples.

Maa-nulth Fisheries (Domestic)

The domestic allocation for Sockeye salmon under the Maa-nulth First Nations Final Agreement is an amount of Fraser River Sockeye salmon equal to 0.13366% of the Fraser River Sockeye Salmon Canadian Total Allowable Catch.

The Maa-nulth First Nations provide catch reports to the Department through the Maa-nulth Electronic Reporting Program (MERP). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and pieces of salmon harvested.

Five Nations (Ahousaht, Ehattesaht, Hesquiaht, Mowachaht / Muchalaht, and Tla-o-qui-aht First Nations) Multi-species Fishery

Five Nuu-chah-nulth First Nations located on the west coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht (the Five Nations) – have an

aboriginal right to fish for any species, with the exception of Geoduck, within their court-defined fishing territories and to sell that fish. For further information please see Section 10.3.1.

The Five Nations Multi-species fishery for Fraser River Sockeye will not be affected by 2021 IFR Steelhead conservation measures.

13.5.6.5.2 Recreational Fisheries

Recreational fisheries in the Fraser River (including Areas 29-6, 29-7, 29-9, and 29-10) will be affected by 2021 IFR Steelhead conservation measures. A 42-day rolling window closure will be applied to recreational fisheries according to the times and areas outlined in Table 13.5-14 below and in Appendix 9. These measures will not extend to marine recreational fisheries.

Table 13.5-14: Dates and Area for the Interior Fraser River 42-day Rolling Closure for Recreational Fisheries in the Fraser River.

Fishery Location	Start	End
Area 29: 29-6, 29-7, 29-9, and 29-10	19-Sep	30-Oct
Mouth to Port Mann Bridge	19-Sep	30-Oct
Port Mann Bridge to Mission	21-Sep	1-Nov
Mission to Hope	22-Sep	2-Nov
Hope to Sawmill Creek	26-Sep	6-Nov
Sawmill Creek to Lytton (Thompson Confluence)	28-Sep	8-Nov
Lytton to Texas Creek	1-Oct	11-Nov
Texas Creek to Kelly Creek	3-Oct	13-Nov
Kelly Creek to Deadman Creek	6-Oct	16-Nov
Deadman Creek to Chilcotin River	9-Oct	19-Nov
Chilcotin River	12-Oct	22-Nov
Thompson River – Thompson Confluence to Bonaparte	1-Oct	11-Nov
Thompson River – Bonaparte River to Kamloops Lake	5-Oct	15-Nov

Opportunities for targeted Fraser River Sockeye fisheries will be determined based upon in-season assessment and abundance of Fraser River Sockeye stocks. Sockeye non-retention will be

in effect in most South Coast waters until such time as in-season information indicates an allowable recreational/commercial total allowable catch of Fraser Sockeye.

In years when opportunities are available for recreational Sockeye, fisheries typically take place in August, and updates are provided via Fishery Notice and on the recreational fisheries website: http://www.bcsportfishingguide.ca. The normal daily limit is four Sockeye in marine waters and two Sockeye in non-tidal waters. In some cases, recreational fisheries may be reduced or closed due to conservation concerns and management considerations that are identified in-season. Due to conservation concerns for other species of Fraser River salmon, Sockeye opportunities may be delayed or forgone. Refer to Section 13.5.6.3, and LAER for details.

As part of proposed 2021 Chinook management measures, Fraser River recreational fisheries would remain closed to salmon fishing until at least August 23 similar to the 2020 season. These measures may be updated based on feedback from consultations. After that date, opportunities for species other than Chinook will be informed by in-season abundance and other conservation issues (Coho, Steelhead, etc.). Reduced fishing opportunities may be provided in tributary areas during times and locations at-risk Chinook stocks would not be encountered. See Section 13.1.4.5.2 for more information.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Fishery Monitoring and Catch Reporting

Marine Waters

Catch monitoring programs including creel surveys, logbooks and the internet recreational effort and catch survey (iREC), are the main tools used to capture recreational catch and effort information for this fishery. South Coast stock assessment staff use these programs to provide annual estimates of the recreational effort and harvest in each area.

Fraser River and Tributaries

Creel surveys are conducted in portions of the lower Fraser River and select tributaries in order to estimate recreational catch and effort for the times and areas surveyed. Typically, the creel survey in the lower Fraser River mainstem begins when the river is opened to recreational salmon fishing; however recently the survey end date has trended toward the end of November as the mainstem opening has trended later in the year. The creel surveys conducted on the Chilliwack River and Nicomen-Norrish recreational fisheries have remained relatively stable

over the last number of years both in times and areas surveyed (generally, Chilliwack is surveyed from mid-September to mid-November and Nicomen-Norrish is surveyed from early October to the end of November).

Catch monitoring programs in the Fraser watershed upstream of Alexandria will range from fisher reported catch to highly intensive creel surveys; however, some times and areas are unmonitored. Expected effort and catch, harvest rates, potential bycatch, and any biological sampling requirements are taken into account when planning the catch monitoring program for these areas.

13.5.6.5.3 Commercial Fisheries

While it is unlikely to occur in 2021, conservation measures to protect Interior Fraser River Steelhead will affect Fraser Sockeye fisheries if fisheries persist late in the season. Dates and areas for rolling window closures can be found in Appendix 9.

Commercial fisheries for Fraser River Sockeye may occur both in the marine approach waters and within the Fraser River and tributaries. In the marine waters these commercial fisheries include the Area B seine and the Area H troll individual transferable quota (ITQ) fishery, and the Area D gill net full fleet competitive (derby) fishery. Additionally, in years with large returns, Area G Troll fishing opportunities on the West Coast of Vancouver Island may be considered. Within the Fraser River and tributaries, commercial fisheries include the Area E gill net full fleet competitive (derby) fishery, along with First Nations economic opportunity (EO) and demonstration fisheries. There may also be consideration for escapement surplus to spawning requirement (ESSR) fisheries in terminal areas.

Opportunities for targeted Fraser River Sockeye fisheries will be determined based upon in-season assessment and abundance of Fraser River Sockeye stocks. Fishing opportunities will also be subject to achieving fisheries management objectives for constraining stocks and species of concern (Early Stuart Sockeye, Cultus Lake Sockeye, Nimpkish Sockeye, Sakinaw Sockeye, IFR Coho, IFR Steelhead, and Fraser River Spring 4_2 and Spring/Summer 5_2 Chinook) in areas where they are present. Even if fishing opportunities are available, in some cases full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season.

Allocation

Table 13.5-15: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South – Fraser – Small Return Years (e.g. 2019)	11 to 20, 29, 121, 123 to 127	48.5%	21.6%	25.1%	0.0%[d]	4.8%

Notes on Sockeye allocation (south):
[d] a 1% share to occur in large Fraser River return years only. A 1% reduction will be proportionately applied across other fleets in those years.

Johnstone Strait (Areas 11 to 13)

Area B (Seine) and Area D (Gill Net)

Early to Late July - Areas 11 to 13

- No fisheries are anticipated prior to late July in order to protect Sakinaw Lake and Fraser River Early Stuart and early-timed Early Summer Run Sockeye. No fishing opportunities are available above Lewis Point prior to late July to protect returning Nimpkish River Sockeye.

August to Mid-September - Areas 11 to 13

- Although highly unlikely in 2021, directed fisheries may occur for Fraser River Sockeye. Opportunities will be based on in-season assessment and abundance information. If a fishery occurs, Area B seines will be managed as an ITQ demonstration fishery (along with Area H troll- see details below in demonstration fisheries section). Area D gill nets will be managed as an open, competitive (derby-style) fishery.

Strait of Georgia (Area 14 and 16)

Area B (Seine)

Consideration may be given for Fraser River Sockeye seine fisheries in portions of Area 14 and Area 16 (Sabine) subject to in-season information, as well as constraints for Sakinaw Sockeye and for other stocks of concern.

Juan de Fuca Strait, Strait of Georgia and Fraser River (Areas 18, 20 and 29)

Area B (Seine)

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Subject to in-season information, Area B seine opportunities will be considered in Juan de Fuca (Area 20), Area 18, and Area 29. Opportunities and fishing locations will be confirmed based on in-season information.

The Fraser River Panel in conjunction with DFO will develop and implement Fraser River Sockeye fishing plans for these areas, as they fall within Fraser River Panel management responsibilities.

Early to Late July – Areas 18, 20 and 29

- No fisheries anticipated prior to late-July in order to protect early-timed Fraser River Sockeye stocks.

Late July to Mid-August - Areas 18, 20 and 29

- Fraser River Sockeye fishing plans will be based on in-season estimates of abundance and timing.
- Coho release mortalities, TAC and diversion rate will be factors determining available harvest opportunities during this period.

Late August to early September – Areas 18, 20, 29

Opportunities for harvesting Sockeye will be based on in-season abundance and assessment information, and subject to IFR Coho, Cultus (Late Run) Sockeye and IFR Steelhead constraints.

Area 29 and Tidal Waters of the Fraser River

Area E Gill Net

Subject to in-season information, Area E gill net opportunities will be considered in Area 29, including tidal waters of the Fraser River and off the Fraser River mouth. Opportunities and fishing locations will be confirmed based on in-season information. Fisheries may take place in August. Fisheries in early September will be subject to constraints due to co-migrating Coho salmon. Sockeye fisheries will not be considered after the Interior Fraser Coho window closure

date as described under Fraser River Fisheries in Section 13.3.2.5 of the Southern Coho Species plan (Section 13.2.7).

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Queen Charlotte Strait and Johnstone Strait (Areas 11 to 13), and lower Strait of Georgia (Areas 18 and 29)

Area H (Troll)

Actual opportunities for targeted Fraser River Sockeye fisheries will be determined based upon in-season assessment and abundance of Fraser River Sockeye stocks and also subject to achieving fisheries management objectives for constraining stocks and species of concern (Early Stuart Sockeye, Cultus Lake Sockeye, Nimpkish Sockeye, Sakinaw Sockeye, IFR Coho, IFR Steelhead, and Fraser River Spring 4_2 and Spring/Summer 5_2 Chinook) in areas where they are present.

If an opportunity is available, ITQ fisheries could occur in Queen Charlotte Strait and Johnstone Strait (Areas 11 to 13), and in the lower Strait of Georgia (Areas 18 and 29). Fishing opportunities will be confirmed in-season following consultation with industry and will depend on run size, diversion rate and Area H TAC. If a fishery occurs, Area H troll will be managed as part of the Area B Seine and Area H Troll ITQ demonstration fishery (see details below in demonstration fisheries section).

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

West Coast Vancouver Island and Queen Charlotte Strait (Areas 11, 12, 20, 111 121 to 127)

Area G (Troll)

Fishing opportunities for Fraser River Sockeye are not planned in 2021 given Area G only receives an allocation for Fraser Sockeye in years of large returns based on commercial allocation arrangements.

For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.

Fishery Monitoring and Catch Reporting

Fishery Monitoring and Catch Reporting includes the following:

Over-flights conducted to count vessels (effort) in each Area D gill net opening; counts of Area B seine and Area H troll vessels are also made if they are present in the fishing area.

On-grounds DFO funded charter patrol coverage in portions of Areas 12 and 13.

Vessel counts conducted to verify number of vessels (effort) in each Area E gill net opening.

On-water observer coverage (on grounds charter patrol and DFO roving catch monitoring coverage) in each Area E gill net opening to conduct net haul observations and gather independent information on encounters of target and non-target species.

Mandatory requirement to file fishing reports in all commercial fisheries, including "Start/Pause/Cancel/End" Fishing reports.

Mandatory catch reporting by phone-in with a paper harvest log and electronic transmission with an electronic harvest log (E-log). Catch reporting requirements are specific to each licence group and are detailed in the conditions of licence for each gear type

100% dockside catch validation for Area B seine and Area H troll ITQ fisheries.

Partial independent on-board/at-sea observer coverage for Area B seine and Area H troll fisheries in areas where species and stocks of concern are present (e.g. Areas 16, 20, 29).

South Coast Fraser Sockeye Demonstration Fisheries

Area B Seine and Area H Troll Fraser River Sockeye Individual Transferable Quota (ITQ) Demonstration Fishery

Please see Appendix 7 for more information on the Area B and Area H Fraser Sockeye and Pink ITQ demonstration fishery guidelines for 2021.

This demonstration fishery will be similar to the quota based ITQ Fraser River Sockeye fishery that was planned for 2009-2020. Note that a separate demonstration fishery proposal is provided for a demonstration – experimental seine fishery in the lower Fraser River.

Region: South Coast and Lower Fraser River Areas

Participants: All Area B seine and H troll licence holders

Location of Fishery: Seine fishing areas that will be considered in the fishery include: Johnstone Strait (portions of Area 12 and 13), Juan de Fuca (portions of Area 20), portions of Areas 16 and 18, and portions of Area 29 off the Fraser River mouth, which may include depths shallower than 45 m.

In Area 20, additional measures may be in place to minimize impacts on Coho. Consideration for seine fishing opportunities in Area 20 will also be dependent on diversion rate estimates.

Troll fishing areas that will be considered in the fishery include; Johnstone Strait (portions of Areas 12 and 13), portions of Areas 16 and 18, and portions of Area 29 off the Fraser River mouth.

In Areas 12, 13 and 20, additional restrictions will be identified around test-fishing locations to minimize impacts on test-fishery assessment requirements.

Gear Type: Seine and Troll gear, selective fishing measures are mandatory and are specified by licence conditions.

Power skiffs may be used where conditions of licence permit. Shallow seine nets may be used in areas off the mouth of the Fraser.

Time Frame: This fishery is planned to occur when Fraser River Sockeye Canadian Commercial TAC is identified. It is anticipated that this fishery will take place within the time period of late July to early September.

The Area H troll fishery is anticipated to be open on a 7 day per week basis as TAC permits. The Area B seine fishery is expected to be open 5 to 7 days per week and will be dependent on the amount of available TAC and the available time frame for the fishery.

It is expected that Area B seine fishing opportunities in Area 20 and Area 29 will also be managed to a boat day limit to control impacts on Interior Fraser Coho.

Allocation: The fishery will be based on available Fraser River Sockeye commercial TAC. Shares for each fleet will be based on the commercial allocation plan.

The Fraser River Sockeye quota (ITQ) will be determined by DFO by dividing the respective Area B and Area H Fraser River Sockeye allocations by the total number of licences for Area B and Area H multiplied by the available commercial Fraser River Sockeye Total Allowable Catch (TAC) determined in-season.

The quota share will be expressed as a percentage of the TAC and the percentage will remain fixed in-season, subject to amendments for in-season quota transactions. The TAC may be distributed over the course of the fishery in increments. The TAC will be announced by fishery notice and adjusted as required. Updates will typically be announced following Fraser River Panel meetings (usually Tuesday and Friday).

Quota will be transferable within each licence area (e.g., Area B to Area B; or, Area H to Area H) as well as between licence areas (e.g., Area B to Area H; or vice versa).

Transfers to or from other commercial fisheries is currently under review by the Department.

The target species is Sockeye and bycatch retention of Pink and Chum is permitted (except Chum retention is not permitted in Area 20). There will be non-retention of Coho, Chinook and Steelhead.

Monitoring Plan: Start, end, pause and daily catch reports will be required by phone-in or electronic logbook. There is a requirement for 100% third-party dockside validation of the catch at designated landing locations. Over flights will be conducted and charter patrol will monitor the fishery.

Additional on-grounds observer coverage/monitoring may be required to assess the releases of non-target species in Area B and H Sockeye fisheries. Observer requirements will be determined in-season, subject to areas fished and effort.

Additional monitoring requirements are required and in place for the Area 20 seine fishery including on-grounds management, set by set reporting in established grid zones and observer coverage.

Area B Seine Fraser River Sockeye Demonstration (ITQ) Fishery in the Lower Fraser River

This demonstration fishery proposal is similar to the proposal that was provided by Area B to DFO in 2010.

The purpose of this experimental fishery project is to demonstrate the effectiveness of harvesting Fraser River Sockeye and/or Pink salmon within the confines of the Fraser River, employing the selective capabilities of a purse seine and secondly to capitalize on the ability to continue the harvest of Sockeye salmon and/or Pink salmon that may not be available in marine areas due to other constraints.

This fishery would be managed as part of the Area B and H demonstration ITQ fishery for Fraser River Sockeye and/or Pink salmon.

Region: Lower Fraser River Area

Participants: All Area B licence holders will be eligible. However, as this is an experiment, effort controls will be in place to limit participation to a maximum of eight to ten vessels fishing on any given day

Location of Fishery: Area 29 in-river: Area B has indicated there are a number of potential locations around New Westminster, Glenrose, the Cement Plant and down to the Deas Tunnel that would be suitable for seining and would for the most part, be out of the shipping lanes

Gear Type: Seine gear using shallow seine nets, the use of power skiffs and selective fishing measures are mandatory and are specified by licence conditions

Time Frame: This fishery is planned to occur when Fraser River Sockeye and/or Pink Canadian Commercial TAC is identified. It is anticipated that this experimental fishery would take place sometime within the time period of mid-August to late September.

> Consideration of other fisheries in the area will be taken into account when planning Area B in- river fishing activities. Specific fishing times would be confirmed in-season through an integrated planning process. The amount of available fishing days for this experiment will be confirmed in-season.

Allocation: For this experimental fishery to proceed, it will require available Fraser River Sockeye commercial TAC. The harvest from this fishery will be part of the Area B and H Fraser River Sockeye and Fraser Pink ITQ demonstration fishery. The quota share will be expressed as a percentage of the commercial TAC.

> As this is an experimental fishery, there will be a cap on the total allowable harvest in this fishery and the amount will be confirmed in-season. The target species is Sockeye and/or Pink salmon, retention of Chum may be permitted; there will be non-retention of all other species.

Monitoring Plan: As per the Area B and H Fraser River Sockeye and Pink demonstration ITQ fishery, start, end, pause and daily catch reports will be required by phone-in or electronic logbook. There is a requirement for 100% dockside validation of the catch at designated off- loading locations.

There will be a requirement for observer coverage on all vessels participating in this fishery. In addition to monitoring catch, observers will be available to collect any DNA sampling that is required and identified.

13.5.6.5.4 Fraser First Nations Commercial Sockeye Harvest

While it is unlikely to occur in 2021, conservation measures to protect Interior Fraser River Steelhead will affect Fraser Sockeye fisheries if fisheries persist late in the season. Dates and areas for rolling window closures can be found in Appendix 9.

Opportunities for targeted Fraser River Sockeye fisheries will be determined based upon in-season assessment and abundance of Fraser River Sockeye stocks. Fishing opportunities will also be subject to achieving fisheries management objectives for constraining stocks and species of concern (Early Stuart Sockeye, Cultus Lake Sockeye, Nimpkish Sockeye, Sakinaw Sockeye, IFR Coho, IFR Steelhead, and Fraser River Spring 4_2 and Spring/Summer 5_2 Chinook) in areas where they are present. Even if fishing opportunities are available, in some cases full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season.

Demonstration Fisheries

Discussions regarding demonstration fisheries that will provide commercial opportunities for First Nations and allow for continued testing of inland fisheries. As in previous years, the focus with First Nations will be on experimenting mainly in terminal areas on abundant stocks. These fisheries will be conducted separately from FSC fisheries, under comparable rules to the commercial fishery and fish harvested will be off-set with licences voluntarily relinquished from the commercial fishery.

Even if fishing opportunities are available, in some cases full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season.

Upper Fraser Indigenous Sustainable Harvesters (UFISH) – In- River Sockeye Fisheries

The UFISH Commercial Fishing Enterprise focuses on viable and sustainable fishing practices. Discussions are on-going with partners based on the viability of individual fisheries. The 2021

demonstration fishery will build on previous years' experiences to implement successful fisheries and address constraints and challenges to harvesting allocations, marketing, processing and acquiring infrastructure required for the emerging inland fisheries.

Participants: UFISH Partnership – Northern Shuswap Tribal Council (NSTC); Tsilhqot'in National Government (TNG)/Xeni Gwet'in First Nations Government; Carrier Sekani Tribal Council (CSTC); Lheidi T'enneh First Nations (LTFN)

North Shuswap Tribal Council

Location: Quesnel River, Quesnel Lake, Chilcotin River and mainstem Fraser

Gear Type: Beach seine, purse seine, dip nets, and fish wheels

Time Frame: Fishery will target Summer run (Quesnel / Chilko / Late Stuart / Nechako Rivers) Sockeye. Potential start date is August 16 for a six week fishery

Tsilhqot'in National Gov't / Xeni'Gwet'in First Nations Government

Location: Chilko River, Chilko Lake and Chilcotin River and mainstem Fraser

Gear Type: Beach seine, purse seine, dip net, partial weir/fish trap, and fish wheel

Time Frame: Fishery will target Summer run (Quesnel / Chilko / Late Stuart / Nechako Rivers) Sockeye. Potential start date is August 16 for a three to four week fishery

Carrier Sekani Tribal Council and Lheidli T'enneh First Nations

Location: Fraser River, Fraser Lake and other suitable locations identified by the parties

Gear Type: Beach seine, dip net, partial weir/fish trap, and purse seine

Time Frame: Fishery will target Summer Run (Late Stuart/Stellako) Sockeye. Potential start date is August 15 for a four week fishery.
NOTE: All fishery time frames are estimates and final dates will be determined based on in- season migration timing and abundance information.

Allocation: All fisheries described above
Allocation to be determined but will be expressed as a percentage (%) share of Commercial Total Allowable Catch (CCTAC) of Fraser Sockeye stocks in the area utilizing relinquished licences from the PICFI program.

Monitoring Plan: All fisheries described above
Fishery will be monitored using designated landing sites, electronic logbook system (ELOG) and validation of catch at either landing site or plant.

Harrison-Fraser River Demonstration Fishery

Region: Lower Fraser Area

Participants: Sts'ailes and Scowlitz First Nations

Location of Fishery: The waters of the Harrison River located between the outlet of Harrison Lake downstream to the orange boundary signs labelled 'Fishing Boundary HFA' approximately 1000 meters below the CN Railway Bridge; and the waters of the Fraser River bounded on the west by a line from a white boundary sign on the upstream side of the Fraser River at the mouth of the Sumas River, thence true north to a white boundary sign on the opposite shore and bounded on the east by the downstream side of the bridge across the Fraser River at Agassiz.

Gear Type: Set nets, drift nets or beach seines. Beach seines not to exceed a maximum mesh size of 2 ¾ inches and a length of 50 fathoms or 360 feet,

Allocation:
Sockeye: To be determined but will be expressed as a percentage (%) share of Canadian Commercial Total Allowable Catch (CCTAC) utilizing relinquished licences form the PICFI program.

Time Frame: All fishery time frames are estimates and final dates will be determined according to in-season migration timing information.
Sockeye: This fishery would be planned to take place once a Fraser River Sockeye Canadian Commercial TAC is identified, potentially late July to early September.
Fraser Chinook: Fraser Chinook bycatch retention may be permitted subject to abundance.

Monitoring Plan: During any set net or drift net fishing activity, the fishers will transport their catch to a predetermined Sts'ailes /Scowlitz landing site to have their catch monitored. During any beach seining activity, a Monitor must be present with every beach seine crew during all fishing activity and provide set-by-set updates to the Sts'ailes Fishery Manager, before the beach seine crews deploy their next set to ensure there is TAC available. The Harrison Fishing Authority will collect all catch statistics via these monitors and report this information to DFO immediately after the fishery closes.

Harvest Agreements

Even if fishing opportunities are available, in some cases full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season.

Tsawwassen Fisheries (Commercial)

In addition to the allocation of salmon for domestic harvests, TFN have an allocation for commercial catch outside of the Treaty as identified via the "Tsawwassen First Nations Harvest Agreement". Fishing undertaken via the Harvest Agreement (HA) will be comparable to the requirements of the current Fraser River commercial fishery (First Nations economic opportunity (EO) fishery), or a general commercial fishery (e.g., Area E). Tsawwassen harvesters will be expected to operate under the same rules that apply to other fishers taking part in that Fraser River commercial fishery.

Sockeye salmon allocation under the Harvest Agreement: 0.78% of the Commercial Allowable Catch for Fraser River Sockeye salmon for that year.

The monitoring program for Tsawwassen Harvest Agreement fisheries includes a mandatory landing program (MLP) using 2 to 4 landing sites at which all fishers must land and have their catch validated and is supplemented by effort validation by vessel patrols. If selective gear is used (e.g., purse seines), monitors must be present during all fishing activity to record catch information on a set-by-set basis.

Economic Opportunities

Negotiations to provide economic opportunities to First Nations in the lower Fraser River will be undertaken as in recent years. Economic opportunity fisheries may be conducted under agreements that specify provisions for planning fisheries, allocations, catch reporting requirements as well as roles and responsibilities regarding the management of the fishery. The Department's general approach is that Aboriginal commercial harvest opportunities are managed using requirements comparable to the commercial fishery.

Even if fishing opportunities are available, in some cases full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season.

Fishery Monitoring and Catch Reporting

Lower Fraser

In the Lower Fraser, catch monitoring programs are managed through Comprehensive Fisheries Agreements. While details will be finalized prior to fisheries occurring; the monitoring programs in place for 2021 are expected to be similar to recent years as follows:

Non-selective (e.g., gill-net) EO fisheries will be monitored using a mandatory landing program (MLP) with packer and land-based sites. All fishers must land their catch at these

sites and have their catch validated. This program is supplemented by effort validation by vessel patrols and overflights.

Selective (e.g., beach seine and purse seine) EO fisheries require monitors to be present during all fishing activity to record catch and release information on a set-by-set basis.

13.5.6.5.5 ESSR Fisheries

ESSR fisheries for individual Fraser Sockeye spawning populations may be considered if the projected number of effective spawners is expected to exceed the freshwater productive capacity of the system taking into account requirements for adult spawners or juvenile rearing. Stock specific spawning requirements may be determined based upon WSP benchmarks, TEK, and stock specific information, on a system by system basis upon receipt of a terminal access request. Given inherent uncertainties about freshwater capacity, a decision on whether an ESSR will proceed will be made by the Department and any amounts specified for harvest may take into account available information and associated uncertainties on a range of factors including: stock-specific abundance, projected spawner abundances, productive capacity of the system, stock composition in the proposed fishing area and selectivity of fishing gear.

Given the uncertainties of in-season information, the Department may permit only a portion of any estimated surplus to be harvested. **Even if fishing opportunities are available, in some cases full harvest targets may not be harvestable due to conservation concerns and management considerations that are identified in-season.**

Table 13.5-16 : Potential framework to determine in-season harvest levels for ESSR fisheries on one terminal stock.

ESSR Fishery	Stock and In-season Assessment Method	In-season Assessment	In-season Assessment Uncertainty	ESSR Harvest Level	
Terminal Enhanced (hatchery or spawning channel)	Weaver- Fishway Gates- Fishway Nadina- Fishway Horsefly Fishway	* Escapement Complete Count	Low	High	>50%
Terminal Wild	Scotch- Fence Chilko- Sonar Quesnel- Sonar Stellako- Sonar Birkenhead- Sonar	* Escapement Complete Count	Low	Medium -High	26-50%

	Upper Barriere- Visual Misc North Thompson- Visual Raft- Visual	**Escapement Index Count	Medium	Medium	11-25%
	Chilliwack- Escapement Projection Pitt- Escapement Projection Late Stuart- Escapement Projection Late Adams- Escapement Projection Seymour- Escapement Projection Harrison- Escapement Projection	*** In-season Run Size Estimate	High	Low	0-10%

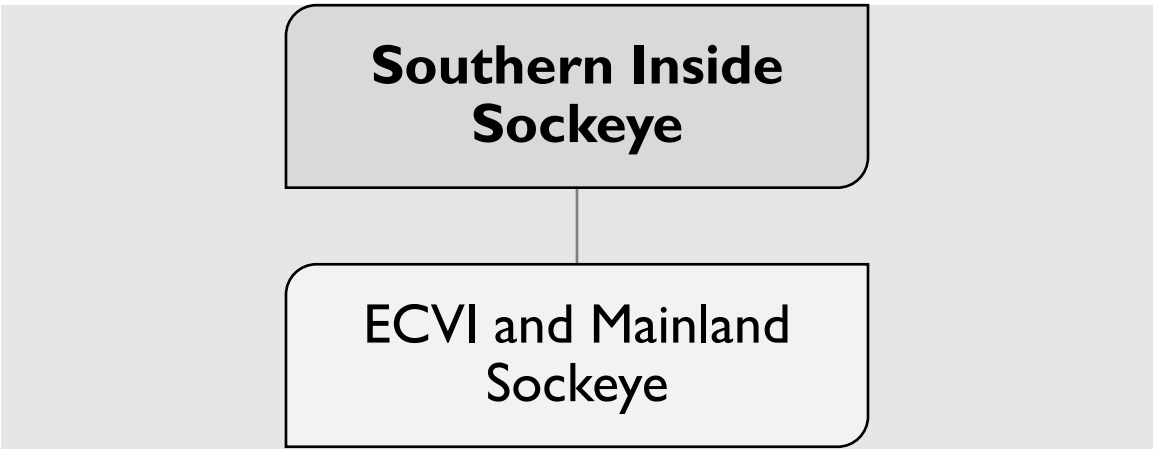
* Complete terminal escapement count (i.e. fence count, fishway count, hydro acoustic count (Didson)). Low uncertainty associated with this type of escapement estimate.

** Escapement index count (i.e. hydro acoustic count (Didson), visual count. Medium uncertainty associated with this type of escapement estimate.

*** In-season run size estimate- Estimate provided in-season in the Fraser Panel process. Escapement projections would consider projected catch above Mission and in-season estimates of the difference between the Mission hydro acoustic estimates and post season spawning ground estimates. High uncertainty associated with the escapement projections.

13.5.7 EAST COAST VANCOUVER ISLAND AND MAINLAND SOCKEYE

13.5.7.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT



Conservation Units

Fulmore	*Quatse*
Heydon	*Schoen*
Ida/Bonanza	*Shushartie*
Kakweiken	*Southern Fjords*
Loose	*River Type*
Mackenzie	*Tzoonie*
Nahwitti	*Vernon*
Nimpkish	*Village Bay*
Pack	*Woss*
Phillips	*Sakinaw*

Figure 13.5-10: Overview of East Coast Vancouver Island and Mainland Sockeye

13.5.7.2 STOCK ASSESSMENT INFORMATION

13.5.7.2.1 Pre-season

Table 13.5-17: ECVI and Mainland Sockeye 2021 Salmon Outlook

Outlook Unit	2020 Outlook
Areas 11-13	Outlook Category '2'. No systems are assessed in Area 11. Preliminary Sockeye returns in 2020 (~25,000) to the Nimpkish River (Area 12) were below the 2016 brood year and well below the 4- and 12-year averages. For the 2021 return, the two main contributing brood years are 2016 and 2017, with associated smolt years of 2018 and 2019, respectively. Brood abundance was above average in 2016 (74K) and below average in 2017 (30K). Based on ocean indicators, marine survival rates for the 2018 and 2019 smolt years appear to be low (poor returns of local pink and coho stocks that out-migrated in 2018 and 2019). Given the considerations above, expectations are for a below average Nimpkish Sockeye return. Expectations for Quatse, Heydon and Phillips are similar to Nimpkish.
Sakinaw	Outlook Category '1'. Of the 33,442 smolts that left Sakinaw Lake in 2018 a total of 85 adult Sockeye returned in 2020. Marine survival continues to be extremely low; for the 2018 ocean entry year, the smolt-to-adult survival improved to 0.14% for hatchery-origin and 0.31% for natural-origin smolts. Smolt production increased to 75,823 in 2019 although just over 1,000 were from natural production. If marine survival is near the 4-year average, a total of 47 adults are expected; 2 natural origin and 45 from captive brood fry releases. 2021 escapement could increase to 111 fish if marine survival is consistent between 2018 and 2019 ocean entry years.

13.5.7.2.2 In-season

Historically many of these Sockeye populations were assessed visually by fishery officers, charter patrol, and stock assessment personnel. In recent years escapements have been consistently monitored for four populations: Quaste River, Heydon Creek, Nimpkish River and Sakinaw River.

The Quatse River Sockeye population has been estimated using a DIDSON acoustic system since 2006. With the installation of a new resistivity fence on the Quatse system, it is anticipated that future estimates will be provided from that program with a few years of DIDSON calibration.

Heydon Creek Sockeye enumeration program was reinstated in 2018 (previously monitored 2000-2012). This program is conducted in partnership with the Wei Wai Kum First Nation and involves monitoring Sockeye migration through an existing fence. In 2020, the program was not conducted for Sockeye enumeration due to COVID restrictions, but was in place for Coho and Chum enumeration. The plan is to continue the program for Sockeye enumeration in 2021, subject to any restrictions due to COVID.

The Nimpkish River Sockeye escapement has been estimated through a standardized swim survey program since 2002. Information on timing and fish distribution is also collected during this program. Since 2015, the Namgis First Nation has worked in partnership with DFO to enumerate Sockeye in the lower portion of the Nimpkish River using a DIDSON system and a deflection fence. This program will continue for its 7th year in 2021.

In 2021 a new program is in place to evaluate the Fulmore Lake Sockeye escapement in partnership with the Tlowitsis Nation and the A-Tlegay Fisheries Society.

Sakinaw Lake Sockeye have been enumerated both as they leave as smolts through a smolt trap and when they return as adults through a counting fence with video recording over the last 13 years. This intensive assessment provides very accurate estimates of abundance, and also provides the adipose fin clip rate (used to identify hatchery origin fish) for further evaluation of freshwater survival rates of hatchery releases, number of natural smolts per spawner and enhanced contribution to the total return (marine survival rates of both hatchery and natural Sockeye).

13.5.7.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

This section of the IFMP is under development and further information will be provided in a subsequent year. There are no commercial or recreational directed fisheries on these Sockeye planned for 2021. However, there may be some small directed First Nations FSC harvests that occur on some of these stocks.

13.5.7.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO SOUTH LOCAL SOCKEYE FISHERIES

Fisheries are structured to reduce the harvest of Sakinaw Lake Sockeye and Nimpkish Sockeye in mixed stock areas.

First Nations FSC fisheries harvest related measures will continue in 2021 to ensure protection of Sakinaw Lake Sockeye. First Nations fisheries in Johnstone Strait will be restricted to gill net and troll only until July 25 and until August 15 in the northern Strait of Georgia. Furthermore, moving window closures to protect Early Stuart Sockeye and potentially additional closures to

protect early-timed Early Summer run Sockeye can limit or delay the start of Sockeye directed FSC fisheries. The waters near the mouth of Sakinaw Creek in Area 16 will be closed to all fishing from June 15 to September 15.

Harvest measures continue to be required to minimize impacts on Nimpkish Sockeye. In order to protect this stock, time and area closures may be implemented for First Nations, commercial, and recreational fisheries in the approach waters to the Nimpkish River (including the river). With the exception of test fisheries, marine waters north of Lewis Point on Vancouver Island (Subareas 11-1, 11-2, & 12-5 to 12-19) are scheduled to be closed to Sockeye retention in all fisheries until late July. However, marine waters north of Lewis Point may be open to Sockeye retention in First Nations FSC fisheries prior to late July if in-season abundance of Nimpkish Sockeye is higher than expected and no other weak stock constraints exist.

Further constraints to fisheries may include harvest restrictions based on in-season returns of Early Stuart, Early Summer, Summer and Late Run (Cultus) Fraser River Sockeye.

13.5.7.5 ALLOCATION AND FISHING PLANS

13.5.7.5.1 First Nations Fisheries

FSC fisheries targeting ECVI and Mainland Sockeye will not be impacted by 2021 IFR Steelhead conservation measures.

Food Social and Ceremonial

The Department continues to work in partnership with the Namgis First Nations on the development of a lower river assessment program for Nimpkish Sockeye. This program will work towards providing a much earlier indication of Sockeye abundance in the Nimpkish River and help to develop a First Nations FSC harvest plan. If in-season abundance permits, some First Nations FSC harvest may occur in the Nimpkish River.

Fishery Monitoring and Catch Reporting

Fishery monitoring will be conducted by DFO and the First Nations under Fisheries Agreements if applicable. First Nations are asked to keep records of harvest and provide catch information to DFO in a variety of formats. Under this licence, if a commercial vessel is used for fishing, First Nations are asked to provide information respecting the species and quantity of fish harvested by this vessel, to the DFO Catch Reporting Officer within 24 hours from landing harvested catch. In addition, catch reporting timelines for First Nations fisheries are outlined in Comprehensive Fisheries Agreements and/or Aboriginal Communal Fishing Licences. Where

in-season management requires, catch reports are sought weekly during the respective fishing season.

Treaty Fisheries

Treaty fisheries targeting ECVI and Mainland Sockeye will not be impacted by 2021 IFR Steelhead conservation measures.

Tla'amin (Domestic)

The Domestic allocations for terminal Sockeye salmon under the Tla'amin First Nation's Final Agreement are as follows:

> A number of Sockeye salmon equal to 25% of the Available Terminal Harvest for the Sockeye salmon stocks that originate from a Terminal Harvest Area, other than Fraser River Sockeye salmon stocks, if the Minister determines that there is an Available Terminal Harvest for those stocks.

The Tla'amin First Nation provides catch reports to the Department through the Aboriginal Harvest Management System (AHMS). The information recorded on catch reports includes the gear type, fishing time period, location of harvest, harvest count by species, harvest effort, and biological samples.

13.5.7.5.2 Recreational Fisheries

For southern BC tidal waters, it is anticipated that Sockeye non-retention will be in effect during those times and in those areas when stocks of concern are present. There are no directed recreational fisheries for ECVI and Mainland Sockeye populations. Updates to recreational fisheries will be provided in- season based on fishery notices. In non-tidal waters, Sockeye non-retention is in effect year- round.

Fishery Monitoring and Catch Reporting

Catch monitoring programs including creel surveys, logbooks and the internet recreational effort and catch survey (iREC) are the main tools used to capture recreational catch and effort information in this fishery.

13.5.7.5.3 Commercial Fisheries

Allocation

There are no directed commercial fisheries for ECVI and Mainland Sockeye populations. Commercial allocation arrangements are set for Fraser River Sockeye fisheries.

Table 13.5-18: Commercial Allocation Implementation Plan for the 2015–current period

Description	Areas	Seine B	Gill Net D	Gill Net E	Troll G	Troll H
South - Fraser	11 to 20, 29, 121, 123 to 127	48.5%	21.6%	25.1%	0.0%[d]	4.8%

Notes on Sockeye allocation (south):
[d] a 1% share to occur in large Fraser River return years only. A 1% reduction will be proportionately applied across other fleets in those years.

East Coast Vancouver Island and Mainland Commercial Sockeye Fisheries

There are no commercial Sockeye harvest opportunities for ECVI and Mainland Sockeye populations. Commercial fisheries target Fraser River Sockeye stocks and opportunities are subject to achieving fisheries management objectives for constraining stocks which includes Nimpkish and Sakinaw Sockeye.

East Coast Vancouver Island and Mainland First Nations Commercial Sockeye Harvests

There are no First Nations commercial harvests for ECVI and Mainland Sockeye populations.

13.5.7.5.4 ESSR Fisheries

There are no ESSR fisheries for these populations.

13.5.8 OKANAGAN SOCKEYE

13.5.8.1 SNAPSHOT OVERVIEW AND MAP OF MANAGEMENT UNIT

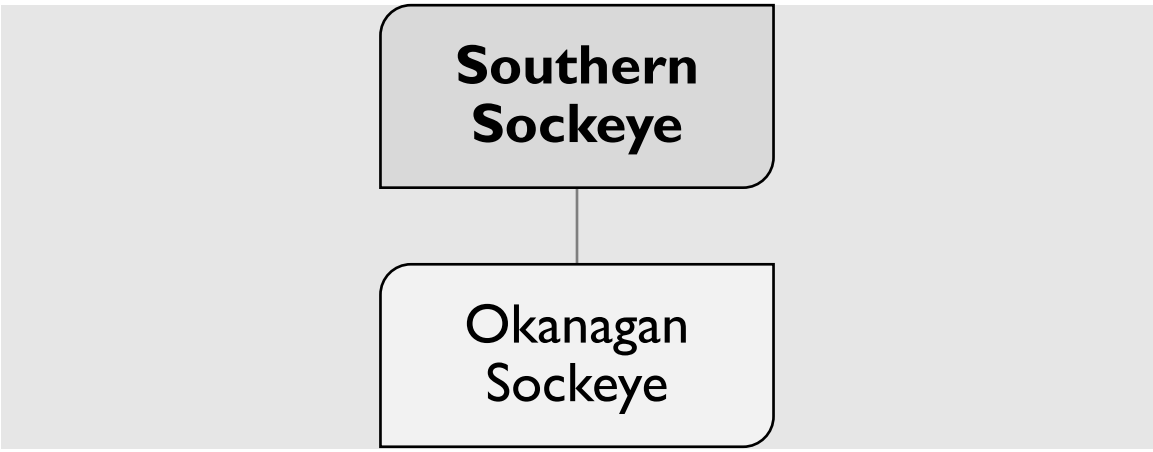


Figure 13.5-11: Overview of Okanagan Sockeye

Okanagan Sockeye is the last remaining viable Sockeye salmon population returning to Canada within the Columbia River Watershed. Run timing into the Okanagan system is primarily affected by water temperature within the Okanagan River. Okanagan Sockeye tend to hold in the Columbia River until migration conditions are favourable. Peak spawning usually occurs from mid to late October. Of all Okanagan River Sockeye enumerated at Wells Dam on the Columbia River, on average roughly 60% of those adults are enumerated on the spawning grounds in Canada.

13.5.8.2 STOCK ASSESSMENT INFORMATION

13.5.8.2.1 Pre-season

The expected return of Okanagan sockeye adults to the Columbia River in 2021 is 154,900 and total to the Okanagan River is 127,300. Jeff Fryer (Columbia River Inter-Tribal Fish Commission). Recreational and commercial fisheries may be considered if abundance permits.

13.5.8.2.2 In-season

Assessment of returns is done via counts of escapement past dams located on the Columbia River in the United States. Spawning ground assessments are done on an annual basis by the Okanagan Nation Alliance fisheries staff and are comprised of visual / dead recovery surveys to determine spawner abundance in the Okanagan River and Skaha Lake system.

13.5.8.3 DECISION GUIDELINES AND MANAGEMENT ACTIONS

The current science based spawning objective is 35,500 fish as enumerated on an indexed section of the spawning ground which is equivalent to approximately 61,200 fish as enumerated through Wells Dam on the Columbia River in Washington State.

The following decision rules are used to manage Okanagan Sockeye in Canada:

If projected escapement past Wells Dam on the Columbia River is less than 10,000 Sockeye, limited fishing for FSC purposes is permitted by Okanagan Nation.

If projected escapement past Wells Dam is between 10,000 and 60,000 fish, an Okanagan Nation FSC catch of 5% of the run that has migrated past Wells Dam is permitted.

If projected escapement past Wells Dam exceeds 60,000 fish, an Okanagan Nation FSC minimum catch of 10% of the run that has migrated past Wells Dam is permitted.

Should the projected escapement past Wells Dam exceed 80,000 fish; additional opportunities may be considered.

13.5.8.4 INCIDENTAL HARVEST, BYCATCH AND CONSTRAINTS TO OKANAGAN SOCKEYE FISHERIES

Fisheries are managed to avoid incidental capture of Okanagan River Chinook.

13.5.8.5 ALLOCATION AND FISHING PLANS

Allocations are described above in the Decision Guidelines and Management Actions section.

13.5.8.5.1 First Nations Fisheries

Food Social and Ceremonial

The Okanagan Nation Alliance opportunities to harvest salmon for food, social and ceremonial purposes are provided through a communal licence negotiated annually with DFO. This licence provides the details of the FSC fishery.

Fishery Monitoring and Catch Reporting

Okanagan Nation Alliance uses a variety of methods to estimate FSC harvests. Current methods include video monitoring, roving creel monitors, catch card reporting and phone interviews.

13.5.8.5.2 Recreational Fisheries

Recreational fisheries will take place if the Wells Dam counts indicate spawning escapement and FSC requirements could be met. The allowable catch will be determined in-season based on Sockeye counts over Wells Dam and movement of fish into Osoyoos Lake. This fishery takes place on Osoyoos Lake.

A creel survey utilizing access sites and boat patrols are conducted capturing effort, landed catch and release data during the fishery. The survey is conducted by the Okanagan Nation Alliance in conjunction with DFO.

13.5.8.5.3 Commercial Fisheries

Okanagan First Nations Commercial Sockeye Harvest

Okanagan Sockeye First Nations Demonstration Fishery

The Okanagan Nation Alliance (ONA) will be working towards sustaining commercial sales of Okanagan Sockeye in addition to working with strategic allies for increasing sales and trade from other inland commercial fisheries. If abundance permits, a 2021 fishery would be similar to previous years where abundance was sufficient. The fishery will continue to build on previous year's demonstration fisheries and address the challenges involved in informing business plans for in-river fisheries in the BC Interior where commercial fisheries are developing, and establishing markets for inland commercial Sockeye.

Region: BC Interior

Participants: Okanagan Nation Alliance partnership: Okanagan Indian Band, West bank First Nations, Penticton Indian Band, Osoyoos Indian Band, Upper Nicola Indian Band Lower and Upper Similkameen Indian bands.

Location of Fishery: Osoyoos Lake and Okanagan River

Gear Type: Purse seine(s), troll fleet and tangle net

Time Frame:
NOTE: All fishery time frames are estimates and final dates will be determined according to in-season migration timing information. Fishery will target on Okanagan (Columbia) Sockeye. Potential start date of July 20 with end date determined on run timing and fish quality

Allocation: Opportunities for commercial and recreational fisheries are not likely in 2021. If abundance permits an Opportunity, it will be identified based on in- season information

of passage thru Wells Dam on the Columbia River. Commercial and recreational harvesting will only be conducted if the Wells Dam counts indicate spawning escapement and FSC requirements could be met. The allowable catch will be determined in-season based on Sockeye counts over Wells Dam and movement of fish into Osoyoos Lake.

Monitoring Plan: These fisheries will be monitored using designated landing sites, electronic logbook system (ELOG) and validation of catch at either landing site or plant. In addition, biotelemetry tracking of adult Sockeye will continue to be developed for estimating instantaneous mortality rates (natural or fishing) during spawner migration.

13.5.8.5.4 ESSR Fisheries

There are no ESSR fisheries for Okanagan Sockeye.

APPENDIX I: LOGBOOK SAMPLES

SALMON TROLL Logbook I.D. # **T10001** ***SAMPLE*** **Report Catch to: 1-(888) 387-0007** Record all catch in pieces **Page #** 11111

Vessel Name: ***Pacific Blue*** VRN (CFV#): ***12346***

Date Day	Date Mon	Mgmt. Area	Zone ☐ or Subarea ☒	Hours Fished	Catch: Frozen or Iced?	[1] Kept or Released	Sockeye	Coho	Pink	Chum	[2] Legal Sized Chinook	[2] Sublegal Sized Chinook	[3] Grilse	Atlantic	[4] Rockfish	[5] Other Species
14	*Jul*	*4*	*9*	*3*	(F) or I	Kept	*25*	*0*	*12*	*0*	*0*			*3*	*0*	*0*
Trip ID #:	***FOS-12345***					Rel.	*0*	*0*	*0*	*0*	*3*	*3*	*5*	*0*	*8 Yellowtail, 3 Canary*	*4 L, 2 D*
Comments:	***8 Hake released, lots of seals around***														[6]DCR Conf. #:	***FOS-12346***
Vessel Master Name:	***Dan Doe***					Signature:	***Dan Doe***								[7]F.I.N.:	***99999***
15	*Jul*	*4*	*5*	*8½*	(F) or I	Kept	*42*	*0*	*8*	*0*	*0*			*0*	*0*	*0*
Trip ID #:	***FOS-12345***					Rel.	*0*	*0*	*0*	*0*	*2*	*5*	*1*	*0*	*8 Yelloweye, 6 unknown rockfish*	*0*
Comments:	***2 Rhinoceros Auklets released alive at 10 AM***														[6]DCR Conf. #:	***FOS-12347***
Vessel Master Name:	***Dan Doe***					Signature:	***Dan Doe***								[7]F.I.N.:	***99999***
16	*Jul*	*5*	*1*	*10*	(F) or I	Kept	*12*	*0*	*0*	*0*	*0*			*0*	*0*	*0*
Trip ID #:	***FOS-12345***					Rel.	*0*	*0*	*0*	*0*	*0*	*1*	*2*	*0*	*2 Chilipepper, 6 unknown rockfish*	*0*
Comments:															[6]DCR Conf. #:	***FOS-12348***
Vessel Master Name:	***Dan Doe***					Signature:	***Dan Doe***								[7]F.I.N.:	***77777***
18	*Jul*	*5*	*1*	*6*	F or (I)	Kept	*0*	*0*	*0*	*0*	*8*			*0*	*0*	*0*
Trip ID #:	***FOS-12398***					Rel.	*0*	*6*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*1L*
Comments:															[6]DCR Conf. #:	***FOS-12402***
Vessel Master Name:	***John Smith***					Signature:	***John Smith***								[7]F.I.N.:	***77777***
19	*Jul*	*5*	*3*	*5½*	F or (I)	Kept	*0*	*0*	*0*	*0*	*12*			*0*	*0*	*0*
Trip ID #:	***FOS-12398***					Rel.	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*2D*
Comments:															[6]DCR Conf. #:	***FOS-12403***
Vessel Master Name:	***John Smith***					Signature:	***John Smith***								[7]F.I.N.:	***77777***

1. Catch: **Kept** are species retained on board; **Released** are species returned to the ocean. **2.** As defined in the applicable Fishery Notice. **3. Grilse** are juvenile salmon under 30 cm. **4.** Rockfish are to be identified by species; if unsure of species, record as Unknown Rockfish. **5. Other Species:** L=Lingcod, H=Halibut, D=D **gfish, M= Mackerel, S Steel ead. Pl ase spe ify White r Green Sturge n** in Comments Se **tion. If an birds, marine mammals, or turtles** were encountered, give time of capture and full name of species in comments. **6. DCR Conf. #** is the confirmation number received upon completion of the Daily Catch Report. **7.** Vessel master's **Fisher Identification Number**.

2021

SALMON SEINE Logbook I.D. # S10001 **Report Catch to: 1-(888) 387-0007** Record all catch in pieces **Page #** ***11111***

Vessel Name: ***Pacific Blue*** VRN (CFV#): ***12346***

Daily Catch Records

Date Day	Date Mon.	Mgmt. Area	Sub-area(s)	Hours Fished	# of sets	[1] Kept or Released	Sockeye	Coho	Pink	Chum	*Adult* Chinook	[2] *Jack* Chinook	Steel-head	Atlantic	[3] Other Fish	[4] Non-fish
14	*Aug*	*3*	*3-3, 3-2*	*8*	*5*	Kept	*42*	*0*	*431*	*0*	*0*	*0*	*0*	*6*	*0*	Yes
Trip ID #:		*FOS-12281*				Rel.	*0*	*3*	*0*	*12*	*2*	*0*	*0*	*0*	*0*	No
Comments: *2 Rhinoceros Auklets released alive at 10 AM,1 coho clipped, 2 coho dead, 1 rel'd alive*													DCR Conf. #: [5]		*FOS-12346*	
Vessel Master Name:			***Dan Doe***				Signature:		*Dan Doe*				[7] F.I.N.:		*99999*	
15	*Aug*	*4*	*4-5*	*5½*	*2*	Kept	*38*	*0*	*850*	*0*	*0*	*0*	*0*	*0*	*0*	Yes
Trip ID #:		*FOS-12281*				Rel.	*0*	*0*	*0*	*2*	*1*	*0*	*1*	*0*	***4 D, 1 L, 1 salmon shark***	No
Comments: *1 harbour seal released, steelhead revived in tank, then released in good condition*													DCR Conf. #: [6]		*FOS-12358*	
Vessel Master Name:			***Dan Doe***				Signature:		*Dan Doe*				[7] F.I.N.:		*99999*	
19	*Aug*	*4*	*4-5*	*9*	*4*	Kept	*53*	*0*	*560*	*0*	*0*	*0*	*0*	*0*	*0*	Yes
Trip ID #:		*FOS-12403*				Rel.	*0*	*2*	*0*	*17*	*4*	*12*	*0*	*0*	*0*	No
Comments: *Both coho rel'd in good condition. 12 jack chinook squishers all dead.*													DCR Conf. #: [6]		*FOS-12428*	
Vessel Master Name:			***John Smith***				Signature:		*John Smith*				[7] F.I.N.:		*77777*	

Offload Catch Records							Sockeye	Coho	Pink	Chum	Chinook	(Other)			
Dates Fished First date Day	Dates Fished First date Month	Dates Fished Last date Day	Dates Fished Last date Month	# Days Fished	Date Offloaded Day	Date Offloaded Month	☐ Pieces ☒ Lbs ☐ Kgs	☐ Pcs ☐ Lbs ☐ Kgs	☐ Pieces ☒ Lbs ☐ Kgs	☐ Pieces ☐ Lbs ☐ Kgs	☐ Pieces ☐ Lbs ☐ Kgs	☐ Pcs ☒ Lbs ☐ Kgs	Complete if catch pooled with that of another vessel: Received from:	Offloaded to:	Vessel
14	*Aug*	*15*	*Aug*	*2*	*15*	*Aug*	*471*	*0*	*3958*	*0*	*0*	*42*	☐	☐	Name:
Business and port offloaded to: *Canfisco, Pr. Rupert*								Fish slip #: *79768*			OCR Conf. #: 6 *FOS-12380*				VRN (CFV#):
19	*Aug*	*19*	*Aug*	*1*	*20*	*Aug*	*310*	*0*	*1692*	*0*	*0*	*0*	☐	☑	Name: *Home Run II*
Business and port offloaded to:								Fish slip #: *79801*			OCR Conf. #: 6 *FOS-12482*				VRN (CFV#): *12347*

1. Catch: Kept are species retained on board; Released are species returned to the ocean. 2. **Jack Chinook** are all chinook smaller than 67 cm fork length (approx 26 inches). 3. **Other Fish**: M= Mackerel, L= Lingcod, H= Halibut, D= Dogfish. Please specify **White or Green Sturgeon** in Comments Section. Give full name for other species. 4. Circle Yes or No as appropriate if any **birds**, **marin mam als**, or **turtles** w re encountered. **Give time of capture an full name of sp** cies in comments. 5. **DCR Conf. #** is the confirmation number received upon completion of the Daily Catch Report. 6. **OCR Conf. #** is the Offload Catch confirmation number. 7. Enter the vessel master's Fisher Identification Number.

2021

SALMON GILLNET Logbook I.D. # **G10001** **Report Catch to: 1-(888) 387-0007** Record all catch in pieces **Page # *11111***

Vessel Name: ***Pacific Blue*** VRN (CFV#): ***12346***

Net Details Type1: ***A*** # Strands2: ***6*** Length: ***200*** (fathoms) Weedline Depth3: ***30cm*** Hang Ratio: ***3*** :1 Mesh Size3: ***4 7/8"*** # Meshes: ***90***

Daily Catch Records

Date Day	Date Mon.	Mgmt. Area	Sub-area(s)	Hours Fished	# of sets	[4] Kept or Released	Sockeye	Coho	Pink	Chum	Chinook	Steel-head	Atlantic	Dogfish	[5] Sturg-eon	[6] Other Fish	[7] Non-fish
4	Aug	12	12-4	5.5	5	Kept	4	0	23	127	0	0	0	0	X	0	Yes
Trip ID #: FOS-12480						Rel.	0	9	0	0	0	0	0	0	0	0	No
Comments: 2 birds killed in 10AM set, kept for research program. Rhinoceros Auklets.																[8] DCR Conf. #: FOS-12346	
Vessel Master Name: Dan Doe						Signature: Dan Doe										[9] F.I.N.: 99999	
5	Aug	12	12-5	7	3	Kept	73	0	245	4	0	0	1	0	X	0	Yes
Trip ID #: FOS-12480						Rel.	0	2	0	0	0	0	0	2	0	2M, 1 salmon shark	No
Comments: Offloaded at CANFISCO in Port Hardy on August 5 at 14:00.																[8] DCR Conf. #: FOS-12367	
Vessel Master Name: Dan Doe						Signature: Dan Doe										[9] F.I.N.: 99999	
6	Aug	12	12-4	6	3	Kept	88	0	116	7	0	0	2	0	X	0	Yes
Trip ID #: FOS-12480						Rel.	0	0	0	0	0	1	0	0	0	11 M, 2 R	No
Comments: Steelhead released in good condition. 2 sea lions released alive around 11AM.																[8] DCR Conf. #: FOS-12382	
Vessel Master Name: Dan Doe						Signature: Dan Doe										[9] F.I.N.: 99999	
29	Aug	17	17-11	6	6	Kept	163	0	328	0	0	0	0	0	X	0	Yes
Trip ID #: FOS-12773						Rel.	0	0	0	0	3	1	0	0	0	0	No
Comments: Fished two management areas today																[8] DCR Conf. #: FOS-12521	
Vessel Master Name: John Smith						Signature: John Smith										[9] F.I.N.: 77777	
29	Aug	29	29-2	4	6	Kept	205	0	493	0	0	0	0	0	X	0	Yes
Trip ID #: FOS-12773						Rel.	0	2	0	0	1	1	0	0	0	0	No
Comments: Both coho put in rev. tank, one died, one released in good condition																[8] DCR Conf. #: FOS-12523	
Vessel Master Name: John Smith						Signature: John Smith										[9] F.I.N.: 77777	

1. **Net Types**: enter 'A' for Alaska Twist, 'M' for Multi Strand or 'C' for Combination. 2. Enter number of strands if net is 'Alaska Twist' type mesh. 3. Give measurement units (*in* or " = inches, *cm* = centimeters, *mm* = millimeters). 4. **Kept** are species retained on board; **Released** are species returned to the ocean. 5. Please specify White or Green Sturgeon in **Comments** Section. 6. **Other Fish**: M= Mackerel, L= Lingcod, H= Halibut. Give full name for other species. 7. Circle Yes or No as appropriate if any **birds, marine mammals,** or **turtles** were encountered. Give time of capture and species details in comments. 8. **DCR Conf. #** is the confirmation number received upon completion of the Daily Catch Report. 9. **F.I.N.** Is the Fisher Identification Number.

2021

APPENDIX 2: FISHING VESSEL SAFETY

TABLE OF CONTENTS

1 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

2 IMPORTANT PRIORITIES FOR VESSEL SAFETY

There are three areas of fishing vessel safety that should be considered a priority. These are: vessel stability, emergency preparedness, and cold water immersion.

2.1 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*, M17P0052 – *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.

2.2 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.

2.3 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.

2.4 OTHER ISSUES

2.4.1 WEATHER

Vessel owners and masters are reminded of the importance of paying close attention to current weather trends and forecasts during the voyage. Marine weather information and forecasts can be obtained on VHF channels 21B, Wx1, Wx2, Wx3, or Wx4. Weather information is also available from Environment Canada website at: https://weather.gc.ca/marine/index_e.html

2.4.2 EMERGENCY RADIO PROCEDURES

Vessel owners and masters should ensure that all crew are able to activate the Search and Rescue (SAR) system early rather than later by contacting the Canadian Coast Guard (CCG). It is strongly recommended that all fish harvesters carry a registered 406 MHz Emergency Position Indicating Radio Beacon (EPIRB). These beacons should be registered with the National Search and Rescue secretariat. When activated, an EPIRB transmits a distress call that is picked up or relayed by satellites and transmitted via land earth stations to the Joint Rescue Co-ordination Centre (JRCC), which will task and 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).

2.4.3 COLLISION REGULATIONS

Fish harvesters must be knowledgeable of the Collision Regulations and the responsibilities between vessels where risk of collision exists. Navigation lights must be kept in good working order and must be displayed from sunset to sunrise and during all times of restricted visibility. To help reduce the potential for collision or close quarters situations which may also result in the loss of fishing gear, fish harvesters are encouraged to monitor the appropriate local Vessel Traffic Services (VTS) VHF channel when travelling or fishing near shipping lanes or other areas frequented by large commercial vessels. Vessels required to participate in VTS include:

a) every ship twenty metres or more in length,
b) every ship engaged in towing or pushing any vessel or object, other than fishing gear,

c) where the combined length of the ship and any vessel or object towed or pushed by the ship is forty five metres or more in length; or
d) where the length of the vessel or object being towed or pushed by the ship is twenty metres or more in length.

Exceptions include:

e) a ship towing or pushing inside a log booming ground,
f) a pleasure yacht less than 30 metres in length, and
g) 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

2.4.4 BUDDY SYSTEM

Fish harvesters are encouraged to use the buddy system when transiting and fishing as this allows for the ability to provide mutual aid. An important trip consideration is the use of a sail/voyage 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.

3 WORKSAFEBC

WorkSafeBC exercises jurisdiction over workplace health and safety, including the activities of crews of fishing vessels. Commercial fishing, diving and other marine operations are subject to the provisions of the *Workers Compensation Act (WCA,)* and requirements in Part 24 of the *Occupational Health and Safety Regulation* (OHSR).

Examples of Part 24 regulatory requirements related to fishing include, but are not limited to, the requirement to establish emergency procedures, to conduct emergency drills, to provide immersion suits for the crew, to provide stability documentation for the vessel, safe work procedures, injury reporting, correction of unsafe working conditions, the requirement to wear personal flotation devices (PFDs), etc.

Other sections of the OHSR also apply to commercial fishing operations. For example, Part 3 addresses training of young and new workers, first aid and employer incident/accident

investigations. Part 4 addresses general conditions such as maintenance of equipment, workplace conduct and impairment. Part 8 addresses issues related to safety headgear, safety footwear, eye and face protection, limb and body protection and personal flotation devices (PFDs) when working on the dock. Part 12 addresses issues related to tools, machinery and equipment, including safeguarding. Part 15 addresses issues related to rigging.

Both owners and masters of fishing vessels are considered to be employers. Under the *Workers Compensation Act* and the *OHS Regulation* (OHSR) they have varying and overlapping duties and responsibilities. Masters, because they have the most control during fishing and related activities, are considered to be the employer with primary responsibility for the health and safety of the crew.

The OHSR and the *WCA* are available from the Provincial Crown Printers or by visiting the WorkSafeBC website: www.worksafebc.com

NOTE: Regarding the OHSR requirement to wear PFD's, WorkSafeBC has produced a video entitled "Turning the Tide – PFD's in the Fishing Industry". For more information on PFD use, including a link to the video, please access the following site:

https://www.worksafebc.com/en/about-us/news-events/news-releases/2018/November/new-fishing-industry-safety-video?origin=s&returnurl=https%3A%2F%2Fwww.worksafebc.com%2Fen%2Fsearch%23q%3DTurning%2520the%2520Tide%26sort%3Drelevancy%26f%3Alanguage-facet%3D%5BEnglish%5D

For further information, contact an Occupational Safety Officer:

Bruce Logan Vancouver/ (604) 244-6477

Richmond/Delta

Mark Lunny Courtenay (250) 334-8732

Cody King Courtenay (250) 334-8733

Paul Matthews Courtenay (250) 334-8741

Jessie Kunce Victoria (250) 881-3461

or the Manager of Interest for Marine and Fishing, Pat Olsen (250) 334-8777

For information on projects and initiatives related to commercial fishing health and safety please contact Tom Pawlowski, Manager, OHS Consultation y and Education Services, at (604) 233-4062 or by email: tom.pawlowski@worksafebc.com or Tim Pryde, OHS Consultant at (604) 802-2954 or by email: tim.pryde@worksafebc.com.

4 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:

Ryan Ford
Program Manager Cell: (604) 739-0540
Fish Safe Office: (604) 261-9700
#100, 12051 Horseshoe Way Email: ryan@fishsafebc.com
Richmond, BC V7A 4V4 www.fishsafebc.com

5 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 investigated 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

Glenn Budden, Investigator, Marine - Fishing Vessels
Transportation Safety Board of Canada
4 - 3071 No. 5 Road
Richmond, BC, V6X 2T4
Telephone: (604) 619-6090

Email: glenn.budden@tsb-bst.gc.ca

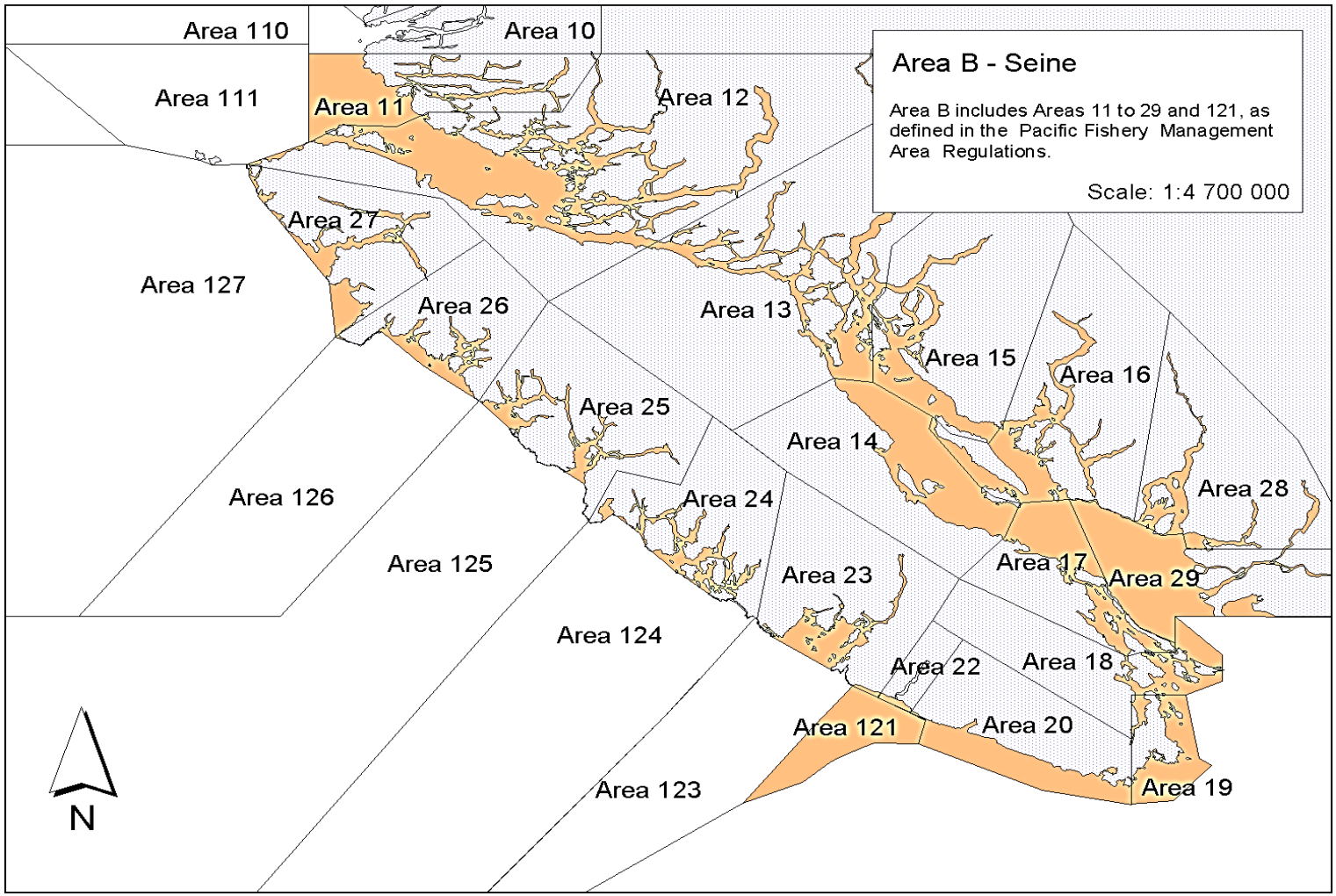
APPENDIX 3: COMMERCIAL SALMON LICENCE AREAS

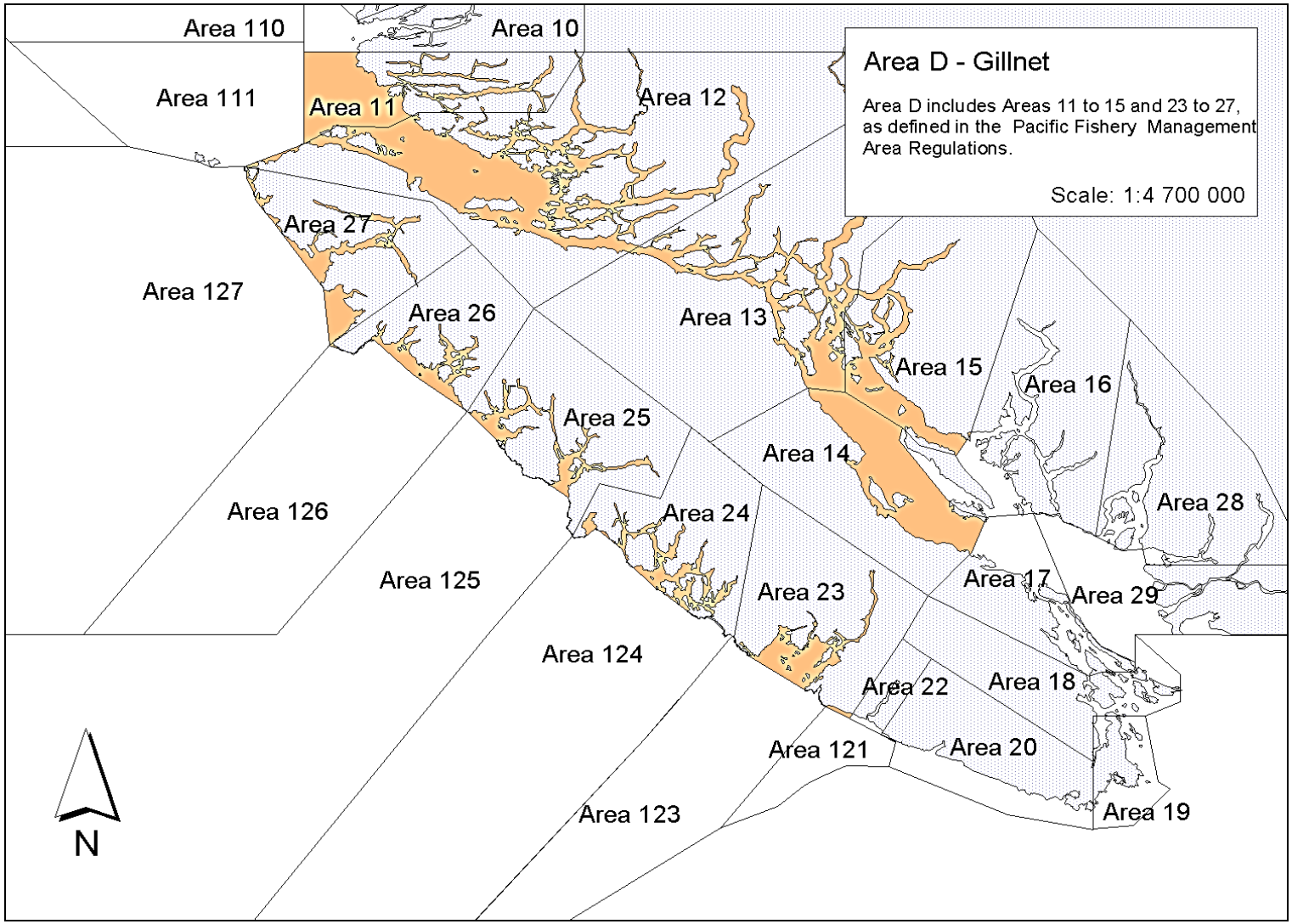
Pacific Salmon Fishing Area	Gear	Corresponding Pacific Fisheries Management Areas (PFMA)
Salmon Area A	Seine	Areas 1 to 10, Subarea 101-7
Salmon Area B	Seine	Areas 11 to 29 and 121
Salmon Area C	Gill net	Areas 1 to 10, Subarea 101-7
Salmon Area D	Gill net	Areas 11 to 15 and 23 – 27
Salmon Area E	Gill net	Areas 16 to 22, 28, 29 and 121
Salmon Area F	Troll	Areas 1 to 10, 101 to 110, 130 and 142
Salmon Area G	Troll	Areas 11, 20 to 28, 111, 121, 123 to 127 and Subareas 12-5 to 12-6
Salmon Area H	Troll	Areas 12 to 19, 28 and 29

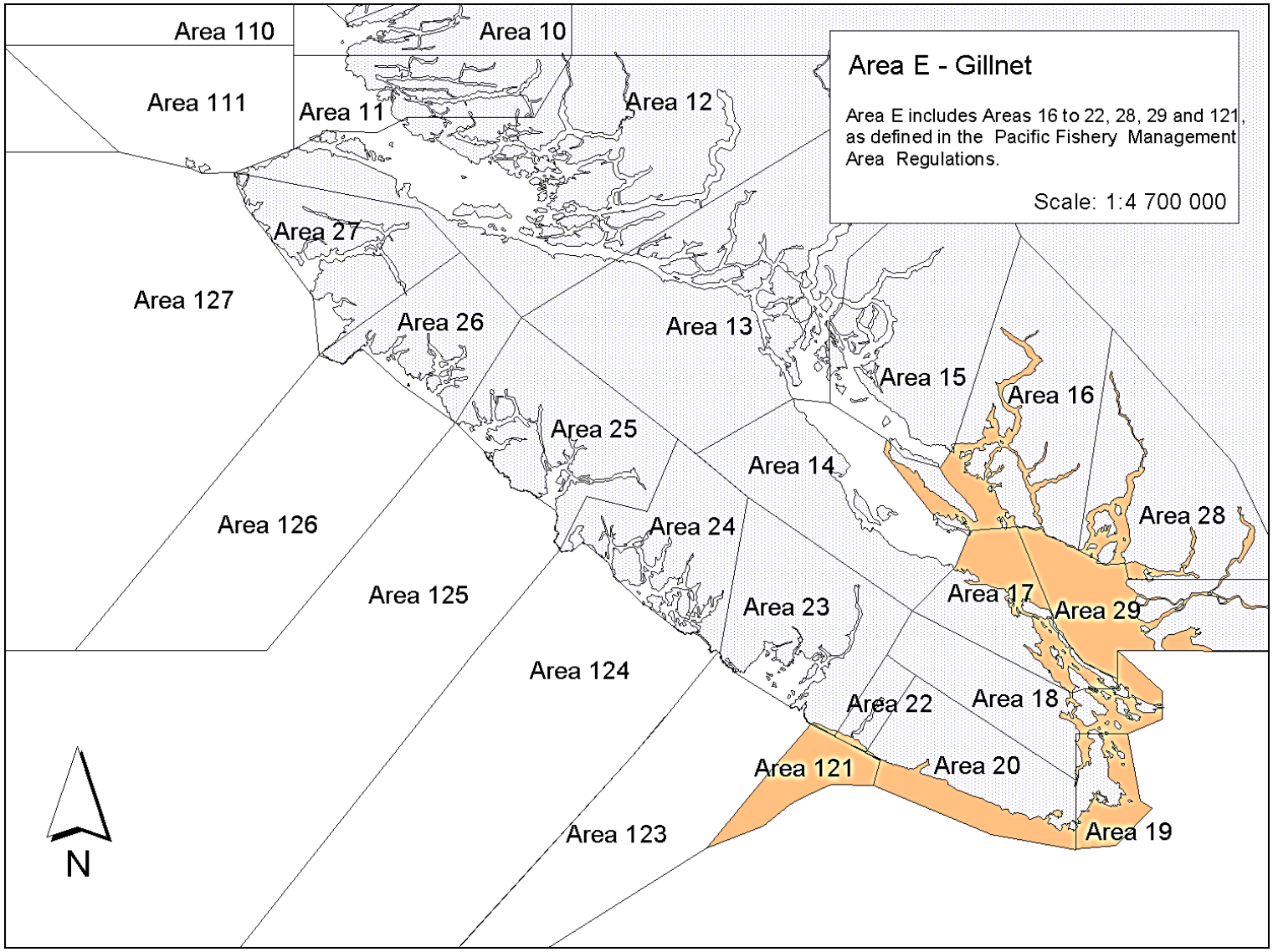
For South Coast PFMA's please see Appendix 4 of this IFMP.

For maps of South Coast commercial licence areas, (Areas B, D, F, G, and H), please see Appendix 4.

APPENDIX 4: MAPS OF SOUTH COAST COMMERCIAL LICENCE AREAS




Area 110
Area 10
Area 111
Area 11
Area 12
Area D - Gillnet
Area D includes Areas 11 to 15 and 23 to 27, as defined in the Pacific Fishery Management Area Regulations.
Scale: 1:4 700 000
Area 27
Area 127
Area 26
Area 13
Area 15
Area 16
Area 25
Area 14
Area 28
Area 126
Area 24
Area 125
Area 23
Area 17
Area 29
Area 124
Area 22
Area 18
Area 121
Area 20
Area 123
Area 19
N


Area 110
Area 10
Area 111
Area 11
Area 12
Area E - Gillnet
Area E includes Areas 16 to 22, 28, 29 and 121, as defined in the Pacific Fishery Management Area Regulations.
Scale: 1:4 700 000
Area 27
Area 127
Area 26
Area 13
Area 15
Area 16
Area 25
Area 14
Area 126
Area 24
Area 28
Area 125
Area 17
Area 29
Area 23
Area 124
Area 22
Area 18
Area 121
Area 20
Area 123
Area 19
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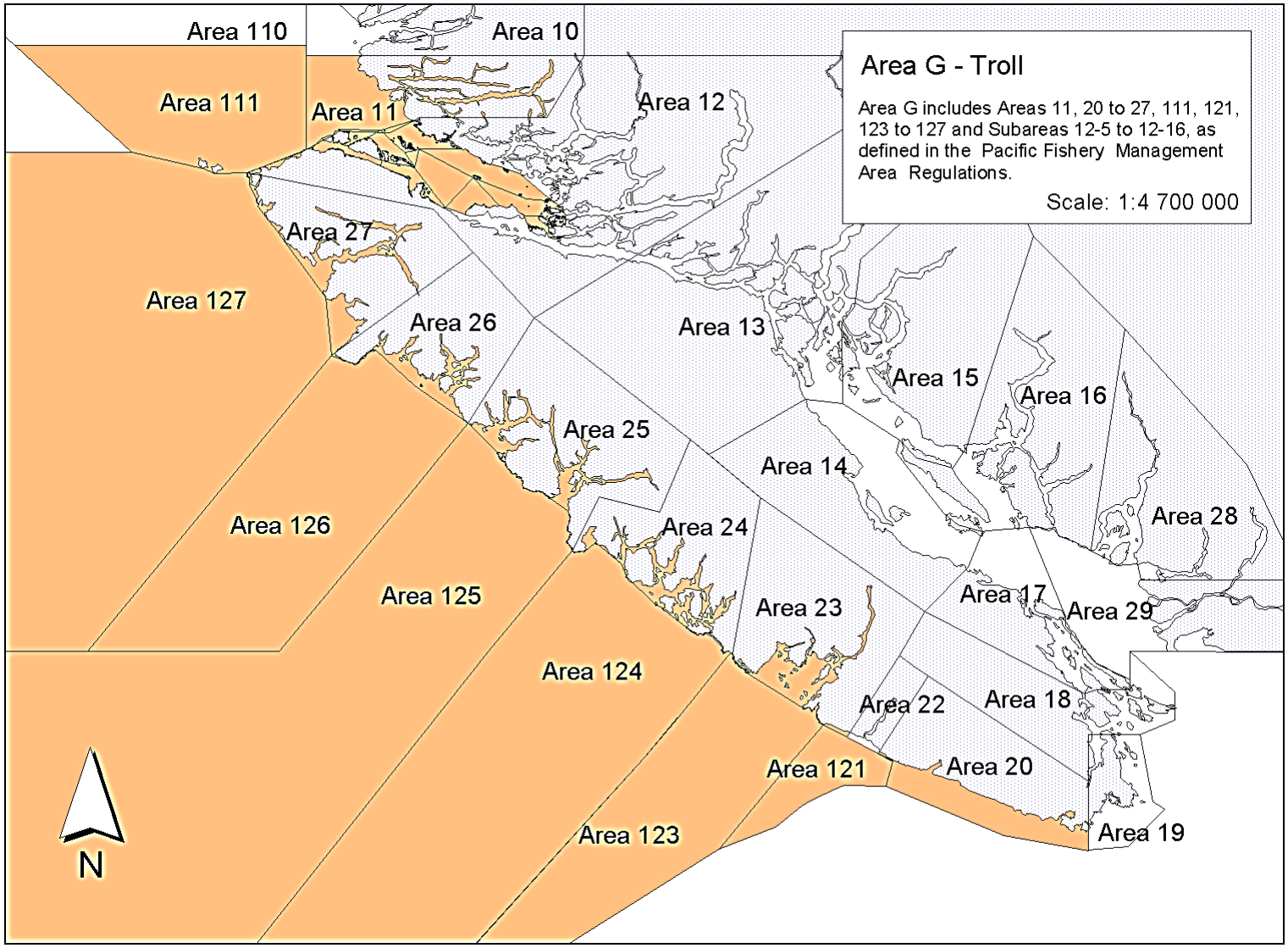
Area G - Troll
Area G includes Areas 11, 20 to 27, 111, 121, 123 to 127 and Subareas 12-5 to 12-16, as defined in the Pacific Fishery Management Area Regulations.
Scale: 1:4 700 000
Area 110
Area 10
Area 111
Area 11
Area 12
Area 27
Area 127
Area 26
Area 13
Area 15
Area 16
Area 25
Area 14
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Area 19
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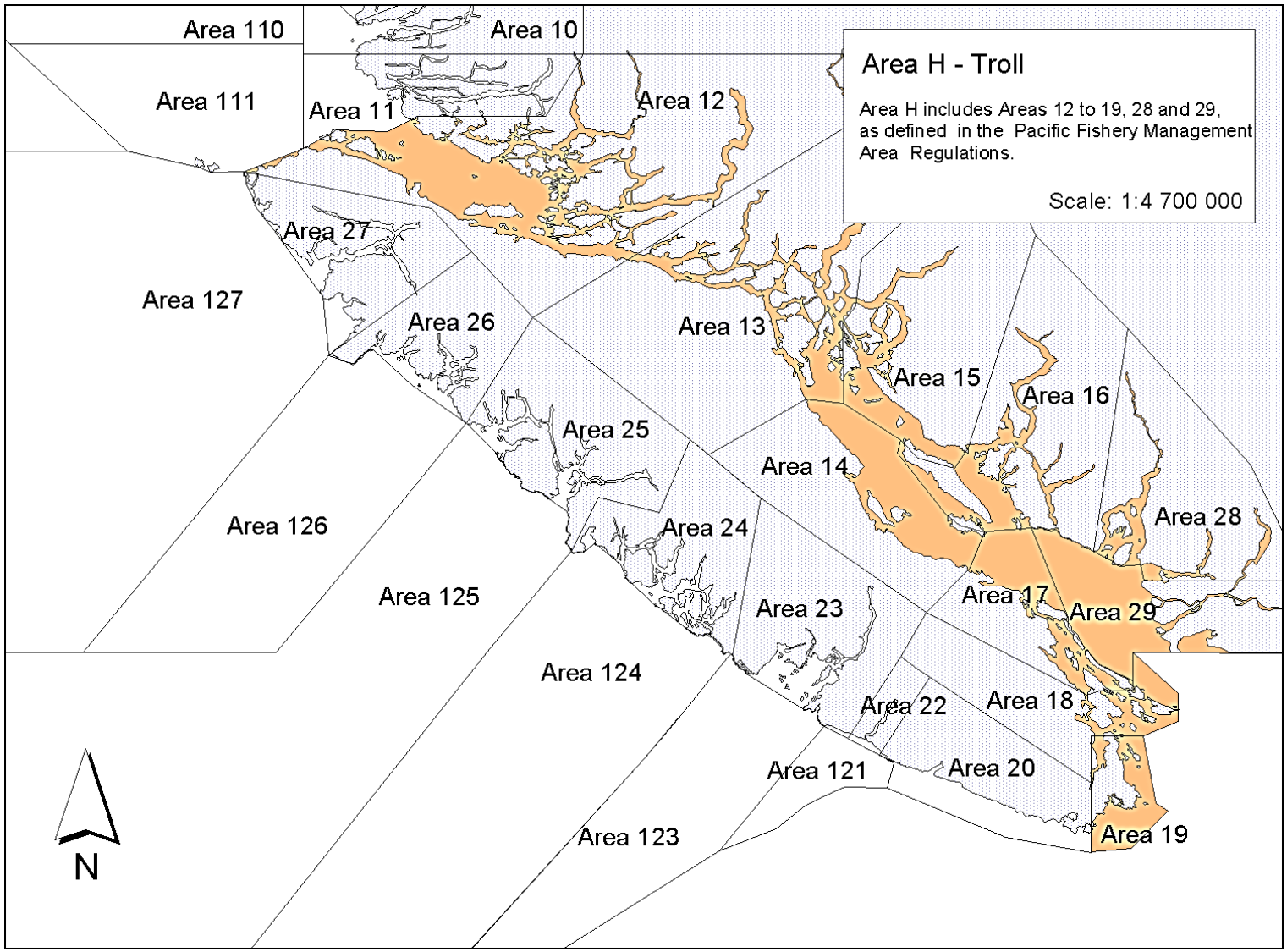
Area 110
Area 10
Area 111
Area 11
Area 12
Area H - Troll
Area H includes Areas 12 to 19, 28 and 29, as defined in the Pacific Fishery Management Area Regulations.
Scale: 1:4 700 000
Area 27
Area 127
Area 26
Area 13
Area 15
Area 16
Area 25
Area 14
Area 126
Area 24
Area 28
Area 125
Area 23
Area 17
Area 29
Area 124
Area 22
Area 18
Area 121
Area 20
Area 123
Area 19
N

APPENDIX 5: ADVISORY BOARD MEMBERSHIPS

The IHPC membership list can also be found on the DFO website at:
http://www.pac.dfo-mpo.gc.ca/consultation/smon/ihpc-cpip/membs-eng.html

INTEGRATED HARVEST PLANNING COMMITTEE
SOUTH COAST SUBCOMMITTEE MEMBERS

RECREATIONAL (THREE) MEMBERS

Martin Paish ..... martinpaish1@gmail.com

Laurie Milligan ..... lmilligan@shaw.ca

Marilyn Scanlan ..... murphymar@shaw.ca

ALTERNATES

Rupert Gale ..... ruperta@telus.net

John Pew ..... N/A

Jeremy Maynard ..... jmaynard@island.net

COMMERCIAL (SIX) MEMBERS

Bob Rezansoff - Area B ..... bob.rezansoff@telus.net

Brad Goodyear - Area D ..... tnbgoodyear@telus.net

Darrel McEachern - Area E ..... grandpadarrel@hotmail.com

Mike Wells - Area G ..... mcwells@shaw.ca

Dane Chauvel - Area H ..... dane@telus.net

Rob Morley - Processor ..... rob.morley@canfisco.com

ALTERNATES

Chris Ashton - Area B ..... areab@telus.net

Barry Crow - Area D ..... johncrow@shaw.ca

Ryan McEachern - Area E ..... ryanmceachern@shaw.ca

Ray Jesse - Area G ..... rjesse2@shaw.ca

Peter Sakich - Area H ..... sakich@island.net

Kim Olsen - UFAWU ..... president@ufawu.org

MARINE CONSERVATION CAUCUS (TWO) MEMBERS

Misty MacDuffee ..... misty@raincoast.org

Greg Taylor ..... gtaylor.fishfirst@gmail.com

ALTERNATE

Vacant

FIRST NATIONS (FOUR) MEMBERS

Vacant

Vacant

Vacant

Vacant

PROVINCE (EX-OFFICIO) (ONE) MEMBER

Vacant

APPENDIX 6: UPDATES TO THE COMMERCIAL SALMON ALLOCATION FRAMEWORK

TABLE OF CONTENTS

1 INTRODUCTION AND PURPOSE

The purpose of this appendix is to outline progress related to updates to the Commercial Salmon Allocation Framework (CSAF), including

Document progress on key work plan items for the 2021 season agreed to by the Salmon Coordinating Committee, Commercial Salmon Advisory Board and DFO;

Describe principles and guidelines for sharing arrangements, building on guidelines approved in the 2015/2016 IFMP;

Outline CSAF demonstration fishery proposals assessed through the Departments' Evaluation Framework. These may be implemented subject to a final fishing plan being approved in the area which addresses any outstanding elements highlighted and sufficient returns for commercial fishing.

2 BACKGROUND

In September 2013, as part of the Pacific Salmon Treaty Mitigation program, Fisheries and Oceans Canada started a process to obtain advice on updating the CSAF to address deficiencies raised by commercial harvesters and First Nations. The Department engaged the existing advisory processes, principally the First Nations Salmon Coordinating Committee (SCC) and the Commercial Salmon Advisory Board (CSAB), and also sought the views of other First Nations and commercial interests on possible changes to the framework. Discussions with the SCC and CSAB were completed at the end of January 2015. Updates approved are detailed in the final 2015/16 IFMP. Work to address key issues raised continue. Key items being discussed include:

a) Supporting local area collaboration: to improve integration and collaboration among CSAF Demonstration, commercial marine and First Nation fishers;

b) Providing support to local proponents and DFO area staff in reviewing and developing existing and new CSAF demonstration fishery proposals; and

c) Using the CSAF small group forum to explore timelines and information needs to support the review of the CSAF sharing arrangements among fleets. Any proposed changes will be included in next year's draft IFMP for feedback prior to being implemented.

The Department's broad interests in continuing to support this process are to improve the long term sustainability of Pacific wild salmon, help commercial fishery participants achieve greater economic benefit, and create more resilient commercial salmon fisheries. The Department's role

has not been to propose changes to the CSAF; rather its focus has been to consider proposed changes to ensure that these were consistent with key Departmental objectives, policies, and programs.

A summary of previous work completed related to the initiative to update the CSAF is also available through the following link: http://www.pac.dfo-mpo.gc.ca/consultation/smon/saf-crrs/index-eng.html.

Principles and guidelines approved through the 2015 IFMP and expanded on in 2017 are included in Section 3 below.

3 PRINCIPLES AND GUIDELINES FOR CALCULATING SALMON SHARES

Below are principles and guidelines intended to provide clarity on commercial sharing arrangements. They have been developed as part of the initiative to update the CSAF in collaboration with the CSAB and SCC.

Please note: these guidelines and principles may be reviewed and updated annually to ensure they remain relevant and clear. Proposed changes will be included in draft IFMPs for feedback prior to being approved. There are no changes proposed for the 2021 season.

APPROVED PRINCIPLES

For simplicity, the updates to the CSAF are organized into three categories: 1. Stabilizing commercial shares; 2. Flexibility to harvest the shares and integrated planning process; and 3. Additional elements for future discussion.

CATEGORY 1: STABILIZING COMMERCIAL SHARES

The following recommendations form the basis for the commercial allocation plan starting in 2015:

a) Commercial salmon shares (specified as a % allocation of the allowable commercial harvest) will be assigned by species, fleet and fishery production area. Shares at the species, fleet and fishery production area are provided in Section 12.7 of the IFMP;

b) Shares will apply for a 5 year period with a provision for a review after year 4 to determine if adjustments should be made to Area A-H sharing arrangements in subsequent years. An earlier review could be considered if circumstances warrant by majority agreement of the commercial advisory board;

c) Sockeye equivalents will no longer be used to adjust shares on an annual basis;

d) Licences transferred to First Nations communities for commercial purposes, from an individual relinquished commercial licence, will be based on an equal percentage allocation of the allowable commercial harvest for all licences (e.g. 1/X where X = total licences per fleet) in that commercial licence area (i.e. Areas A to H). Please note that licence shares may change over time due to changes in fleet size (e.g. licence retirements, stacking) or updates to the A-H sharing arrangements outlined in the commercial salmon allocation plan based on the periodic review (i.e. for the 2021 season).

e) A central, common tracking system developed to provide an open and transparent annual accounting of all commercial A to H licences/allocations and First Nation economic fishery allocations by each First Nations economic fishery.

f) In addition to the 22 fishery production areas that existed pre-2015, three new areas have been added, as of 2015, to better define sharing arrangements for troll fisheries limited by the Pacific Salmon Treaty including the WCVI Aggregate Abundance Based Management (AABM) Chinook, Northern BC AABM Chinook and the AB-line Pink troll fisheries.

g) Sharing arrangements in the commercial salmon allocation plan are not fixed entitlements. Although best efforts will be made to achieve fishery production area target allocations over the course of the season, no guarantees are offered that allocations will actually be achieved in any given year. The achievement of commercial allocations will depend upon the ability to fish selectively and the conservation needs of the resource. In the event that allocations are not achieved over the course of the season, no compensatory adjustments (i.e. overage/underage provisions) will be made to future allocations.

h) Fishing opportunities for all commercial fisheries, including First Nations commercial fisheries, targeting the same fishery management unit should be planned to provide reasonable opportunities to harvest shares. No fishery should be allowed such that its operation puts another fleet out of the water (e.g. using a disproportionate amount of bi-catch to target share or using insufficient effort such that it takes an unreasonable amount of time to achieve weekly target). Post season reviews will address whether fisheries adjustments may be required in future years to address situations where allocations are not achieved.

i) In the event of extenuating circumstances (e.g. when fisheries are opened until further notice after escapement objectives are met in a terminal fishery), commercial sharing arrangements may be set aside and commercial opportunities will focus on harvesting

surplus salmon. These situations will be discussed at local processes where possible to coordinate fishing plans.

Further considerations on Stabilizing Commercial Shares

In addition to the three additional production areas which were approved starting in 2015, the SCC recommended adding an additional fishery production area for a total of 26. This 26th fishery production area would result by dividing the Fraser River Chum from the southern inside Chum production area. This additional production area was not approved, however may be considered in the future pending additional discussion.

It is expected that annual post-season reviews will be conducted to consider how well the approved allocation arrangements have been implemented in commercial fisheries that season.

CATEGORY 2: FLEXIBILITY TO HARVEST SHARES AND INTEGRATED PLANNING PROCESS

Both the CSAB and the SCC are seeking greater flexibility to harvest the shares that are assigned at the fishery production area level and/or are associated with voluntarily relinquished commercial licences transferred to First Nations.

The following principles and operational guidelines form the basis for the incremental testing of flexibilities to harvest shares which started in 2016 informed through the collaborative advisory process (CSAF small group, which includes participants of from the SCC, CSAB and DFO) and a Departmental evaluation framework (these are described in more detail under "further considerations on flexibilities" below).

a) Greater flexibility, such as fishing location and methods, should be provided to harvest the shares; however, 'one size does not fit all' and each gear type through its area harvest committee or First Nations economic fishery should determine the best approach to harvest their shares;

b) First Nations that have Area A-H licences may continue to fish those licences in the current A-H fisheries or they may choose to transfer the harvest share associated with those licences to a First Nation economic fishery. Under the SCC proposal, any First Nations economic fishery would have to be managed in coordination with other fisheries and would require approval from the Department (including proposed fishing method, location and time);

c) A revised collaborative process will be required to coordinate the collective interests of the A-H fisheries and First Nations economic fisheries in order to produce integrated fishing plans. This could also include more local harvest planning processes as required;

d) In-season transfers of shares among and between A-H and First Nation economic fisheries will be considered. These arrangements will be subject to operational guidelines for pre-season and in-season transfers (see the current Guidelines and any proposals for Temporary Commercial Salmon Share Transfers, Section 12.7.1);

e) Transfers between fisheries, including marine and inland areas, must account for similar stocks/species, as well as, any management adjustments that may need to be taken into consideration for transfers to inland areas;

f) Bycatch and stocks of concern (i.e. non-targeted species that limit target species access) will not be formally allocated at this time. Available impacts must be shared between all commercial fisheries, including First Nation economic fisheries, in the development of operational plans to allow every fishery reasonable access to its target species. Operational plans should be discussed annually through a collaborative process among all commercial fishery participants, including First Nations economic interests. The use of bycatch will require more discussion to further clarify how bycatch is best used under different scenarios;

g) There will be a requirement to have accurate, timely and accessible fisheries data, such that there is sufficient information for all Pacific salmon fisheries to be managed sustainably and to meet other reporting obligations and objectives; and

h) Common standards and approach will be used for evaluating and approving flexibilities to harvest shares whether these are Area A-H or First Nations economic fisheries. Operational issues about how to operationalize harvest flexibilities in different areas has underscored the need for greater clarity and transparency in applying any of the proposed changes.

i) Assessment fisheries should take into consideration existing sharing arrangements between A to H and First Nations commercial fisheries; opportunities for assessment fisheries should be proportionate with existing shares or as agreed to by the relevant parties.

Further Considerations on Flexibility to Harvest Shares:

The SCC proposal envisaged that any First Nations that have Area A-H licence(s) may continue to fish those licence(s) in A-H fisheries or choose to transfer the harvest share associated with

that licence to a First Nation economic fishery. This could result in First Nation economic fisheries in marine or inland areas based on shares converted from A-H fisheries. The relevant First Nations economic fishery (including any proposed fishing methods, times and locations) would need approval from the Department. Any First Nations fishery would have to be managed in coordination with other commercial fisheries (including A-H), on the same species and would have to meet Department requirements for stock assessment, catch monitoring, compliance and enforcement.

Similarly, the CSAB suggested that fleets in the A-H fisheries should decide how to best harvest their shares through harvest committee deliberations and thus endorsed the view that "one size does not fit all" when it came to how fleets may choose to harvest their shares.

The Department will adopt an incremental approach to implementation of harvesting flexibilities starting in 2016, informed through a collaborative advisory process and a common evaluation framework to review proposals submitted.

Collaborative Process

An inclusive commercial advisory process including commercial representatives from the A – H fisheries and First Nations economic fisheries will be required for the Department supporting implementation of any proposed flexibilities. Since 2015, a small working group comprised of CSAB, SCC and DFO representatives has been effective at exploring opportunities for collaboration and improving understanding of various perspectives, while communicating with each host organization to ensure consistency and accuracy of feedback included. The purpose of this CSAF small working group is as a forum to discuss and make recommendations for the Department's consideration on implementation of the revised allocation framework, the operational details associated with proposed flexibilities and how to prioritize testing of potential harvesting flexibilities including: reviewing and assessing proposals pre-season and considering the results of pilots against evaluation criteria post-season. The Department will continue to work with the existing CSAB and SCC to determine next steps, other priority items for discussion, relevant for this forum and support the use of the CSAF small group process for collaborative discussions.

Local Fishing Area Discussions:

Discussions on commercial harvest plans including which group fishes first, sequencing of opportunities, amounts of fishing time and other fishing plan parameters should be discussed among fishery participants at planning processes suitable to the scale of the fishery (e.g. local area) and included within the IFMP as required. The Department will continue to consider

advice and recommendations on proposed fishing plans from the local First Nations, Area Harvest Committees, and other groups to promote integrated fishery planning.

Local management committees are encouraged to promote effective communication, consultation and support increased collaboration and integration of commercial fisheries. Structure and protocol for any local committees should promote effective management through open, transparent and collaborative process to develop and implement commercial fishing plans. Existing processes will be used whenever possible/practical to support pre-season planning, in-season management and post-season review. Operational plans should be guided by the principles and guidelines outlined in this document and, where possible, identify clear decision guidelines that address the potential fishery configurations and effort associated with a range of potential commercial harvest scenarios.

Pre-agreed methods for calculating in-season harvest amounts associated with commercial allocations for all groups should be identified in local area fishing plans and/or the IFMP where appropriate and communicated preseason so all commercial participants have clarity on sharing arrangements. Methods should account for all commercial allocations including A to H fleets, FN demonstration, economic opportunities and harvest agreement fisheries.

Approaches for in-season communication (e.g. integrated conference calls, Fisheries Notices, etc.) of fishing opportunities, sharing arrangements and catch to date should be provided for discussion with First Nations and stakeholders.

Evaluation Framework

In 2016, DFO in collaboration with the SCC and CSAB developed an Evaluation Framework (E.F.) supported by all parties. The E.F. outlines the objectives and criteria that are used to assess CSAF proposals for flexible harvest arrangements for all commercial/economic fisheries. The E.F. may be reviewed and updated annually based on post-season discussions.

CATEGORY 3: ADDITIONAL ELEMENTS FOR DISCUSSION:

In addition to commercial allocation arrangements within Section 12.5 of the IFMP and those listed above in Category 2: *Flexibility to Harvest Shares*, there are a number of additional elements in the SCC and CSAB proposals where differences remain. These elements may have policy implications and require additional discussion, collaboration and analysis by commercial harvesters, First Nations and the Department.

Details are included within the original proposals received by both the SCC and CSAB in 2015 which can be reviewed at:
http://www.pac.dfo-mpo.gc.ca/consultation/smon/saf-crrs/index-eng.html

Further considerations on additional elements:

The following areas have been highlighted by the SCC and CSAB where there was no agreement concerning the proposed changes.

There was also a difference of views on the approach to dual fishing (the retention of fish for food, social and ceremonial purposes during a commercial fishery under agreed circumstances). The SCC has proposed that First Nations economic fisheries be permitted to have dual fishing whereas the CSAB has raised concerns about fairness of this approach to the A to H fishery and its potential conservation issues on stocks of concern. The Department has initiated discussions with the SCC on draft dual fishing principles, intended to guide under what circumstances dual fishing pilots may be considered in the future.

The CSAB has indicated concerns with the guidelines for the conversion of an existing marine A-H commercial licence (not including licences held in DFO inventory) into a First Nation economic fishery allocation (guidelines the CSAB would like to be consider prior to approval of conversions include timing (e.g. pre-season vs. in-season), notification, and transfer/tracking requirements. Please see the transfer guidelines in Section 12.7.1 for more details.

In addition, there are some proposed changes that are principally matters best handled between DFO and the relevant group. These matters will require further discussion with the Department.

The SCC has proposed a separate management body/process to manage First Nations salmon shares including a proposed body (a 'First Nations' licensing board') to administer use of shares associated with relinquished commercial salmon licences from the DFO inventory or licences otherwise set aside for First Nations use. The Department has not initiated development of a separate board; however DFO would be interested in hearing any principles for the distribution of licences which the SCC may suggest for consideration.

The CSAB had indicated interest in reviewing commercial licencing policy, however initial discussions highlighted the diversity of views and priorities on potential areas of work within the CSAB.

4 CSAF Demonstration Fishery Proposals for Flexible Harvest Arrangements

As part of implementing changes to the CSAF, the Department adopted an incremental approach to providing increased flexibility to harvest salmon shares starting in 2016. Each proposal is assessed by the same Evaluation Framework which defines the principles and operational guidelines required by DFO to ensure appropriate implementation of proposed

harvesting flexibilities. The Department's Evaluation Framework was developed to assess proposals with input from the SCC and CSAB. There continues to be agreement from DFO, the SCC and CSAB to continue using the Evaluation Framework with no updates to the principles, objectives and criteria currently in use.

Below is a table outlining demonstration fishery proposals that were reviewed using the Department's Evaluation Framework. For details on proposals or fishing plans for CSAF demonstrations which were included in the final IFMP and implemented in previous years, please contact the relevant resource manager in the area or Ge Li (Ge.Li@dfo-mpo.gc.ca).

Approved CSAF demonstration fisheries listed below will be implemented contingent on any remaining considerations being resolved with a fishing plan approved in the local area and sufficient returns for commercial harvest. The Department will be discussing operational details with First Nations and stakeholders in each demonstration fishery proposal area to develop fishing plans. Should operational considerations not be resolved or sufficient abundance not materialize, the demonstration fishery will not occur in the coming season.

Any demonstration fishery that does proceed in 2021 will be reviewed as part of the post-season review process. Below is a table which outlines the section and related demonstration fishery project included within this appendix.

Year Approved	Salmon Coordinating Committee	Commercial Salmon Advisory Board
	Northern B.C.	Northern B.C.
2016	Central Coast hatchery Chum (Heiltsuk/Kitasoo)	Central Coast Coho (Area F)
2016	Nass River Sockeye (Nisga'a Lisims Government)	
2016	Nass River Sockeye (Gitanyow Fisheries Authority)	
2016	Skeena Sockeye (NCSFNSS)	
2016	Skeena Sockeye (Lake Babine Nation)	
2016	Skeena Sockeye (Gitksan Watershed Authorities)	
2017	Central Coast Chum (Nuxalk)	
2017	Haida Gwaii Coho (CHN)	

Year Approved	Salmon Coordinating Committee	Commercial Salmon Advisory Board
2018	Skeena Pink – Area 3 / 4 (NCSFNSS)	
2018	Coho bycatch within existing Pink ESSR (Wet'suwet'en)	
2018	Central Coast Chinook (Nuxalk)	
2019	Skeena Sockeye (Metlakatla First Nation)	
2020	Central Coast Chum and Pink (Heiltsuk First Nation)	
2021	**Skeena Sockeye (Lax Kw'alaams Band)**	
2021	**Nass Pink (Metlakatla First Nation and Lax Kw'alaams Band)**	
	Southern B.C.	Southern B.C.
2016	Cowichan Chum (Cowichan Tribes)	
2017	Goldstream Chum (Saanich Tribes)	Qualicum/Puntledge (Chum Area D)
2017		Area 12 – 9 Encounter study (Area D)
2017		Mainland/Inlet Pink and Chum (Area H)
2018	Bute Inlet Chum (Homalco First Nation)	Bute Inlet Chum (Area H)
2018		Bute Inlet Chum (Area D)
2019	Terminal Chum (K'omoks First Nation)	Mainland Inlet Pink & Chum Fishery: Area 12 Broughton Archipelago (Area H)
2019	Nanaimo Terminal Chum (Snuneymuxw First Nation)	
2020		Fraser Chum ITQ (Area E)

First Nations requests for access to salmon allocations associated with licences in the Departmental licence inventory will be reviewed internally by the Department and outcomes will be confirmed First Nations proponents. Demonstration fisheries that do not receive requested allocations will not proceed.

Full versions of the original proposals or final fishing plans is available upon request to Ge.Li@dfo-mpo.gc.ca or the local fishery manager.

To view the list of North Coast CSAF demonstration fisheries, please see Appendix 6 of the Northern BC IFMP.

4.1 TERMINAL CHUM (K'OMOKS FIRST NATION)

	Terminal Chum
Included in Final IFMP	2019
Status (Implemented/ Developing)	2019: insufficient returns 2020: not implemented
Allocation*	13.41% of Southern Inside Chum.
Location	A portion of 14 (TBC)
Size	1- 2 seines or 3-5 gillnet vessels. Final number based on the number of fish to be harvested.
Catch Monitoring (Key Elements)	TBC – consistent with commercial marine fisheries
Communication	A K'omoks Tribes Fisheries demonstration fishery manager will be identified and will be responsible for the coordination of the K'omoks fishery and will be the primary contact for all communication with DFO and fishers.
Further Information	Kent Spencer – Aboriginal Affairs Advisor

*Shares change annually based the respective gear shares for the production Area and licences in DFO Inventory. Shares were based on 24 Area B, 18 Area D, 68 Area E, and 19 Area H licences in the DFO Inventory.

4.2 NANAIMO TERMINAL CHUM (SNUNEYMUXW FIRST NATION)

	Nanaimo Terminal Chum
Included in Final IFMP	2019
Status (Implemented/ Developing)	2019: not implemented 2020: implemented
Allocation*	13.41% of Southern Inside Chum.
Location	Nanaimo River Approach Areas/Portions of Departure Bay (TBC)
Size	1- 2 seines or 3-5 gillnet vessels. Final number based on the number of fish to be harvested. (TBC)
Catch Monitoring (Key Elements)	TBC – consistent with commercial marine fisheries
Communication	A Snuneymuxw Tribes Fisheries demonstration fishery manager will be identified and will be responsible for the coordination of the Snuneymuxw fishery and will be the primary contact for all communication with DFO and fishers.

Further Information	Terry Palfrey – Fisheries Manager/Kent Spencer – Aboriginal Affairs Advisor

*Shares change annually based the respective gear shares for the production Area and licences in DFO Inventory. Shares were based on 24 Area B, 18 Area D, 68 Area E, and 19 Area H licences in the DFO Inventory.

4.3 MAINLAND INLET PINK & CHUM FISHERY: AREA 12 BROUGHTON ARCHIPELAGO (AREA H)

	Mainland Inlet Pink & Chum – Area 12 Broughton Archipelago (Area H)
Included in Final IFMP	2019
Status (Implemented/ Developing)	2019: not implemented 2020: not implemented
Allocation	Existing share of Southern Inside Chum as per the CSAF.
Location	Sub-Areas 12 -26 to 12-30 and 12-35 to 12-42 (TBC)
Size	5 vessels. Final number based on the number of fish to be harvested.
Catch Monitoring (Key Elements)	Start, end, pause, cancel and daily catch reporting; logbook or E-log entry for each day of fishing; monitoring program to be determined.
Communication	Communication protocols with other fisheries and participants and DFO would be coordinated with the Resource Manager. The same type of program that occurs for southern inside Chum is envisioned.
Further Information	Christine Bukta – DFO Fisheries Manager

4.4 COWICHAN CHUM (COWICHAN TRIBES)

	Cowichan Terminal Chum (Cowichan Tribes)
Included in Final IFMP	2016
Status (Implemented/ Developing)	2016: Implemented 2017: Implemented 2018: Implemented 2019: Not Implemented 2020: Implemented
Allocation*	13.41% of Southern Inside Chum.
Location	A portion of 18-6, a portion of 18-7, a portion of 18-8.

Size	1- 2 seines or 3-5 gillnet vessels. Final number based on the number of fish to be harvested.
Catch Monitoring (Key Elements)	At-sea observer; mandatory landing site; 100% at-sea coverage; monitoring plan, in-season reporting
Communication	A Cowichan Tribes Fisheries demonstration fishery manager will be identified and will be responsible for the coordination of the Cowichan fishery and will be the primary contact for all communication with DFO and fishers.
Further Information	Terry Palfrey – DFO Fisheries Manager

*Shares change annually based the respective gear shares for the production Area and licences in DFO Inventory. Shares were based on 24 Area B, 18 Area D, 68 Area E, and 19 Area H licences in the DFO Inventory.

4.5 GOLDSTREAM CHUM (SAANICH TRIBES)

	Goldstream Chum (Saanich Tribes)
Included in Final IFMP	2016
Status (Implemented/ Developing)	2017: Insufficient returns 2018: Implemented 2019: Not Implemented 2020: Not Implemented
Allocation*	13.41% of Southern Inside Chum.
Location	A portion of 19-8, subareas 19-10, 19-11, and a portion of subarea 19-12
Size	1- 2 seines or 3-5 gillnet vessels. Final number based on the number of fish to be harvested.
Catch Monitoring (Key Elements)	At-sea patrols; mandatory landing site; 100% dock side monitoring; monitoring plan, in-season reporting
Communication	A Saanich Tribes Fisheries demonstration fishery manager will be identified and will be responsible for the coordination of the Saanich fishery and will be the primary contact for all communication with DFO and fishers.
Further Information	Terry Palfrey – DFO Fisheries Manager

*Shares change annually based the respective gear shares for the production Area and licences in DFO Inventory. Shares were based on 24 Area B, 18 Area D, 68 Area E, and 19 Area H licences in the DFO Inventory.

4.6 BUTE INLET CHUM (HOMALCO FIRST NATION)

	Bute Inlet Chum (Homalco First Nation)
Included in Final IFMP	2018
Status (Implemented/ Developing)	2018: insufficient returns; final fishing plan pending 2019: not implemented 2020: not implemented
Allocation*	13.41% of Southern inside Chum
Location	13-21
Size	3-5 gillnet vessels. Final number based on the number of fish to be harvested.
Catch Monitoring (Key Elements)	To be determined in discussion with DFO
Communication	A Homalco First Nations representative will be identified and will be responsible for the coordination of the Bute Inlet fishery and will be the primary contact for all communication with DFO and fishers.
Further Information	Kent Spencer – DFO Aboriginal Affairs Advisor

*Shares change annually based the respective gear shares for the production Area and licences in DFO Inventory. Shares were based on 24 Area B, 18 Area D, 68 Area E, and 19 Area H licences in the DFO Inventory.

4.7 SOCKEYE, PINK AND CHUM ALTERNATE GEAR (AREA E)

	Fraser River Sockeye, Pink and Chum Alternate Gear (Area E)
Included in Final IFMP	2016
Status (Implemented/ Developing)	2016/2017: not implemented, insufficient interest 2018: not implemented, final fishing plan pending 2019: not implemented, final fishing plan pending 2020: not implemented
Allocation	Existing share of Area E Fraser River Sockeye, Pink and Chum as per the CSAF.
Location	Fraser River main stem
Size	Up to 15 shallow seines to harvest Pinks, Sockeye, Chum. 1-3 beach seine for Chum. The numbers of shallow seines and the beach seines would be limited by the uncaught Area E allocation.
Catch Monitoring (Key Elements)	Dock side monitoring for the shallow seines and on grounds monitor for the beach seines; 3 landing sites; 25% roving observer coverage

Communication	Area E would appoint a spokesperson for communication with other fisheries and DFO. It is expected that there would be at least weekly in-season communications with DFO and or a local harvest committee if one is struck.
Further Information	Barbara Mueller – DFO Fisheries Manager

4.8 QUALICUM AND PUNTLEDGE CHUM (AREA D)

	Qualicum and Puntledge Chum (Area D)
Included in Final IFMP	2017
Status (Implemented/ Developing)	2017: implemented 2018: insufficient returns 2019: insufficient returns 2020: not implemented
Allocation	Existing share of Southern Inside Chum as per the CSAF
Location	Area 14
Size	4 vessels
Catch Monitoring (Key Elements)	Start, end, pause, cancel and daily catch reporting; logbook or e-log entry for each day of fishing
Communication	Communication in-season would be via the Chum working group committee
Further Information	Ryan O'Connell – DFO Fisheries Manager

4.9 AREA 12-9 ENCOUNTER (AREA D)

	Area 12-9 Encounter Study (Area D)
Included in Final IFMP	2017
Status (Implemented/ Developing)	2014: Implemented 2018: Implemented 2020: Not Implemented
Allocation*	Existing share of Sockeye as per the CSAF
Location	Subareas 12-9, 12-10, and portion of 12-8
Size	10 to 25 vessels
Catch Monitoring (Key Elements)	Minimum of 20% on-board observer coverage; subject to regular Area D Gill Net licence conditions; logbook or e-log entry for each day of fishing

Communication	Communication in-season would be via the Fraser harvest committee
Further Information	Greg Hornby – DFO Fisheries Manager

4.10 BUTE INLET CHUM (AREA D)

	Bute Inlet Chum (Area D)
Included in Final IFMP	2018
Status (Implemented/ Developing)	2018: insufficient returns; final fishing plan pending 2019: not implemented 2020: not implemented
Allocation	Existing share of Southern Inside Chum as per the CSAF.
Location	Areas 13-20-22
Size	Limited entry fleet (4-5 vessels). Final number based on the number of fish to be harvested.
Catch Monitoring (Key Elements)	Start, end, pause, cancel and daily catch reporting; logbook or E-log entry for each day of fishing
Communication	Communication in-season would be via the Chum working group committee.
Further Information	Greg Hornby – DFO Fisheries Manager

4.11 MAINLAND INLET PINK & CHUM – JERVIS INLET (AREA H)

	Mainland Inlet Pink & Chum – Jervis Inlet (Area H)
Included in Final IFMP	2017
Status (Implemented/ Developing)	2017: Not implemented - low forecast; final fishing plan pending 2018: Not implemented - low forecast; final fishing plan pending 2019: Not implemented - low forecast; final fishing plan pending 2020: Not implemented
Allocation	Existing share of Southern Inside Chum as per the CSAF.
Location	Areas 12 to 19 and 28
Size	2-3 vessels. Final number based on the number of fish to be harvested.
Catch Monitoring (Key Elements)	Start, end, pause, cancel and daily catch reporting; dockside catch validation; logbook or E-log entry for each day of fishing

Communication	Communication protocols with other fisheries and participants and DFO would be coordinated with the Resource Manager. The same type of program that occurs for southern inside Chum is envisioned.
Further Information	Christine Bukta – DFO Fisheries Manager

4.12 BUTE INLET CHUM (AREA H)

	Area 13 – Bute Inlet Chum (Area H)
Included in Final IFMP	2018
Status (Implemented/ Developing)	2018: insufficient returns; final fishing plan pending 2019: insufficient returns; final fishing plan pending 2020: not implemented
Allocation	Existing share of Southern Inside Chum as per the CSAF.
Location	Areas 13-20 and 23
Size	4 vessels
Catch Monitoring (Key Elements)	Start, end, pause, cancel and daily catch reporting; logbook or E-log entry for each day of fishing; monitoring program to be determined.
Communication	Communication protocols with other fisheries and participants and DFO would be coordinated with the Resource Manager. This fishery should form part of the southern inside Chum coordinated management program.
Further Information	Christine Bukta – DFO Fisheries Manager

4.13 FRASER CHUM ITQ (AREA E)

	Fraser Chum ITQ (Area E)
Included in Final IFMP	2020
Status (Implemented/ Developing)	2020: Implemented
Allocation	TBD (in-season)
Location	Fraser River
Size	Up to 100 vessels (est.)

Catch Monitoring (Key Elements)	Logbook or e-log entry for each day of fishing; dockside validation; roving at-sea observer coverage; subject to Area E Gill Net licence conditions;
Communication	Communication in-season via the Chum WG; Area E Harvest Committee (AEHC)
Additional Comments	For 2020/2021 Area E will proceed with a Chum ITQ demonstration fishery proposal. Area E has expressed interest in transition of all Fraser River (Area 29) salmon fisheries from open/competitive to transferable share based over time.
Further Information	Barbara Mueller – Resource Manager/Dean Allan – Area Chief

APPENDIX 7: AREA B AND AREA H FRASER SOCKEYE ITQ DEMONSTRATION FISHERY

2021 GUIDELINES

The following information is provided as a guide to the Area B and Area H Individual Transferable Quota Demonstration fishery. These guidelines are intended for general purposes only. Where there is a discrepancy between the guidelines and the licence conditions, the Conditions of 2021/2022 Salmon Area B Licence or the Conditions of 2021/2022 Salmon Area H Licence are the final authority.

TOTAL MORTALITY APPROACH FOR MANAGING AREA B AND H INDIVIDUAL TRANSFERABLE QUOTA SHARES FOR FRASER SOCKEYE AND PINK:

Individual licence holders will have the flexibility to decide how to use their available quotas (ITQs) of Sockeye and Pink during fishery openings and subject to conditions of licence.

Accounting of ITQs for Fraser River Sockeye will be based on total mortalities, including retained catch and assessed release mortalities; for Fraser Pink accounting will only include retained catch (release mortalities will not be tracked).

For any Pink or Sockeye retained, catches will be attributed to available vessel ITQ on a 1 for 1 basis.

All Fraser Sockeye and Pink retained will be verified by 100% mandatory landing and independent dockside monitoring.

Sockeye release mortality will also be attributed to available vessel ITQ based on the steps below.

All Sockeye retained and Sockeye release mortalities will be attributed to ITQs. Sockeye Release mortalities will be assessed as follows:

- Step 1: The Sockeye encounter rate will be assessed for both Area B and H fleets. The Sockeye encounter rates will be based on independent At-Sea Observer data. Different encounter rates will be used for each fleet (B vs. H), Area (e.g. Area 12, 13, 18, 29) and time (daily). Note: The same encounter rates will be applied to all vessels in each fleet in each Area on a given day, except those vessels with a

stationary Observer that have an encounter rate less than the fleet average (see Appendix 7C).

- Step 2: The validated Pink catch for a vessel will be used to calculate the Sockeye encounters.
  - If no Sockeye were retained, then Sockeye release mortality will be assessed against the Sockeye ITQ and calculated as the fleet-wide Sockeye encounter rate multiplied by the total Pink landing multiplied by the Sockeye release mortality rate.
  - If Sockeye were retained:
    - In excess of the expected fleet-wide Sockeye encounter rate based on the validated Pink catch for the vessel, then the vessel's Sockeye ITQ is reduced by the number of Sockeye retained on a 1 for 1 basis and no Sockeye release mortality will be applied;
    - Less than what would be expected based on the fleet-wide Sockeye encounter rate applied to the validated Pink catch for the vessel, then the vessel's Sockeye ITQ will be reduced by the number of Sockeye retained on a 1 for 1 basis, plus the Sockeye release mortality applied to the difference between the number retained and what would be expected based on the fleet-wide Sockeye encounter rate.
- Step 3: Sockeye release mortality rates will be fixed at 10% for Area H Troll and 25% for Area B Seine.
  - For example:
    - A troll vessel landing 400 Pink and no Sockeye from Area 12 on August 20 with a fleet-wide Sockeye encounter rate from Observer data of 15% Sockeye for that day and area would be assessed a release mortality of 6 Sockeye against their quota as follows:
      - 400 Pinks × 0.15 encounter rate × 0.10 release mortality = 6 Sockeye mortalities
    - A seine vessel landing 10,000 Pink and 400 Sockeye from Area 12 on August 28 with a fleet-wide Sockeye encounter rate from Observer data of 7% Sockeye for that day and area would be assessed 475 Sockeye against their quota as follows:

- 10,000 Pinks x 0.07 encounter rate = 700 expected Sockeye encounters
- 700 expected Sockeye – 400 landed Sockeye = 300 releases
- 300 releases x 0.25 release mortality = 75 Sockeye release mortalities
- 400 landed Sockeye + 75 Sockeye release mortalities = 475 total Sockeye mortalities

- (See additional examples in Appendix 7D)

This approach allows for direct transferability of Sockeye and Pink ITQs between Area B and Area H vessels and allows for different release mortality rates for the Area B and H fleets.

SETTING TAC AND ASSOCIATED QUOTA SHARES:

The Area B Seine Fraser River Sockeye quota will be determined by DFO by dividing the Area B Seine Fraser River Sockeye allocation (percent), by the total number of licensed vessels for Area B multiplied by the available Fraser River Sockeye Commercial Total Allowable Catch (TAC) determined in-season.

The Area H Troll Fraser River Sockeye quota will be determined using the same formula, i.e. by dividing the Area H Troll Fraser River Sockeye allocation (percent), by the total number of licensed vessels for Area H multiplied by the available Fraser River Sockeye Commercial TAC determined in-season.

The Fraser River Pink quota will be determined for both the Area B Seine and Area H Troll fleets using a similar approach to the above.

The quota share will remain fixed in-season subject to amendments for seasonal quota transactions and will be expressed as a percentage of the Commercial TAC.

The Commercial TAC for both Sockeye and Pink will be distributed over the course of the fishery in increments and will be cumulative over the course of the season.

The Commercial TAC will be announced by Fishery Notice and adjusted if necessary following Fraser River Panel meetings (usually Tuesday and Friday) depending on abundance and stock composition. Note the Commercial TAC announced will be for the purpose of determining shares in pieces of salmon for the ITQ demonstration fishery only.

The Pink commercial TAC may be adjusted to account for the proportion of the catch attributable to non-Fraser Pinks.

Sockeye	Area B	Area H
No. of licences	169	68
Fleet share of Sockeye	48.5%	4.8%
Individual licence share (Fleet Share/# licences)	0.28698%	0.07059%

Pink	Area B	Area H
No. of licences	169	68
Fleet share of Pink	82.5%	10%
Individual licence share (Fleet Share/# licences)	0.48817%	0.14706%

CALCULATING SOCKEYE ENCOUNTERS:

Encounter rates based on Observer data will be assessed daily by gear type and area, and applied to all vessels in each fleet in a given area.

Encounter rates estimated from individual Observers on the same gear in the same area in the same day will be averaged to provide a single estimated encounter rate (e.g. a single data point below).

The encounter rates for a given day will be entered into the ITQ database on the next day.

For same day trips, the encounter rate from the previous day or a projection may be used if the encounter rate is not yet available for the day the catch was landed.

Examples are provided in Appendix 7C.

OPENING AND CLOSING THE FISHERY:

Areas will be opened normally, using Variation Orders and Fishery Notices.

Area B and Area H fisheries will open after a Commercial TAC is identified.

Certain fishing areas may be restricted to fisheries in order to avoid stocks of concern and to move the fleets into areas of lesser impact.

Areas 12 and 13 as well as Areas 14, 16, 18, 20, and 29 may not be open at the same time due to species and stock composition, diversion rate, observer coverage, and/or Sockeye encounter rate.

If at any point at the start of, or during, the season there is no Commercial TAC available for Fraser Sockeye, or a conservation constraint (e.g. Cultus Sockeye exploitation rate constraint) limits further commercial Sockeye harvest, then the Department may close the fishery to retention of Sockeye. In this situation, any fishing opportunities for retention of Pink Salmon will continue to be managed using the ITQ demonstration fishery guidelines and Sockeye release mortalities may continue to be tracked. Specific information for this situation will be communicated in-season via Fishery Notice.

AREA FISHING PLANS:

Appendix 7A contains more detailed fishing plans, however at this time all fishing plans are very general and subject to change in-season following Fraser River Panel meetings. Fishery Notices will be posted throughout the season to ensure the most up to date information regarding the Area B and Area H fishing plans are available on a timely basis.

Areas 12 and 13: The start date for the Area B and Area H fisheries will be confirmed by Fishery Notice dependent on in-season information. Area B and Area H fisheries are usually planned for five to seven days per week, to be confirmed by Fishery Notice. Fishing restrictions in test fishing areas are outlined in Appendix 7B and will be confirmed by Fishery Notice in-season.

Area 14 and 16: Consideration may be given in-season for Fraser River Sockeye fisheries in Sabine Channel subject to Sakinaw constraints as well as constraints for other stocks of concern.

Area 20: In 2014, the Area B Harvest Committee requested the Department review the Coho release mortality rate previously set at 70%; the release mortality rate was set at 50%. The Coho release mortality rate will remain at 50% for the 2021 fishing season and Observer coverage will be mandatory.

The anticipated start date for the Area B fishery will be confirmed by Fishery Notice. Opportunities in this fishery will be dependent on in-season assessment

information, diversion rate, and Coho impacts. **For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.**

Areas 18 and 29: Options for fishing off the river in Area 29 and in Area 18 for Area B and Area H will be confirmed by Fishery Notice. A proposal for an Area 29 in-river demonstration fishery for the Area B fishery is outlined in the IFMP. **For 2021, a combination of fisheries closures and mandatory and voluntary measures will be in place to support prey availability and reduce physical and acoustic disturbance. Fishing restrictions promote foraging for SRKW within key foraging areas in their identified critical habitat. These measures are outlined in section 5.8.**

Test Fishing: To ensure test fishing information is not compromised during the ITQ fishery, restrictions are in effect when fishing near assessment boats (Appendix 7B). **Sub-area and opening times will be modified in-season and announced on the grounds by DFO representatives and by Fishery Notice. If any conflicts arise, changes to the opening times and fishing areas will be announced by Fishery Notice.**

CATCH MONITORING AND VALIDATION:

Verification of at-sea releases is essential to the management of Fraser River Sockeye and other co-migrating stocks. Data collected by At-Sea Observers may be used to calculate fleet-wide releases. Poor compliance with permitting Observers on-board to collect this data will impact future fishing opportunities.

The level of coverage for At-Sea Observers will be determined in-season based on areas open to fishing, effort, and gear type for each day of fishing.

Start, end, pause, cancel, and daily catch reports (as per Conditions of Licence) must be made by, or on behalf of, all Area B and Area H vessel masters by cellular (call or text), land line, or satellite phone to the Salmon Catch Reporting Service provider or by E-log (please refer to your conditions of licence).

Vessel masters must complete a logbook or E-log entry for each day of fishing. The vessel master must print and sign their name and Fisher Identification Number (FIN) beside each record made in the paper harvest log.

Catch validation, which will include dockside and designated transport vessel landings, is a requirement of ITQ fisheries and must be arranged in advance by, or on behalf of, Area B and Area H vessel masters.

Upon validation of the catch (including bycatch species) the vessel master must review and sign the validation form. The catch (including bycatch species) data will be entered into the ITQ database no later than 12 hours after the validation is complete.

Mandatory fish hold checks will be performed.

Conditions of Licence list the designated offload ports.

For reference purposes, Area B Seine Fishery and Catch Reporting Requirements are attached in Appendix 7A for Johnstone Strait, Area 20, and Area 29. The appendices also include further information regarding restrictions when fishing in designated seine test fishing locations (Appendix 7B).

CATCH VALIDATION REQUIREMENTS:

Catch validation is mandatory and individual licence holders are required to make their own arrangements with a Landing Observer Service Provider authorized by the Department. Licence holders that plan to harvest Sockeye are encouraged to register with the Landing Observer Service Provider in advance of the fishery to confirm arrangements. The Landing Observer Service Provider will be announced by Fishery Notice prior to the fishery.

Prior to any landing of fish, the vessel master shall call in to the Landing Observer Service Provider and provide the following information:

- vessel name;
- vessel registration number;
- name and Fisher Identification Number of the vessel master;
- contact phone number;
- date, time, port and location of landing of the fish;
- name of fish buying station where fish are to be landed;
- product type;
- estimated number of pieces by species, by day;
- area fished; and
- number of sets made.

Note: As much notice as possible should be given so the Landing Observer Service Provider can make arrangements for a Landing Observer to be present for the landing which is a mandatory licence requirement.

A salmon Landing Observer shall be present during all landings of catch to record the number and weight of each species of salmon and by-catch (including non-salmon) delivered. This information will be entered into the ITQ database not later than 12 hours after validation has occurred.

All salmon shall be landed at one of the following locations:

- Area B Seine: Campbell River, French Creek, Greater Vancouver, Port Hardy, Port McNeill, Port Renfrew, Quadra Island or to a transport vessel **designated** for the quota fishery.
- Area H Troll: Campbell River, Comox, Cowichan Bay, French Creek, Greater Vancouver, Kelsey Bay, Nanaimo, Port Hardy, Port McNeill, Quadra Island or to a transport vessel designated for the quota fishery. Or if pre-arranged, any other mutually agreed upon location between the **designated** Landing Observer Service Provider and the vessel master.

QUOTA TRANSFERS:

Licence holders or designates are encouraged to register with the Quota Officer prior to the fishing season. The contact information will be used in season to contact the licence holder, designate or skipper in the event of an overage or discrepancy with catch data. Licence holders/designates can confirm their available quota by contacting the Quota Officer. The Quota Officer and contact information will be announced by Fishery Notice prior to the season.

Quota may be reallocated as a percent (for the season) or by pieces (for example, to temporarily cover an overage). Note that once any pieces have been transferred from a licence you can no longer transfer the entire remaining percentage.

Quota will be transferable within each licence area (e.g. Area B to Area B or Area H to Area H) as well as between licence areas (e.g. Area B to Area H or Area H to Area B). The Department may consider transfers outside of Area B and Area H. Refer to Section 12.7.1 Transfer Guidelines for the Temporary Transfer of Commercial Salmon Shares of the 2021-2022 South Coast Salmon IFMP for more details.

Where the Department has received for processing two or more conflicting requests for trading, all of the requests for trading will be denied.

Given the short window of fishing opportunity, quota transfers will be permitted while vessels are on-grounds, however if a vessel is in an overage situation they cannot continue to fish until that overage has been covered.

DFO staff will enter the quota transfer into the ITQ database during normal working hours (8am to 4pm Monday to Friday). If required, additional hours will be available in-season.

Quota reallocation forms will be available from:

Christine Bukta (250) 286-5888 or Christine.Bukta@dfo-mpo.gc.ca

Or online at: https://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/licence-commercial-permis-eng.html

OVERAGES:

Overages must be covered by a quota reallocation within 24 hours of landing and validation (the '24 hour rule'). Vessels are not permitted to recommence fishing until all overages have been covered.

If a vessel recommences fishing when in an overage situation, Conservation and Protection (C&P) will be notified immediately. Vessels are not permitted to recommence fishing until all overages have been covered.

An increase in the TAC cannot be used to cover an overage. The quota being transferred to a vessel in an overage situation must be quota that was available prior to the TAC increase.

Overages as a result of a run downgrade must be covered by a quota reallocation.

An overage occurring as a consequence of a decrease in the TAC will not have to be covered if the fishery is closed for the duration of the season.

TRANSPORTING:

Area B and Area H vessels will be permitted to move fish from one licenced vessel to another licenced vessel (Area B and H only) on the grounds.

If a vessel transports and lands fish from other licenced vessels, quota reallocations must be made within 24 hours of landing with the catch assigned to the landing vessel only when the landing vessel has a quota overage.

All vessels are required to document in the Offload Catch Report section of the logbook or E-log, when fish has been pooled (transshipped) onto another vessel or vessels.

Transporting vessels must document in a Transfer Log as required in Part 3 Section 2 of the Conditions of 2021/2022 Salmon Area B or Area H Licence, and provide to the Landing Observer Service Provider, detailed information on the name of the vessel that caught the fish, the date the fish were caught, the location (subarea) in which the fish were caught and the amount of each species retained and landed.

Refer to the Part 3 Section 2 of the Conditions of 2021/2022 Salmon Area B or Area H Licence for all transporting requirements.

Note that as stated in the Conditions of 2021/2022 Salmon Area B and Area H Licence, no salmon of species that are not permitted to be caught and retained in the commercial salmon fishery from which this vessel is receiving fish shall be on board this vessel when commercially caught salmon are on board.

TRANSPORT VESSEL (PACKER)-BASED VALIDATION INFORMATION:

Vessel masters shall deliver only to transport vessels designated for the quota fishery.

To become a transport vessel designated for the Area B and Area H Fraser Sockeye ITQ Demonstration Fishery refer to the Fishery Notice released prior to the opening.

All transport vessels for the quota fishery carrying multiple vessels catch will be required to take onboard an observer to complete validation of catch.

On-board validators will follow the Landing Observer Service Provider's established procedures for verifying catch and performing mandatory hold checks.

Any transport vessels wanting to carry fish without an onboard observer will have to contact the manager identified in the Fishery Notice released prior to the opening to obtain approval.

Transport vessels without an onboard observer will only be able to carry catch from one vessel participating in the ITQ fishery and must not have any salmon of any species caught in another fishery.

Transport vessels without an onboard validator are responsible for recording and providing to the Dockside Monitoring Service Provider the Hail Number verifying the landing vessels contacted the Landing Observer Service Provider prior to delivering to the transport vessels. If the landing vessel does not have a hail number the transport vessel shall instruct the vessel master to call the Landing Observer Service Provider. These transport vessel masters are responsible for assuring that all fish are offloaded and that the totals are recorded on the transfer log, as required in the Conditions of 2021 Transport Licence.

Refer to the Conditions of 2021 Transport Licence for all transporting requirements.

VESSEL VALIDATION INFORMATION:

To avoid discrepancies in quota and validation records, vessel masters must review and sign the validation slip.

When reporting catch to the service provider, vessel masters must provide an accurate breakdown of daily catch.

SERVICE PROVIDER REQUIREMENTS:

The service provider is to provide DFO with copies of all Validation and Tally forms. Copies of the validations forms must be provided to DFO within 24 hours of completing the validation, and Tally forms must be provided after the fishery closes for the season or upon request by the Department.

The catch (including bycatch species) validation data will be entered into the ITQ database no later than 12 hours after the validation is complete.

The service provider is required to perform quality assurance and quality control checks on all data entered into the ITQ database both in-season and post season. Regular checks must be completed to verify the accuracy of the data entry.

APPENDIX 7A

AREA B SEINE FISHERY AND CATCH REPORTING REQUIREMENTS BY AREA

This document is for information purposes only. Fishers must have a valid 2021/2022 Salmon Area B licence, complete with Conditions of 2021/2022 Salmon Area B Licence. Where there is a discrepancy between this document and the Conditions of 2021/2022 Area B Seine Licence, the Conditions of Licence shall prevail.

Given ongoing declines in Interior Fraser River Steelhead escapement and the designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO is implementing a rolling window closure throughout Southern BC to protect Interior Fraser River Steelhead in 2021. Areas and dates for the window closure are identified in Appendix 9.

Johnstone Strait Seine	
Opening dates/times	Seines open, as per in-season Fishery Notices, in portions of Areas 12 and 13. Fishery openings and closures will also be announced on the grounds by the Charter Patrol vessel.
Target Species	In Areas 12 and 13, the target species in the fishery is Fraser River Sockeye, subject to in-season abundance information. The incidental catch and retention of Chum and Pink may be permitted in the areas open to fishing. There will be non-retention of Coho, Chinook and Steelhead.
Gear specifics	Min Bunt Mesh 70 mm. The use of power skiffs is not permitted. Seine vessel masters are reminded that mandatory brailing and sorting of catch is required, as is the use of revival tanks.
Monitoring	The Department will work with the Area B and H Harvest Committee representatives and the At-Sea Observer Service Provider to determine how best to deploy Observers based on Areas open to fishing, predicted fleet-size and previous Sockeye encounter rate estimates. The final decision for deploying Observers rests with the Department.

On Ground reporting requirements	Start Fishing Report, Daily Catch report, End Fishing Report, Cancel Trip Report. In addition Test Fishing Zone Catch Reports may be required. The Test Fishing Zone Catch Reports are additional catch reporting requirements that may be in effect while fishing in the Test Fishing Zones. Please see Appendix 7B for more information. When fishing in Subarea 12-3, it is important to differentiate between fishing in Subarea 12-3W (West of Robson Bight) and 12-3E (East of Robson Bight).
Test Fishing	Vessel masters are reminded that test fishing vessels will be operating during the fishery in Areas 12 and 13. Vessels planning to fish near the test fishing locations are not to interfere with test fishing operations. Test fishing information is a key component of the in-season assessment of Fraser River Sockeye returns. If interference with test fishing activities occurs, fishery closures in test fishing locations will be considered. Please see the attached Appendix 7B for more detail pertaining to fishing in the Test Fishing Zones.
DFO Contacts	Christine Bukta, 250-286-5888

Area 20 Seine Fishery and Catch Reporting Requirements	
Opening dates/times	Seines open, as per in-season Fishery Notices, in a portion of Subareas 20-1, in waters deeper than 55 meters (30 fathoms).
Target Species	In Area 20, the target species in this fishery is Fraser River Sockeye Salmon, subject to in-season abundance information. There will be non-retention of Coho, Chum, Chinook and Steelhead.
Gear specifics	Min Bunt Mesh 100 mm. Power skiffs are permitted to be used. Seine vessel masters are reminded that mandatory brailing and sorting of catch is required, as is the use of revival tanks.
Monitoring	Increased observer coverage may be required for fisheries in this area.

On Ground reporting requirements	Start Fishing Report, Daily Catch Report, End Fishing Report, Cancel Trip Report. When fishing in Area 20 the following additional On-Grounds Catch Reporting information must be reported during the fishery: On-Grounds Reporting: Upon completion of a set (after brailing is completed), the Vessel Master shall report, to the At-Sea Observer, the set number for the current day's fishing, time the set was made, set location (grid area) and the number of all species of fish caught and retained or released. Log sheets for recording and reporting individual set information will be provided by DFO or the At-Sea Observer prior to commencement of the fishery. The Observer will relay the information to the DFO manager upon completion of the set. As communications may be limited, the set by set information may need to be provided to the DFO manager at the end of each fishing day. The Observer or DFO will provide the fishing vessel skippers participating in this fishery a chart prior to the commencement of the fishery. This chart divides the fishing area into grid areas and catches by set will be recorded in correspondence to the grid areas.
Test Fishing	Vessel masters are reminded that test fishing vessels will be operating during the fishery in Area 20. Vessels planning to fish near the test fishing locations are not to interfere with test fishing operations. Test fishing information is a key component of the in-season assessment of Fraser River Sockeye returns. If interference with test fishing activities occurs, fishery closures in test fishing locations will be implemented.
DFO Contacts	Terry Palfrey, 250-756-7158 Christine Bukta, 250-286-5888

Area 29 Seine Fishery and Catch Reporting Requirements	
Opening dates/times	Seines open, as per in-season Fishery Notices, in portions of Area 29. Typical Subareas that may open include 29-3, 29-4, and 29-6. Options to fish in the latter Subareas, as well as portions of Subareas 29-7, 29-9,

	and 29-10 will be determined in-season and announced by Fishery Notice. Fishery openings and closures will also be announced by Fishery Notice.
Target Species	In Area 29, the target species in this fishery is Fraser River Sockeye Salmon, subject to in-season abundance information. The incidental catch of Chum and Pink may be retained in the areas open to fishing. There will be non-retention of Coho, Chinook and Steelhead.
Gear specifics	Min Bunt Mesh 70 mm. Power skiffs are permitted to be used. Seine vessel masters are reminded that mandatory brailing and sorting of catch is required, as is the use of revival tanks.
Monitoring	Increased Observer coverage may be required for fisheries in this area.
On Ground reporting requirements	Start Fishing Report, Daily Catch Report, End Fishing Report, Cancel Trip Report.
Test Fishing	Vessel masters are reminded that test fishing vessels may be operating during the fishery in Area 29. Vessels planning to fish near the test fishing locations are not to interfere with test fishing operations. Test fishing information is a key component of the in-season assessment of Fraser River Sockeye returns. If interference with test fishing activities occurs, fishery closures in test fishing locations will be implemented.
DFO Contacts	Barb Mueller, 604-666-2370 Christine Bukta, 250-286-5888

APPENDIX 7B

2021 FRASER SOCKEYE COMMERCIAL FISHERY RESTRICTIONS IN DESIGNATED SEINE TEST FISHING LOCATIONS

In-season test-fishing assessment information in the marine approach areas is critical in estimating abundances of returning Fraser River Sockeye stocks and identifying available harvest levels.

Commercial fisheries must be structured and scheduled to ensure that test fishing assessment information is not compromised.

This is particularly critical in the Area B Seine Individual Transferable Quota (ITQ) fishery which provides for additional days of fishing than would be permitted under a derby-style fishery.

Given ongoing declines in Interior Fraser River Steelhead escapement and the designation of the Thompson and Chilcotin River Steelhead as Endangered by COSEWIC, DFO is implementing a rolling window closure throughout Southern BC to protect Interior Fraser River Steelhead. Areas and dates for the window closure are identified in Appendix 9.

JOHNSTONE STRAIT AREA B SEINE ITQ FISHERY RESTRICTIONS:

AREA 12

Subarea 12-3 is a Test Fishing Zone. **Catch reports must differentiate between fish caught in 12-3W (West of Robson Bight) and 12-3E (East of Robson Bight).**

DFO and the PSC will need the cooperation from as many ITQ vessels as possible fishing in the Test Fishing Zone to record set-by-set information. All ITQ vessels must have set-by-set data sheets or E-logs onboard while fishing in the Test Fishing Zone. Data sheets will be available for pickup from the test vessel or from the Charter Patrol in that area. **ITQ vessels fishing in the Test Fishing Zone are required to record set-by-set catch and effort information**; this includes the duration of set times from time when the net goes in the water until the time when the rings are up (closed). E-log software has been modified so that vessel masters are able to send individual set-by-set information. Please note: E-log software can handle set-by-set catch information, but at this time, set times and duration of sets cannot be reported by the E-log software. Vessel masters are requested to record set times and set durations separate from the E-log entries.

Test fishing vessels will announce their fishing pattern on the grounds for each four (4) day test fishing period.

Test fishing vessel will start at the lower areas 1st (Fine Beach or Robson Bight) and work seaward towards Blinkhorn.

Test fishing vessel will start fishing 1 hour earlier each day from the previous years (net in the water by 07:00 hours).

Below Robson Bight will be assessed every 2nd day; Robson Bight will be assessed every day.

Test fishing vessel's first set each day will be 07:00 hours at either Fine Beach or Robson Bight and proceed seaward towards Blinkhorn. During this time no vessel will be permitted to fish in front of the test fishing vessel, within 1 net length of the beach. The test fishing vessel will announce when they have closed their net, after which ITQ vessels can commence fishing in that location. **Please note: Commercial opening times and areas will be announced by Fishery Notice.**

ITQ vessels must hail their intention to fish to the test fishing vessel or to the on-grounds Charter Patrol vessel prior to conducting any fishing in the Test Fishing Zone.

If there is interference with the test fishing vessel additional time and area closures will be implemented during the fishery between Fine Beach and Blinkhorn.

AREA 13

Area B Seine ITQ Fishery Restrictions:

Loggers Point to Little Bear Bight is a Test Fishing Zone.

Regular lower boundary in effect at Loggers Point.

ITQ vessels must hail their intention to fish to the test-fishing vessel or to the on-grounds Charter Patrol vessel prior to conducting any fishing in the Test Fishing Zone.

All ITQ vessels must have set-by-set data sheets or E-logs onboard while fishing in the Test Fishing Zone. Data sheets will be available for pickup from the test vessel or from the charter patrol in that area. **ITQ vessels fishing in the Test Fishing Zone are required to record set-by-set catch and effort information**; this includes the duration of set times from time when the net goes in the water until the time when the rings are

up (closed). E-log software has been modified so that vessel masters are able to send individual set-by-set information. **Please note:** E-log software can handle set-by-set catch information, but at this time, set times and duration of sets cannot be reported by the E-log software. Vessel masters are requested to record set times and set durations separate from the E-log entries.

Priority access for the test vessel is required in all designated test fishing locations.

If there is poor compliance, additional closures will be implemented during the fishery starting with a lower boundary at Bodega Point.

APPENDIX 7C

2021 FRASER RIVER SOCKEYE AND PINK INDIVIDUAL TRANSFERABLE QUOTA AREA B SEINE AND AREA H TROLL DEMONSTRATION FISHERY MANAGEMENT APPROACH

Fisheries and Oceans Canada has created this working document at the request of the Area B and H Salmon Harvest Committees to help guide pre-season Fraser Sockeye and Pink fishery planning. This document outlines some of the management approaches that will be used by the Department, but ultimately the management structure must remain flexible in order to respond to in-season information.

AREAS

The following Areas may be open to commercial Sockeye and/or Pink directed fisheries:

Area H Troll- Areas 12, 13, 18, and 29.

Area B Seine- Areas 12, 13, 14, 16, 18, 20, and 29.

OBSERVERS

In 2011, Area H Troll vessels had very limited Observer coverage. After preliminary review of the Observer data early in the fishery, it was assumed that the Sockeye encounter rate for troll vessels was less than the Sockeye encounter rate for seine vessels. An additional Observer day in late August lends support to this assumption. As troll vessels did not provide Observers for most of the fishery the Sockeye encounter rate for Area B Seine fleet was applied; this procedure may have in fact penalized troll vessels as the seine encounter rate was assumed to be higher.

Area B Seine vessels provided Observers in Areas 12, 13, and 29. The Observers in Area 12 were split between Area 12 North (Subareas north of 12-4) and Area 12 South (Subareas 12-4, 12-3, and 12-1), with additional Observers for some vessels that experimented with shallow seine gear modifications. Area 29 Observers were placed on vessels fishing outside the 45m contour line and on vessels with shallow seine gear modifications fishing the “flats” (inside the 45m contour line). Those vessels fishing the flats with shallow seine nets had increased Observer coverage to address concerns with Coho, Chinook, and Steelhead bycatch, and to monitor and record crab encounters and release condition (of crabs and Coho).

For 2013, the Department required daily Observer coverage in each Area where vessels were actively fishing. The number of Observers required was based on the estimated fleet size fishing in a given Area on a given day. Given that Sockeye were not to be retained, and the Sockeye quota was to account for releases during the Pink fisheries, Observer coverage was critical in determining the Sockeye encounter rates by Area. Observer coverage in Areas 12 and 29 were adequate, but the Observer coverage in Area 13 was poor, with vessels avoiding taking Observers during the opening.

For 2019, the Department will required daily Observer coverage in each Area where vessels were actively fishing. The number of Observers required was based on the estimated fleet size fishing in a given Area on a given day, with a requirement for more Observers early in the fishery when the Sockeye encounter rates were high (>10%, assuming there is sufficient Sockeye quota) and the Sockeye/Pink composition was fluctuating, as well as in transition areas (moving from Johnstone Strait to Area 29 fisheries). As the fishery progresses and Sockeye encounter rates decrease and stabilize, the requirement for Observer coverage may decrease, except in those Areas of special concern (due to stocks or species present or any habitat concerns).

For Area H troll vessels, Observers will be necessary periodically during the fishery to verify the assumption that Area H vessels have a lower Sockeye encounter rate versus seines. For those days on which Area H vessels take Observers, the average fleet-wide encounter rate will be based on the Area H Observer data for that fishing Area. If the assumption that Area H vessels have a lower Sockeye encounter rate than Area B vessels continues, for those days and Areas fished by troll vessels without any Observer coverage, the average Sockeye encounter rate for seines will be applied. If it is determined that the Sockeye encounter rate is higher for troll vessels than for seine vessels, the Department will require the troll fleet to provide additional Observers to determine the daily Sockeye encounter rates. The additional Observer coverage will be subject to fleet size and Areas actively being fished.

For Area B seine vessels fishing in Johnstone Strait, two to four Observers will be required daily in each Area early in the fishery as determined by the Department. As the fishery progresses and the Sockeye encounter rates decrease and stabilize this requirement may decrease. A decrease in Observers will be subject to fleet size and in-season assessments of risks to Sockeye by Area Managers. As fisheries transition to the mouth of the Fraser River, increased Observer coverage will be required to confirm Sockeye encounter rates and to monitor by-catch species (Coho, Chinook, and Steelhead) and crab encounters. Those vessels fishing shallower depth will require increased Observer coverage. This increased Observer coverage will extend to those vessels that may potentially fish in-river.

Fishing opportunities may also exist for Area B seine vessels in Areas 14, 16, 18 and 20. Participation in these Areas is likely to be limited however observer coverage will be required when vessels are actively fishing in these areas.

DEPLOYING OBSERVERS

The Department will work with the Area B and H Harvest Committee representatives and the At-Sea Observer Service Provider to determine how best to deploy Observers based on Areas open to fishing, predicted fleet-size and previous Sockeye encounter rate estimates. The final decision for deploying Observers rests with the Department.

ROVING VS. STATIONARY OBSERVERS

Observers in Johnstone Strait may be stationary or roving. Roving Observers are defined as Observers that board a vessel after a set is completely closed prior to the brailing of any fish from the net and remain on that vessel until the last fish is removed from the net. Stationary Observers are defined as Observers that board a vessel at the start of a fishing trip prior to the commencement of any fishing and remain on the vessel for the entire fishing trip until the vessel has ended the fishing trip by landing the catch.

CALCULATION OF SOCKEYE ENCOUNTER RATE

Encounter rates based on Observer data will be assessed daily by gear type and Area, and applied to all vessels in each fleet in a given Area. Encounter rates estimated from individual Observers on the same gear in the same Area in the same day will be averaged to provide a single estimated encounter rate for that Area and gear. The encounter rates for a given day will be entered into the ITQ database on the next day.

Note, those vessels with stationary Observers will receive the lower of two options:

Their vessels daily Sockeye encounter rate; OR

The average fleet-wide Sockeye encounter rate.

TEST FISHERY DATA

Now that the Department has transitioned back to the use-of-fish to finance salmon test fishery activities, test fishery data may be more reliable than recent years as some fish will be taken on board.

The test fishery data may be used to supplement or augment the Sockeye encounter rate data generated by the seine fleet. For example, in 2011 the test fishery data was used to supplement the Observer data from Area 12 on September 6 as the stationary Observer vessel had very poor fishing, catching 0 Sockeye and 8 Pinks vs. the Area 12 seine test vessel which caught 35 Sockeye and 1,571 Pinks.

DFO CONTACTS

Christine Bukta (Acting ECVI Fishery Management Coordinator)
Christine.Bukta@dfo-mpo.gc.ca
250-286-5814

Madeline Wanless (ECVI Assistant Fishery Manager)
Madeline.Wanless@dfo-mpo.gc.ca
250-895-9349

APPENDIX 7D

NOTE: <u>These examples are for illustration purposes only</u>. Actual quota amounts (in pieces) could vary substantially from those used in the examples and will be determined based on in-season assessment information.

Example 1: Cumulative TAC with Sockeye & Pink retention

	Week 1 - 1st week August				Week 2				Week 3				Week 4				Week 5 - last week Aug/1st week Sep				Week 6			
Hypothetical Sockeye TAC-Cumulative	224,000		PK "catch":	20,600	235,000		PK "catch":	7,600	235,500		PK "catch":	38,000	270,500		PK "catch":	1,794,000	277,500		PK "catch":	1,794,000	278,000		PK "catch":	60,800
Hypothetical Pink TAC-Cumulative	2,000,000		PK "avail":	30,000	2,000,000		PK "avail":	275,000	4,000,000		PK "avail":	1,100,000	8,400,000		PK "avail":	2,200,000	8,400,000		PK "avail":	1,900,000	8,400,000		PK "avail":	560,000
	Area B		Area H		Area B		Area H		Area B		Area H		Area B		Area H		Area B		Area H		Area B		Area H	
Calculations	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**
Initial ITQ allocation	0.2887%	0.4911%	0.0632%	0.1316%	0.2887%	0.4911%	0.0632%	0.1316%	0.2887%	0.4911%	0.0632%	0.1316%	0.2887%	0.4911%	0.0632%	0.1316%	0.2887%	0.4911%	0.0632%	0.1316%	0.2887%	0.4911%	0.0632%	0.1316%
Initial ITQ (pieces)	647	9,821	141	2,632	678	9,821	148	2,632	680	19,643	149	5,263	781	41,250	171	11,053	801	41,250	175	11,053	803	41,250	176	11,053
ITQ Remaining (pieces)	647	9,821	141	2,632	33	9,721	25	2,582	35	19,543	23	5,113	136	41,150	40	10,403	81	31,150	40	8,903	58	21,150	25	7,403
Sockeye Encounters																								
Fleet-wide sockeye encounter rate	55%	n/a	55%	n/a	30%	n/a	30%	n/a	10%	n/a	10%	n/a	3%	n/a	3%	n/a	1%	n/a	1%	n/a	0.1%	n/a	0.1%	n/a
Sockeye release mortality rate	25%	n/a	10%	n/a	25%	n/a	10%	n/a	25%	n/a	10%	n/a	25%	n/a	10%	n/a	25%	n/a	10%	n/a	25%	n/a	10%	n/a
Hypothetical Weekly Landing																								
Retained Catch	645	100	123	50	-	-	-	100	-	-	-	500	-	10,000	-	1,500	-	10,000	15	1,500	-	-	-	800
Release mortalities Charged																								
Expected sockeye encounters	55		27.5		0		30		0		50		300		45		100		15		0		0.8	
Assessed sockeye released	0		0		0		30		0		50		300		45		100		0		0		0.8	
Additional Release Mortality Assessed	0		0		0		3		0		5		75		5		25		0		0		0	
Total Mortality (catch plus release mortality assessed)	645	100	123	50	-	-	3	100	-	-	5	500	75	10,000	5	1,500	25	10,000	15	1,500	-	-	0	800
Cumulative Catch	645	100	123	50	645	100	126	150	645	100	131	650	720	10,100	136	2,150	745	20,100	151	3,650	745	20,100	151	4,450
ITQ Remaining at end of week	2	9,721	18	2,582	33	9,721	22	2,482	35	19,543	18	4,613	61	31,150	35	8,903	56	21,150	25	7,403	58	21,150	25	6,603

Example 2: Cumulative TAC with Pink retention only (sockeye released)

	Week 1 - 1st week August				Week 2				Week 3				Week 4				Week 5 - last week Aug/1st week Sep				Week 6			
Hypothetical Sockeye TAC-Cumulative	224,000		PK "catch":	3,800	235,000		PK "catch":	259,600	235,500		PK "catch":	962,000	270,500		PK "catch":	1,794,000	277,500		PK "catch":	1,794,000	278,000		PK "catch":	542,000
Hypothetical Pink TAC-Cumulative	2,000,000		PK "avail":	30,000	2,000,000		PK "avail":	275,000	4,000,000		PK "avail":	1,100,000	8,400,000		PK "avail":	2,200,000	8,400,000		PK "avail":	1,900,000	8,400,000		PK "avail":	560,000
	Area B		Area H		Area B		Area H		Area B		Area H		Area B		Area H		Area B		Area H		Area B		Area H	
Calculations	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**	**sockeye**	**pink**
Initial ITQ allocation	0.2887%	0.4911%	0.0632%	0.1316%	0.2887%	0.4911%	0.0632%	0.1316%	0.2887%	0.4911%	0.0632%	0.1316%	0.2887%	0.4911%	0.0632%	0.1316%	0.2887%	0.4911%	0.0632%	0.1316%	0.2887%	0.4911%	0.0632%	0.1316%
Initial ITQ (pieces)	647	9,821	141	2,632	678	9,821	148	2,632	680	19,643	149	5,263	781	41,250	171	11,053	801	41,250	175	11,053	803	41,250	176	11,053
ITQ Remaining (pieces)	647	9,821	141	2,632	678	9,821	146	2,582	564	18,143	143	5,113	516	34,250	160	10,403	454	24,250	160	8,903	430	14,250	135	7,403
Sockeye Encounters																								
Fleet-wide sockeye encounter rate	55%	n/a	55%	n/a	30%	n/a	30%	n/a	10%	n/a	10%	n/a	3%	n/a	3%	n/a	1%	n/a	1%	n/a	0.1%	n/a	0.1%	n/a
Sockeye release mortality rate	25%	n/a	10%	n/a	25%	n/a	10%	n/a	25%	n/a	10%	n/a	25%	n/a	10%	n/a	25%	n/a	10%	n/a	25%	n/a	10%	n/a
Hypothetical Weekly Landing																								
Retained Catch	-		-	50	5	1,500	-	100	15	5,500	-	500	10	10,000	-	1,500	-	10,000	25	1,500	-	3,000	25	500
Release mortalities Charged																								
Expected sockeye encounters	0		27.5		450		30		550		50		300		45		100		15		3		0.5	
Assessed sockeye released	0		27.5		445		30		535		50		290		45		100		0		3		0	
Additional Release Mortality Assessed	0		3		111		3		134		5		73		5		25		0		1		0	
Total Mortality (catch plus release mortality assessed)	-	-	3	50	116	1,500	3	100	149	5,500	5	500	83	10,000	5	1,500	25	10,000	25	1,500	1	3,000	25	500
Cumulative Catch	-	-	3	50	116	1,500	6	150	265	7,000	11	650	348	17,000	15	2,150	373	27,000	40	3,650	373	30,000	65	4,150
ITQ Remaining at end of week	647	9,821	139	2,582	562	8,321	143	2,482	415	12,643	138	4,613	433	24,250	156	8,903	429	14,250	135	7,403	429	11,250	110	6,903

APPENDIX 8: CATCH MONITORING AND REPORTING RISK ASSESSMENTS FOR PACIFIC SALMON

Following multi-sectoral consultations, DFO released the national *Fishery Monitoring Policy* in 2019 (available at: http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/fishery-monitoring-surveillance-des-peches-eng.htm), replacing the regional *Strategic Framework for Fisheries Monitoring and Catch Reporting in the Pacific Fisheries* (2012). The national *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. A phased approach to implementation of the national *Fishery Monitoring Policy* will result in a transition period from the Strategic Framework to the national policy.

There are two new risk assessment tools associated with the national policy—the Risk Screening Tool and the Quality Assessment Tool. These tools will screen risks posed by fisheries to stocks and examines complexity and compliance to inform monitoring requirements, and examine the impacts of monitoring program design and operation on the data quality of the resulting catch estimates, respectively. The national *Fisheries Monitoring Policy* is designed to help bring consistency and equity across fisheries for monitoring programs that adequately address the risk posed by each fishery. Levels and frequency of monitoring should respond to the degree of risk associated with the fishery and the complexity of the fishery. The steps to implement the national *Fishery Monitoring Policy* are outlined in Figure 13.5-12 below.

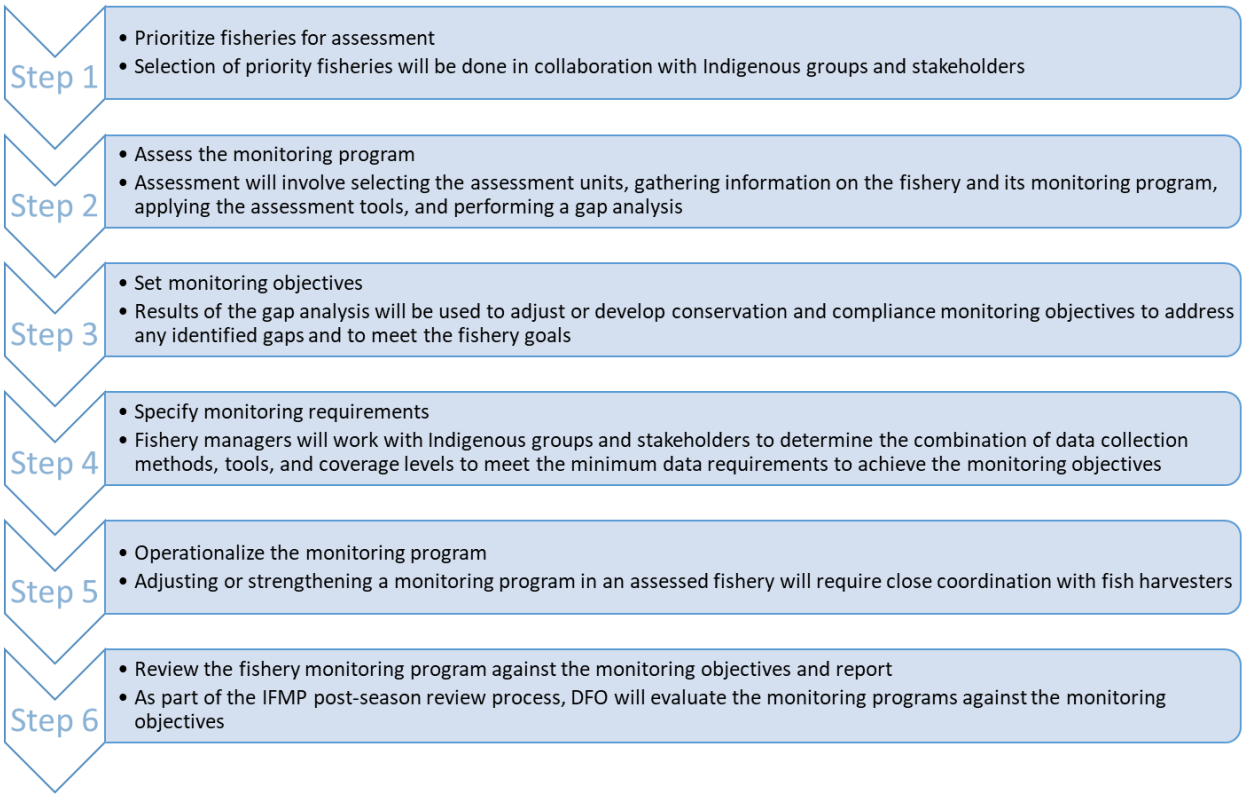

Figure 13.5-12: Procedural steps for implementing the national Fishery Monitoring Policy

In 2015, DFO partnered with the Monitoring and Compliance Panel to identify round 1 priority fisheries in Pacific Region to undertake risk assessments under the Strategic Framework. Thirteen draft risk assessments for commercial salmon fisheries were drafted internally by the Department in late 2018/early 2019 and released in the 2019-20 North and South Coast Salmon IFMP's for consultation. Feedback received during the 2019-20 IFMP consultation process included concern over inaccurate and inconsistent scoring and lack of transparency and inclusivity in the process. This feedback was reviewed internally by DFO at the regional level and incorporated where possible. To further ensure accuracy and consistency in scoring, two contractors were hired to complete independent reviews of the draft commercial risk assessments. After reviewing the changes made to the draft assessments as a result of this process with the Commercial Salmon Advisory Board and Area Harvest Committees, and considering the development and finalization of the national *Fishery Monitoring Policy*, a decision was made to reassess the fisheries evaluated under the Strategic Framework before proceeding with publishing the final risk assessments. Future fishery assessments will proceed under the national *Fishery Monitoring Policy*.

To discuss the new national *Fishery Monitoring Policy* with regional staff, please contact the Regional Fisheries Monitoring Coordinator, Caroline Wells, at Caroline.Wells@dfo-mpo.gc.ca or 778-939-8503. Feedback and questions are welcomed, as your contributions and participation are valuable to the implementation of this national policy.

APPENDIX 9: ROLLING WINDOW CLOSURES TO PROTECT INTERIOR FRASER RIVER STEELHEAD

This table outlines Interior Fraser River (IFR) Steelhead window closure dates by area. These are generalized dates that apply to the entire fishing area unless otherwise stated in the species specific fishing plans contained in Section 13. Fishing plans outlined in Section 13 may include slight modifications to these dates that result from applying the closure window to more specific fishing areas. Note that the duration of the closure window will not be shortened in applying these adjustments.

Window closures are INCLUSIVE of both the START and END dates shown in the table below. For any given area, the first day fishing may occur following a closure is the day following the END date in the table.

Also note that all sub-Areas listed in this table under the "Fraser River" section will be included as part of "Fraser River fisheries". For additional clarity, all fisheries occurring in Areas 29-6, 29-7, 29-9, and 29-10 are included within the Fraser River measures.

Finally, please note the term "commercial" in the following tables includes all communally licenced First Nations fisheries that permit sales, such as Economic Opportunity, Harvest Agreement, and Demonstration fisheries, as well as non-First Nations commercial openings.

Table 13.5-19: Interior Fraser River Steelhead Rolling Window Closure Dates by Area

Fishery Location		27-day window closure (commercial troll fisheries and FSC fisheries occurring in the Fraser River)		42-day window closure (commercial drift and set gillnet, purse seine, beach seine, and shallow seine fisheries and recreational fisheries occurring in the Fraser River)	
		Start	End	Start	End
Fraser River	Area 29: 29-6, 29-7, 29-9, and 29-10	26-Sep	22-Oct	19-Sep	30-Oct
	Mouth to Port Mann Bridge	26-Sep	22-Oct	19-Sep	30-Oct
	Port Mann Bridge to Mission	28-Sep	24-Oct	21-Sep	1-Nov
	Mission to Hope	29-Sep	25-Oct	22-Sep	2-Nov
	Hope to Sawmill Creek	3-Oct	29-Oct	26-Sep	6-Nov
	Sawmill Creek to Lytton (Thompson Confluence)	5-Oct	31-Oct	28-Sep	8-Nov
	Lytton to Texas Creek	8-Oct	3-Nov	1-Oct	11-Nov
	Texas Creek to Kelly Creek	10-Oct	5-Nov	3-Oct	13-Nov
	Kelly Creek to Deadman Creek	13-Oct	8-Nov	6-Oct	16-Nov
	Deadman Creek to Chilcotin River	16-Oct	11-Nov	9-Oct	19-Nov
	Chilcotin River	19-Oct	14-Nov	12-Oct	22-Nov
	Thompson River – Thompson Confluence to Bonaparte	8-Oct	3-Nov	1-Oct	11-Nov
	Thompson River – Bonaparte River to Kamloops Lake	12-Oct	7-Nov	5-Oct	15-Nov

Fishery Location		27-day window closure (commercial troll fisheries and FSC fisheries occurring in the Fraser River)		42-day window closure (commercial drift and set gillnet, purse seine, beach seine, and shallow seine fisheries and recreational fisheries occurring in the Fraser River)	
		Start	End	Start	End
Strait of Georgia	Area 29: 29-8	28-Sep	24-Oct	21-Sep	1-Nov
	Area 29: 29-1 to 29-5	23-Sep	19-Oct	16-Sep	27-Oct
	Area 28	23-Sep	19-Oct	16-Sep	27-Oct
	Area 18	24-Sep	20-Oct	17-Sep	28-Oct
	Area 17	23-Sep	19-Oct	16-Sep	27-Oct
	Area 16	22-Sep	18-Oct	15-Sep	26-Oct
	Area 15	21-Sep	17-Oct	14-Sep	25-Oct
	Area 14	21-Sep	17-Oct	14-Sep	25-Oct
Johnstone Strait	Area 13	17-Sep	13-Oct	11-Sep	22-Oct
	Area 12	12-Sep	8-Oct	6-Sep	17-Oct
	Area 11	11-Sep	7-Oct	5-Sep	16-Oct
	Area 111	10-Sep	6-Oct	4-Sep	15-Oct
West Coast Vancouver Island	Area 19	22-Sep	18-Oct	15-Sep	26-Oct
	Area 20	19-Sep	15-Oct	12-Sep	23-Oct
	Area 21	18-Sep	14-Oct	11-Sep	22-Oct
	Area 121	18-Sep	14-Oct	11-Sep	22-Oct
	Area 123	16-Sep	12-Oct	9-Sep	20-Oct
	Area 124	13-Sep	9-Oct	6-Sep	17-Oct
	Area 125	11-Sep	7-Oct	4-Sep	15-Oct
	Area 26	8-Sep	4-Oct	1-Sep	12-Oct
	Area 126	8-Sep	4-Oct	1-Sep	12-Oct
	Area 27	6-Sep	2-Oct	30-Aug	10-Oct
	Area 127	6-Sep	2-Oct	30-Aug	10-Oct

Table 13.5-20: Terminal fishery areas that are excluded from IFR Steelhead window closures.

This table outlines Pacific Fishery Management Areas that are understood to fall outside of the migratory path of IFR Steelhead and will not be subject to window closures implemented for IFR Steelhead conservation. Additional details for portions of areas listed below will be contained in the species specific fishing plans in Section 13.

Please note that tributaries of the Fraser River that are NOT downstream of Thompson and Chilcotin River Steelhead spawning areas are also excluded from IFR Steelhead window closures, but are not listed in this table.

Area	Sub Area Description
11	11-3 to 11-10
12	12-22, 12-23, 12-25 to 12-48
13	13-20, 13-21, 13-22, 13-24, 13-37, 13-38, 13-42, 13-43 portions of 13-3, 13-5, 13-19
14	14-1, 14-8, 14-10, 14-11, 14-14, 14-15 portions of 14-4, 14-5, 14-7 and 14-9
15	15-4, 15-6 portions of 15-1, 15-2, 15-5
16	16-3 to 16-16
17	17-2 to 17-9, 17-13 to 17-21 portions of 17-12
18	18-7 and 18-8 portions of 18-6
19	19-7 to 19-12
20	20-2, 20-6, 20-7
22	Entire Area
23	All Sub Areas
24	All Sub Areas
25	All Sub Areas
26	26-1 to 26-10
27	27-3, 27-7 to 27-11 portions of 27-2
28	28-3 to 28-5, 28-11 to 28-14 portions of 28-2

APPENDIX 10: 2021 SALMON OUTLOOK

Purpose

The purpose of this document is to provide an 'Outlook' of expected abundance of salmon in 2021 to inform the harvest planning process.

The Outlook provides either an expected abundance for those stocks with statistical forecasts or a categorical abundance expectation based expert opinion.

Changes to the outlook

For 2021, changes have been made to the Outlook document in order to:

I. Align CU groupings with stock management units (SMUs) to better inform decision-making consistent with *Fishery Act* and IFMP requirements.

II. For those SMUs with statistical forecasts, consolidate and report them in the Outlook Document.

III. For those SMUs without statistical forecasts, standardize the interpretation of SMU status in relation to outlook categories;

IV. Remove language regarding fishery consequences.

V. Add information on SMU 'stock trajectories' and biological benchmarks and management references (where defined) for additional context. (In Progress)

It is hoped these changes will result in a document that provides more useful and relevant information to inform decision-making.

Background

Stock Management Units

For the 2021 Outlook, 'Stock Management Units' (SMUs) replace 'Outlook Units' (OUs). This change has been made because many OUs did not correspond well with stock aggregates used to inform development of Integrated Fisheries Management Plans (IFMPs) for salmon. Refinement is also required for implementation of the fisheries-related revisions to the Fishery Act.

For salmon, the working definition of a 'stock management unit' (SMU) is a 'group of one or more conservation units (CUs) that are managed together with the objective of achieving a joint status', meaning harvest control rules would apply to the aggregate, at least in a coarse sense. Use of SMUs does not preclude considerations related to conserving CU-level diversity, but rather is a practical aggregation of CUs for harvest planning and reporting purposes. That is, it

is the scale at which harvest management plans, or better, management and assessment procedures, are developed in Integrated Fisheries Management Plans (IFMPs). In many cases, elements of the Precautionary Approach are implemented at finer scales of organization within a SMU.

Biological and Management References

The purpose of a stock forecast or outlook is to provide information to harvest managers to potentially adjust harvest plans according to the expected stock abundance. Ideally in that regard, the status of the stock management unit (or sub-unit) is assessed against specified limits and targets and pre-defined harvest strategies (or harvest control rules) are in place that define the actions required to meet targets and avoid limits.

Therefore, where biological benchmarks and/or limit reference points are defined for CUs or SMUs, respectively, they are noted in the Outlook/Forecast tables below. Similarly, if management targets are in place they are identified. Lack of these references is a gap and work is on-going to develop methods and complete the analyses to define these references. The summary below describes how these biological and management references are applied and interpreted.

WSP Lower Biological Benchmarks and Limit Reference Points (LRPs)

For implementation of the Wild Salmon Policy, the status of salmon Conservation Units (CU) is assessed against 'biological benchmarks'. The lower biological benchmark allows for substantial buffer between it and the level of abundance at which the stock would be considered at risk of extinction and is generally estimated as SGEN. The upper biological benchmark delineates the 'amber' from 'green' WSP status zone and is generally estimated as .80 SMSY. For more data-limited systems (i.e. where it is not possible to numerically estimate stock-recruit parameters), proxies for lower and upper biological benchmarks may be applied. For example, the lower and upper biological benchmarks are estimated as .25 and .60 percentiles of the long-term observed spawning abundance.

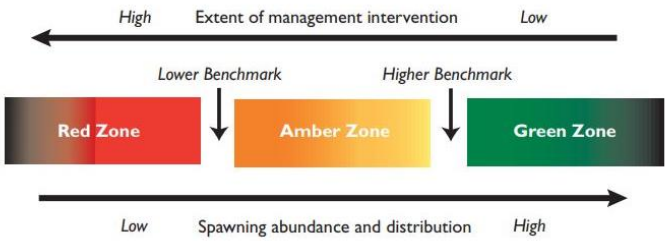

Figure 13.5-13. Benchmarks and biological status zones for CU assessments.

Under DFO's Precautionary Approach (PA), the stock management unit (SMU) limit reference point (LRP) is a biologically-defined reference that delineates the 'critical zone' from the 'cautious zone' for harvest management. It represents the status below which serious harm is occurring to the stock. There may also be resultant impacts to the ecosystem, associated species and a long-term loss of harvest opportunities.

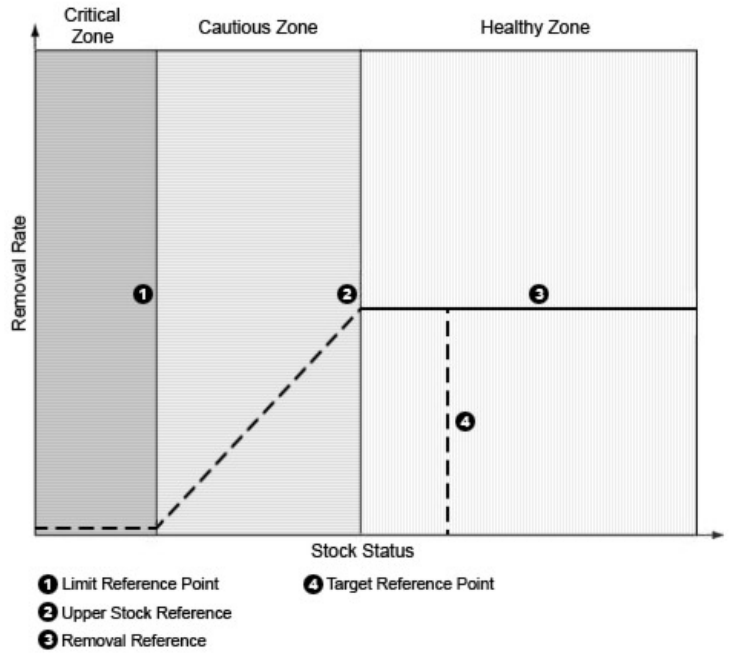

Figure 13.5-14. Schematic of a generalized harvest strategy under DFO's PA.

Given the intent is similar between the WSP and DFO's PA, it is practical to equate the SMU LRPs with lower biological benchmarks at the CU level. However, the WSP recognizes that serious harm to species occurs when CUs are depleted or lost. Therefore, to be consistent with the WSP, LRPs at the SMU scale should consider CU-scale biodiversity. Methodological approaches for defining LRPs are being developed to ensure CU-level biodiversity is taken into account and for both data-rich and data-limited assessment systems.

Management Targets and Operational Control Points

While management targets or operational control points are often informed by biological benchmarks and stock-recruit reference points, they also take into account other objectives such as maximizing sustainable harvest, avoiding over-fishing, maintaining stable access and opportunity, allocation objectives such as how catch is distributed among harvesters, etc. As such, they are tightly linked to the harvest strategy and fishery management measures.

In some cases, the management target may be a simple trigger such as when a 'surplus-to-escapement-target' harvest control rule is in place. In other cases, there may be multiple

management targets (or operational control points) used to adjust the harvest control rule at different levels of abundance.

Note that an SMU can be below its management target (and therefore subject to some level of harvest restriction as per the harvest control strategy), but well above levels that represent a serious conservation concern (i.e. the LRP or LBB). In other situations, an SMU may be well above its target but subject to harvest restrictions because the stock rears or co-migrates in mixed-stock fishing areas with other SMUs (or CUs) that are near or below their LRP (or LBB).

Stock outlooks

Categorical stock outlooks

For the 'Preliminary Outlook' and for those SMUs for which statistical forecasts are not produced, either because the SMU is not intensively managed and/or is more data limited, categorical 'outlooks' are assigned. These outlooks are based on expert opinion qualified with information from monitoring programs. For each stock grouping an outlook of expected spawning abundance is assigned based on a scale of 1 to 4.

For CUs or SMUs with references in place (i.e. either lower (LBB) and upper biological benchmarks (UPP) and/or lower reference points (LRP) and upper stock references (USR) and Target Reference Point (TRP)), these references are used to assign Outlook category. For more data-limited CUs or SMUs (i.e. those without defined stock or management references), expected spawning abundance is compared to average or median abundance based on available information.

SMUs for which insufficient data area available to determine an Outlook are noted as 'Data Deficient'.

Outlook Category	CUs or SMUs with references		Data Limited CUs or SMUs	
	Wild Salmon Policy (CU Level)	Precautionary Approach (SMU Level)	Category Definition	Expected spawning abundance
1	Red Zone (i.e. below the LBB)	Critical Zone (i.e. below the LRP)	Well below average	<25th percentile
2	Amber Zone (i.e. below the LBB,	Cautious Zone (i.e. above the LRP below the USR)	Below Average	25 to 40th percentile

Outlook Category	CUs or SMUs with references		Data Limited CUs or SMUs	
	Wild Salmon Policy (CU Level)	Precautionary Approach (SMU Level)	Category Definition	Expected spawning abundance
	below the UPP)			
3	Green Zone (i.e. above the UBB)	Healthy Zone (i.e. above the USR)	Near Average	40 to 60th percentile
4	Green Zone (i.e. at or above the TRP)	Healthy Zone (at or above the TRP)	Abundant	>60th percentile
Data Deficient			Insufficient information	Unknown

YUKON RIVER AND TRANSBOUNDARY

YUKON RIVER

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Forecast /Outlook
YUKON CHINOOK	Aggregate includes 9 CUs	**51,000** (ESC. AVG. 2005+)		**48,750** (42,500 – 55,000) Escapement Target (S_{MSY})	**57,000 (80% CI; 42,000 – 77,000)**
	Porcupine Aggregate 3 CUs	Data Deficient (Mainstem as indicator)		N/A	
	The spawning escapement of Canadian-origin Yukon River mainstem Chinook salmon in 2020 was below average, at 31,000. The current spawning escapement goal endorsed by the U.S./Canada Yukon River Panel for Mainstem Chinook is 42,500-55,000 Chinook salmon and has been met only 50% of the time over the last decade. Five and six year-old fish dominate returns. Recent total production observed in Canadian-origin Yukon River Chinook salmon stocks is well below past years: averaging around 71,000 over the last ten years compared to 150,000 in the 1980s and 1990s. Assessment of Porcupine Chinook continues (limited data).				
YUKON COHO	Porcupine CU	**4000** (ESC. 5-year AVG)			**Data Deficient**
	Very little is known about Coho Salmon stock status within Canadian portions of the Yukon River drainage. Data from the U.S. portion of the drainage suggest returns to the drainage in the last five years have been near the long term average; however, no assessment programs are currently undertaken in Canada and the current stock status is unknown. It is known that coho salmon primarily return as 4-year-olds and overlap in run timing with fall chum salmon.				
YUKON CHUM	Mainstem – includes 5 CUs	**182,000** (ESC. AVG 2006+)		**87,000** (70,000 - 104,000) Escapement Target (S_{MSY})	**135,000 – 190,500**
	The spawning escapement of Canadian-origin Yukon River mainstem Chum salmon in 2020 was among the lowest on record, at 23,500. Runs are typically dominated by four year-old fish, followed by five year-old fish; much lower-than-expected returns of four year-old fish in 2020 contributed to the poor run. The current mainstem spawning escapement goal endorsed by the Yukon River Panel is 70,000 – 104,000 Chum salmon, which has been met every year in the past decade except 2020.				
	Porcupine – includes 2 CUs	**46,000** (ESC. 1972 – 2020 AVG) **22,000** (ESC. 5-year AVG)		**35,500** (22,000 - 49,000) Escapement Target (S_{MSY})	**1-2**
	The spawning escapement of Fishing Branch River Chum salmon in 2020 was also historically low, at 4,795. The current spawning escapement goal for the Porcupine River (as assessed at the Fishing Branch River) endorsed by				

	the U.S./Canada Yukon River Panel is 22,0000-49,000 Chum salmon. Returns over the last five years have been well below expected and the minimum escapement goal was not achieved in three of the last five years.	

TRANSBOUNDARY AREA

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 FORECAST/ OUTLOOK
ALSEK SOCKEYE	Alsek	**96,000** (ESC. 10-year Avg.)		**29,700** (esc. Goal range 24,000 – 33,500)	**40,000**
	Klukshu	**13,000** (ESC, 10-year Avg.)		**9,700** (esc. Goal range 7,500 – 11,000)	**10,000**
	Based on brood year escapements below the MSY target range and stock-recruitment relations from historical records, a below average, but within the escapement goal range run is expected. This aggregate stock is dominated by lake and river type age 5 fish. 2021 Outlook Category is 2.				
ALSEK CHINOOK	Alsek	**5400** (ESC. 10-year Avg.)		**4,700** (esc. Goal range 3,500 – 5,300)	**4000**
	Klukshu	**1,500** (ESC. 10-year Avg.)		**1,000** (esc. Goal range 800 – 1,200)	**1000**
	Based on brood year escapements that were both above and below average but near the MSY target range and recent sibling survival data, an average run within the escapement goal range is expected. Alsek Chinook are stream type dominated by 5- and 6-year olds.				
ALSEK COHO	Alsek CU				**2**
	Only a partial weir count is carried out. Brood year counts were slightly below average. Run is dominated by 4 year olds				
STIKINE SOCKEYE	Tahltan	**67,000:** **38,000** (wild) **28,000** (enhanced) (ESC. 10-year Avg.)		**24,000** (18,000 to 30,000) Escapement Target (S_{MSY})	**28,000:** **9000** (wild) **19,000** (enh.)
	Mainstem	**41,000** (ESC. 10-year Avg.)		**30,000** (20,000 to 40,000) Escapement Target (S_{MSY})	**28,000**
	Based on a combination of primary brood year smolt counts and sibling-based predictions, a below average run is anticipated for 2021 but above escapement goals. Recent poor marine survival may influence this. This is an aggregate stock of lake and river type 5 year olds.				
STIKINE CHINOOK	Aggregate includes 2 CUs	**18,500** (ESC. 10-year Avg.)		**17,400** (14,000 - 28,000) Escapement Target (S_{MSY})	**9,900** (5400-14,200)
	2021 run is forecast to be well below the 10-year average of 19,200 and below the escapement goal range of 14,000 – 28,000. The anticipated run				

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 FORECAST/ OUTLOOK
	size does not provide for directed fisheries. Stikine Chinook are stream type dominated by 5- and 6-year olds.				
STIKINE COHO	Stikine CU				**Data Deficient**
	Reliable brood year escapement data are limited and ancillary observations are sometimes contradictory.				
TAKU SOCKEYE	Aggregate includes 4 CUs	**144,000** (ESC. 10-year Avg.)		**58,000** (Esc. Goal Range 40,000 - 75,000)	**140,000**
	Enhanced (Tatsamenie)	**8000** (ESC. 10-year Avg.)	n/a		**6000**
	Enhanced (Trapper)				**300**
	Based on stock-recruitment data, the 2021 run is expected to be near the 10 year average of 154,100 but well over the management objective of 58,000. This is an aggregate stock of lake and river type 5 year olds.				
TAKU CHINOOK	Aggregate includes 3 CUs	**17,400** (ESC. 10-year Avg.)		**25,500** (19,000 - 36,000) Escapement Target (S_{MSY})	**10,300** (6,100 to 14,500)
	2021 is expected to again be well below the 10-year average of 19,400 and well below the escapement goal range of 19,000-36,000. The anticipated run size does not provide for directed fisheries. Taku chinook are stream type dominated by 5 and 6 year olds.				
TAKU COHO	Aggregate includes 3 CUs	**97,000** (ESC. 10-year Avg.)		**70,000** (50,000 - 90,000) Escapement Target (S_{MSY})	**94,000**
	Based on preliminary smolt abundance in 2020 combined with recent smolt-to-adult survival rates, an average run above the management target of 70,000 is expected for 2021. Run is dominated by 3 year olds.				
TRANSBOUNDARY CHUM	Taku Chum CU				**Data Deficient**

NORTH COAST AREA

HAIDA GWAII

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Outlook
HAIDA GWAII SOCKEYE	Aggregate includes 10 CUs	1990-present avg. spawners ~ 25000	None	Under development for several CUs	**2** (low to average)
	Low to average returns for systems that were surveyed in 2020 (Copper, Yakoun, Awun, Naden, total count for 4 biggest systems was ~15K).				
HAIDA GWAII PINK – ODD	Aggregate includes 6 CUs (even and odd year)				**n/a**
	Haida Gwaii stocks are primarily even year stocks with little to no returns in odd years.				
HAIDA GWAII CHINOOK	Aggregate includes 2 CUs				**Data Deficient**
	No recent assessments of Yakoun Chinook.				
HAIDA GWAII COHO	Aggregate includes 3 CUs				**Data Deficient**
	Limited assessments since 2002. Returns to enumeration sites such as Tlell and Deena have been generally good over the past decade, with weaker than average escapement observed at Tlell and the Deena in 2020.				
HAIDA GWAII CHUM	Aggregate includes 5 CUs				**Data Deficient**
	Haida Gwaii Chum stocks have been consistent over the past decade with poor productivity and returns in Area 2E and moderate productivity in Area 2W. Chum returns to Tasu Sound have generally had good productivity with returns achieving management targets in most years over the past decade. Terminal fishing opportunities in Tasu Sound dependent on good marine survival.				

SKEENA AND NASS RIVERS

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 FORECAST/ OUTLOOK
NASS SOCKEYE	**Aggregate incudes 7 CUs**	**261,790** (Avg. ESC, 1982+)		250,000 (Escapement Target)	**Model 1 (5-yr Avg): 328,000** (181,000 to 596,000) **Model 2 (Sibling): 386,000** (177,000 to 861,000) Terminal RTC
	2020 was the lowest return to the Nass since 1992, and below average returns expected for 2021. Forecast TRTC range from 177-861K .				
SKEENA SOCKEYE	**Aggregate (wild and hatchery)**	**2,584,000** (Avg. Return 1973+)	**Under review**	**Under review, esc target is 1,050,000, 400,000 lower operational control point**	**Model 1 (5-yr Avg): 1,258,913** (679,966 to 2,300,799) **Model 2 (Sibling): 1,696,972** (796,679 to 3,614,662)
	Skeena – Wild Aggregate includes 30 CUs	Variable	Under review	Included in Skeena aggregate, under review	
	Overall, expecting a low to average return in 2021. Return rates for Skeena - Wild are more variable than Babine Lake – Enhanced. Extremely poor returns for lower Skeena sockeye CUs, average returns for some middle and upper Skeena systems, poor for others. Generally poor abundance is forecast in 2020 for wild age-4 Sockeye based on poor age-3 returns in 2020. Stronger age-5 returns expected in 2020 based on higher than expected age-4 returns in 2020. Return rates have become more uncertain in recent years, with greater variability among the Skeena stock components.				
	Babine Lake - Enhanced		Under review	Spawning channel capacity = 470,000	
	Overall, expecting a moderate return in 2021 unless age-4 Sockeye return stronger than expected. Low age-4 returns expected in 2021 based on very low age-3 returns in 2020. Stronger abundance forecast in 2021 for age-5 Sockeye based on modest age-4 returns in 2020.				
MAINLAND COASTAL SOCKEYE	Areas 3 to 6				**2**
	Very low escapements relative to average for all coastal and lower Skeena sockeye systems, and for Area 6 sockeye systems				
NASS PINK	Aggregate includes 5 CUs				**2**
	The Nass pink return is expected to be below average (2). The brood year return was below 25% but better emergence conditions may lead to a slight increase.				
SKEENA PINK	Aggregate includes 3 CUs				**1 to 2**

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 FORECAST/ OUTLOOK
	The Skeena pink return is expected to be "well below average"(1) to "below average" (2). The brood year return was below 25% but better emergence conditions may lead to a slight increase				
NASS CHINOOK		**31,000 (TRTC 1994-2020)**		15,000 (ESC target)	**32,000 (18,000 to 56,000)** Terminal RTC
	The 2021 return is uncertain after record low escapements in 2017. Preliminary forecast is for 24,000 return to Canada (Nisga'a Fish & Wildlife). There is generally low productivity among stream-type stocks in the north-west				
SKEENA CHINOOK	Aggregate includes 12 CUs	**72,000** (GSI mark-recapture based on KLM Petersen estimates 1984-2020)			**2**
	Kitsumkalum Indicator Stock	13,200 (KLM Petersen mark-recapture 1984-2020)			
	Below average returns are expected for both summer and spring timed Skeena Chinook. The 2021 return is highly uncertain after record low escapements in 2017 and 2020. There is generally low productivity among stream-type stocks in the north-west				
NASS COHO	Aggregate includes 3 CUs				**1-2**
	Total escapement is expected to be below average in 2021. The 2020 run size was well below average with low productivity and marine survival evident in the preceding years.				
SKEENA COHO	Aggregate includes 4 CUs				**1-2**
	Lower productivity over previous years is forecasted based on low returns in 2020 for both interior and coastal coho populations and continuance of lower marine survivals.				
SKEENA - NASS CHUM	Nass CU	**13,632 (**1950-Present)	none	Under Review. MEG is 72,000	**2**
	Below average (2). Some very low returns in dominant brood year but better ocean conditions in recent years.				
	Skeena CU Aggregate includes 2 CUs				**1**
	Well below average (1). All brood returns have been at or below 25% (note: data limited)				

CENTRAL COAST

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Outlook
MAINLAND COASTAL SOCKEYE	Areas 7 and 8				**Variable – Data deficient, 1, 2**
	Most systems in areas 7 and 8 are data deficient. Average returns relative to recent period (2000+) for systems that were surveyed in Area 8 (Atnarko, Koeye, Kadjusdis, Namu). Atnarko sockeye returns are well below historic and population is in recovery.				
RIVERS / SMITH SOCKEYE	Rivers – Aggregate includes 2 CUs (Wannock River and Owikeno Lake)	272,000 (Avg. ESC, 2000+)	Under development	None	**2**
	2020 return to Rivers Inlet based on DIDSON-ARIS estimate was lower than in recent years. Low to average returns are expected in Areas 9 and 10. Docee Fence (Area 10/Smith Inlet/Long Lake) sockeye is not operational, no escapement information for this system available since 2017 .				
	Smith – Aggregate includes x CUs	62,000 (Avg. ESC, 2000+)			**Data Deficient**
CENTRAL COAST PINK	Area 6	821,999 (odd year)		MEG - 1,447,000	**2**
	Area 7	288,232 (odd year)		MEG – 444,720	**1**
	Area 8	908,042 (odd year)		MEG – 1,520,400	**1**
	Area 9	174,250		MEG – 342,450	**1**
	Area 10			MEG – 65,600	**Data deficient**
	Low returns are expected in Area 7 and average to above average returns in Area 8. The odd year Bella Coola/Atnarko stock exceeded escapement target in 2017. Odd year returns are expected to be above average if marine survival is good.				
CENTRAL COAST CHINOOK	Atnarko Indicator Stock	**15,500** (Maximum likelihood model 1990-2020)		**5009 (Atnarko wild)** Escapement Target (S_{MSY})	**2**
	These stocks are generally depressed and this pattern is expected to continue or worsen given generally low productivity among stocks in the north-west. Assessments are of poor quality.				
	Areas 7 and 8 –				**3 / Data Deficient**
	2021 Bella Coola returns are expected to be below average based on returns in recent years.. Other assessments are of poor quality.				
	Areas 9 and 10 –				

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Outlook
	Aggregate includes 5 CUs				**3 / 2 / Data Deficient**
	Wannock River Chinook returns are expected to be average. The spring-run stocks including the Owikeno tributary stocks and Chuckwalla/Kilbella stocks are expected to be below average based on recent trends; however, assessments are of poor quality or are no longer conducted.				
CENTRAL COAST COHO	Areas 5 and 6 – Aggregate includes 4 CUs				**2 (Low)**
	Lower productivity over previous years is forecasted based on low Area 6 returns and continuance of lower marine survivals.				
	Areas 7 to 10 – Aggregate includes 4 CUs				**2 (Low)**
	Lower productivity over previous years is forecasted based on low returns in 2020 for both interior and coastal coho populations and continuance of lower marine survivals. However, there is very little data to review to develop an overall assessment.				
CENTRAL COAST CHUM	Area 5	17,480		MEG – 22,000	**1**
	Area 6	165,409		MEG – 134,000	**1 – 2**
	Area 7	196,659		MEG – 311,950	**1**
	Area 8	162,000			**3**
	Area 9	30,981		MEG – 150,700	**1 (data limited)**
	Area 10	17,807			**1 – 2 (data limited)**
	Wild brood year escapements were generally good in Area 8 but low in other areas. Returns of enhanced stocks remain dependent upon variable ocean survivals				

SOUTH COAST AREA

WEST COAST VANCOUVER ISLAND

Stock Management Unit	Conservation Unit /Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 FORECAST/ OUTLOOK
WCVI - BARKLEY SOCKEYE	**Somass Aggregate (GCL + SPL)**	**740,000** (Avg. Run Size 1977+)		**170,000** Run Size – lower operational control point	**350,000**
	Great Central Lake CU	400,000 (Avg. Run Size 1977+)	29,290 LBB		**3**
	Sproat Lake CU	340,000 (Avg. Run Size 1977+)	41,350 LBB		**3**
	For the 2021 return, the two main contributing brood years are 2016 and 2017 and the two main contributing smolt years are 2018 and 2019. Brood abundance was above average in 2016 and low in 2017. Smolt abundance was high in 2018 and low in 2019. Based on ocean indicators, marine survival rates for the 2018 and 2019 smolt years appear to be low. Given the considerations above, expectations are for a moderate Somass Sockeye return. The low returns in the last two years were mostly attributed to poor freshwater and marine survival despite the large returns of 2015 and 2016.				
	Henderson Lake CU	34,000 (Avg. Run Size 1978+)	5000 LBB	9% max. harvest rate at run sizes <15,000	**<15,000**
	For the 2021 return, the two main contributing brood years are 2016 and 2017 and the two main contributing smolt years are 2018 and 2019. Brood abundances were moderate in both 2016 and 2017. Smolt abundance continues to be low. Based on ocean indicators, marine survival rates for the 2018 and 2019 smolt years may be low. The key factors influencing this outlook are the low spawner abundances in the main contributing brood years (9,700 Sockeye in 2016; 22,000 Sockeye in 2017; Table 4) for the 2021 return, as well as low marine survival rates experienced by these two brood years. Therefore, expectations are for a continued low Henderson sockeye return in 2021.				
WCVI - OTHER SOCKEYE	22 CUs are associated with this stock management unit.				**Data Deficient**
	Assessment data are not available to forecast others systems. However, WCVI populations tend to covary. Therefore, expectations are for low-to-moderate returns based on the outlooks for Somass and Henderson.				
WCVI PINK	3 CUs are associated with this stock management unit.				**Data Deficient**

Stock Management Unit	Conservation Unit /Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 FORECAST/ OUTLOOK
	Since the collapse of WCVI pinks in the mid 1960s there has been negligible catch and only opportunistic assessment of returns during assessment of other species. The available data suggest WCVI pink salmon populations continue to persist at very low relative to historic levels with high variability.				
WCVI CHINOOK	Southwest Vancouver Island CU			10 – 15% maximum exploitation rate in key 'pre-terminal' CDN fisheries	**1**
	Nootka and Kyuquot CU				
	Northwest Vancouver Island CU				
	Recent year escapements of WCVI Chinook natural populations remain low. There has been improvement in Kyuquot (NWVI wild indicators) in recent years. Less improvement in Clayoquot (SWVI wild indicators) which remains the biggest concern; and specifically improvement is almost all in the Bedwell where low level enhancement seems to be resulting in improved returns. Survival rates of natural production is thought to be less than half that of hatchery production; similarly productivity remains relatively low. WCVI wild Chinook remain a stock of concern.				
	Somass/Robertson (Hatchery)	68,000 (Avg terminal run 1995-2020)	n/a	39M eggs (spawner target is adjusted for expected age/sex composition)	**133,000** (98,000-167,000)
	Conuma Hatchery	37,000 (Avg terminal run 1995-2020)	n/a	10,000 ESC target but varies to ensure escapement of eggs associated with an average 10,000 escapement.	**33,000** (19,000-35,000)
	Nitinat Hatchery	25,000 (Avg terminal run 1995-2010)	n/a	10,000 ESC including brood stock	**27,000** (18,000-35,000)
	WCVI Other Hatchery Supplemented (e.g. Burman R, Sarita R.)	Varies by individual river; see local plans for details.	Work is underway to develop lower bench marks (C. Holt lead).	Varies by individual river; see local plans for details.	**(3) 43,000** (28,000-56,000)
	Overall returns in 2021 will likely be similar to 2020 which was higher than average abundance in the SWVI and near average abundance in NWVI. Observed returns of earlier age classes suggest an above average marine survival rate for the 2016 brood year (age 5 in 2021), above average survival the 2017 brood year (age 4 in 2021) and maybe average survival for the 2018 brood year (age 3 in 2021). Age 3 returns were higher than expected in most WCVI areas in 2020; over 50% in the Somass return and also high % males in				

Stock Management Unit	Conservation Unit /Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 FORECAST/ OUTLOOK
	Conuma and Nitinat. This suggests a potential for an above average return of eggs in 2021 (means lower escapement goals in the harvest – hatchery directed systems).				
WCVI COHO	3 CUs are associated with this stock management unit.				**3**
	Information to forecast Coho returns is limited. Therefore, there is considerable uncertainty in this assessment. 2020 had a poor return along most of the WCVI; for example, escapement through Stamp Falls was in the bottom 20% of all returns since 2000. For 2021, most of the return will originate from the 2018 brood year that went to sea in 2020. Robertson Hatchery coho jacks were higher than average in 2020 suggesting improvement in 2021 with average returns expected. For most WCVI areas, Coho spawning populations have been relatively stable.				
WCVI CHUM	Area 23 (Barkley) – Southwest Vancouver Island CU	**69,000** (Avg. Return, 1995+)		48,000 Run size – lower operational control point, 15% max harvest rate	**38,000** (6,000-70,000)
	Area 24 (Clayoquot) – Southwest Vancouver Island CU	**57,000** (Avg. Return, 1995+)		42,000 Run size – lower operational control point, 15% max harvest rate	**23,000** (13,000-33,000)
	Area 25 (Nootka) – Southwest Vancouver Island CU	**41,000** (Avg. Return, 1995+)		26,000 Run size – lower operational control point, 20% max harvest rate	**14,000** (5,000-24,000)
	Area 25 (Esperanza Inlet) – Southwest Vancouver Island Cu	**49,000** (Avg. Return, 1995+)		24,000 Run size – lower operational control point, 15% max harvest rate	**82,000** (25,000-139,000)
	Area 26 (Kyuquot) – Southwest Vancouver Island CU	**60,000** (Avg. Return, 1995+)		25,000 Run size – lower operational control point, 15% max harvest rate	**46,000** (15,000-76,000)
	Area 27 (Quatsino Sound) – Northwest Vancouver Island CU				**Data Limited**
	Area 25 (Conuma Hatchery) – Southwest	**88,000** (Avg. Return, 1995+)			**22,000** (12,000 to 32,000)

Stock Management Unit	Conservation Unit /Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 FORECAST/ OUTLOOK
	Vancouver Island CU				
	Nitinat Hatchery	**491,000** (Avg. Return, 1995+)	n/a	225,000 Run size – lower operational control point	**163,000** (23,000 to 303,000)
	Recent returns of WCVI Chum have been depressed in most areas relative to average abundances. Returns of WCVI Chum in 2021 will likely be below average to average in most areas. Brood years 2016, 2017 and 2018 will contribute to the 2021 return as age 5, 4 and 3, respectively. The 2016 brood year had an above average return in most areas and we expect an above average contribution of age 5s in 2021. The 2017 and 2018 brood year returns were below average abundances, and the 2018 and 2019 sea entry years resulted in below average to average survival. This will limit both the age 3 and 4 (dominant age class) contributions to the 2021 return. The recent stock status of wild WCVI Chum has generally been poor with spawning abundance for wild indicator stocks frequently below upper biological benchmarks. In addition, hatchery production has declined in recent years; particularly for the Conuma hatchery in PFMA 25 (Tlupana Inlet).				

EAST COAST VANCOUVER ISLAND/MAINLAND INLETS

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Outlook
ECVI / MAINLAND SOCKEYE	Nimpkish	60,000 median spawners			**2**
	Sockeye returns to this system in 2020 were well below average. For the 2021 return, the two main contributing brood years are 2016 and 2017 and the two main contributing smolt years are 2018 and 2019. Brood abundance was above average in 2016 and below average in 2017. Based on ocean indicators, marine survival rates for the 2018 and 2019 smolt years appear to be low (poor returns of local pink and coho stocks that out-migrated in 2018 and 2019). Given the considerations above, expectations are for a below average Nimpkish Sockeye return. Brood years contributing to the 2021 return were 2016 (74K) and 2017 (30K).				
	Area 16 (Sakinaw)	**117** (Avg. Return, 1995+)	2,440	4,470	**1**
	Of the 33,442 smolts that left Sakinaw Lake in 2018 a total of 85 adult Sockeye returned in 2020. Marine survival continues to be extremely low; for the 2018 ocean entry year, the smolt-to-adult survival improved to 0.14% for hatchery-origin and 0.31% for natural-origin smolts. Smolt production increased to 75,823 in 2019 although just over 1,000 were from natural production. If marine survival is near the 4-year average, a total of 47 adults are expected; 2 natural origin and 45 from captive brood fry releases. 2021				

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Outlook
	escapement could increase to 111 fish if marine survival is consistent between 2018 and 2019 ocean entry years.				
	Other (Areas 11 to 13)	Heydon: 2,600 median spawners Quaste: 2,200 median spawners			**2**
	Expectations for other populations such as Quatse, Heydon and Phillips are similar to Nimpkish.				
ECVI / MAINLAND PINK	Areas 11 to 13 - Odd	Reconstructed Median Returns Southern Fjords (Even): 1.6 million Southern Fjords (Odd): 613K Nahwitti (Odd): 12K			**1** (NEVI and Area 12 Mainland Inlets)
	Georgia Strait - Odd	Strait of Georgia (Odd): 536K Strait of Georgia (Even): 142K			**3** (Southern portion of area on ECVI)
	Even Year: 2020 saw varied returns throughout South Coast with poor returns in Northern Vancouver Island and generally improved/strong returns to the systems from Adam River south to Campbell River on the Island. Very poor (well below average) returns to Area 12 Mainland Inlets and very strong recovery and returns observed on the Philips River in Area 13 Mainland Inlets. In river return timing of pinks was much earlier than normal in many systems (i.e. Quinsam) **Odd Year:** In 2019, returns were similar to what was observed in 2020, with very poor escapements in Northern Vancouver Island and across to the Mainland and much better returns to the lower portions of Area 12 and into 13 on the Island. It is anticipated that we will likely see a similar distribution of abundance as the last 2 years. Expectations for 2021 are well below average returns to NEVI and Mainland Inlets and average returns to the Southern Portions of the area on ECVI. Pink fry outmigration numbers from Quinsam in 2020 (~15 million) was the third largest abundance since 1997 and should convert to strong returns in 2021. Historically, Pink returns to this area have been highly variable and expectations continue to be highly uncertain.				
MAINLAND INLET CHINOOK	This aggregate includes 4 CUs				**Data Deficient**
	Includes Homathko and Klinaklini				
UPPER GEORGIA	Quinsam River Fall Run	**9850** (AVG. Terminal			**3**

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Outlook
STRAIT CHINOOK		Run Index, 1979+)			
	2020 saw above average escapements to most systems monitored on Northern Vancouver Island. Hatchery returns at Quinsam were well above average, and other systems such as Nimpkish, Adam and the Salmon all showed signs of improving escapements. Expectations in 2021 are for continued improved escapements especially if Chinook harvest regulations to reduce impacts on Early timed Fraser Chinook continue.				
MIDDLE GEORGIA STRAIT CHINOOK	Puntledge and Big Qualicum Rivers Fall Run Enhanced	**14,385** (AVG. Terminal Run Index, 1995+)	7,193		**3**
	Following a strong return of 17,000 in 2019, just under 10,000 fish returned to the Puntledge River in 2020. Returns to the Big Qualicum River were above the four year average of 6,980 at 12,235. Stable production levels and modest survivals for several hatchery indicators suggest average to above average returns are likely for 2021.				
LOWER GEORGIA STRAIT CHINOOK	Cowichan River Fall Run Unenhanced (<20% hatchery origin)	**6,826** (AVG. Terminal Run Index, 1982+)	3,413	**6500 (Cowichan)** Escapement Target (S_{MSY})	**2**
	Adult Chinook returns to the Cowichan River in 2020 exceeded the target escapement of 6,500 naturally spawning adults for the fifth consecutive year. The number of jacks in the population was high; similar to observations in 2017 which produced strong returns of three year olds in 2018 and four year olds in 2019. The 2021 outlook is for average to above average returns but this may be altered depending on final escapement estimates and age composition. Wild production continues to drive the escapement with the proportion of hatchery fish in the population estimated at 10% for all age classes in 2020. A similar rebuilding trend has not been observed in the Nanaimo River where counts remain low and stable (<5,000). 2021 escapement is expected to remain low and stable.				
GEORGIA STRAIT SPRING AND SUMMER CHINOOK	Nanaimo and Puntledge Summer Enhanced	**1,712** AVG. Terminal Run Index, 2004+)			**2**
	Several surveys of spring/summer Chinook holding areas in the Nanaimo River were conducted producing a count of 583 fish in 2020 which was up from 267 in 2019. Puntledge summer Chinook were below the 4-year average of 820 fish at just over 400. Most of the reduction can be attributed to reduced smolt releases in preceding years. Rebuilding efforts for these				

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Outlook
	populations are continuing. At these levels, rebuilding will take several generations even with improved survival				
JOHNSTONE STRAIT / MAINLAND INLET COHO	Area 12				**2**
	Returns showing some improvement– but still below long term average escapements in many systems surveyed. Keogh- preliminary escapement (874) is an improvement over the previous 4 years but lower than the long term average. Estimated escapement has steadily increased from that observed in 2016 (230), despite relatively stable but high juvenile recruitment, indicating improving marine survival. The return in 2020 stems from an above average smolt abundance of 72K. 2020 out migration was also strong (87K). Expectations in 2021 are for this improved survival to continue but still below average returns. The Area 12 forecast for 2021 is 31% higher than the brood returns in 2018. Coho abundance in this region can be characterized as 'well below average' ..				
	Area 13 - North				**2**
	Hatchery indicators for this outlook unit are Quinsam and Big Qualicum. Both systems saw average, or slightly better than average returns. General observations to date suggest better than forecasted returns across the area. Village Bay Creek on Quadra Island is being monitored by video and has observed higher than expected numbers of Coho through the fence. The wild indicator is Black Creek (included below in the Georgia Strait OU). The Area 13 forecast is 9% higher than the 2018 observed indices. Coho abundance in this region can be characterized as 'well below average'				
STRAIT OF GEORGIA COHO	Quinsam				**2**
	Big Qualicum				
	Black Creek				
	Hatchery indicators for this Outlook Unit are the Quinsam and Big Qualicum rivers.2020 adult returns to the Big Qualicum are well above the four year average of 8,600 at over 22,300. An unplanned reduction in smolt output in 2018 produced a low return of 2,600 fish in 2019. Production levels are back to normal and 2021 returns are expected to be average to above average. The wild indicator is Black Creek. 2020 estimate of 1,935 adults through fence is an improvement over the 2017 brood year (1,333 adults). 2020 escapement is below the long-term average but was expected based on poor marine forecasts and below average smolt production in 2019 (~40K). Fewer jacks returned in 2020 than seen in recent years (1,690) but still making up a large proportion of the total return. Improvement to marine survival are evident from 2019 to 2020 and it is anticipated that will continue. Smolt production in 2020 (83.1K) is significantly above the long-term average which be contributing to the 2021 return. The 2021 forecast for the three indicators is for a continuation of the low marine survival levels seen in recent years.				
	Johnstone Strait Area and Mainland Inlets				**2**

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Outlook
INNER SOUTH COAST CHUM - Non-Fraser	(Areas 11 to 13)				
	Summer run Chum Salmon stocks in 2020 appear to have done poorly relative to recent years and remained below average throughout the area. This will likely continue through 2021. Fall run Chum returns in 2020 are still being assessed; however, abundance appears to be below average in most systems surveyed. Productivity of these stocks has declined over the last 4 years and has been attributed to poor marine conditions for salmon. There is some indication that survivals have been better in the Southern range of the distribution of Inside Southern Chum. For the 2021 return, below average parental brood abundances in both 2017 and 2018 and a 4 year decline in Chum productivity will likely mean below average return of fall Chum in 2021. Recovery initiatives continue for the Nimpkish Chum Stock within this area. Expect variability in Chum returns.				
	Jervis/Narrows Inlet (Brittian, Deserted, Skwawka, Tzoonie, Vancouver)	**51,151** (Avg. Return, 2004+)		85,000	**12,200** (Like Last Year)
	Mid-Vancouver Island (Puntledge, Big Qualicum, Little Qualicum)	**225,697** (Avg. Return, 1995+)		230,000	**23,400** (Like Last Year)
	Nanaimo River	**61,288** (Avg. Return, 2004+)		40,000	**43,800** (Like Last Year
	Cowichan River	**177,032** (Avg. Return, 2006+)		160,000	**157,000** (Like Last Year)
	Goldstream River	**27,070** (Avg. Return, 2000+)		15,000	**22,300** (Like Last Year)
	Preliminary escapement data for 2020 suggest well below target escapements for systems in mid to northern Georgia Strait and Jervis/Narrows Inlet. Returns to Nanaimo, Cowichan and Goldstream were near or slightly above target. For 2021, abundance is expected to follow a similar pattern with stocks in the southern part of Georgia Strait such as Cowichan, Nanaimo, and Goldstream forecast near escapement targets. Mid-Island systems (Puntledge, Little				

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Outlook
	Qualicum, Big Qualicum) are expected to remain well below target levels. Jervis/Narrows Inlet stocks are forecast to be below target abundance.				

LOWER AND INTERIOR FRASER AREA

FRASER SOCKEYE SALMON

Quantitative forecasts for Fraser Sockeye stocks are produced annually. The 2021 forecasts were presented to the Fraser River Panel at the Pacific Salmon Treaty meeting in February.

To generate outlooks specific to each Outlook Unit, the brood year escapement was compared to the abundance-based benchmarks calculated for the recent Wild Salmon Policy re-evaluation where available and the recent median escapement (or cycle line escapement for cyclic stocks). Where stock recruitment data exists for non-cyclic stocks, the lower abundance-based benchmark is calculated using the Ricker model and corresponds to S_{GEN}, while the upper abundance-based benchmark is 80% of S_{MSY}.

AVERAGE AGGREGATE RETURN (ALL CYCLES, ALL STOCKS): 7,812,200

AGGREGATE FRASER SOCKEYE FORECAST 2021 (ALL STOCKS): 1,259,000 (299,000 to 5,231,000)

Stock management Unit: EARLY STUART

Average aggregate return (all cycles): 286,600

Conservation Unit	Average Return (all cycles)	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST/ OUTLOOK
Early Stuart *(CU: Takla-Trembleur-EStu)* - Cyclical: Yes	31,600			WSP – RED COSEWIC – END	**18,000** (8000 – 47,000)
	Below average returns are expected for this CU. The brood-year effective total spawners (ETS; 12,870) was below the WSP lower benchmark for ETS (97,682). Brood-year effective female spawners (EFS; 7,136) was below the long-term cycle line average EFS (95,066) and below the recent cycle line average EFS (29,958). This stock was heavily impacted by the Big Bar landslide in 2019 and 2020 return years, and is expected to continue to suffer additional en-route mortality associated with the slide.				

Stock management Unit: EARLY SUMMER

Average aggregate return (all cycles): 516,000

Conservation Unit	Average Return (all cycles)	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST / OUTLOOK
LOWER FRASER					
Upper Pitt River *(CU: Pitt-ES)* - Cyclical: No	83,900	10,627 LBB		WSP – Green COSEWIC – NAR	**40,000** (14,000 – 108,000)
	Moderate-to-good returns are expected for this CU. Historically, the five-year-old component has contributed substantially to this population, especially for this cycle line. Both the 2017 and 2016 brood-year effective total spawners (ETS; 23,612 and 35,329, respectively) were above the WSP lower benchmark ETS (10,627); the 2017 ETS were below the upper benchmark (26,845) while the 2016 ETS were above the upper benchmark. As well, the 2017 and 2016 brood-year effective female spawners (EFS; 13,297 and 18,401, respectively) were both above the recent average EFS (11,546). Relative to the long-term EFS (13,445), the 2017 brood-year EFS were barely below average while the 2016 brood-year EFS were above average. Note these comparisons include the Upper Pitt River spawning channel escapements to be consistent with Grant et al (2020).				
Chilliwack *(CU: Chilliwack-ES)* - Cyclical: Yes*				WSP – AM/GR COSEWIC – NAR	**10,000** (4,000 – 44,000)
	*While this stock exhibits cyclical returns, limited data preclude cycle-specific benchmarks (Grant et al 2020). Historically, the five-year-old component has contributed a considerable amount of the population for this cycle line. The uncertainty in both the age structure and relevant benchmarks for comparison is reflected in the outlook status. Moderate to below-average returns are expected for this CU. The four-year-old (2017) effective total spawners (ETS; 6,525) was below the WSP lower benchmark (8,000), but the five-year-old (2016) ETS (52,761) was above the WSP upper (16,000) benchmark. Likewise, the 2017 effective female spawners (EFS; 2,536) was below both the long-term (5,147) and recent (3,074) average EFS, while the 2016 EFS (30,138) was above both long-term and recent averages. Given that 2020 (i.e., the 2016 cycle line) was the dominant return, this CU is expected to have a sub-dominant return in 2021.				
Nahatlatch River *(CU: Nahatlatch-ES)* - Cyclical: No	1400 (median esc)			WSP – Amber COSEWIC – SC	**8,000** (2,000 – 32,000)
SOUTH THOMPSON					
(CU: Shuswap-ES)				WSP – Amber COSEWIC – NAR	

Conservation Unit	Average Return (all cycles)	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST / OUTLOOK
Two populations represent this CU, but they share one set of benchmarks. - Cyclical: Yes & Yes	Collectively, below-average returns are expected for this CU given that both the Scotch Creek effective total spawners (ETS; 4,859) and the Seymour River ETS (3,160) together were below the WSP lower benchmark (40,035). Scotch Creek brood-year effective female spawners (EFS; 2,356) was also below the long-term average (2,999) and the recent average EFS (4,666) for this cycle line. Seymour River brood-year EFS (1,675) was also below the long-term (3,693) and recent average EFS (5,210) for this cycle line.				**6,000** (1,000 – 19,000)
Misc. (ESHU)					
MID AND UPPER FRASER					
(CU: Anderson-Seton-ES) - Cyclical: No		3700 LBB		WSP – AM/GR COSEWIC – NAR	**2**
	Moderate-to-below-average returns are expected for this CU. Brood-year effective total spawners (ETS; 5,942) was above the WSP lower benchmark for ETS (3,662), while the brood-year effective female spawners (EFS; 3,204) was below the long-term (4,340) and recent average EFS (6,230). It is important to note that these comparisons include the Gates Spawning Channel, but as of January 2020 the channel operations are discontinued which may influence interpretation of these trends moving forward.				
(CU: Nadina-Francois-ES) - Cyclical: No	77,500	21,694 LBB		WSP – AM/GR COSEWIC – NAR	**19,000** (6000 – 68,000)
	Moderate returns are expected for this CU. Historically, the five-year old component has contributed moderately to this cycle line. While the 2017 effective total spawners (ETS; 4,429) were below the WSP lower benchmark (21,694), the 2016 ETS (25,589) were above it (but below the upper benchmark of 68,273). Likewise, the four-year-old (2017) effective female spawners (EFS; 2,323) was below both the long-term (9,439) and recent average EFS (14,646). However, the five-year-old (2016) EFS (16,110) was above both long-term and recent mean EFS. These comparisons include the Nadina spawning channel escapement estimates to be consistent with Grant et al (2020).				
CU: Bowron-ES) - Cyclical: No	68,700	5200 LBB		WSP – RED COSEWIC – END	**400** (100 – 1000)
	Below-average returns are expected for this CU. Brood-year effective total spawners (ETS; 244) was below the WSP lower benchmark for ETS (5,249). The brood-year effective female spawners (EFS; 122) was also below the long-term (3,998) and recent average EFS (2,137). This stock was heavily impacted by the Big Bar landslide in 2019 and 2020 return years, and is expected to continue to suffer additional en-route mortality associated with the slide.				
Taseko-ES	250 (median esc)			WSP – RED COSEWIC – END	**100** (30 – 300)
	Reliable return data are not available for this CU, thus no WSP benchmarks are available (see Appendix). Low returns are typically expected for this CU. Brood-				

Conservation Unit	Average Return (all cycles)	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST / OUTLOOK
	year effective female spawners (EFS; 10) was below the long-term average EFS (1,215) and below the recent average EFS (158). Limited sample size precludes statements about the age structure of sockeye in Taseko Lake. This stock was heavily impacted by the Big Bar landslide in 2019 and 2020 return years, and is expected to continue to suffer additional en-route mortality associated with the slide.				

Stock management Unit: SUMMER RUN

Average aggregate return (all cycles): 3,953,500

Conservation Unit	Average Return (all cycles)	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST/ OUTLOOK
Harrison River *(CU: Harrison (River-Type)-S)* - Cyclical: No	138,400	39,900 LBB		WSP – Green COSEWIC – NAR	**21,000** (3000 – 120,000)
	Low-to-moderate returns are expected for this CU. Historically, this population can have a considerable three-year-old component. The four-year-old (2017) effective total spawners (ETS; 48,953) was above the WSP lower benchmark for ETS (38,928), while the three-year-old (2018) ETS (14,998) was below it. The 2017 effective female spawners (EFS; 29,391) was below both the long-term (29,934) and recent average EFS (90,120), as was the 2018 EFS (8,171).				
Raft River *(CU: Kamloops-ES)* - Cyclical: No	29,800	5000 LBB		WSP – Amber COSEWIC – SC	**8000** (2000 – 31,000)
	Below-average returns are expected for this CU. Brood-year effective total spawners (ETS; 3,933) was below the WSP lower benchmark for ETS (4,958). Brood-year effective female spawners (EFS; 2,269) was also below the long-term (4,288) and recent average EFS (6,072). This population occasionally has a five-year-old component, but it is variable and inconsistent, thus was not considered.				
Quesnel *(CU: Quesnel-S)* - Cyclical: Yes	1,369,900	172,300 LBB		WSP – RED/AM COSEWIC – END	**285,000** (69,000 – 1,425,000)
	Below-average returns are expected for this CU. Brood-year effective total spawners (ETS; 105,880) was below the WSP lower benchmark for ETS (180,491). Brood-year effective female spawners (EFS; 59,636) was also below the long-term (443,226) and recent average EFS (177,775). These comparisons include the Horsefly River spawning channel escapements. This stock was impacted by the Big Bar landslide in 2019 and 2020 return years, and is expected to continue to suffer additional en-route mortality associated with the slide.				
Stellako River *(CU: Francois-Fraser-S)* - Cyclical: No	463,300	24,400 LBB		WSP – AM/GR COSEWIC – SC	**68,000** (21,000 – 229,000)
	Good returns are expected for this CU. Brood-year effective total spawners (ETS; 89,387) was above the WSP lower benchmark for ETS (24,256) but below the upper benchmark (122,612). However, brood-year effective female spawners (EFS; 49,425) was below the long-term (55,446) and recent average EFS (88,305). This stock was impacted by the Big Bar landslide in 2019 and 2020 return years, and is expected to continue to suffer additional en-route mortality associated with the slide.				
Chilko *(CUs: Chilko-S and Chilko-ES)* - Cyclical: No	1,435,000	64,220 LBB		WSP – Green COSEWIC – NAR	**311,000** (71,000 – 1,366,000)
	Good to above-average returns are expected for this CU. Brood-year effective total spawners (ETS; 356,268) was above the WSP lower benchmark (64,220) and above the upper benchmark (353,863) for ETS. However, brood-year effective female spawners (EFS; 212,956) was below the long-term (223,927)				

	and recent average EFS (343,492). The smolt brood returning as adults in 2021 was the 5th highest on record, with 62.6 million smolts recorded leaving Chilko Lake in the spring of 2019. These comparisons include the historical Chilko River spawning channel escapement. This stock was impacted by the Big Bar landslide in 2019 and 2020 return years, and is expected to continue to suffer additional en-route mortality associated with the slide.				
Late Stuart *(CU: Takla-Trembleur-Stuart-S)* - Cyclical: Yes	526,000	103,300 LBB		WSP – RED/AM COSEWIC – END	**285,000** (62,000 – 1,241,000)
	Moderate to below-average returns are expected for this CU. Brood-year effective total spawners (EFS; 142,409) was above the WSP lower benchmark for ETS (112,600), but below the upper benchmark (622,626). However, brood-year effective female spawners (EFS; 80,081) was below the long-term (220,413) and recent average EFS (89,712) for this cycle-line. These comparisons include the historical Chilko River spawning channel escapement. This stock was impacted by the Big Bar landslide in 2019 and 2020 return years, and is expected to continue to suffer additional en-route mortality associated with the slide.				

Stock management Unit: LATE RUN

Average aggregate return (all cycles): 3,056,100

Conservation Unit	Average Return (all cycles)	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST/ OUTLOOK
Cultus Lake *(CU: Cultus-L)* - Cyclical: No	31,600			WSP – RED COSEWIC – END	**900** (200 – 4000
	Below-average returns are expected for this CU. Brood-year effective total spawners (EFS; 421) was below the WSP lower benchmark for ETS (15,454). Brood-year effective female spawners (EFS; 274) was below the long-term (841) and recent average EFS (450). The smolt brood returning as adults in 2021 was composed of 7070 marked (hatchery-origin) and 4796 unmarked (lake-origin) individuals which is extremely low relative to past outmigration.				
Portage Creek *(CU: Seton-L)* - Cyclical: No	39,600	2,200 LBB		WSP – RED COSEWIC – END	**2000** (400 – 9000
	Below-average returns are expected for this CU. Brood-year effective total spawners (EFS; 1,033) was below the WSP lower benchmark for ETS (2,193). Brood-year effective female spawners (EFS; 441) was below the long-term (4,022) and recent average EFS (3,202).				
South Thompson *(CU: Shuswap-L)* - Cyclical: Yes	2,320,200	429,400 LBB		WSP – AM/GR COSEWIC – NAR	**35,000** (8000– 149,000)
	Below-average returns are expected for this CU. Brood-year effective total spawners (EFS; 13,767) was far below the cycle-specific WSP lower benchmark for ETS (713,769). Brood-year effective female spawners (EFS; 8,445) was below the long-term (9,185) and recent average EFS (32,098). These comparisons include the historical Adams River spawning channel escapements.				

Conservation Unit	Average Return (all cycles)	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST/ OUTLOOK
Birkenhead River *(CU: Lillooet-Harrison-L)* - Cyclical: No	335,000	15,700 LBB		WSP – Amber COSEWIC – SC	**22,000** (5000 – 95,000
	Moderate returns are expected for this CU. Historically, this population has a considerable five-year-old component. Both the 2017 and 2016 brood-year effective total spawners (ETS; 17,668 and 27,564) were above the WSP lower benchmark (15,685) but below the upper benchmark (81,023). However, both the 2017 and 2016 brood-year effective female spawners (EFS; 9,900 and 13,474) were below the long-term (40,822) and recent average EFS (17,418).				
Weaver Creek *(CU: Harrison (U/S)-L)* - Cyclical: No	329,700	10,700 LBB		WSP – AM/GR COSEWIC – SC	**74,000** (23,000 – 235,000
	Moderate returns are expected for this CU. Brood-year effective total spawners (EFS; 28,855) was above the WSP lower benchmark (10,731), but below the upper benchmark (84,597). Brood-year effective female spawners (EFS; 14,382) was below the long-term average EFS (21,081) but above the recent average EFS (6,514). These comparisons include the Weaver Creek spawning channel escapements to be consistent with Grant et al (2020).				
Big Silver Creek *(CU: Harrison (D/S)-L)* - Cyclical: No				WSP – AM/GR COSEWIC – SC	**3**
	Reliable return data are not available for this CU, thus no WSP benchmarks are available. Moderate to good returns are expected for this population. Brood-year effective female spawners (EFS; 3,072) was above the long-term (1,668) and recent average EFS (2,844).				
Widgeon Slough *(CU: Widgeon (River-Type))* - Cyclical: No				WSP – RED COSEWIC – END	**1**
	Reliable return data are not available for this CU, thus no WSP benchmarks are available (see Appendix). Below average returns are expected for this CU. The 2017 effective female spawners (EFS; 83) was below the long-term average EFS (324) and the recent average EFS (94). This population may have contribution from the 3-year-old component, but this is uncertain due to small population and sample sizes over time. For reference, the 2018 EFS (68) was below the long-term average EFS and below the recent average EFS.				

FRASER PINK

Conservation Unit	Average Return	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST/ OUTLOOK
Fraser - Odd only (CU: Fraser River)	11,500,000				**3,009,000** (p50)
	Since juvenile enumeration did not take place in Spring 2020, the only information we have to assess stock status comes from escapement and return in 2019. Escapement in 2019 (8,307,419) was above historical average (6,187,390). 2019 returns (8,858,203) were below historical average (11,492,861), owing to exceptionally low escapement in 2017 (3,392,159). While Fraser Pink salmon do not have associated Wild Salmon Policy				

	benchmarks, and have not been assessed by COSEWIC, there is an escapement target of 6,000,000 when returns are above 7,059,000. When returns are below 7,059,000, exploitation rate declines with decreasing return abundance linearly from 15% to 0%. When returns are above 20,000,000 there is an exploitation rate cap of 70%. These fisheries reference points supply some insight into stock status. 2019 returns and escapements satisfied both the “lower” reference point of 7.059 million, and the escapement goal of 6,000,000. It should be noted that Pink salmon enumeration methods (used both for escapement and returns) have changed substantially over time, and therefore historical values may not be comparable to recent estimates of escapement and return. Therefore, stock status should be approached with caution.	

FRASER CHINOOK

Stock Management Unit	Conservation Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST/ OUTLOOK
SPRING RUN 4_2 CHINOOK SALMON	**Aggregate SMU**	**16,511** (Terminal Run, 1979+)		**22,146** Escapement Target (S_{MSY})		**9,138** (3,386 to 17,650) Terminal Run
	CK-17 Lower Thompson	**6360** (ESC, 5yr Avg.)	4613		WSP – Red COSEWIC – END.	
	CK-16 South Thompson-Bessette Creek	**66** (ESC, 5yr Avg.)	222		WSP – Red	
	Expectations are for continued depressed abundance due to low parental escapements in 2017, ongoing unfavorable marine and freshwater survival conditions and low productivity. The 2020 escapement estimate was below the parent brood escapement in 2016, and for those systems that escapement estimates are available, escapement was below the recent average. (2019 Outlook Category was 1)					
SPRING RUN 5_2 CHINOOK SALMON	**Aggregate SMU**	**36,985** (Terminal Run, 1979+)		**42,165** Escapement Target (S_{MSY})		**17,588** (10,637 to 25,372) Terminal Run
	CK-04 Lower Fraser	**278** (ESC, 5yr Avg.)	347		COSEWIC – Special Concern	
	CK-08 Middle Fraser- Fraser Canyon	**24** (ESC, 5yr Avg.)	230		WSP – Data D. COSEWIC – END	
	CK-10 Middle Fraser	**2339** (ESC, 5yr Avg.)	5327		WSP – Red COSEWIC – Threat.	
	CK-12 Upper Fraser	**162** (ESC, 5yr Avg.)	5277		WSP – Red COSEWIC – END	
	CK-18 North Thompson	**8387** (ESC, 5yr Avg.)	935		WSP – Red COSEWIC – END	
	Expectations are for continued low abundance related to depressed parental escapements and continuing unfavorable marine and freshwater survival					

Stock Management Unit	Conservation Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST/ OUTLOOK
	conditions and low productivity. The 2020 escapement estimate was below parental brood escapements in 2015 and similar to the recent average. (2019 Outlook Category was 1)					
SUMMER RUN 5$_2$ CHINOOK SALMON	**Aggregate SMU**	**36,732** (Terminal Run, 1979+)		**23,567** Escapement Target (S_{MSY})		**14,490** (8,514 to 20,176) ~Cont'~ Terminal Run
	CK-05 Lower Fraser – Upper Pitt	**60** (ESC, 5yr Avg.)	256		WSP – Data D. COSEWIC – END	
	CK-06 Lower Fraser	**63** (ESC, 5yr Avg.)	325		WSP – Data D. COSEWIC – Threat.	
	CK-09 Middle Fraser - Portage	**68** (ESC, 5yr Avg.)	346		WSP – Red COSEWIC – END	
	CK-11 Middle Fraser	**9147** (ESC, 5yr Avg.)	5871		WSP – Amber COSEWIC – Threat.	
	CK-14 South Thompson	**875** (ESC, 5yr Avg.)	964		WSP – Amber	
	CK-19 North Thompson	**1907** (ESC, 5yr Avg.)	1829		WSP – Red COSEWIC – END	
	Expectations are for continued overall low abundance related to low parental escapements, low marine and freshwater survival, and low productivity. The 2020 escapement estimate was below parental brood escapements in 2015 and below the recent average. (2019 Outlook Category was 1).					
SUMMER RUN 4$_1$ CHINOOK SALMON		**93,242** (Terminal Run, 1977+)		**120,322** Escapement Target (S_{MSY})		**108,611** (61,523 to 161,376) Terminal Run
	CK-13 South Thompson	**97,611** (ESC, 5yr Avg.)	23,469		WSP – Green COSEWIC – Not at Risk	

Stock Management Unit	Conservation Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST/ OUTLOOK
	CK-15 Shuswap River	**23,185** (ESC, 5yr Avg.)	2,096		COSEWIC – Not at Risk	
	CK-07 Maria Slough	**343** (ESC, 5yr Avg.)	15		Not assessed.	**1**
	Expectations are for the prefishery abundance to exceed spawner escapement objective at the Lower Shuswap indicator stock. The 2020 escapement estimate was above the parental brood escapement in 2016 and above the recent average for all locations except for Maria Slough where abundance was extremely low. (2019 Outlook Category was 1/4).					
FALL RUN 4$_1$ CHINOOK SALMON	**Aggregate**	**131,822** (Terminal Run, 1977+)				
	(P)Hatchery Exclusion-Lower Fraser River	**26,600** (ESC, 1975+)	n/a (hatchery stock)		Not assessed.	**39,593** (esc.)
	CK::Lower Fraser River-fall timing (white) - Harrison	**83,600** (ESC, 1975+)	**15,318**	**75,100** Escapement Target (S_{MSY})	WSP – Green COSEWIC – Threat.	**35,150** (esc.)
	The 2020 Harrison (natural) preliminary escapement estimate was similar to the parental brood escapement in 2016, and below the recent average and escapement goal. The 2020 Chilliwack (hatchery) escapement estimate was 35,795 adult spawners which was also similar to the 2016 brood estimate of 34,586 spawners.. Current marine conditions and stock productivity appear to be unfavorable, with escapement estimates only meeting the escapement objective for the Harrison River once in the past 9 years . Chilliwack hatchery production, marine survival, and recent fishery exploitation are expected to return sufficient abundance to achieve hatchery production objectives.					

FRASER COHO

STOCK MANAGEMENT UNIT	Conservation Unit / Sub Unit	Average Return	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 FORECAST /OUTLOOK
Interior Fraser Coho	Interior Fraser – Aggregate includes 5 CUs	**34,727 (esc. 1998 – 2019)**				**43,882** (36,969 to 52,087)
		The preliminary estimate of the 2020 pre-fishery abundance for the Interior Fraser Aggregate was 81,100, 107% higher than the 2020 forecast and 60% higher than the 2019 pre-fishery abundance of 50,850. The 2021 forecast of pre-				

		fishery abundance for the Interior Fraser Aggregate is 43,882 Coho with an 80% forecast range of 36,969 – 52,087. (2019 Outlook Category was 1)	
Lower Fraser Coho	Lower Fraser – Aggregate includes 3 CU	The observed 2020 marine survival from the Inch Creek Hatchery indicator was 7.9% which was higher than the previous year (+85%) and was much higher than the forecast level (+297%). There was a substantial increase in the FW Terminal fishery in the Nicomen/Norrish Rivers, possibly due to Covid-19 travel restrictions. The retrospective analysis showed that the best performing model has remained the NPGO climate index. The 2021 forecast for marine survival for this indicator is 2.3%, a decrease (-71%) from the observed level in 2020. (2019 Outlook Category was 1)	**1**

FRASER CHUM

Stock Management Unit	Conservation Unit	Average Return (all cycles)	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 OUTLOOK
Inner South Coast Chum - Fraser	Lower Fraser CU			There is a management goal of 800,000 wild spawners.		**2**
		Fraser River Chum Salmon spawning escapement in 2017 fell below the 800,000 goal for the first time since 2010. Returns in 2021 will be dominated by 4 year old brood from the 2017 escapement (660,000 spawners). With the exception of the unusually high escapement in 2016 (1.98 mil spawners), spawning escapement has trended down since the 2012 return. Spawning escapement in 2019 was estimated at 300,000 Chum; this is the lowest recorded escapement in over 20 years. The October 22, 2020 in-season estimate of the Fraser Chum terminal return was 1.08 million fish with an 80% probability the terminal return would be between 0.70 and 1.7mil Chum. Escapement assessments in 2020 are currently underway but early indications are the terminal return will be close to the lower end of the range. An estimate of the 2020 spawning escapement will be available by April 2021				

HOWE SOUND / BURRARD INLET

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Outlook
PINK	Part of the Southern Fjords odd and even CUs				**Data Deficient**
CHINOOK	Part of the South Coast – Southern Fjords CU				**Data Deficient**
	Some years with good information for the Indian River.				
Strait of Georgia Coho	Howe Sound – Burrard Inlet CU				**Data Deficient**

INNER SOUTH COAST CHUM – Non-Fraser	Howe Sound – Burrard Inlet CU				**Data Deficient**

BOUNDARY BAY

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	2021 Outlook
CHINOOK	Part of the South Coast – Southern Fjords CU				**Data Deficient**
	Data available from the Little Campbell fence program.2020 return was about 650 fish.				
COHO	Boundary Bay CU				**Data Deficient**
INNER SOUTH COAST CHUM – Non-Fraser	Boundary Bay CU				**Data Deficient**

OKANAGAN

Stock Management Unit	Conservation Unit / Sub-Unit	Average Run / Avg. Spawners	LRP / LBB	Management Target	WSP / COSEWIC STATUS	2021 Outlook
OKANAGAN SOCKEYE	Osoyoos			58,730 adults at Wells Dam or 29,365 as peakcounts in the terminal index area		77,000 – 94,000 (esc)
	The 2017 brood year (BY) escapement of 4,287 (peak live plus dead terminal count) achieved <15% of the current Canadian domestic target for this CU (29,365 as peak live plus dead in the terminal index area). Returns of Okanagan Sockeye adults to the Columbia and Okanagan rivers in 2021 will be derived from smolt cohorts from brood years 2016-2018 that migrated seaward in spring 2018 (returning as 5-year-olds), 2019 (returning as 4-year-olds) and 2020 (returning as 3-year olds). Although year-specific smolt-to-adult survival values for these specific cohorts are not available as yet, Okanagan Sockeye marine survival variations are known to be similar to Barkley Sound sockeye in that above- and below-average survivals occur in association with either cold-ocean (La Niña) or warm ocean (El Niño) events, respectively. Examination of the association between historic smolt-to-adult return (SAR) variations and NOAA Fisheries "stop-light" ocean condition indicators (including the Oceanic Niño Index (ONI)) suggests that the 2018 and 2020 (but not 2019) sea-entry smolts were likely to have experienced a modest					

<table>
<tr><td></td><td colspan="5">improvement in survival rates, relative to the low (<2%) SAR applied to 2015-2017 smolt out-migration years. Applying a 3.6% SAR to smolt cohorts for the 2018 and 2020 sea-entry years, and 2% SAR to the 2019 sea-entry year, yields an estimate of approximately 258,000 adults contributing to the 2021-2023 return years. Allocation of this production to specific return years based on average age-at-return values for Okanagan Sockeye suggests a total return in 2021 of 77,000 age-4 and age-5 Okanagan wild-origin fish, which typically comprise 91% of adult returns. Production of hatchery-origin fish from Skaha Lake may increase these returns by 10-20% for an overall maximum return of 94,000 adult Sockeye of Okanagan origin in 2021.</td><td></td></tr>
<tr><td rowspan="2">OKANAGAN CHINOOK</td><td>Okanagan Summer</td><td>27 (esc. 2009- 2019)</td><td>1000</td><td></td><td>COSEWIC - END</td><td rowspan="2">1</td></tr>
<tr><td colspan="5">Expectations for 2021 are for continued depressed abundance related to low parental escapements, low marine and freshwater survival, low productivity, and low hatchery production. The COSEWIC identified the status as endangered (2017).</td></tr>
</table>

APPENDIX 11: 2021 PSSI COMMERCIAL FISHERY CLOSURES

As part of immediate conservation measures under the **Pacific Salmon Strategy Initiative (PSSI)**, the Minister announced several new commercial fishery closures for the 2021 season to protect stocks of conservation concern. These closures are an initial step toward long-term conservation closures beginning in 2022, which will be considered following consultation with affected groups. The impacts from the long-term closure will be mitigated by a commercial licence retirement program and other initiatives to support transformation of the fishery.

For commercial fisheries that are closed, DFO intends to manage other fisheries to allow stocks of concern to reach spawning grounds consistent with the conservation intent of the closures and allocation priorities.

2021 Southern Salmon Commercial Fishery Closures

Fishery	Area	Group	Gear Type
Johnstone Strait Mixed Stock Chum	12, 13	Area D	Gill net
Nitinat Hatchery Chum	21	Area B	Seine
Nitinat Hatchery Chum	21	Area E	Gill net
Fraser Chum	29	Tsawwassen Harvest Agreement	Gill net
Fraser Chum	29	Musqueam Economic Opportunity	Gill net
Fraser Chum	29	Area E	Gill net