Pacific Salmon Commission

2019/2020 Thirty-Fifth Annual Report

Pacific Salmon Commission

Established by Treaty between Canada and the United States March 18, 1985 for the conservation, management and optimum production of Pacific salmon

Thirty-Fifth Annual Report 2019/2020

Vancouver, B.C.
Canada

December 2020

PACIFIC SALMON COMMISSION

ESTABLISHED BY TREATY BETWEEN CANADA
AND THE UNITED STATES OF AMERICA
MARCH 18, 1985

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Letter of Transmittal

In compliance with Article II, Paragraph 14 of the Treaty between the Government of Canada and the Government of the United States of America concerning Pacific salmon (the Treaty), it is my pleasure as Executive Secretary of the Pacific Salmon Commission to present my compliments to the Parties and to transmit the Thirty-Fifth Annual Report of the Commission.

This report summarizes the activities of the Commission for the fiscal year April 1, 2019 to March 31, 2020. It reports on the results of the 2019 fishing season and on meetings of the Commission and its subsidiary bodies. Also included are the annual reports of the Northern and Southern Fund Committees, and an independent auditor's report on financial activities of the Commission during the fiscal year April 1, 2019 to March 31, 2020.

Additional details about the Commission's activities and the Treaty are available at www.psc.org.

Sincerely,

Mr. John Field

Executive Secretary

PACIFIC SALMON COMMISSION

OFFICERS for 2019/2020

Chair	Mr. Philip Anderson
Vice-Chair	Ms. Rebecca Reid

COMMISSIONERS

Canada	**United States**
Mr. John McCulloch	Mr. McCoy Oatman
Mr. Murray Ned	Mr. Robert Turner
Mr. Bob Rezansoff	Mr. Douglas S. Vincent-Lang
Chief Russ Jones	Mr. W. Ron Allen
Dr. Brian E. Riddell	Mr. William F. Auger
Mr. Paul Sprout	Mr. Rick Klumph
Mr. Andrew Thomson	Ms. Staci MacCorkle

SECRETARIAT STAFF

Executive Secretary	Mr. John Field
Administrative Officer	Ms. Ilinca Manisali
Chief, Fisheries Management Programs	Ms. Fiona Martens
Chief, Fisheries Management Science	Ms. Catherine Michielsens

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INTRODUCTION

Since the early 20th century, Canada and the United States have discussed and collaborated on Pacific salmon conservation and management. Interception of Pacific salmon bound for rivers of one country in fisheries of the other has been a particularly important issue over the years. Scientific research identified a number of intercepting fisheries on species and stocks originating from Alaska, British Columbia, Washington, Oregon and Idaho. This research indicated that Alaskan fishers were catching some of the salmon bound for British Columbia, Idaho, Oregon and Washington. Canadian fishers off the West Coast of Vancouver Island were capturing some of the salmon bound for rivers of Washington and Oregon, while fishers in northern British Columbia were intercepting certain fish returning to Alaska, Washington, Oregon and Idaho. U.S. fishers were catching Fraser River salmon as they traveled through the Strait of Juan de Fuca and the San Juan Islands towards the Fraser River.

Cooperative management of stocks subject to interception became a matter of common concern to Canada and the United States, and governments desired a mechanism to enable each country to reap the benefits of its respective management and enhancement efforts. That mechanism is now provided through the Treaty Between the Government of Canada and the Government of the United States of American Concerning Pacific Salmon (hereafter the "Pacific Salmon Treaty" or "the Treaty"), which entered into force upon the exchange of instruments of ratification by the President of the United States of America and the Prime Minister of Canada on March 18, 1985.

The treaty, *inter alia*, established a) a bilateral fishery management organization known as the Pacific Salmon Commission (the Commission), and b) bilateral fishery management regimes for conservation and harvest sharing of salmon stocks. Each country (Party) retains jurisdictional management authority but must manage its fisheries in a manner consistent with the provisions of the Treaty. The Treaty is intended to enable bilateral conservation and enhancement to prevent overfishing, increase production, and ensure that each country receives benefits equivalent to its own salmon production. The Commission also serves as a forum for consultation between the Parties on their salmonid enhancement operations and research programs.

The Commission comprises four Commissioners (and alternates) from each country as the principle deliberative body. The Commission has also established numerous subsidiary committees, and four geographically oriented panels. The Panels report to the Commission and provide advice on the conservation and management of selected stocks of concern, with certain exceptions as noted below:

Transboundary Panel: stocks originating from the Alsek, Stikine and Taku River systems.

Northern Panel: stocks originating in rivers situated between Cape Suckling in Alaska and Cape Caution in British Columbia.

Southern Panel: stocks originating in rivers located south of Cape Caution, other than Fraser River sockeye and pink salmon.

Fraser River Panel: has special in-season regulatory responsibilities for stocks of sockeye and pink salmon originating from the Fraser River.

Yukon River Panel: makes recommendations to authorities in Alaska and the Canadian government concerning the conservation and coordinated management of salmon originating in the Yukon River in Canada, but does not report to the Commission.

The panels review annual post-season reports, annual pre-season fishing plans and ongoing and planned salmonid enhancement programs of each country. They also provide recommendations to the Commission for development of fishery regimes in accordance with the objectives of the Treaty. These regimes, once

adopted by the Commission and accepted by the Parties, are implemented by the relevant fishery management agencies in each country.

The Parties accord the Fraser River Panel special responsibility for in-season regulation of Fraser River sockeye and pink fisheries of Canada and the United States in southern British Columbia and northern Puget Sound, in an area designated as Fraser River Panel Area Waters. Scientific and technical work is conducted for the Panel by the Fishery Management Division of the Commission's Secretariat staff.

With long-term fishery arrangements in place through periodic amendment of the Treaty, the meeting agendas for the Commission have concentrated on implementation that will improve fisheries management and aid the countries' efforts to recover weakened stocks. These provisions include establishment of two bilaterally-managed restoration and enhancement funds, provisions to enhance bilateral cooperation, and improvements to the scientific basis for salmon management.

The Commission generally meets three times annually and conducts its business between meetings through its permanent Secretariat located in Vancouver, British Columbia. In the period April 1, 2019 to March 31, 2020, the Commission met on three occasions:

1. Fall Session
   October 14-18, 2019. Spokane WA.

2. Post-Season Meeting of the Commission and Panels
   January 13-17, 2020. Portland, OR

3. Thirty-Fifth Annual Meeting of the Commission
   February 18-21, 2020. Vancouver B.C.

This, the Thirty-Fifth Annual Report of the Pacific Salmon Commission, provides a synopsis of the activities of the Commission and its subsidiary bodies during its Thirty-fifth fiscal year of operation, April 1, 2019 to March 31, 2020.

Activities of the Commission

PART I
ACTIVITIES OF THE COMMISSION

A. Fall SESSION OF THE PACIFIC SALMON COMMISSION
October 2019, Spokane, Washington

The Commission met in two bilateral sittings during the week.

The Commission adopted the final 2018 national post-season fisheries reports.

Executive Secretary John Field briefed the Commissioners about changes related to the PSC Chief Biologist position upon the retirement of Mr. Mike Lapointe, who served as PSC Chief Biologist for 17 years. A bilateral selection Committee offered the position to two internal candidates who co-applied for the position: Dr. Catherine Michielsens (who previously served as Director of Modeling and Data Management) and Ms. Fiona Martens (most recently serving as the Director of Coordination and Stock Identification). Going forward, Dr. Michielsens would focus on the scientific aspects of the position and Ms. Martens would focus on the program and policy aspects of the job.

The Commission received a presentation about the Big Bar landslide compiled by Fisheries and Oceans Canada (DFO) biologists Chuck Parken, Mike Hawkshaw, David Patterson and Timber Whitehouse.

The Commission received and adopted a report from the Chinook Interface Group (CIG). The report included information and recommendations related to the proposed Secretariat coordinator position for the Chinook Technical Committee (CTC); the recalibration of the Chinook Model including its adoption, and implementation and translation of Tables 1 and 2 in Chapter 3 of Annex IV; the analysis of gaps and resulting priorities to implement the new Calendar Year Exploitation Rate (CYER) metric for the ISBM fisheries; the ad hoc Bilateral Okanagan Chinook Work Group; and the CIG's forward agenda in support of the CTC and its implementation of Chapter 3 provisions through 2028.

The Commission discussed the annual work plans presented by the Panels and Committees and issued instructions to the Panels and Committees.

The Commission further discussed the Committee on Scientific Cooperation (CSC) work plan. The Commission accepted the work plan but noted that the identification of emerging scientific issues relevant to Treaty implementation for Panels and Committees was a key task requiring further elaboration in consultation with the Panels and Committees. The Commission determined that the PSC Chair and Vice Chair (with others as appropriate) would discuss timelines and desired CSC deliverables ahead of the January 2020 Post Season meeting.

The Commission discussed the establishment of a work group to oversee the Mark Selective Fishery Fund, which was agreed to in the revised Chapter 3 of the Pacific Salmon Treaty. The Commission directed Mr. Field to provide a list of issues to be considered by each National Section regarding the establishment of a MSF work group in advance of the January 2020 Commission meeting.

The Commission accepted the PSC Slate of Officers for 2019/2020.

Ms. Susan Farlinger was presented with a plaque commemorating her service as a Commissioner from 2010 to 2018.

B. MEETING OF THE COMMISSION AND PANELS
January 2020, Portland, Oregon

Two bilateral sessions were held during the meeting.

The Commission accepted the Parties' preliminary 2019 post-season fisheries reports.

The Commission received presentations about 2019 Chinook fisheries from Canada, the Southern United States, and Alaska, which were intended to help the Commissioners gain a good understanding about Chinook fisheries in both countries.

The Commission received a report from the Chinook Interface Group (CIG)
about issues addressed by CIG during the meeting including: CIG membership, Chinook Technical Committee (CTC) membership, the Okanagan Chinook workgroup work plan, the CTC work plan, the CYER workgroup, the delay in developing standards for incidental mortality beyond February 2020, and the CEII and CWT work group. The Commission also accepted new versions of Tables 1 and 2 and Appendix C for Chapter 3 for an updated publication of the Treaty.

The Commission accepted the final report of the Fraser Strategic Review Committee (FSRC) and the Committee was dissolved.

The Commission agreed that the Fraser River Panel, Fraser River Technical Committee, and the PSC Secretariat staff would continue to assess the hydroacoustic program and that it would evolve as necessary.

A small working group of Commissioners charged with discussing the structure and function of the Committee on Scientific Cooperation (CSC) presented a report on its discussions about process improvements around CSC priority setting and work plan development. The working group planned to table a recommendation at the Commission's February meeting about how to proceed.

The Commission received two presentations about the Big Bar Slide from Fisheries and Oceans Canada. The first presentation provided background information about the slide and about Fisheries and Oceans Canada's remediation efforts. The second presentation addressed scientific questions surrounding salmon stocks affected by the slide.

C. PACIFIC SALMON COMMISSION ANNUAL MEETING
February 2020, Vancouver, B.C.

The Commission met bilaterally three times during the week.

Mr. Mark Saunders, director of the International Year of the Salmon (IYS) for the North Pacific delivered a presentation to the Commission about IYS activities, which included conducting high seas expeditions, promoting the IYS brand, holding scientific workshops, and facilitating work on data standardization.

A bilateral group of four Commissioners assigned to review the role and responsibilities of the Committee on Scientific Cooperation (CSC) reported on its activities and proposed a process for CSC work plan development and implementation, which was approved by the Commission.

Canada reported that it conducted a review of the Commission's post-season report template and concluded that it was satisfactory.

Mr. Gwil Roberts, Director of Fisheries and Oceans Canada (DFO) Big Bar Landslide Response, and Mr. Gord Sterritt, the Executive Director of the Upper Fraser Fisheries Conservation Alliance delivered an update to the Commission about Canada's response to the Big Bar landslide.

The Chinook Interface Group (CIG) delivered a report to the Commission focused on seven items: the development of a CIG agenda; succession planning for the Chinook Technical Committee (CTC); the Okanagan Chinook Working Group workplan; incidental mortality standards; the CYER workgroup; terms of reference for the Catch and Escapement Indicator Program (CEII), Coded Wire Tag and Recovery workgroup, and Mark Selective Fishery fund; and the CTC Coordinator proposal. The Commission adopted the CIG report and the recommendations within.

The Standing Committee on Finance and Administration delivered its report to the Commission, which included the proposed FY2020/21 budget for the Secretariat and associated staffing considerations. The Commission discussed and adopted the report as submitted (see the full report in the section for the Standing Committee on Finance and Administration).

The Commission received reports on workplan assignments from the Northern Panel, Southern Panel, Transboundary Panel, Fraser River Panel, Selective Fisheries Evaluation Committee, and Chinook Technical Committee.

The Transboundary Panel Chairs reported that the Panel could not come to agreement on an issue related to the bilateral Taku River sockeye assessment program and revised MSY escapement goal.

The Commission discussed the issue and agreed that a bilateral work group of Commissioners would attempt to resolve the Transboundary River Panel's disagreements over implications of Annex IV, Chapter 1, paragraphs 3(b)(i)(B-H) (and other issues that may arise) by May 1, 2020.

Activities of the Standing Committees

PART II
ACTIVITIES OF THE STANDING COMMITTEES

A. MEETINGS OF THE STANDING COMMITTEE ON FINANCE AND ADMINISTRATION

The Standing Committee on Finance and Administration met on December 19, 2019, January 15 & 16, 2020, and February 18 & 19, 2020. The Committee addressed several issues and made recommendations for the Commission's consideration as noted below.

Secretariat staffing considerations

A number of near-term staffing issues for the Secretariat required review by the Committee:

1. Database Manager

In February 2018, the Commission approved a 2-year pilot project for the Secretariat to hire a term database manager to assist the Chinook Technical Committee (CTC) in completing the Chinook Information System (CIS) and other data management tasks for Fraser sockeye assessment. The Secretariat secured funding from the Southern Endowment Fund to offset 75% of the incumbent's salary and benefits from May 2019 through May 2020.

Given the success of the pilot program, as evidenced by the positive feedback received from Parties, the Secretariat recommended that the term database manager position be converted to a permanent/ indeterminate position, with Mark McMillan as the incumbent, effective May 28, 2020 (end of pilot project).

Consistent with the FY2020/21 budget proposal below, the Committee recommends that the Database Manager position be converted to permanent status effective May 28, 2020.

2. CTC Coordinator

The CTC Functions and Operations Group (CTC FOG) issued its final report to the Commission in October 2018, proposing options to assist the CTC and documenting workload issues raised throughout 2017-2018. The Commission considered the CTC FOG report and outlined steps to assist the CTC.

The CTC FOG report prompted the Executive Secretary to work with CTC leadership and Secretariat staff to propose a permanent "Chinook Technical Committee Coordinator Position" to address some of the workload issues identified (i.e. recordkeeping, communication, coordination). The Executive Secretary prepared a position description for the CTC Coordinator, which contemplates a BI-2 classification level with an associated salary, benefits, and travel costs of $130,000/year.

Consistent with the FY2020/21 budget proposal below, the Committee recommends that the CTC Coordinator position be created for a one-year term as a pilot project, and subsequently evaluated for extension or conversion to full-time status.

3. BI-3 Biologist (post-Lapointe workload distribution)

In March 2019, Fiona Martens and Catherine Michielsens replaced Mike Lapointe as the new Chief of Fisheries Management Programs and Chief of Fisheries Management Science respectively. They were recruited internally and did not seek salary reclassification. As they took on new leadership responsibilities, and as part of a longer-term effort to improve efficiency and enhance scientific support for the Parties, they

re-assigned and delegated tasks to subordinates to the extent permitted by the subordinates' job classification and scope.

This effort revealed a need to hire a mid-level biologist to address the resulting workload redistribution. The incumbent's responsibilities would be two-fold: providing in-season support for the Fraser River assessment program, and providing database assistance to the Secretariat, the CTC, and other technical committees as feasible.

The Executive Secretary recommended that the BI-3 biologist's salary and benefits be covered through the BI-5 salary savings realized with the departure of Mike Lapointe.

Consistent with the FY2020/21 budget proposal below, the Committee recommends that the Secretariat proceed with the recruitment of the BI-3 biologist position with the salary and benefits funded as specified above.

Budget proposal for FY 2020/2021

The Committee reviewed the proposed budget for FY 2020/2021 as presented on February 20, 2020 (Table I).

It was agreed that the proposed budget for FY 2020/2021 would incorporate the annual salary and benefits, as well as certain travel costs of the Database Manager and the CTC Coordinator positions. The Committee understood that funding applications totaling over $156K for FY 2020/2021 were submitted by the Secretariat to the Northern and Southern Endowment Funds for some of these costs, with such potential grant revenue not reflected in the proposed budget. Decisions on these grants will be known on or about February 27, 2020.

The Committee understood that should these grant applications not be successful, the Secretariat is projected to incur a deficit of $82,081 by the end of FY 2020/2021. The Committee agreed that in this circumstance, the Secretariat may access the Working Capital Fund (current balance $109K) to cover the deficit. Any such deduction from the Working Capital Fund would be paid back in future years with savings or elevated dues, as determined by the Commission with associated advice from the Committee.
Accordingly, the Committee recommends that the Commission adopt the proposed budget for FY 2020/2021 as shown in Table I.

Test Fishing

Test fishing finances remained a significant issue for the Parties, after record-low return of Fraser River sockeye and pink salmon in 2015, 2016, 2017, and 2019. The low returns have precluded the capture and sale of adequate fish to recover test fishing costs in those years, and the Parties have made supplementary financial contributions to the Test Fishing Revolving Fund (TFRF) to help defray the test fishing costs.
Through a combination of supplementary contributions from the Parties, and a financial surplus generated in 2018 (an Adams-dominant year) due to better-than-projected per pound fish prices, the TFRF balance is projected to be $1.24M as of March 31, 2020, which would be sufficient to cover the 2020 season test fishing program cost (even without significant sales of test fishery catch).
The Committee considered the following test fishing issues:

1. Draft TFRF financial regulation

The Committee tasked the Executive Secretary with drafting a financial regulation governing the creation and management of the TFRF, and the mechanism through which test fishing deficits would be apportioned to the Parties depending on certain parameters such as abundance, conservation concerns, and First Nations fish allocations. The Committee is currently in the process of reviewing the proposed financial regulation and is expecting to provide a recommendation to the Commission by February 2021.

2. Draft Test Fishing Policy

The Committee reviewed the draft Test Fishing Policy prepared by Canada and asked for feedback on it from the Fraser River Panel. The Committee agreed to revisit the Test Fishing Policy at a March 2020 teleconference. The Committee recommends that in absence of a final test fishing policy, the Parties prepare an ad-hoc test fishing agreement for the 2020 season.

3. Supplemental remuneration for idled test fishers

The Secretariat proposed the partial compensation of Fraser River sockeye and pink salmon test fishers in cases of delayed or cancelled test fisheries, unless such test fishers are (temporarily) released from their obligation to be on standby. The inclusion of such an agreement in future test fishing contracts would increase transparency regarding the rights and responsibilities of the test fishers as well as PSC staff and Fraser River Panel, especially in low-abundance years.

The Committee deferred a recommendation on this issue pending further consultation with the Fraser River Panel.

National dues and projected deficits

The Committee acknowledged that regular annual PSC dues have remained level since FY 2011/2012 at $1,879,636 CAD per Party, and that the Secretariat has been able to operate at level dues for the past nine years due to budget savings from poor fish returns and low sampling intensity, and having certain large equipment purchases funded by the Southern Endowment Fund (prior to the creation of the Capital Asset Replacement Reserve Fund).

The Committee recognizes that without a significant increase in annual dues, the PSC is poised to exhaust its carryover by the end of FY 2020/2021 and enter a cumulative deficit position thereafter. Without adequate cash flow, the Secretariat would be unable to continue supporting the Parties at current levels of service.

The Committee acknowledged different approaches could be used to prevent budget deficits over different time-scales. One approach is to secure a one-time large increase in dues that would be maintained over the next 10 years and prevent the large cumulative deficit projected by FY2030/31. Another approach is year-on-year incremental funding as determined by the projected budget (i.e. some years may require higher contributions than others).

These two approaches could be implemented simultaneously, with each Party adopting a different one depending on their specific circumstances. The Committee agreed to reconvene by teleconference in March 2020 to discuss the details of the increased funding arrangements and how it would be reflected in the Secretariat's financial reports.

B. MEETINGS OF THE STANDING COMMITTEE ON SCIENTIFIC COOPERATION

At the October 2019 Fall Meeting, the Commission discussed recent hurdles in reaching bilateral agreement on the CSC's work plan priorities each year. These discussions led to a working group of four Commissioners (Auger, Riddell, Thomson, and Turner) charged with recommending the best means to utilize expertise on the CSC to advance Treaty implementation.
The working group met to discuss process improvements around CSC priority setting and work plan development, and recommended the following process:

1. During development of annual work plans, Panels and Committees should identify significant scientific or technical needs or propose investigations for potential assignment to the Committee on Scientific Cooperation (CSC). Also, the Commission may periodically accept proposals for investigations, solicited or otherwise, from other sources. These submissions will be collated by the PSC and submitted to the bilateral Steering Committee (two commissioners per Party, assisted by the Executive Secretary) and CSC for review before the end of October.

2. The Steering Committee and CSC will meet by teleconference prior to the post-season PSC meeting to discuss and consider which of these requests could best support PST objectives. The representatives of the Steering Committee, in consultation with CSC, may seek additional input from their national sections to inform the discussion.

   Among other things, the Steering Committee, in consultation with the CSC, will consider the merit and feasibility of, resources needed for, improvements or modifications to, or any other attributes of each proposal in formulating a recommendation on the disposition of that proposal.

3. At the Post Season meeting, Steering Committee members will, if appropriate and in consultation with members of the CSC, seek additional input about the proposed projects from their respective national sections. The Steering Committee will then meet bilaterally to develop final recommendations for submission to and consideration by the Commission at the Annual Meeting.

4. The Commission is expected to determine whether to adopt, modify and adopt, or not adopt recommendations of the Steering Committee and formulate from its decisions an appropriate work plan for the CSC.

5. The CSC is expected to implement the Work Plan, periodically report to the Commission on the status of implementation and submit final reports with recommended action items as appropriate.

6. The Commission is expected to receive final reports and determine appropriate action(s).

In February 2020, the Commission adopted this recommendation to generate a more concise process for assigning tasks to the CSC moving forward.

The working group met with CSC members during the February 2020 meeting to discuss the new process, and noted the following:

- The Commission has authorized "test flight" of the new process with the Oct. 2019 CTC and Southern Panel work plan items flagged for CSC attention.

- Those two bodies had flagged the same issue in 2020 for the CSC as follows:

The PSC should consider establishing a coastwide, multi-species forum under the oversight of the Committee on Scientific Cooperation to share developments and advice regarding adaptation of Pacific salmon management approaches to environmental change. There is strong evidence that environmental change is occurring and accelerating to a degree such that past experience cannot be expected to serve as a reliable basis to forecast the future. Increases in uncertainty, variability and directional change are expected to alter hydrologic, precipitation, temperature and growth patterns which, in turn, are likely to affect the survival, productivity, abundance, distribution, and migration patterns of Pacific salmon. The forum should provide reporting of significant developments in the knowledge base as well as vetting of recommendations for monitoring and reporting systems, and potential adaptation strategies.

The Parties appointed Commissioners Auger, Klumph, Riddell, and Thomson to the CSC Steering Committee. This Steering Committee was scheduled to meet with the CSC in spring/summer of 2020 to advance the "test flight" of the new process as noted above.

C. MEETINGS OF THE NORTHERN AND SOUTHERN FUND COMMITTEES

This section summarizes the meetings and business of the Northern and Southern Fund Committees between April 1, 2019 and March 20, 2020. A more detailed account of these meetings is available in the 2019 Annual Report of the Endowment Fund Committees to the Commission, which is available for download from the PSC website.

Joint Fund Committee Meetings

The Northern and Southern Fund Committees have agreed that given the congruent nature of their agendas, their decision to combine the funds into a single master account for investment management purposes, and the efficiencies involved with respect to interaction with the Fund managers, it is appropriate to meet together as a Joint Fund Committee at least once a year for Fund financial reviews and investment manager interviews.

The Joint Fund Committee met twice during the 2019/20 Canadian Financial Year:

1. May 7 and 8, 2019
2. November 21, 2019

May 2019

The spring meeting of the Joint Fund Committees was held in Vancouver on May 7 and 8.
Mr. Federico Cervantes and Ms. Michelle Richardson of Aon Hewitt provided the 2019 Q1 investment performance report, noting that: Morgan Stanley continued to outperform; LSV's 'deep value' style remained out of favor and returns were disappointing; and that Philips, Hager and North Investment Management anticipated a period of volatility. The Committee was generally satisfied with the report, apart from the on-going poor performance of LSV, and selected LSV (international equity), Invesco (real estate) and IFM (infrastructure) for interviews in November.

In 2018 it was noted that the fees for custodial services (Royal Bank of Canada) were high. Subsequently, the Fund Committees commissioned a search for a new Custodian Bank. Following in-person interviews by a Subcommittee of Committee members, at this meeting Northern Trust was recommended to the Joint Fund Committee as the new custodian. The recommendation was accepted, and the transition was scheduled for July 2019.

Ms. Manisali provided a summary of the Investment Consultant search process. She discussed the responses to the RFP and the review and selection of a short-list of finalists for interview. The Committee then received in-person presentations from the Investment Consultant candidates: Aon Hewitt; Mercer Investments; and

George & Bell Investments. The Committee then discussed each candidate firm including their staff turnover and continuity, bench strength, local presence, fees, client lists, and the anticipated time likely to be taken to "come up to speed" with the Funds. The Committee agreed to make a final decision the following morning.

On May 8th a motion to change the Funds' Investment Consultants to George & Bell was passed. The motion was amended to add that the term of the contract with George & Bell should be 5 years, with a review after 2 years. A July 1st, 2019 start date was approved.

PSC Secretariat Director of Finance Ms. Ilinca Manisali presented the draft 2019/20 Northern and Southern Fund administration budgets. The Committee heard that the 2018/19 administration costs had come in under budget except for the professional services fee paid to Morgan Stanley, which includes a performance-based component. Morgan Stanley had performed better than expected and had been paid a higher fee accordingly. The Committee discussed the format for the presentation of annual Northern, Southern and Yukon River Panel administration budgets and the Controller agreed to develop an improved budget format incorporating enhanced levels of detail. A motion to approve the 2019/20 Northern and Southern Fund administration budgets was passed.

An in-camera discussion between the Joint Committees and the Executive Secretary regarding staffing for the Committees concluded the meeting.

November 2019

The autumn meeting took place on November 21. The meeting opened with third quarter performance report presented by Ms. Kamila Giesbrecht and Mr. Brendan George, investment consultants from George & Bell.

Ms. Giesbrecht provided an update on the transfer of responsibility for management of the Fund's infrastructure portfolio from listed (RARE) to direct (IFM). In October the Fund's commitment with IFM was fully invested following a legal review and the identification of suitable investment assets. She also highlighted the large proportion (50%) of equities in the Fund's portfolio and recommended a reduction in these holdings to reduce the Fund's risk exposure during a market correction. Furthermore, Ms. Giesbrecht suggested the possibility of adding another global equity manager to complement the Fund's existing global manager as an effective alternative for the funds currently invested with LSV. Lastly, Ms. Giesbrecht provided an update on the administrative cost savings associated with the transition from RBC to Northern Trust as the Fund's custodian and the changeover from Aon Hewitt to George & Bell as its investment consultant.

Next Ms. Giesbrecht reviewed LSV's performance and provided an overview of the Fund's existing global equity structure and overall asset mix. She restated the risks associated with large equity holdings and the Fund's recent efforts in mitigating those risks by diverting a portion of its equities into real estate and infrastructure.

Ms. Giesbrecht suggested the Fund Committees consider further diversification as a protection against a market downturn while maintaining existing returns to support project funding. She explained that the Fund's portfolio had performed well in recent times but that market dynamics have changed, and that the extent of the Fund's downside protection is unknown. She stressed that the Joint Fund Committee's most important decision is selecting the right asset mix for the current market environment and proposed a new asset mix review to generate portfolio composition options for consideration.

A motion to establish an Investment Subcommittee to work with George & Bell to conduct an asset mix review in January 2020 was passed. Mr. Steve Gotch (N Fund), Mr. Doug Mecum (N Fund), Mr. Larry Peck (S Fund), and Dr. Don Hall (S Fund) volunteered to assist with this task.

The Committee then received in-person presentations from the Fund managers: LSV (EAFE/NNA equities); Invesco (real estate); and IFM (direct infrastructure). Ms. Giesbrecht and Mr. George advised that the strong performances of Invesco and IFM have validated their place in the Fund's portfolio and noted that both managers provide the downside protection the Fund requires in a market correction. Conversely, Ms. Giesbrecht and Mr. George advised that LSV's poor performance is likely to continue and will likely suffer during a recession without providing the downside protection the Committees seek.

Apart from LSV, the Committee was generally satisfied with the managers' reports.

Lastly, Ms. Giesbrecht and Mr. George presented their transition plan to address management changes at George & Bell. Ms. Giesbrecht announced her departure from George & Bell but offered to continue her involvement with the Joint Fund Committee as an advisor in a voluntary capacity. Mr. George would replace Ms. Giesbrecht as the Fund's lead consultant. The Fund Committees emphasized that they had chosen to hire George & Bell based on their capacity to meet the needs and goals of the Fund and that the Committee's relationship is with George & Bell and not a specific individual.

Northern Fund Committee Meetings

The Northern Fund Committee met twice during this period. The main agenda items were:

May 8th (p.m. only), 2019.

- Potential for a Call for Proposals for 2020 emphasizing projects that are located within and focus on stocks which impact fisheries in the Northern Fund's geographic area.
- Proposal to develop a formal policy on core agency funding.
- Shared support of Gulf of Alaska expedition with the Southern Fund.
- Review of 2019 Alsek Sockeye and Chinook stock restoration project.
- Fund financial obligations in 2020.
- Timetable for Call for Proposals.

October 8th and 9th (Co-Chairs a.m. only), 2019.

- First round selection of 2020 Northern Fund project concepts to be invited to proceed to Stage Two detailed proposals.
- Review and approval of annual audited financial statements.
- Status report on the transition to new investment consultant and financial custodian.
- Review of Q2 quarterly performance report.

Southern Fund Committee Meetings

The Southern Fund Committee met twice during this period. The main agenda items were:

May 8 (p.m. only), 2019.

- Review of Lower Fraser Coho Escapement proposal.
- Potential for a Call for Proposals for 2020.
- Fund financial obligations in 2020.
- Timetable for the Call for Proposals.
- PSC Secretariat: tracking progress of ongoing projects.

September 25 and 26 (site visit), 2019.

- First round selection of 2020 Southern Fund project concepts to be invited to proceed to Stage Two detailed proposals.
- Review and approval of annual audited financial statements.
- Review of Q2 quarterly performance report.
- Status report on the transition to new investment consultant and financial custodian.
- Renewal of the Southern Fund's Strategic Plan.
- The Southern Fund Committee conducted a site visit and attended a presentation in the Chilliwack, BC area on September 26th.

Activities of the Panels

PART III
ACTIVITIES OF THE PANELS

A. FRASER RIVER PANEL

At the January meeting the Panel received reports reviewing the 2019 fishing season, an overview of the Mission program, addressed Total Allowable Catch (TAC) calculations and allocation status, reviewed test fishing program expenses and revenues, and reviewed the marine reconstruction of pink salmon for improvement of assumptions for future years. Canada also presented an update on the Big Bar landslide and discussed key management questions. Next steps resulting from the Fraser River Strategic Review Committee (FSRC) report on hydroacoustics was also discussed. At the February meeting the Panel received reports from Canada on 2019 escapements, and 2020 pre-season forecasts for Fraser River sockeye salmon. Additional reports were provided regarding Washington sockeye salmon pre-season forecast and historical returns. The Panel also discussed next steps in the FSRC process on acoustics and test fishing options regarding the 2020 schedule and next steps for determining test fishery retention guidelines in 2020. Another update was provided from Canada regarding the mitigation efforts at Big Bar.

B. NORTHERN PANEL

No Report was received by the time of publication.

C. SOUTHERN PANEL

No Report was received by the time of publication.

D. TRANSBOUNDARY PANEL

The Transboundary Panel (Panel) held two series of bilateral sessions in conjunction with the Pacific Salmon Commissions meetings, the first being the 2019 Post-Season meeting in Portland (January 13-16, 2020) while the second was the 2020 Annual meeting in Vancouver (February 17-21, 2020).

At its Post-Season meeting in January, fishery managers, enhancement project coordinators, scientific and technical staff from both the United States and Canada presented information to the Panel pertaining to treaty-related fishery performance, overall status of stocks and enhancement activities in the Transboundary Rivers treaty area for the 2019 season. The Panel also received presentations on the result of 2018 Taku and Stikine Sockeye Salmon Enhancement Production Plans (2019 fry releases resulting from 2018 egg takes). On review the Panel Co-Chairs approved the results of sockeye enhancement programs as presented, which included confirmation that escapement of all adult sockeye salmon (wild or enhanced) to spawning sites in the Taku River watershed will be counted towards determination of total annual "escapement". The Panel also received presentations on the results of Taku River sockeye salmon assessment program and escapement goal analysis, completed the annual review of overage and underage considerations pertaining to the performance of 2019 fisheries and received a presentation on the results of the International Alsek River sockeye and Chinook salmon stock rebuilding workshop held in May 2019.

The Annual meeting in February involved the review of pre-season outlooks for Alsek, Taku and Stikine River salmon stocks (including Canadian management measures to be implemented in 2020 to comply with Stikine River sockeye salmon allowable catch allocations), exchange of information on proposed fishery management measures in Canada and Alaska for the Chapter 1 geographic area, agreement on sockeye salmon enhancement programs planned for 2020 and reviewed recommendations for 2020 assessment fisheries. On review, the Co-Chairs approved the 2020 Taku River Enhancement Production Plan (which included and expanded egg take program for the Trapper Lake site), the 2020 Stikine Enhancement Production plan, a

bilaterally endorsed Stikine River sockeye salmon assessment fishery (1,800 fish limit) for the 2020 season, initiation of the Transboundary Technical Committee's review of Stikine River sockeye salmon datasets for the purpose of developing a recommendation for an updated spawning escapement goal by December 2022, and initiation of the Alsek River Chinook and sockeye salmon stock assessment pilot project in the lower (U.S. portion) of the watershed. Despite extensive negotiations, the Panel was unable to achieve bilateral agreement on a recommendation for improvements to the Taku River sockeye salmon assessment program and a revised escapement goal range or spawning objective to be implemented starting in the 2020. As a result, this matter was referred to the Commissioners for resolution.

The Panel reviewed progress on items identified within the 2019-2028 Chapter 1 Implementation Plan, with specific emphasis on key activities proposed for 2020.

Review of 2019 Fisheries and Treaty-Related Performance

PART IV
REVIEW OF 2019 FISHERIES AND TREATY-RELATED PERFORMANCE

The following review has been drawn from a number of reports prepared by Commission staff, joint technical committee, and domestic agencies for presentation to the Commission. Source documents are referenced for each part of this review. All figures are preliminary and will be updated in future reports as more complete tabulations become available.

A. FRASER RIVER SOCKEYE AND PINK SALMON

The 2019 season saw a record low number of sockeye return to the Fraser River. The run size of 493,000 sockeye was 90% less than the median forecast (4,795,000) and 88% below the cycle line average. While lower survival rates similar to previous years were expected, there is no clear explanation why survival rates turned out to be the lowest on record. This very low run size was further impacted by the Big Bar rockslide that was discovered at the start of the season on June 23, 2019. The rockslide impacted the stocks with spawning grounds above Big Bar which amounted to 81% of the total Fraser sockeye run. The rockslide created a physical barrier that impeded upstream migration, especially early in the season when water discharge levels were too high to allow natural migration past the slide. The overall low run size in combination with the Big Bar migration challenges resulted in the smallest spawning escapement in the Fraser River since 1943. Unlike the sockeye return, the Fraser River pink salmon return in 2019 was 76% above the median forecast (5,018,600). The impact of the slide on pink salmon was much smaller than for sockeye given the low proportion of pinks that traditionally spawn above Big Bar, the lack of stream fidelity and the later timing of the pink salmon run when discharge levels are lower. The following paragraphs describe the planning of the 2019 season and the Panel management actions, including those taken in response to the low sockeye salmon run size and the Big Bar rockslide.

Pre-season Planning

1. At the time of pre-season planning, there had been no knowledge that a landslide had occurred at Big Bar and therefore the impact of Big Bar had not been taken into account in any of the pre-season plans.
2. Pre-season, the median run size forecast (p50 level) was 4,795,000 Fraser River sockeye salmon and according to the quantitative forecast there was a one in two chance that the run size would be between 2,891,000 and 8,676,000. Given the recent declines in productivity, it was however emphasised that there was a high likelihood that expected returns be lower than the median forecast and likely would fall between 2,891,000 and 4,795,000 sockeye. The median Fraser River pink run size forecast was 5,018,600 (p50 level) with a one in two chance that the run size would be between 3,577,000 and 7,513,000.
3. Pre-season expectations of migration parameters included a 69% diversion rate for Fraser River sockeye and a 50% diversion rate for Fraser River pink salmon through Johnstone Strait. The Panel adopted the following Area 20 50% migration dates: July 5 for Early Stuart, July 30 for Early Summer, August 10 for Summer, August 18 for Late-run sockeye, and August 28 for pink salmon.
4. At median (p50) forecast abundance levels, pre-season spawning escapement goals were 41,000 Early Stuart, 186,000 Early Summer, 1,572,000 Summer and 336,600 Late-run sockeye for a total of 2,135,600 sockeye salmon and 4,483,000 pink salmon. The goals for Fraser River pink salmon and for each sockeye management group were established by applying Canada's Spawning Escapement Plan to their median forecasted run sizes.
5. Management Adjustments (MAs) of 28,300 Early Stuart, 83,700 Early Summer, 141,500 Summer-run and 188,500 Late-run sockeye were added to the spawning escapement targets to increase the likelihood of achieving the targets.

6. The projected Total Allowable Catch (TAC) of Fraser River sockeye salmon based on the median forecasted abundances and agreed deductions was 2,011,000 sockeye, of which 16.5% (331,800 sockeye) were allocated to the United States (U.S.). The projected TAC of Fraser River pink salmon was 528,400 fish, of which 25.7% (135,800 pinks) were allocated to the U.S.
7. Pre-season model runs indicated it was unlikely the Summer-run TAC could be fully harvested due to fisheries constraints required to achieve spawning escapement targets for co-migrating Early Summer and Late-run stocks, however, the model runs for pink salmon indicated that the TAC could be fully harvested.
8. The Panel adopted the Management Plan Principles and Constraints, the 2019 Regulations, and the 2019 Pre-season Agreement on Test Fishing Deductions.

In-season Management Considerations

9. The in-season marine migration timing was later than pre-season expectations for all sockeye management groups except the Early Summer run: 3 days for Early Stuart run, 1 day earlier for Early Summer-run, 9 days for Summer run and 1 day for Late run. Pink salmon timing which was 8 days earlier than the expected timing caused sockeye and pink salmon migrations to overlap more than expected pre-season.
10. The overall Johnstone Strait diversion rate for Fraser River sockeye was 84% compared to the pre-season forecast of 69%. The Fraser River pink salmon diversion rate was 11%, which was a record low, instead of 50% that was used in pre-season modelling.
11. Returns for Fraser sockeye salmon were substantially below median pre-season forecasts unlike Fraser River pink salmon which returned substantially above the median pre-season forecast. Early Stuart run: 37% below median forecast, Early Summer run: 80% below median forecast, Summer run: 91% below median forecast, Late run: 94% below median forecast and pink salmon run: 76% above median forecast. The number of returning Early Stuart sockeye fell between the p10 and p25 run size forecast, but for Early Summer, Summer and Late-run, the number of returning sockeye were lower than the p10 run size forecasts. The pink salmon return exceeded the p75 run size forecast.
12. The very low number of sockeye returning to the Fraser River caused the spawning escapement target to equal the run size for all management groups. Therefore, the adoption of management adjustments (MAs) was unnecessary, as it would not impact the targets. Fraser River discharge was below historical average and river temperatures were above historical average in July and through mid-August and near record highs in early September.

Implications of the Big Bar rockslide

13. The Big Bar rockslide, discovered on June 23, created a five-meter waterfall on the Fraser River that formed an upstream migration barrier for salmon with spawning grounds above Big Bar. The slide impacted 100% of the Early Stuart, 60% of the Early Summer run, and 90% of the Summer run. The proportion of pink salmon stocks spawning above Big Bar was expected to be low. The extent that the rockslide impeded natural upstream migration was dependant on water velocity which was higher earlier in the season. Big Bar therefore had a larger impact on early migrating stocks, in particular Early Stuart sockeye.
14. A Unified Command Incident Management Team was set up in response to the slide which involved collaboration between First Nations, Federal and Provincial governments. The response to the slide in the summer of 2019 included: the partial creation of a natural fishway through rock-manipulations, fish transport by helicopter and truck and the collection of Early Stuart broodstock for emergency enhancement.
15. As discharge levels decreased over the summer and water levels declined, an increasing proportion of the run was able to make it past the slide naturally.
16. Of the stocks above Big Bar, the following proportions made it to the spawning grounds: 0.34% of the Early Stuart Run, 49% of the Early Summer run stocks and 75% of the Summer run stocks.

17. Post-season, additional remediation work included breaking up and removing rocks to improve natural fish passage and the construction and deployment of a concrete fishway and flexible, pressurised fish transport tube.

Run Size, Catch, Escapement and Migration patterns

18. Returns of adult Fraser sockeye totalled 493,000 fish which was 75% below the escapement of 2,006,000 fish in the brood year (2015). This return was the smallest since records started in 1893. Divided into management groups, adult returns totalled 26,000 Early Stuart, 93,300 Early Summer-run, 351,600 Summer-run and 22,300 Late-run sockeye.
19. Due to the very poor sockeye return, all sockeye management groups were managed using a low abundance exploitation rates (LAER); 10% for Early Stuart and 20% for the other management groups.
20. Catches of Fraser River sockeye salmon in all fisheries totalled 16,700 fish, including 9,900 fish caught by Canada, 470 fish caught by the U.S. and 6,400 fish caught by test fisheries. Almost all the Canadian catch occurred in First Nations FSC fisheries (Food, Social and Ceremonial, 9,700 fish). In Washington, catches were in ceremonial Treaty Indian fisheries. Fisheries in Alaska harvested 77,600 (preliminary number) Fraser sockeye. Excluding Alaska catches, the overall harvest rate was 3% of the run, which is the smallest in recent years.
21. DFO's near-final estimates of spawning escapements to streams in the Fraser River watershed totalled 302,000 adult sockeye. This was 75% less than the brood year escapement of 1,189,000 adults and the lowest escapement on this cycle since 1943. By management group and for this cycle line, spawning escapements in 2019 were the lowest on record for Early Stuart, the third smallest for Early Summer-run, below the cycle line average for Summer run and the lowest on record for Late run. There were 146,500 effective female spawners in the Fraser watershed, representing an overall spawning success of 98%.
22. The total run-size estimate of Fraser River pink salmon was 8,858,600. Catches totalled 550,800 fish, with 300,300 caught by Canada, 233,300 caught by the U.S. and 17,200 caught in test fisheries. This catch represents an exploitation rate of 6%, which is the third lowest exploitation rate since records began in 1959.
23. Since 2009, estimates of pink salmon passage have been obtained through the hydroacoustics program at Mission. In 2019, the run size of Fraser River pink salmon was calculated by adding the total catch of pink salmon below Mission (292,700 fish) to the Mission passage estimate (8,565,900 fish), while the spawner abundance (8,307,800 fish) was calculated by subtracting the total catch from the run size.

Achievement of Objectives

24. In order of descending priority, the goals of the Panel are to achieve the targets for spawning escapement, international sharing of the TAC, and domestic catch allocation.
25. In-season management decisions are based on targets for spawning escapement, which are represented in-season by potential spawning escapement targets (i.e., spawning escapement targets plus MAs). Due to the extremely low return, the spawning escapement targets for all management groups equalled their run sizes, and there was no need for the Panel to adopt MA estimates. Also, with the very low catches, the potential escapements (i.e., Mission escapement minus all catch above Mission) for each management group were very similar to the spawning escapement target: Early Stuart sockeye (on target), Early Summer-run (3% under), Summer-run (8% under) and Late-run sockeye (10% under).
26. For all management groups, the spawning escapement target equalled the run size, so the escapement target could only be obtained in the absence of catches and any difference between estimates. Thus, even with the rigorous management approach that was applied in 2019, spawning escapement targets could not be met for any management group. Additionally, the Big Bar rockslide also meant further

reductions in escapement to upper river spawning areas, and this was a dominant factor for some populations (e.g. Early Stuart).

27. Spawning ground estimates of Fraser sockeye abundance totalled 302,000 adults, which is 39% below the post-season target. Spawner abundance was severely below target for Early Stuart sockeye (100% under), below target for Early Summer-run (52% under), below target for Summer-run (30% under) and below target for Late-run sockeye (52% under). The exploitation rates for all management groups were less than their respective LAERs.
28. There was no International TAC (Total Allowable Catch) of Fraser sockeye, based on the calculation method set out in Annex IV, Chapter 4 of the Pacific Salmon Treaty. The Washington catch of 470 Fraser sockeye therefore exceeded the U.S. share. The total Canadian catch of 9,900 Fraser sockeye, which includes a catch of 200 fish in the Charter test fisheries (Albion and Area 12 Chum) was 200 fish more than the Canadian share of TAC + AFE. In these calculations, the TAC is based on the TAC on the date of the last in-season Panel meeting (September 24, 2019), while catches are post-season estimates.
29. In terms of domestic U.S. allocation objectives for Fraser sockeye, Treaty Indian fishers were 470 fish above their shares of the U.S. TAC.
30. For Fraser River pink salmon, there was a TAC of 2,882,800 salmon based on the calculation method set out in Annex IV, Chapter 4 of the Pacific Salmon Treaty.
31. Access to pink salmon TAC was limited as all sockeye management groups were in a LAER, and the run size for pink salmon was only increased from 5.0 to 8.9 million on September 12 when most of these fish had already passed through US waters. As a result, the spawning escapement for Fraser River pink salmon was greater than the post-season target (38% over), and the exploitation rate was very low at 6%.
32. The Washington catch of 233,300 Fraser pink salmon was less than their 25.7% share of the international TAC and the Canadian catch of 300,300 was 1,841,600 fish less than their share.
33. Regarding domestic U.S. allocation objectives for Fraser pink salmon, both Treaty Indian and All Citizen fishers were below their shares of the U.S. TAC, 210,800 fish and 297,000 fish, respectively.
34. There was no by-catch of non-Fraser sockeye salmon, but there was a by-catch of 52,760 non-Fraser pink salmon in commercial net fisheries regulated by the Fraser River Panel. Catches of other Fraser and non-Fraser salmon species included 5,720 Chinook, 190 coho, and 10 chum.

Allocation Status

35. By Panel agreement there is a U.S. payback of 470 Fraser River sockeye to be carried forward to 2020. There was no payback owed for Fraser River pink salmon.

B. 2019 POST-SEASON REPORT UNITED STATES SALMON FISHERIES OF RELEVANCE TO THE PACIFIC SALMON TREATY

PRELIMINARY 2019 SOUTHEAST ALASKA FISHERIES

NORTHERN BOUNDARY AREA FISHERIES

District 104 Purse Seine Fishery

The 2019 revision of the Pacific Salmon Treaty (PST) Agreement calls for abundance-based management of the District 104 purse seine fishery. The agreement allows the District 104 purse seine fishery to harvest 2.45 percent of the Annual Allowable Harvest (AAH) of Nass and Skeena sockeye salmon prior to Alaska Department of Fish and Game (ADFG) statistical week 31 (referred to as the treaty period). The AAH is calculated as the total run of Nass and Skeena sockeye salmon minus either the escapement requirement of 1.1 million (200,000 Nass and 900,000 Skeena) or the actual in-river escapement, whichever is less.

The District 104 purse seine fishery opens by regulation on the first Sunday in July. In 2019, the first potential opening was July 7 (week 28). The pre-week 31 fishing plan for District 104 was based on the preseason Canadian Department of Fisheries and Oceans (DFO) forecast runs of approximately 2.33 million Nass and Skeena sockeye salmon. In the 2019 Treaty period (Alaska statistical weeks 28-30), 9,399 sockeye salmon were harvested during a 12-hour opening in Week 28 and a 12-hour and a 10-hour opening in week 29 (Table 1). The fishery closed in week 30 due to low Skeena River sockeye salmon abundance. A total of 36 purse seine vessels fished at some time in the district during the Treaty period. In past years 60% to 80% of Treaty-period sockeye salmon have been of Nass and Skeena origin, therefore we would anticipate between 5,600 and 7,500 Nass and Skeena sockeye salmon may have been harvested in the District 104 purse seine fishery during the 2019 Treaty period. The final number of Nass and Skeena sockeye salmon harvested, and the actual harvest by stock, will not be available until harvest, escapement, and stock composition estimates are finalized for the year.

In 2019, a total of 3,528,011 pink salmon, 270,993 sockeye salmon, 175,212 chum salmon, 77,593 coho salmon, and 7,174 Chinook salmon were harvested in the District 104 purse seine fishery (Table 1). The number of days that the fishery was open, and the number of boats fishing were both below the 1985–2018 average (Figure 1 and 2). Purse seine fisheries were on non-retention for Chinook salmon throughout most the season, except for weeks 30 and 31. Sockeye salmon harvests were below average in all weeks except 33 (Figure 4) and the treaty period (week 28–30) harvest of 9,399 was only 10% of the 1985–2018 average. The total sockeye salmon harvest of 270,993 was 59% of the 1985–2018 average of 458,000 fish. Harvests of coho salmon were also below average in all weeks except 33 (Figures 5) and the overall harvest of 77,593 was 70% of the long-term average. The overall pink salmon harvest of 3,528,011 was only 44% of the long-term average (Figure 6) and the chum salmon harvest of 175,212 was 60% of the long-term average (Figure 7).

Since the PST was signed in 1985, the number of hours open, boats fished, and boat-days fished in the pre-Week 31 annex period in District 104 are down 56%, 62% and 85% respectively compared to the averages in the pre-treaty 1980-1984 period (Table 2). The total pre-week 31 Treaty-period sockeye salmon harvest is also down 49%. The seine fleet moves freely between districts as various species are harvested, so seining opportunities elsewhere affect the effort and catch in District 104.

Table 1. Catch and effort in the Alaska District 104 purse seine fishery, 2019.

Week/ Opening	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Hours
28	7/7	0	959	2,229	6,420	1,995	26	12
29	7/14	0	2,679	2,935	19,209	5,962	11	12
29B	7/18	0	5,761	3,201	71,108	6,975	17	10
31	7/28	1,429	22,124	5,224	598,209	14,619	48	15
31B	7/31	5,745	52,441	13,036	983,188	29,762	88	39
32	8/4	0	30,516	4,340	500,532	26,588	56	39
32B	8/8	0	29,974	8,231	447,968	23,701	39	39
33	8/12	0	69,430	19,347	515,787	31,174	56	39
33B	8/16	0	30,100	8,584	245,664	17,699	41	39
34	8/20	0	23,355	8,346	104,688	12,138	22	39
34B	8/24	0	3,654	2,120	35,238	4,599	13	39
							Permits Fished	
Weeks 28-30		0	9,399	8,365	96,737	14,932	55	34
Weeks 31-34		7,174	261,594	69,228	3,431,274	160,280	109	288
Total		7,174	270,993	77,593	3,528,011	175,212	112	322

Table 2. Fishing opportunity, effort, and sockeye salmon harvest prior to week 31 in the District 104 purse seine fishery, 1980–2019.

Year	Hours Fished	Individual Permits Fished	Days Fished (1d=15hrs)	Approximate Boat-Days	Sockeye Harvest	Sockeye Catch per Boat-Day
1980	207	244	13.8	2,877	266,273	93
1981	132	212	8.8	1,108	185,188	167
1982	117	255	7.8	1,435	213,150	149
1983	108	241	7.2	1,211	170,306	141
1984	132	174	8.8	805	103,319	128
1985	84	141	5.6	502	100,590	200
1986	108	194	7.2	968	91,320	94
1987	90	134	6	457	72,385	158
1988	108	210	7.2	994	248,789	250
1989	84	135	5.6	438	157,566	360
1990	42	171	2.8	276	169,943	615
1991	41	134	2.7	243	98,583	406
1992	29	108	1.9	142	79,643	561
1993	45	171	3	343	163,189	476
1994	55	84	3.7	202	158,524	783
1995	58	109	3.9	218	71,376	328
1996	31	113	2.1	128	215,144	1,684
1997	56	159	3.7	409	572,942	1,402
1998	32	78	2.1	89	17,394	196
1999	30	38	2	44	7,664	174
2000	81	66	5.4	192	48,969	255
2001	50	95	3.3	182	203,090	1,115
2002	72	44	4.8	124	26,554	215
2003	52	40	3.5	97	84,742	875
2004	107	24	7.1	102	30,758	302
2005	68	38	4.5	93	35,690	382
2006	95	39	6.3	117	89,615	766
2007	50	68	3.3	136	112,135	824
2008	33	17	2.2	22	6,262	281
2009	72	38	4.8	95	15,971	168
2010	55	21	3.7	39	4,617	118
2011	84	29	5.6	77	25,280	329
2012	87	30	5.0	93	18,300	196
2013	46	36	3.1	59	13,102	222
2014	60	101	4	260	115,015	442
2015	70	39	4.7	100	43,873	439
2016	60	106	3.8	332	110,346	332
2017	20	24	1.3	20	12,036	602
2018	48	55	3.2	122	19,743	128
2019	34	36	2.3	50	9,399	188
Avg. 80-84	139	225	9	1,487	187,647	136
Avg. 85-18	62	85	4	227	95,328	462
% Change	-56%	-62%	-56%	-85%	-49%	241%

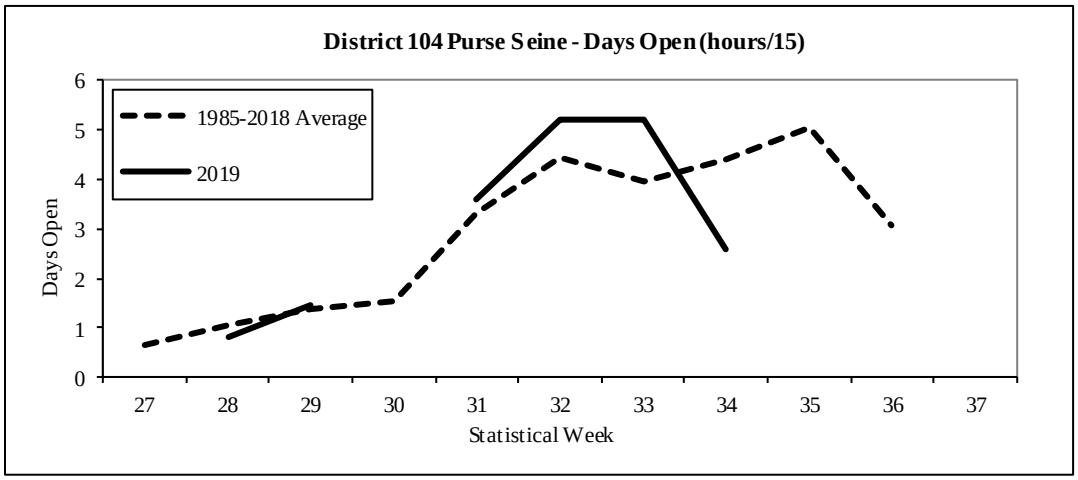

Figure 1. Days open by week in the District 104 purse seine fishery, 2019.

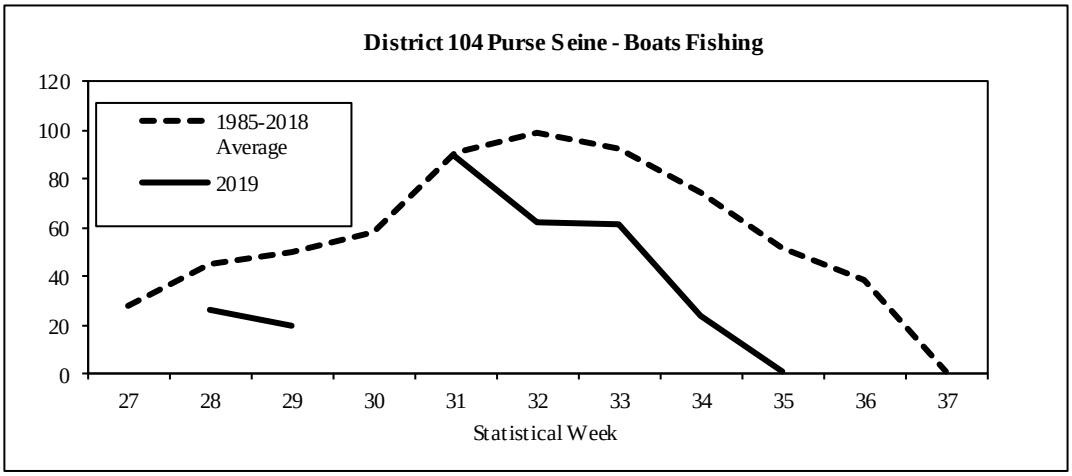

Figure 2. Number of boats fishing by week in the District 104 purse seine fishery, 2019.

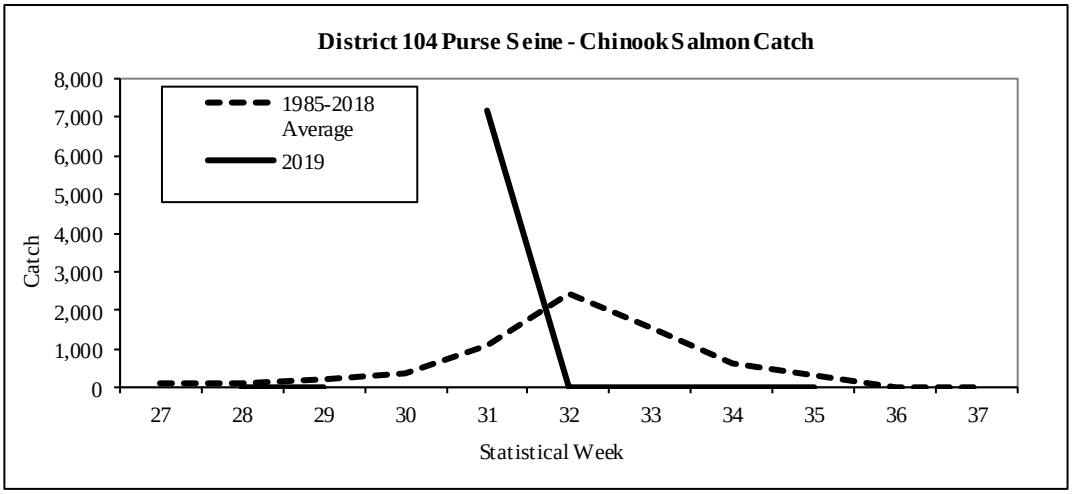

Figure 3. Chinook salmon harvest by week in the District 104 purse seine fishery, 2019.

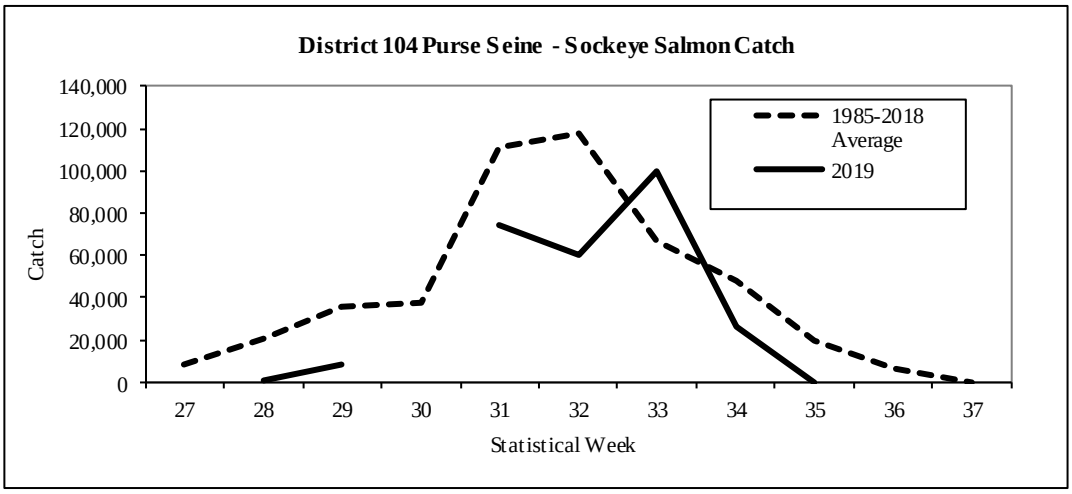

Figure 4. Sockeye salmon harvest by week in the District 104 purse seine fishery, 2019.

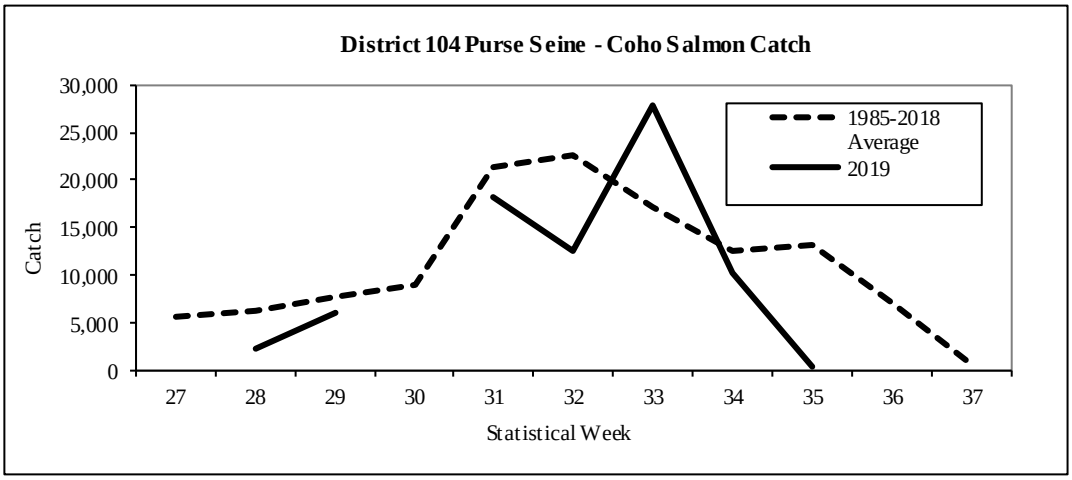

Figure 5. Coho salmon harvest by week in the District 104 purse seine fishery, 2019.

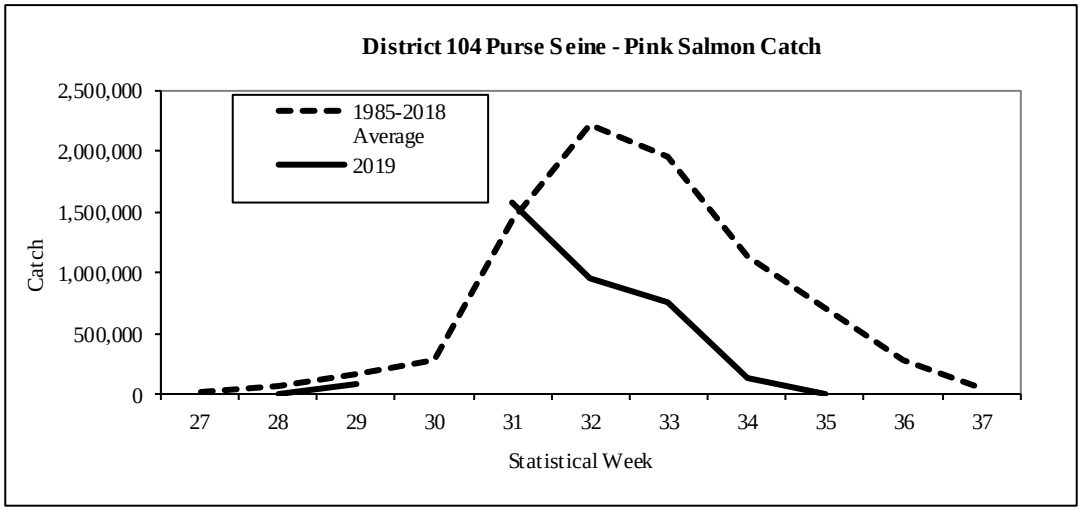

Figure 6. Pink salmon harvest by week in the District 104 purse seine fishery, 2019.

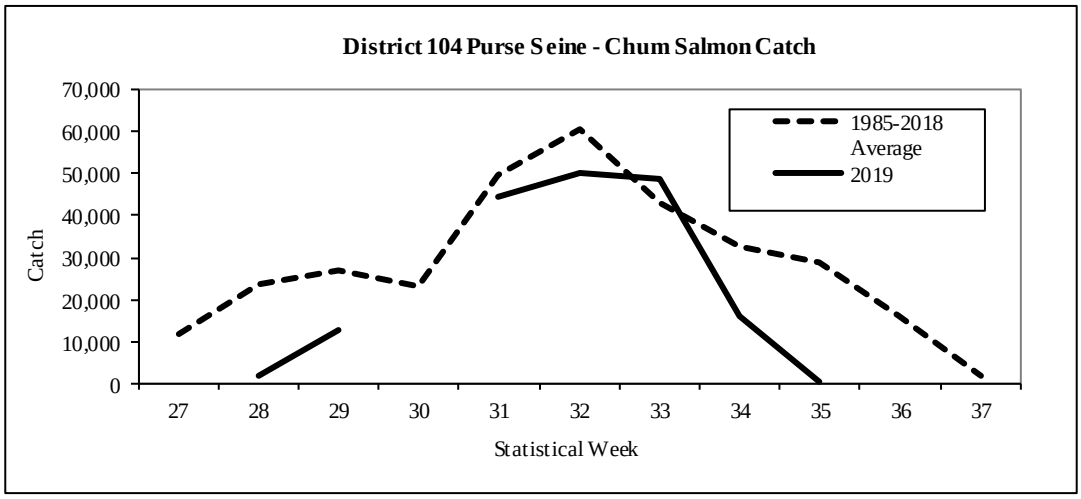

Figure 7. Chum salmon harvest by week in the District 104 purse seine fishery, 2019.

District 101 Drift Gillnet Fishery

The 2019 PST agreement calls for abundance-based management of the District 101 (Tree Point) drift gillnet fishery. The agreement specifies a harvest of 13.8 percent of the AAH of the Nass River sockeye salmon run. The AAH is calculated as the total run of Nass sockeye salmon minus either the escapement requirement of 200,000 or the actual in-river escapement, whichever is less. The run of Nass sockeye salmon was forecasted at 620,000 in 2019 which, minus an escapement goal of 200,000, would result in an AAH of about 420,000. Using this forecast, the 2019 allowable harvest in the District 101 drift gillnet fishery was approximately 58,000 Nass River sockeye salmon.

The District 101 drift gillnet fishery opens by regulation on the third Sunday in June, which was June 16 (week 25) in 2019. During the early weeks of the fishery, management is based on the run strength of Alaska wild stock chum and sockeye salmon and on the run strength of Nass River sockeye salmon. Beginning in the third week of July, when pink salmon stocks begin to enter the fishery in large numbers, management emphasis shifts by regulation to that species. By regulation, the District 101 Pink Salmon Management Plan (PSMP) begins the third Sunday in July and sets gillnet fishing time in this district in relation to the District 101 purse seine fishing time. Beginning in Week 36 (September 1) management was based on the strength of wild stock fall chum and coho salmon.

The District 101 drift gillnet fishery opened Sunday June 16 (week 25) in 2019. The number of days the fishery was open was near average all season (Figure 8), but the number of boats fishing during weekly openings was below average throughout the season (Figure 9). The total number of individual boats fishing during the season was 57, which was approximately 54% of the 1985-2018 average of 105 boats. A total of 15,986 sockeye salmon were harvested, which was only 14% of the 1985–2018 average of 111,870 fish and the lowest harvest since the inception of the PST (Tables 3 and 4). Harvests of sockeye salmon were well below treaty period averages throughout the season (Figure 10). The cumulative sockeye salmon harvest prior to the initiation of the PSMP in Week 30 was 5,962 fish, or about 37% of the season's total sockeye salmon harvest. The final number of Nass River sockeye salmon harvested at Tree Point will not be available until catch, escapement, and stock composition estimates are finalized for the 2019 season. In past years approximately 65% of the District 101 gillnet sockeye salmon harvest has been of Nass River origin, therefore we would anticipate that approximately 10,400 Nass River sockeye salmon may have been harvested in the District 101 gillnet fishery in 2019.

Coho salmon harvests were below average throughout the season and the total harvest of 28,800 fish was 59% of the treaty period average (Figure 11). Pink salmon harvests were below average most of the season

and the total harvest of 204,971 fish was 42% of average (Figure 12). Chum salmon harvests were near or below average in most weeks of the fishery and the total harvest of 182,457 fish was 61% of average (Figure 13). Chinook salmon harvests were near average throughout the season (Figure 14).

Table 3. Weekly harvest and effort in the Alaska District 101 commercial drift gillnet fishery, 2019.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Hours
25	6/16	262	512	361	582	771	30	95.98
26	6/23	428	1,466	269	3,481	2,899	33	96
27	6/30	327	1,508	175	10,463	5,911	38	96
28	7/7	98	1,486	363	25,954	19,666	41	96
29	7/14	41	990	232	22,670	17,140	44	96
30	7/21	57	2,347	438	30,715	20,593	38	96
31	7/28	61	3,779	1,595	35,060	28,600	39	120
32	8/4	22	2,098	1,243	34,883	23,559	35	120
33	8/11	6	964	1,295	30,866	12,069	32	120
34	8/18	1	193	1,592	8,045	22,854	20	120
35	8/25	3	504	4,134	2,132	20,318	35	120
36	9/1	2	102	2,665	90	4,462	33	96
37	9/8	4	32	5,049	26	2,634	29	96
38	9/15	1	4	5,640	4	830	24	96
39	9/22	0	0	2,758	0	142	13	96
40	9/29	0	1	991	0	9	7	96
Total		1,313	15,986	28,800	204,971	182,457	57	1,656
1985-2018 Avg.		1,484	111,870	48,608	490,021	298,202	106	1,371

Table 4. Sockeye salmon harvest in the Alaska District 101 gillnet fishery, 1985 to 2019, and comparison of harvest and effort (boats, hours, and boat-hours) between weeks 26 and 35 when sockeye salmon are most abundant in this district.

	Total	Catch and Effort between Weeks 26-35			
Year	Sockeye Harvest	Sockeye Harvest	Individual Permits Fished	Total Hours Open	Boat-Hours[1]
1985	173,100	159,021	155	1,032	106,209
1986	145,699	143,286	201	960	109,490
1987	107,503	106,638	178	615	64,104
1988	116,115	115,888	192	756	93,072
1989	144,936	130,024	178	1,023	117,465
1990	85,691	78,131	159	840	70,421
1991	131,492	123,508	136	984	80,064
1992	244,649	243,878	118	1,080	94,159
1993	394,098	390,299	149	1,032	102,814
1994	100,377	98,725	144	984	74,408
1995	164,294	151,131	140	1,008	82,512
1996	212,403	175,569	130	1,104	86,108
1997	169,474	152,662	138	1,008	81,672
1998	160,506	159,307	124	1,044	87,358
1999	160,028	158,268	118	1,032	80,424
2000	94,651	94,399	95	912	49,488
2001	80,041	62,129	76	1,020	46,874
2002	120,353	106,360	76	1,008	42,528
2003	105,263	96,921	71	1,104	44,008
2004	142,357	141,395	61	1,104	42,400
2005	79,725	75,875	70	1,104	40,864
2006	62,770	53,048	48	840	28,265
2007	66,822	50,642	56	1,032	33,713
2008	34,113	30,672	54	936	31,961
2009	69,859	69,325	65	1,080	43,432
2010	62,680	61,987	68	1,008	45,135
2011	88,618	87,744	87	840	47,627
2012	62,506	40,518	85	1,008	43,695
2013	54,575	45,413	92	1,104	59,437
2014	55,828	49,722	73	1,095	44,551
2015	28,155	27,365	71	912	35,946
2016	39,912	38,078	71	1,008	44,640
2017	25,073	19,702	68	984	39,672
2018	19,920	18,540	54	1,296	30,960
2019	15,986	15,335	51	1,080	37,944
Average 1985-2018	109,131	102,043	106	999	61,812

[1]Boat-hours equals the sum of all weekly estimates of boat-hours: boats fished multiplied by open hours. Boat-hours does not equal individual permits fished multiplied by total open hours.

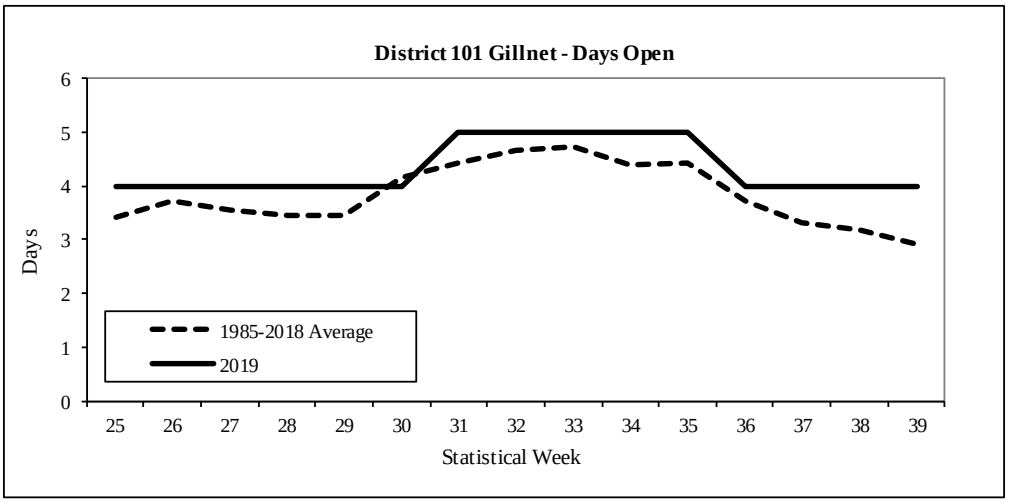

Figure 8. Days open by week in the District 101 drift gillnet fishery, 2019.

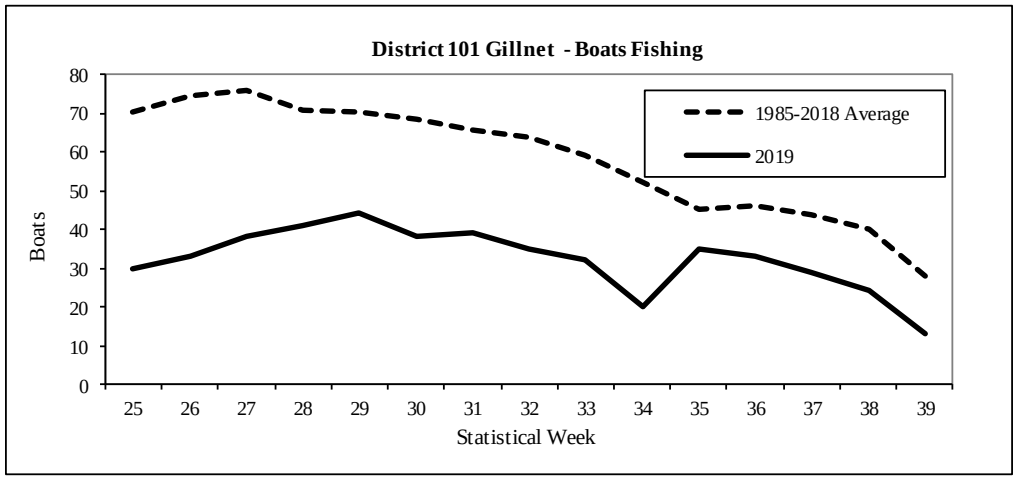

Figure 9. Number of boats fishing by week in the District 101 drift gillnet fishery, 2019.

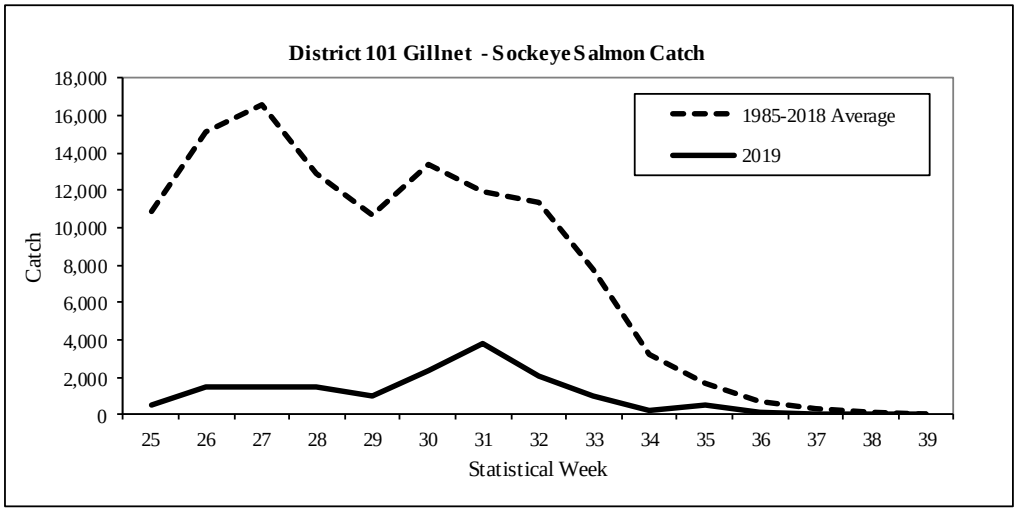

Figure 10. Sockeye salmon harvest by week in the District 101 drift gillnet fishery, 2019.

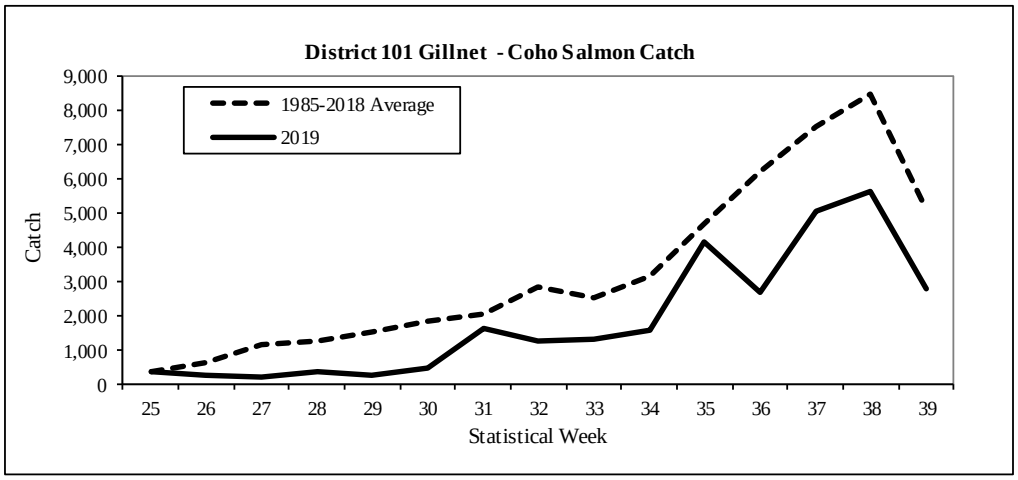

Figure 11. Coho salmon harvest by week in the District 101 drift gillnet fishery, 2019.

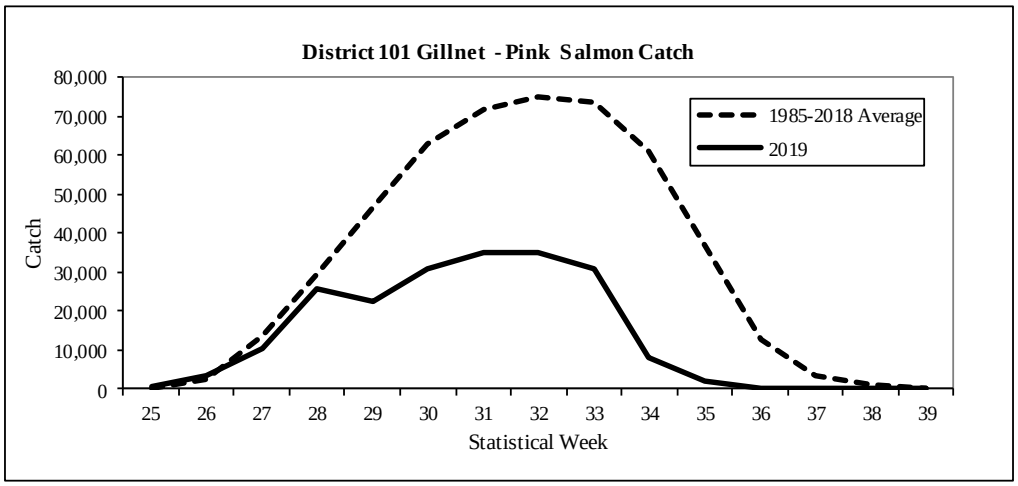

Figure 12. Pink salmon harvest by week in the District 101 drift gillnet fishery, 2019.

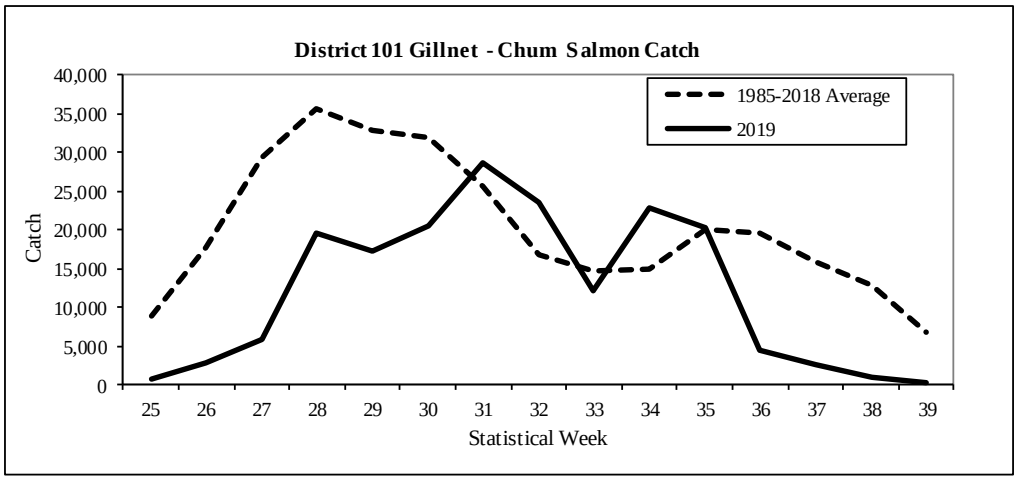

Figure 13. Chum salmon harvest by week in the District 101 drift gillnet fishery, 2019.

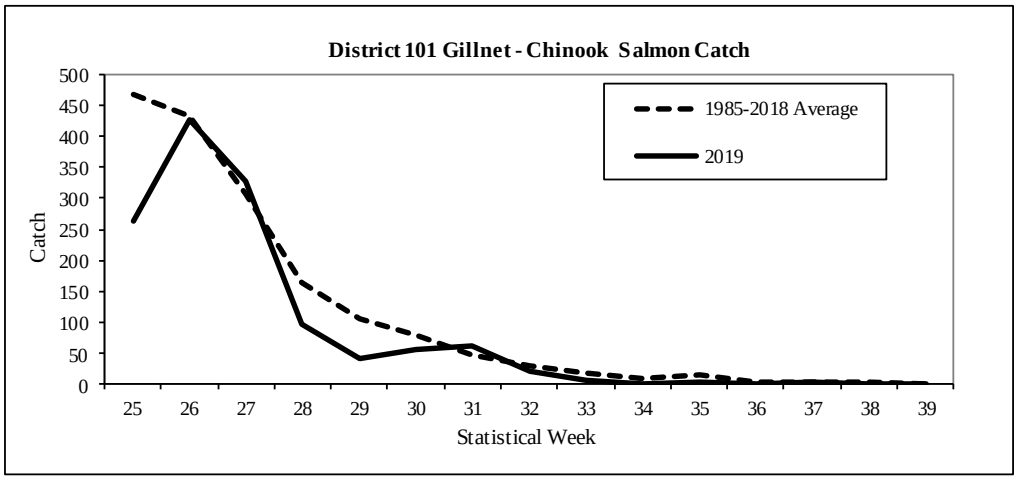

Figure 14. Chinook salmon harvest by week in the District 101 drift gillnet fishery, 2019.

Pink, Sockeye, and Chum Salmon Escapements

Escapements of pink salmon were generally strong in southern Southeast Alaska and poor to average throughout the northern half of the region. The total 2019 Southeast Alaska pink salmon escapement index of 8.81 million index fish ranked 33rd since 1960. Biological escapement goals were met in the Southern Southeast and Northern Southeast Outside subregions, but escapement to the Northern Southeast Inside Subregion was below goal in 2019 (Table 5). On a finer scale, escapements were within or above management targets for 9 of 15 districts in the region and for 27 of the 46 pink salmon stock groups in Southeast Alaska. The Southern Southeast Subregion includes all of the area from Sumner Strait south to Dixon Entrance (Districts 101–108). The escapement index value of 5.63 million was within the escapement goal range of 3.0 to 8.0 million index fish. The pink salmon harvest of 18.0 million in the Southern Southeast Subregion was below the recent 10-year average of 20 million fish. The overall Southeast Alaska pink salmon harvest of 21.1 million fish was approximately 58% of the 2009–2018 average of 36.1 million.

Table 5. Southeast Alaska 2019 pink salmon escapement indices and biological escapement goals by subregion (in millions).

Subregion	2019 Pink Salmon Index	Biological Escapement Goal	
		Lower Bound	Upper Bound
Southern Southeast	5.63	3.0	8.0
Northern Southeast Inside	1.65	2.5	6.0
Northern Southeast Outside	1.53	0.75	2.50
Total	8.81		

Sockeye salmon runs throughout Southeast Alaska were mixed in 2019, and escapement targets were met for 10 of the 12 sockeye salmon systems with formal escapement goals. Sockeye runs were very good for many northern stocks but were generally poor in southern Southeast Alaska. The Hugh Smith Lake adult sockeye salmon escapement was 2,040, which was well below the optimal escapement goal range of 8,000 to 18,000 adult sockeye salmon. Based on the expanded peak foot survey count, the escapement of sockeye salmon into McDonald Lake was only 24,200 fish, which was below the sustainable escapement goal range of 55,000 to 120,000.

For summer-run chum salmon, lower bound sustainable escapement goals were met for all three subregions in Southeast Alaska. Runs are divided into summer and fall stocks. The Southern Southeast summer-run chum salmon stock group is composed of an aggregate of 15 summer-run chum salmon streams on the inner islands

and mainland of southern Southeast Alaska, from Sumner Strait south to Dixon entrance, with a sustainable escapement goal of 62,000 index spawners (based on the aggregate peak survey to all 15 streams). Summer chum salmon escapements were near or above average at most index streams in southern Southeast Alaska, and the index of 105,000 in 2019 was well above the escapement goal (Figure 15).

Cholmondeley Sound is the only area in southern Southeast Alaska with a formal escapement goal for fall chum salmon. Fall chum salmon runs are monitored in Cholmondeley Sound through aerial surveys at Disappearance and Lagoon creeks. The escapement index of 20,000 was below the lower bound of the sustainable escapement goal range of 30,000 to 48,000 index spawners (based on the aggregate peak survey to both streams; Figure 16).

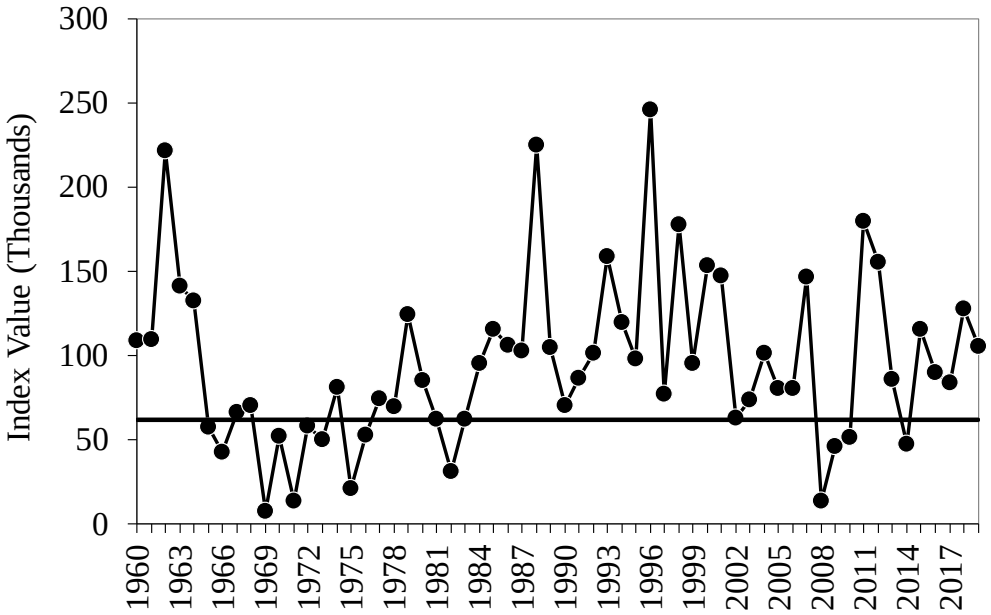

Figure 15. Observed escapement index value by year (solid circles) and the sustainable escapement goal threshold of 62,000 index spawners (horizontal line) for wild summer-run chum salmon in the Southern Southeast Subregion, 1960–2019.

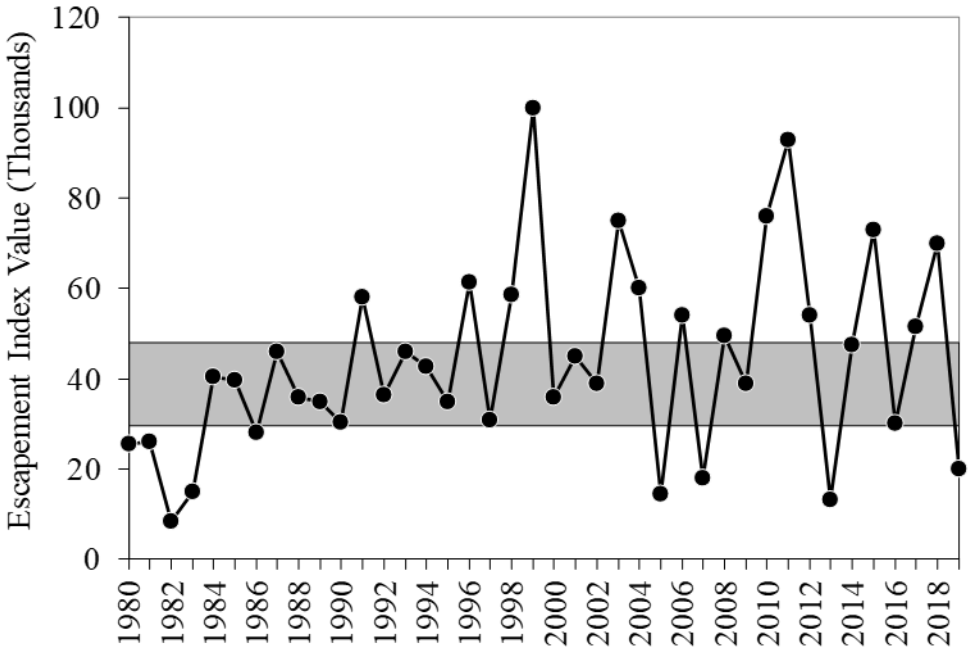

Figure 16. Observed escapement index value by year (solid circles) and the sustainable escapement goal range of 30,000 to 48,000 index spawners (shaded area) for Cholmondeley Sound fall-run chum salmon, 1980–2019.

TRANSBOUNDARY AREA FISHERIES

Stikine River Area Fisheries

The 2019 preseason forecast for large Chinook salmon returning to the Stikine River was approximately 8,250 fish, which did not allow for directed Chinook salmon fisheries in District 108. The standard mark-recapture program was not operated this year due to the low forecasted run and the desire by both countries to reduce mortality associated with the program. Inseason estimates produced by the Stikine Chinook Management Model (SCMM) indicated an escapement of 13,600 fish, which is near the lower end of the goal range of 14,000 fish. The final run size was estimated to be 14,400 fish.

The 2019 preseason forecast for sockeye salmon returning to the Stikine River was 90,000 fish, which was well below the recent 10-year average of 153,000 fish. The 2019 forecast included approximately 29,000 wild Tahltan (32%), 36,000 enhanced Tahltan (40%), and 24,000 mainstem (27%) sockeye salmon. During the first half of the sockeye salmon management period, fishing periods in District 108, and to a lesser extent in District 106, were determined by the inseason abundance estimate of the Tahltan Lake run. Management actions during the second half of the sockeye fishery became focused on the mainstem component of the Stikine River sockeye salmon run in District 8, while returns to local area systems were the focus in District 6. Typically, Tahltan Lake sockeye salmon stocks exhibit peak run timing in District 106 and 108 fisheries during statistical week 26 (June 24–June 30). During an average Tahltan Lake run, significant numbers of sockeye salmon could be present as early as statistical week 24 (June 10–16) and as late as statistical week 31 (July 29–August 4). The actual 2019 runs of local area sockeye salmon stocks were average to below average.

Due to the poor performance of Chinook salmon stocks in SE Alaska, restrictions were implemented in the Districts 106 and 108 gillnet fisheries to conserve Chinook salmon. In District 106, the initial opening was delayed by one week and a six-inch maximum mesh restriction was in place for the first three openings. In District 108, the initial opening was delayed until week 26. Additionally, time, area, and mesh restrictions

were implemented through statistical week 29 (July 14–July 20). Estimated harvest of large Stikine River Chinook salmon by the District 108 drift gillnet fishery during the sockeye salmon directed fishery period (weeks 27–29) was 113 fish based on GSI. The District 108 Spring Troll hatchery access fishery was closed for 2019. Commercial trolling remained closed to Chinook salmon retention in District 108 until the second opening of the Summer Troll fishery. U.S. harvest of large Stikine River Chinook salmon in all District 108 fisheries was estimated to be 134 fish; well below the U.S. base level catch (BLC) of 3,400 fish.

The District 106 drift gillnet sockeye salmon fishery opened Sunday, June 16 (week 25) and the District 108 drift gillnet fishery opened Sunday, June 23 (week 26). The initial openings in District 106 were limited to two days in week 25 and 26. The following week, both districts were opened for three days with mesh and area restrictions in place. The mesh restriction was lifted from District 6 in week 28, but mesh and area restrictions continued to be in place for District 108. Given the below average forecast of sockeye salmon runs returning to the Stikine River and local area stocks, fishing time was limited to two days for most weeks. Fishing time peaked with three days in week 27 to harvest the surplus Tahltan Lake component of the Stikine River sockeye salmon run. By week 29, it became apparent that the mainstem portion of the Stikine River sockeye run was coming in below average and open time in District 108 was limited to two days before closing for two weeks during weeks 30 and 31. Open time in District 106 also experienced weekly reductions and was limited to two days per week in weeks 29 through 31 for McDonald Lake sockeye conservation (Tables 6 and 7). The preliminary postseason assessment for Stikine River sockeye salmon was 85,500 fish and included 26,900 wild Tahltan (23%), 29,800 enhanced Tahltan (24%), and 28,800 Mainstem (41%) fish.

Districts 106 and 108 were managed based on pink salmon abundance during the month of August and three or four-day openings occurred in weeks 32 through 34 (Figures 17 and 24). In late August, management focus switched to coho salmon and the fisheries continued to be open for two to four days weekly through the remainder of the season. The number of boats participating in the District 106 fishery was below average early and late in the season, and slightly above average from weeks 33 to 36 (Figure 18). The seasonal number of permits fished was 87% of average (Table 6). The number of boats participating in the District 108 fishery was below average in nearly all weeks of the fishery and the 78 permits fished was 60% of the average of 130 permits (Figure 25; Table 7).

During the 2019 season, 424,495 pink salmon, 23,844 sockeye salmon, 113,152 chum salmon, 59,208 coho salmon, and 1,073 Chinook salmon were harvested in the District 106 drift gillnet fishery (Table 6). Chinook salmon harvests were below average from mid-June through late August, but were well above average in week 36 (Figure 19); the harvest was comprised of 43% Alaska hatchery origin fish. Sockeye salmon harvests were below average all season (Figure 20), and the total sockeye salmon harvest of 23,844 fish was 29% of the recent 10-year average; 4,300 were estimated to be of Stikine River origin. Harvests of coho salmon were also below average in most weeks of the season and the overall harvest of 59,208 coho salmon was 41% of the recent 10-year average of 145,300 fish (Figure 21). Pink salmon harvests were above average most of the season (Figure 22), and the overall harvest of 424,495 fish was 139% of the recent 10-year average. Chum salmon harvests were well below average through mid-July, above average from mid-to-late August, and then dropped back below average throughout the remainder of the season. The overall harvest of 113,152 chum salmon was 70% of average (Figure 23).

During the 2019 season, 10,884 pink salmon, 6,591 sockeye salmon, 50,653 chum salmon, 9,478 coho salmon, and 4,253 Chinook salmon were harvested in the District 108 drift gillnet fishery (Table 7). The harvest of Chinook salmon was well below average in the first week of the fishery in week 26, well above average in week 27, and was near or below average until late July (Figure 26). An estimated 134 Stikine River large Chinook salmon were harvested in District 108 from weeks 25 through 29 by subsistence, sport, troll, and drift gillnet fisheries. District 108 gill net sockeye salmon harvests were below average throughout the season (Figure 27) and the harvest of 6,591 fish was only 22% of the recent 10-year average. An estimated 3,700 fish, or 57% of the harvest, were estimated to be Stikine River sockeye salmon. The overall coho salmon harvest of 9,478 fish was also well below the recent 10-year average of 26,300 fish (Table 7, Figure 28). Pink salmon harvests were below average throughout the season and the overall harvest was 24% of the recent 10-

year average (Figure 29). The overall harvest of 50,653 chum salmon was 34% of the recent 10-year average (Figure 30).

Table 6. Weekly salmon harvest in the Alaskan District 106 commercial drift gillnet fisheries, 2019.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
25	16-Jun	66	309	191	542	147	32	2	64
26	23-Jun	109	1,028	376	4,546	1,349	40	2	80
27	30-Jun	191	3,157	1,054	14,202	8,232	42	3	126
28	7-Jul	75	2,933	1,437	17,856	6,350	42	2	84
29	14-Jul	125	3,399	1,726	42,209	8,927	47	2	94
30	21-Jul	60	3,045	1,056	48,534	9,187	47	2	94
31	28-Jul	54	3,284	2,036	45,276	14,046	48	2	96
32	4-Aug	72	2,522	1,912	65,957	10,640	63	3	189
33	11-Aug	62	2,417	7,429	111,893	11,583	74	4	296
34	18-Aug	15	1,380	7,027	50,430	18,130	65	4	260
35	25-Aug	29	266	8,866	17,647	13,255	75	3	225
36	1-Sep	151	86	7,704	4,631	6,567	80	3	240
37	8-Sep	28	18	8,485	736	3,340	70	2	140
38	15-Sep	16	0	5,766	34	1,048	46	3	138
39	22-Sep	10	0	2,743	2	255	13	3	39
40-41	29-Sep	10	0	1,400	0	96	18	5	90
Total		1,073	23,844	59,208	424,495	113,152	131	45	2,254
2009-2018 Average		2,335	82,240	145,292	304,358	162,255	150	47	2,751
2019 as % of Average		46%	29%	41%	139%	70%	87%	100%	82%

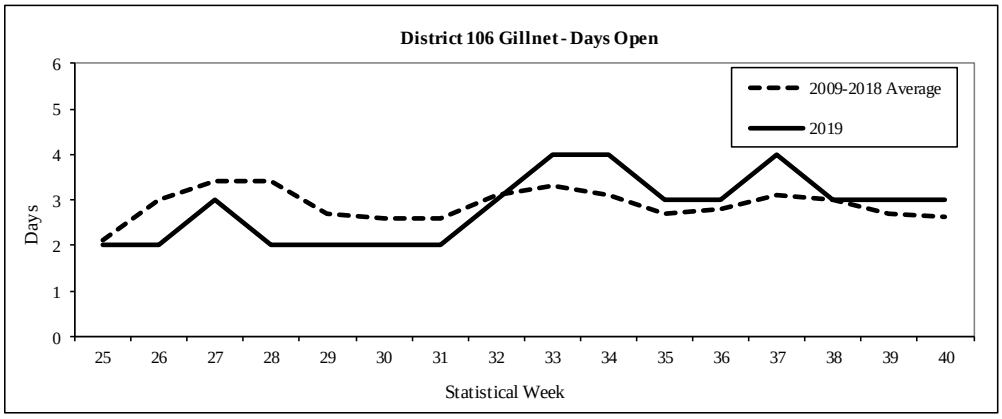

Figure 17. Days open by week in the District 106 drift gillnet fishery, 2019.

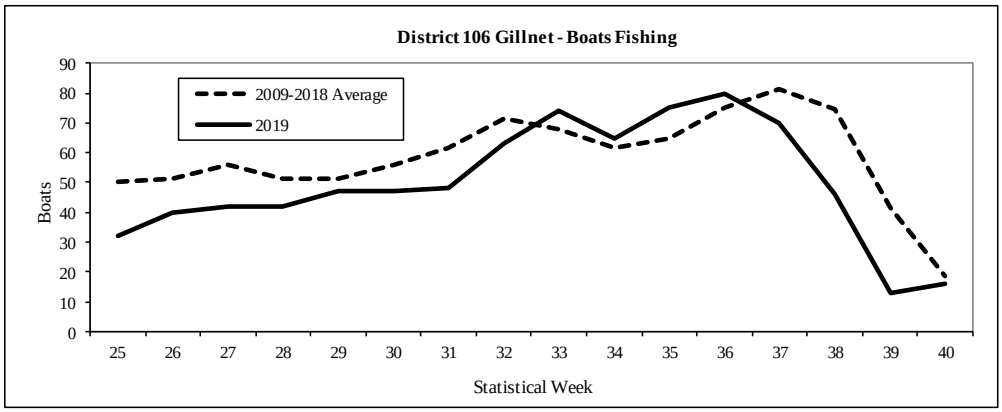

Figure 18. Number of boats fishing by week in the District 106 drift gillnet fishery, 2019.

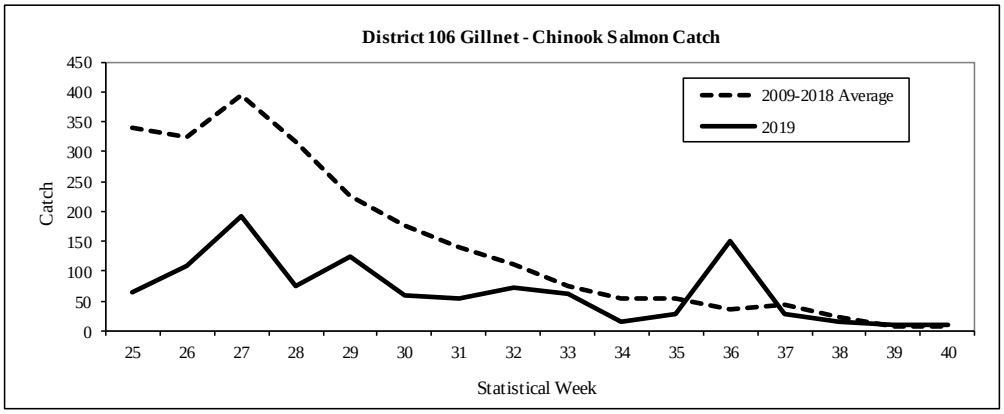

Figure 19. Chinook salmon harvest by week in the District 106 drift gillnet fishery, 2019.

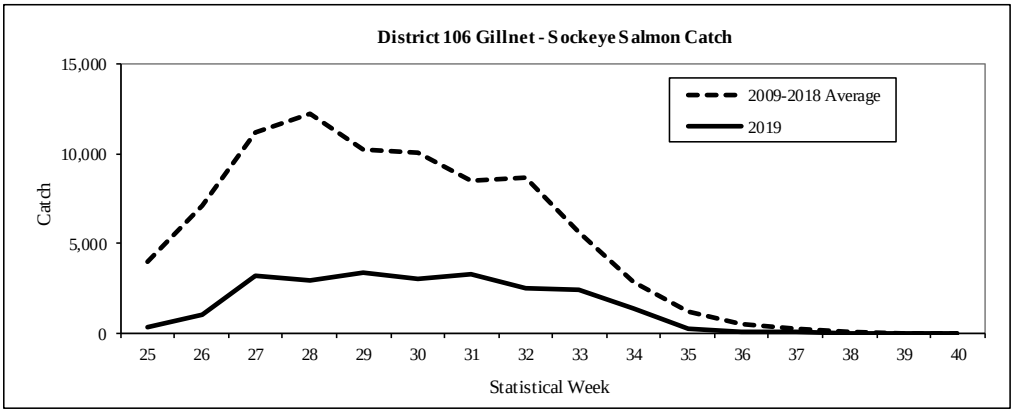

Figure 20. Sockeye salmon harvest by week in the District 106 drift gillnet fishery, 2019.

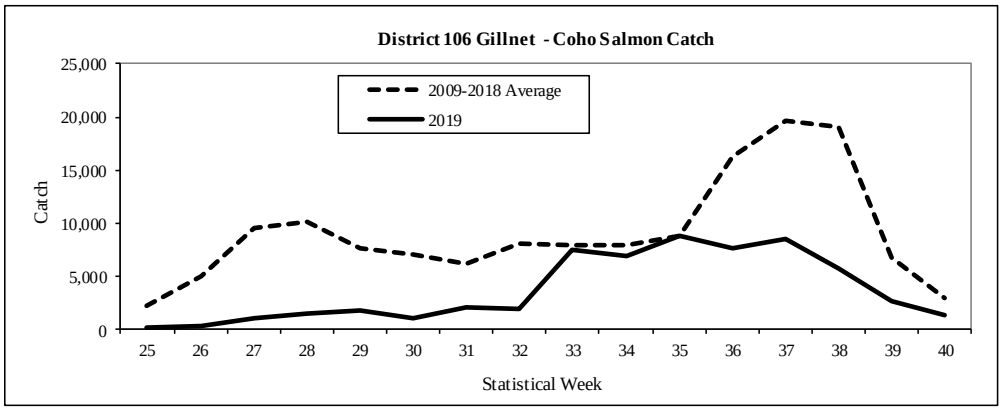

Figure 21. Coho salmon harvest by week in the District 106 drift gillnet fishery, 2019.

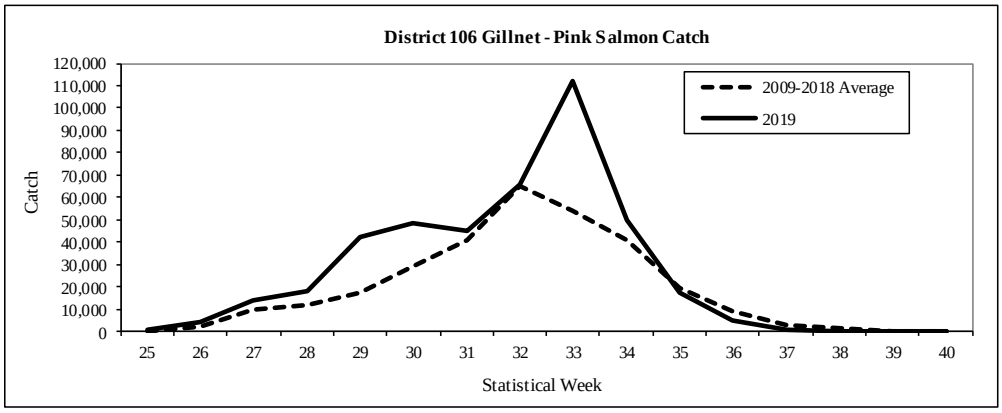

Figure 22. Pink salmon harvest by week in the District 106 drift gillnet fishery, 2019.

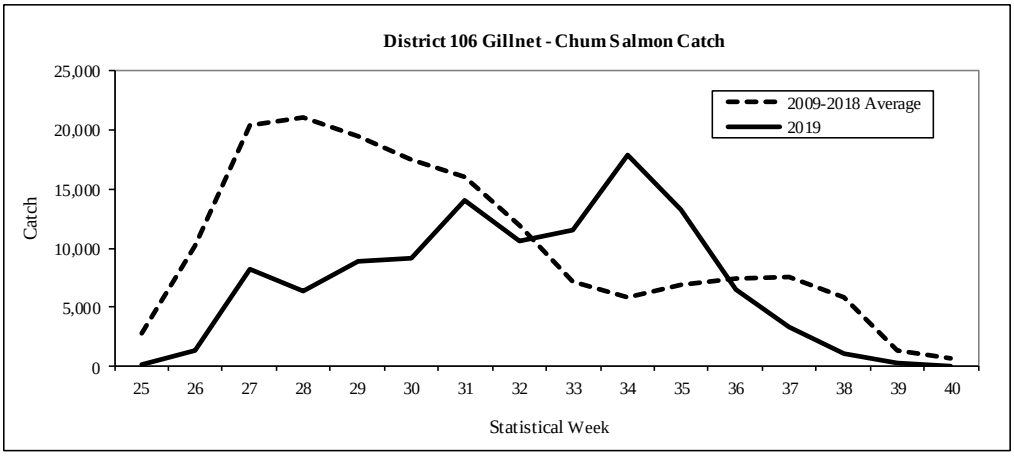

Figure 23. Chum salmon harvest by week in the District 106 drift gillnet fishery, 2019.

Table 7. Weekly salmon harvest and effort in the Alaskan District 108 traditional commercial drift gillnet fishery, 2019.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
26	23-Jun	139	1,329	9	26	68	12	2	24
27	30-Jun	2,609	2,001	41	258	985	35	3	105
28	7-Jul	792	1,219	37	602	3,150	28	2	56
29	14-Jul	536	1,232	76	1,843	3,851	20	2	40
32	4-Aug	110	566	597	4,864	26,639	51	3	153
33	11-Aug	44	156	1,073	1,679	9,690	31	4	120
34	18-Aug	10	69	1,863	1,126	5,382	30	4	120
35	25-Aug	2	15	1,297	444	745	13	3	39
36	1-Sep	1	1	549	35	28	9	3	27
37	8-Sep	9	3	1,792	6	33	14	2	28
38	15-Sep	1	0	1,563	1	74	13	3	39
39-41	22-Sep	0	0	581	0	8	8	8	24
Total		4,253	6,591	9,478	10,884	50,653	78	39	775
2009-2018 Average		6,771	29,636	26,292	45,272	149,031	130	49	1,735
2019 as % of Average		63%	22%	36%	24%	34%	60%	80%	45%

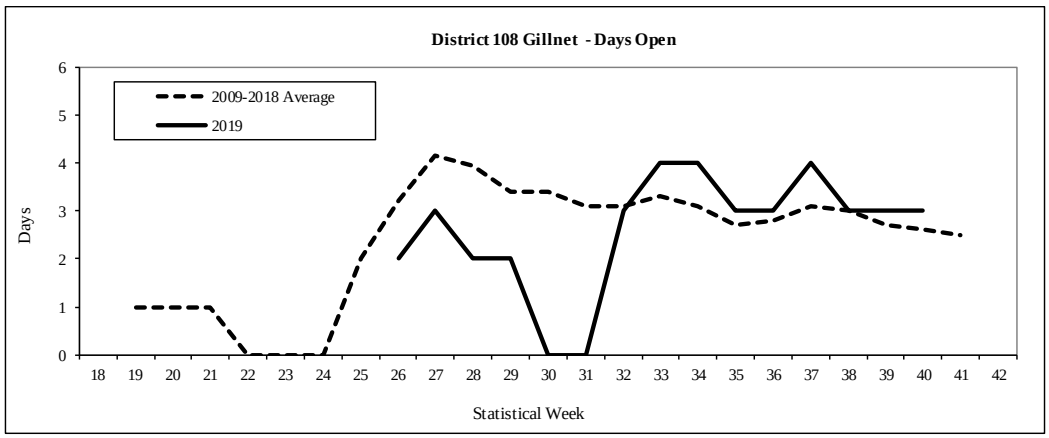

Figure 24. Days open by week in the District 108 drift gillnet fishery, 2019.

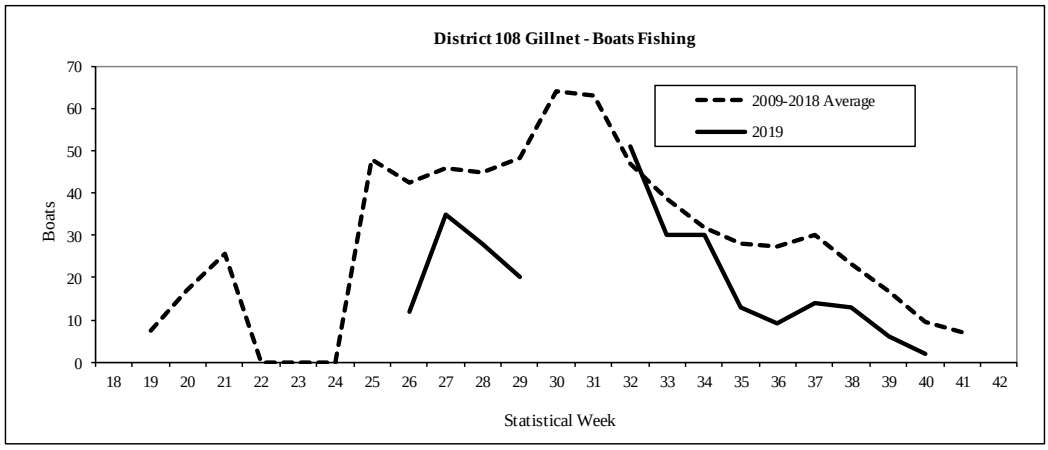

Figure 25. Number of boats fishing by week in the District 108 drift gillnet fishery, 2019.

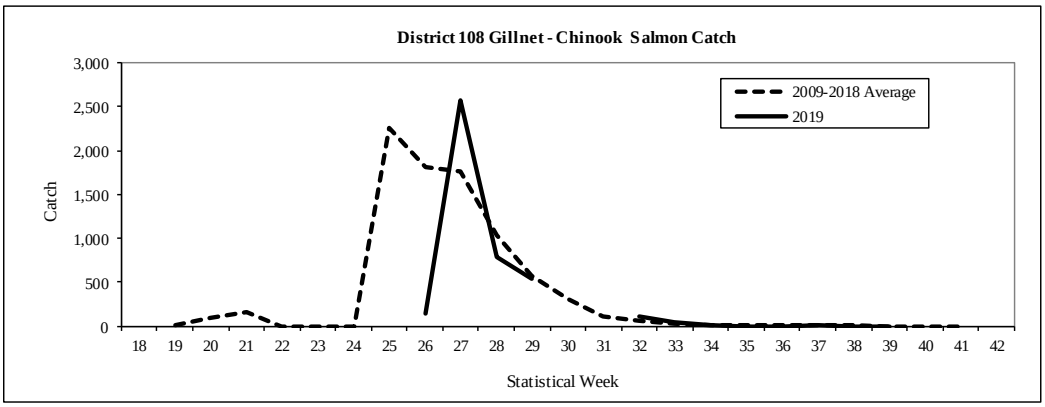

Figure 26. Chinook salmon harvest by week in the District 108 drift gillnet fishery, 2019.

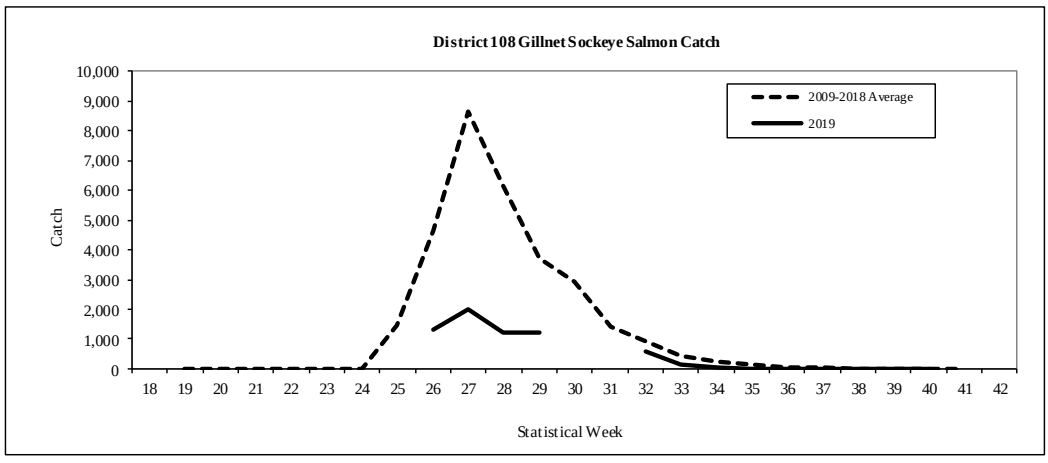

Figure 27. Sockeye salmon harvest by week in the District 108 drift gillnet fishery, 2019.

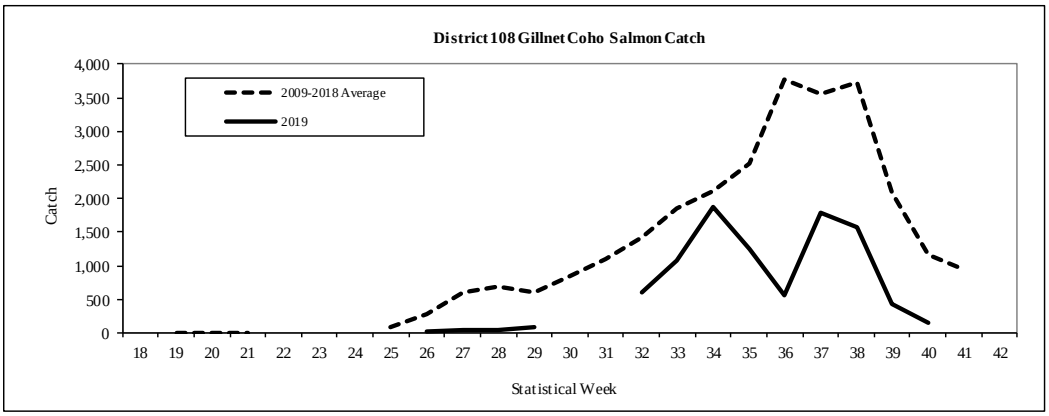

Figure 28. Coho salmon harvest by week in the District 108 drift gillnet fishery, 2019.

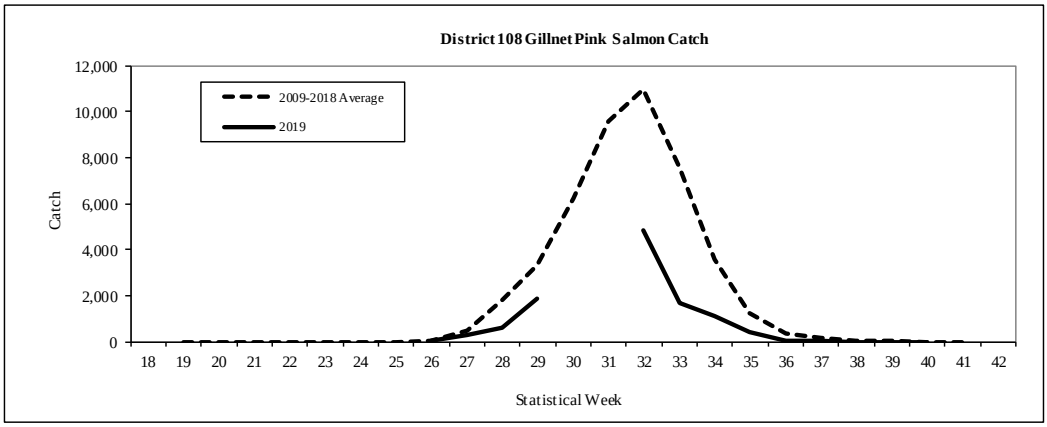

Figure 29. Pink salmon harvest by week in the District 108 drift gillnet fishery, 2019.

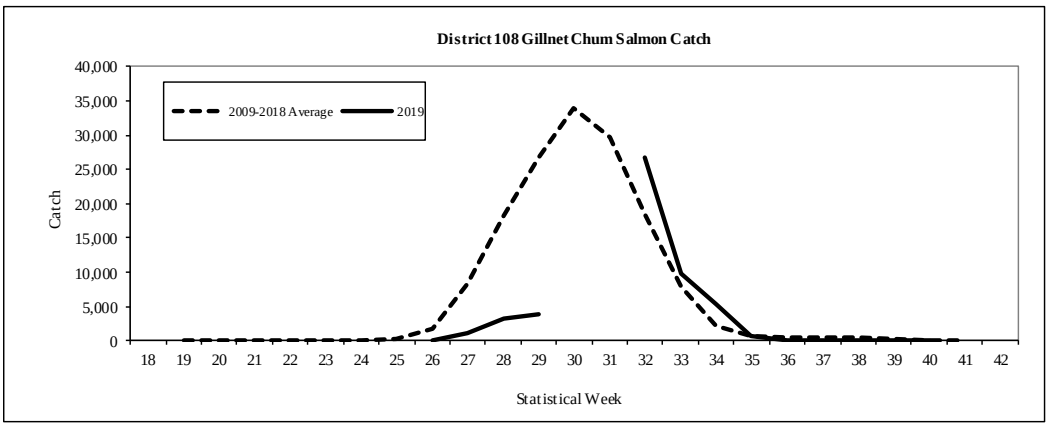

Figure 30. Chum salmon harvest by week in the District 108 drift gillnet fishery, 2019.

Taku River Area Fisheries

The traditional drift gillnet fishery in District 111 targets salmon stocks bound for the trans-boundary Taku River. This fishery is managed for Chinook salmon from week 18 to week 24 when there are sufficient fish surplus to escapement needs to provide for a fishery. From week 25 to week 33 the fishery is managed for Taku River sockeye salmon, and from week 34 to week 42 for Taku River coho salmon. Also harvested in this fishery are salmon bound for Stephens Passage and Port Snettisham streams as well as enhanced Chinook, sockeye, coho and chum salmon from Douglas Island Pink and Chum, Inc. (DIPAC) hatchery releases. The

traditional fishery does not include harvests from the Speel Arm Special Harvest Area (SHA) inside Port Snettisham.

The escapement goal range for Taku River large Chinook salmon is 19,000 to 36,000 fish with a point goal of 25,500 fish. In years of high abundance, directed Chinook salmon fisheries can be implemented to harvest fish in excess of escapement needs. The 2019 preseason terminal run forecast for the Taku River of 9,050 large Chinook salmon did not allow for any directed Chinook salmon fisheries in District 111 and significant restrictions in time, area, and gear were implemented in the first three directed sockeye salmon openings (weeks 25–27) to minimize Chinook salmon harvest.

The traditional spawning objective for Taku River sockeye salmon was a range of 71,000 to 80,000 fish, with a point goal of 75,000 fish. This was established in 1985 based on the professional judgement of U.S. and Canadian biologists during initial PST negotiations to be used until a scientifically based goal was developed. Historically, the total allowable catch associated with this goal has been based on an inriver run size estimate inflated by not accounting for tag dropout rates that more recent radio telemetry studies have documented in the mark/recapture experiment. Concurrent with the adoption of an adjusted inriver run estimate to account for these dropouts, an interim spawning objective for the 2019 season was agreed to by the TBR Panel in February of 2019. This arrangement incorporated a 22% adjustment to the inseason inriver run estimates, and a corresponding interim spawning objective range of 55,000 to 62,000 fish with a management target of 59,000 fish. A bilaterally approved MSY goal for Taku River sockeye salmon will be in place prior to the 2020 fishing season. The original 2019 Taku River wild sockeye salmon terminal run forecast of 154,000 fish was based on Canadian stock-recruit and sibling forecasts was below the average of 180,000 fish. For early season management purposes before an inseason estimate was available, this forecast was adjusted by the observed dropout rate to 120,000 fish. DIPAC forecasted 230,000 enhanced sockeye salmon returning through District 111 waters to Snettisham Hatchery.

An escapement goal range of 50,000 to 90,000 Taku River coho salmon with a point goal of 70,000 fish was adopted in early 2015. New harvest sharing provisions between the U.S. District 111 drift gillnet fishery and the Canada inriver fisheries are in place, specified in the PST, and the U.S. management intent in 2019 was to achieve the AC and spawning objective. The 2019 preseason Taku River forecast was for a below average terminal run of 73,000 coho salmon, and DIPAC forecast a run of 62,000 enhanced coho salmon from releases in Gastineau Channel. DIPAC forecasted runs totaling 1,400,000 enhanced chum salmon to Gastineau Channel and Limestone Inlet, which was near the recent average.

The traditional drift gillnet fishery in District 111 began on Sunday, June 16, 2019 (week 25). The initial drift gillnet opening of the season in District 111 was for two days, with a significant area restriction, six inch maximum mesh size restriction, and night closures in place, intended to minimize harvest of Taku River Chinook salmon. Effort for the opening was 35 boats, which was above the ten-year average of 28 boats. Only 191 sockeye salmon were harvested during the opening, and the chum salmon harvest of 628 fish was only 9% of the average week 25 harvest for the district (Figures 34 and 37). A total of 83 Chinook salmon were harvested, which was well below average for week 25 (Figure 33).

From late June through late July (weeks 26–31) effort in the District 111 drift gillnet fishery was generally below average, with a peak of 108 boats fishing in week 31 (Figure 32). From early August through early October (weeks 32–41), overall effort in the fishery was well below average in most weeks (Figure 32). Harvests of sockeye salmon were near or above average through early August, but then dropped to below average for the rest of the season (Figure 34). Weekly chum salmon catches were well below average and approximately 245,000 fish were harvested from mid-June to mid-August (Figure 37). The vast majority of the summer-run chum salmon harvest in District 111 consists of DIPAC hatchery fish returning to release sites in Gastineau Channel and Limestone Inlet. The Chinook salmon harvest of 1,201 fish was near average for years with no directed Chinook salmon fishery (Figure 33). Pink salmon harvests built to above average in the weeks prior to mid-July, then dropped below average for the remainder of the season. The pink salmon harvest of 69,137 fish was only 47% of average (Figure 36). The overall coho salmon harvest of 23,235 fish

was below average and the peak weekly harvest of 7,048 fish occurred in week 37 (Figure 35). Fall chum salmon harvests were well below average from week 34 through 40 (Figure 37).

A number of Chinook salmon stocks are known to contribute to the Juneau area sport fishery, including those from the Taku, Chilkat, and King Salmon rivers, and local hatchery stocks, but the major contributor of mature wild fish is believed to be the Taku River. Non-retention of Chinook salmon in District 111, 112, 115, and parts of District 113 and 114, from April 1 through June 14, resulted in minimal harvest of wild fish in the sport fishery. The GSI-based District 111 harvest estimates of Taku River large Chinook salmon during the accounting period is 124 fish in the drift gillnet fishery, 94 fish in the sport fishery, and an estimated 10 fish in the personal use fishery, for a total of 228 fish. Harvests of Taku River large Chinook salmon in these fisheries from week 30 onwards were minimal and resulted in a total harvest well below the U.S. base level catch of 3,500 fish. The preliminary escapement estimate of Taku River large Chinook salmon is approximately 10,000 to 12,000 fish, which is well below the escapement goal range of 19,000 to 36,000 fish.

The 2019 traditional District 111 sockeye salmon harvest of 95,421 fish was 97% of average. Peak catches of sockeye salmon occurred in weeks 29 through 31 (mid-July to early August; Figure 34). The Speel Arm SHA was opened from week 32 to 37 and 9,605 sockeye salmon were harvested in the common property fishery. The lower bound of the Speel Lake sustainable escapement goal range of 4,000 to 9,000 fish was reached with 6,440 fish counted through the weir through September 20. DIPAC sockeye salmon returning to the Snettisham Hatchery contributed a minimum of 21,000 fish to the traditional District 111 harvest. The preliminary escapement estimate of Taku River sockeye salmon is 77,000 fish, which was above the interim escapement goal range of 55,000 to 62,000 fish.

The 2019 traditional District 111 coho salmon harvest of 23,235 fish was 64% of the recent ten-year average (Figure 35). Approximately 88% of the coho salmon were harvested in Taku Inlet, which was above the ten-year average of 82%, and 12% were harvested from Stephens Passage and Port Snettisham. Coho salmon stocks harvested in District 111 include runs to the Taku River, Port Snettisham, Stephens Passage, and local Juneau area streams as well as Alaskan hatcheries. This was the fifth year of full production for DIPAC's revitalized enhanced coho salmon program. Alaska hatchery (nearly entirely DIPAC) coho salmon first appeared in the District 111 harvest in week 32, and comprised substantial proportions of the harvest each remaining week of the fishery. Alaska hatchery coho salmon contributed 35% of the 2019 District 111 traditional drift gillnet harvest. The preliminary escapement estimate of Taku River coho salmon is 82,700 fish, which was towards the upper end of the escapement goal range of 50,000 to 90,000 fish.

The 2019 District 111 traditional pink salmon harvest of 69,137 fish was 47% of average (Figure 36). Pink salmon escapements were very poor in the Northern Southeast Inside subregion of Southeast Alaska and the District 111 escapement index was approximately 37% of the lower end of the management target range. The 2019 District 111 traditional fishery chum salmon harvest of 245,962 fish was 41% of average and was comprised almost entirely of summer run fish (Figure 37). The summer chum salmon run continues through mid-August (week 33) and is mostly comprised of domestic hatchery fish and small numbers of wild stocks. Chum salmon returning to DIPAC release sites in Gastineau Channel and Limestone Inlet contributed a major portion of the harvest, but quantitative contribution estimates are not available. Approximately 54% of the District 111 chum harvest was taken in Taku Inlet, and 47% in Stephens Passage. The harvest of 1,181 fall-run chum salmon (i.e. chum salmon caught after week 33) was 42% of average. Most of these fall-run chum salmon are probably wild fish of Taku and Whiting River origin.

Table 8. Weekly salmon harvest in the Alaskan District 111 traditional commercial drift gillnet fishery, 2019[a].

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
25	16-Jun	83	191	1	2	628	35	2	70
26	23-Jun	133	988	6	102	2,530	41	2	82
27	30-Jun	304	2,363	39	2,328	17,677	59	2	118
28	7-Jul	272	7,914	75	20,125	46,322	99	3	297
29	14-Jul	144	17,694	155	17,752	84,049	87	4	348
30	21-Jul	117	27,574	637	10,133	66,058	96	4	384
31	28-Jul	92	21,400	1,900	7,407	22,397	108	4	432
32	4-Aug	31	9,888	1,105	6,505	3,911	56	5	280
33	12-Aug	14	5,530	1,206	3,775	1,209	23	4	92
34	18-Aug	2	1,705	1,941	948	542	19	3	57
35	26-Aug	1	113	2,563	59	292	22	2	44
36	1-Sep	5	54	2,120	1	129	20	3	60
37	8-Sep	2	7	7,048	0	147	25	4	100
38	15-Sep	1	0	4,041	0	67	26	5	130
39	22-Sep	0	0	264	0	4	8	5	40
40	27-Sep	0	0	134	0	0	2	5	10
41	10/6	0	0	0	0	0	0	5	0
Total		1,201	95,421	23,235	69,137	245,962	183	62	2,544
2009–2018 Average		1,836	98,333	36,418	145,906	598,379	195	51	2,947
2019 as % of Average		65%	97%	64%	47%	41%	94%	122%	86%

[a] There was no directed fishery for Chinook salmon in District 111 in 2019 due to a low Taku River preseason abundance forecast.

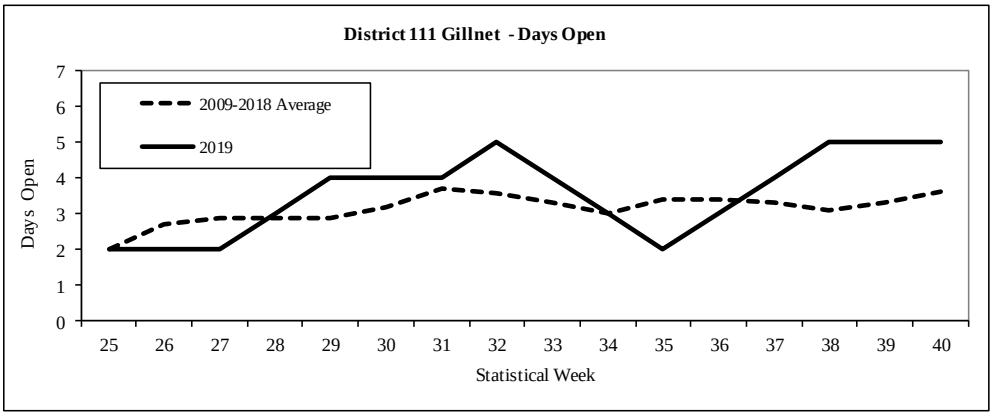

Figure 31. Days open by week in the District 111 drift gillnet fishery, 2019.

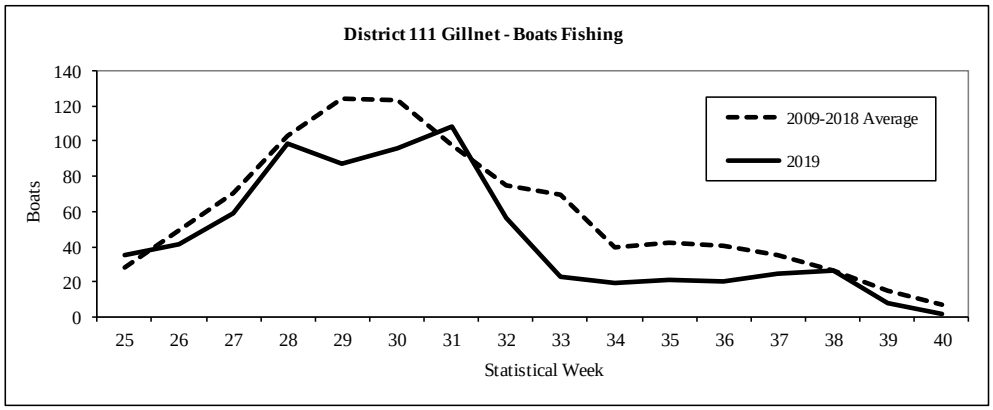

Figure 32. Number of boats fishing by week in the District 111 drift gillnet fishery, 2019.

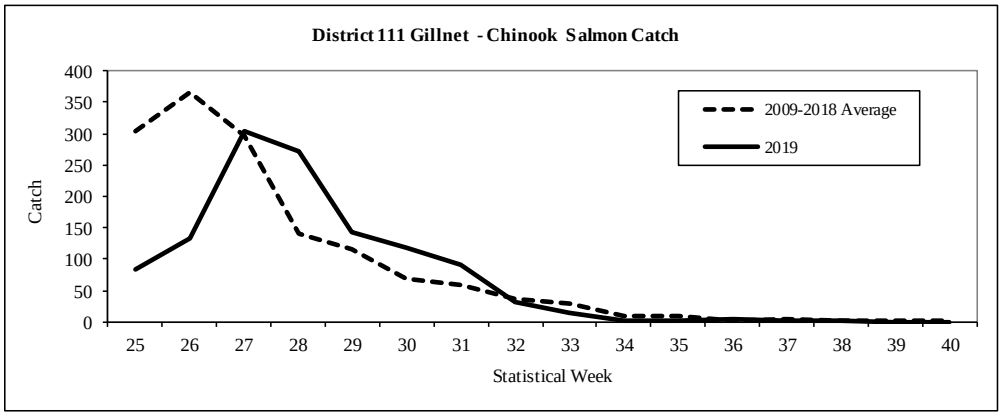

Figure 33. Chinook salmon harvest by week in the District 111 drift gillnet fishery, 2019.

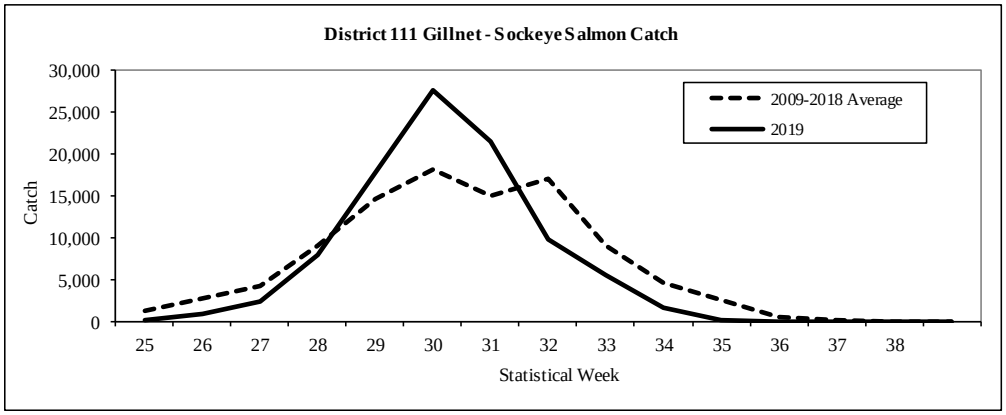

Figure 34. Sockeye salmon harvest by week in the District 111 drift gillnet fishery, 2019.

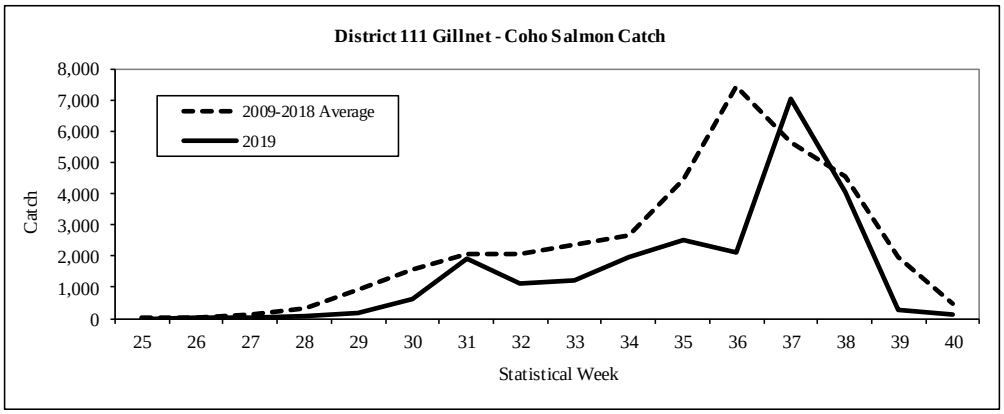

Figure 35. Coho salmon harvest by week in the District 111 drift gillnet fishery, 2019.

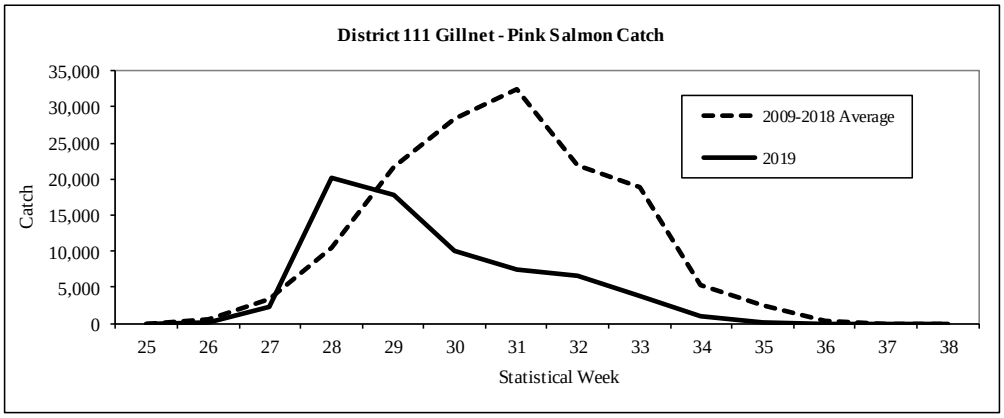

Figure 36. Pink salmon harvest by week in the District 111 drift gillnet fishery, 2019.

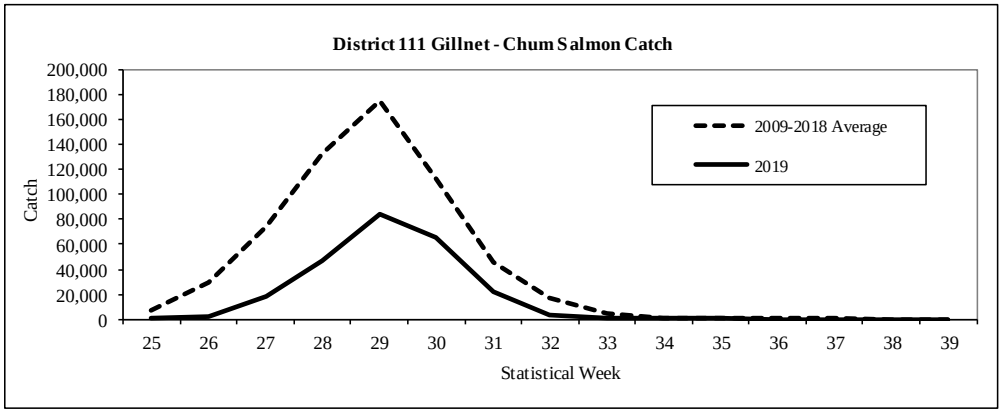

Figure 37. Chum salmon harvest by week in the District 111 drift gillnet fishery, 2019.

Transboundary River Joint Enhancement

The transport of sockeye salmon fry from the Snettisham Hatchery facility back to the Canadian lakes was complete on June 14, 2019. Approximately 6.32 million fry were released in Tahltan and Tatsamenie lakes in Canada. The overall green egg to fry survival for brood year (BY) 2018 releases was 79% (Table 9). After transporting BY18 fry back to their respective lakes, all TBR modules, incubators, and short-term fry rearing containers were broken down, cleaned, and disinfected prior to setting up to receive green eggs from BY19 egg-takes.

Brood year 2019 egg-takes began on August 31st at Tahltan Lake, September 4th at Trapper Lake, and September 17th at Tatsamenie Lake. An estimated total of 7.5 million green eggs were collected from the three donor lakes. Tahltan Lake egg-takes were completed on September 25th after collecting an estimated 4.5 million eggs in 10 egg lots. Tatsamenie Lake egg-takes were completed on October 12th after collecting 2.6 million eggs in 6 lots. Trapper Lake egg-takes were completed on September 6th after collecting 429,000 eggs in 2 lots. DFO contractors collected adult sockeye salmon tissues on the spawning grounds and shipped them to the ADF&G Juneau Fish Pathology laboratory via Snettisham Hatchery per the treaty agreement.

Table 9. Summary of numbers and survival rates of brood year 2018 sockeye salmon fry released May and June 2019. Fish were raised at Snettisham Hatchery as part of the Transboundary River Salmon Enhancement Project.

Brood stock	Release site	Number of trips	Survival rate to eyed stage	Survival rate to release	Number released
Tahltan	Tahltan Lk	4	93.8%	82.5%	1,858,000
Tatsamenie	Upper Tatsamenie Lk	3	81.3%	75.5%	1,389,600
Tatsamenie	Upper Tatsamenie Lk Lk, Extended Rearing	4	81.6%	79.9%	378,700
	Average/Totals	11	87.5%	79.4%	3,618,500

During the 2019 season, the ADF&G Thermal Mark Lab processed 10,652 sockeye salmon otoliths collected by ADF&G and DFO staff as part of the U.S./Canada fry-planting evaluation program. These collections came from commercial and test fisheries in both U.S. and Canadian waters on the Taku and Stikine Rivers over a 13-week period. The laboratory provided estimates on hatchery contributions for 58 distinct sample collections. Estimates of the percentage of hatchery fish contributed to commercial fishery catches were provided to ADF&G and DFO fishery managers 24 to 48 hours after samples arrived at the lab.

Alsek River Area Fisheries

Although harvest sharing arrangements of Alsek salmon stocks between Canada and the U.S. have not been specified, Annex IV of the Pacific Salmon Treaty calls for the development and implementation of cooperative abundance-based management plans and programs for Alsek River Chinook and sockeye salmon. Escapement goals are in place for Chinook and sockeye salmon stocks spawning at the Klukshu River, a tributary that flows into the Tatshenshini River, approximately 80 km northeast of its junction with the Alsek River. The principal escapement-monitoring tool for Chinook, sockeye, and coho salmon stocks on the Alsek River is the Klukshu River weir, operated by Fisheries and Oceans Canada in cooperation with the Champagne-Aishihik First Nation since 1976. In 2013, Canadian and U.S. biologists adopted a new biological escapement goal range of 7,500 to 11,000 sockeye salmon through the Klukshu River weir. The current biological escapement goal range for Klukshu River Chinook salmon, adopted in February 2013, is a range of 800 to 1,200 fish.

ADF&G manages the Alsek River commercial set gillnet fishery to achieve the agreed upon escapement goal ranges. Time and area openings are adjusted by monitoring fishery performance data and comparing it to historical CPUE. The duration of weekly fishing periods is based on fishery performance data (CPUE) and Klukshu River weir data. Historically, gillnets have often been restricted to a maximum mesh size of 6 inches through July 1 to minimize Chinook salmon harvest. The U.S. commercial set gillnet sockeye salmon fishery was delayed two weeks in 2019 and a 6-inch maximum mesh restriction was in effect through July 18 as a Chinook salmon conservation measure.

Preseason expectations were for below average Chinook and sockeye salmon runs in 2019. The overall Alsek drainage sockeye salmon run was expected to be approximately 45,000 fish; which was near the recent 10-year average run size of approximately 46,700 sockeye salmon. The preseason outlook for 2019 was based on a predicted run of 10,400 Klukshu River sockeye salmon derived from a Klukshu River stock-recruitment model and an assumed Klukshu River contribution rate of 23% to the total run (based on mark-recapture

results from 2000–2004 and run size estimates using GSI from 2005–2006 and 2011–2014). Principal contributing brood years for the 2019 run were 2014 and 2015. The Klukshu River escapements in 2014 and 2015 were 12,100 and 11,400 sockeye salmon respectively; both below the 10-year average of 14,700 fish.

The 2019 Alsek River set gillnet fishery opened Sunday June 16 (week 25). The total number of individual permits fished during the season was 12, which was below the 2009–2018 average of 16 permits. The commercial fishery was opened for a total of 40 days which was near the ten-year average of 46 days. The overall effort in boat-days was 58% of the average due to low or no effort in many weeks late in the season (Table 10). Harvests of Chinook salmon through late June were below the recent ten-year average (Table 10). Harvests of sockeye salmon were near average from weeks 26 to 29 and then dropped to well below average from week 30 on. The total harvest of 9,787 fish was 71% of the 2009–2018 average of 13,820 fish (Table 10). There was little effort after late July. In the past several years there has been reduced fishing effort during the coho salmon season due to economic struggles and lack of pilots to transport fish to town. In 2019, only 1 coho salmon was harvested (Table 10).

The Klukshu River weir count of 19,073 sockeye salmon was above the upper bound of the 7,500 to 11,000 fish escapement goal range. The count of 4,274 early run sockeye salmon (count through August 15) and the late run count of 14,799 were both above average. The Alsek River drainage estimate of 114,000 fish is above the escapement goal of 24,000 to 33,500 sockeye salmon. The Klukshu River weir count of 1,589 Chinook salmon was above the upper bound of the 800 to 1,200 fish escapement goal range. Alsek River drainage escapement estimate of 3,400 to 6,400 Chinook salmon encompasses the escapement goal range of 3,500 to 5,300 fish.

Table 10. Weekly fishing effort and salmon harvest for Alsek River, 2019.

							Effort		
Statistical	Start	Catch							Boat
Week	Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Days
25	16-Jun	26	509	0	0	0	11	1	11
26	23-Jun	36	2,108	0	0	0	11	1	16
27	30-Jun	10	1,613	0	0	0	9	2	18
28	7-Jul	5	2,739	1	0	0	10	2	20
29	14-Jul	2	2,422	0	0	0	8	2	16
30-32[a]	21-Jul	0	396	0	0	0	10	5	14
33-40[b]	11-Aug	0	0	0	0	0	0	27	0
Total		79	9,787	1	0	0	12	40	95
2009-2018 Avg.		406	13,820	829	0	6	16	46	165
2019 as % of Avg.		19%	71%	0%		0%	75%	87%	58%

[a] Includes weeks with fewer than three permits, confidential information so data combined in catch table.
[b] Weeks 33-40 opened to fishing but not fished.

SOUTHEAST ALASKA CHINOOK SALMON FISHERY

All Gear Harvest

The Southeast Alaska/Yakutat (SEAK) Chinook salmon fishery is managed to stay within the annual all-gear PST total allowable catch limit determined by the SEAK early winter District 113 Troll fishery catch-per-unit-effort (CPUE) metric estimated from data collected in statistical weeks 41–48. Management of the 2019 SEAK Chinook salmon fishery was configured based on a preseason winter power troll CPUE metric of 3.38 for the 2019 fishing season. This CPUE translated into an all-gear PST allowable catch limit of 140,323 Treaty Chinook salmon. Management plans established by the Alaska Board of Fisheries allocate the CPUE-

based Treaty catch limit among gear types and prescribe management measures for both commercial and sport fisheries [5AAC 29.060(b) and 47.055].

During the 2018 Alaska Board of Fisheries meeting held in Sitka, action plans for Chilkat, King Salmon, and Unuk river stocks of Chinook salmon were adopted, giving the ADF&G direction, through emergency order authority, to conserve these stocks along with other wild SEAK and TBR stocks. Therefore, management actions were taken by all gear types in 2019 to lower calendar year exploitation rates and pass as many SEAK and TBR Chinook stocks to escapement as possible. The winter troll fishery closed early on March 15, spring troll fisheries were restricted to near terminal areas or areas on the outside coast, and in the summer troll fishery the primary corridors and waters directly adjacent to the terminus of the Unuk, Chilkat and Stikine rivers were closed to the retention of Chinook salmon in the troll fishery. Retention of Chinook salmon in the purse seine fishery was delayed until July 20. The purse seine fishery had three 15-hour and one 39-hour period of Chinook retention then went back to Chinook non-retention for the remainder of the season after August 1. Gillnet fisheries in districts 6 and 8 (near the mouth of the Stikine river) were delayed to the latter part of June. Gillnet fisheries in districts 11 and 15 (near the mouths of the Taku and Chilkat rivers) were subject to time and area restrictions through mid-July, with gear restrictions in place through early July. Openings in terminal harvest areas were delayed into June. Similarly, sport fisheries outside of terminal areas were delayed until mid-June or early July and were closed to non-residents during the first half of August.

The total Chinook salmon harvest by all SEAK commercial fisheries was 145,396 fish and the sport fish harvest was 29,700, for a total all-gear harvest of 175,096 (Table 11). This includes an all-gear harvest of 1,309 in the Annette Island Metlakatla Indian Community tribal fishery that is not directly managed by the State of Alaska. The all-gear harvest of Treaty Chinook salmon was 140,307 fish including 1,053 fish from the Metlakatla Indian Community tribal fishery (Table 12). The 2019 all-gear Treaty harvest of 140,307 was below the CPUE-based harvest limit of 140,323.

Table 11. Estimated all-gear Chinook salmon harvests in 2019.

Gear	Total Harvest	AK Hatchery Harvest	Wild Terminal Exclusion	Alaska Hatchery Addon	Treaty Harvest
Troll	109,364	8,841	211	6,087	103,067
Sport	29,700	6,600	0	5,104	24,596
Drift Gillnet	14,419	12,773	0	11,377	3,042
Purse Seine	21,367	12,506	0	12,011	9,356
Set Gillnet	246	0	0	0	246
Total Net	36,032	25,280	0	23,387	12,644
Total All Gear	***175,096***	***40,721***	***211***	***34,578***	***140,307***

Note: Annette Island Metlakatla Indian Community tribal harvest of 1,309 Chinook salmon are included of which 1,053 were Treaty fish. This includes a total tribal harvest of 736 troll, 385 drift gillnet, 188 purse seine fish of which 559 troll, 306 drift gillnet, and 188 purse seine Treaty fish.

Note: Terminal area harvests are included.

Table 12. Southeast Alaska Chinook salmon all-gear harvests (1987–2019) and deviation from the harvest ceiling limit (1987-1998), postseason allowable catch (1999-2008), and preseason catch limit (2009-2019). Harvests are in thousands.

Year	Total Harvest	Add-on and Exclusion Harvest	Treaty Harvest Limit[1]	Treaty Harvest	Deviation Number	Deviation Percent
1987	282.4	17.1	263.0	265.3	2.3	0.9%
1988	279.3	22.5	263.0	256.8	-6.2	-2.4%
1989	291.0	21.5	263.0	269.5	6.5	2.5%
1990	366.9	45.9	302.0	321.0	19.0	6.3%
1991	359.5	61.5	273.0	298.0	25.0	9.2%
1992	258.8	36.8	243.0	222.0	-21.0	-8.7%
1993	304.1	32.9	263.0	271.2	8.2	3.1%
1994	264.4	29.2	240.0	235.2	-4.8	-2.0%
1995	235.7	58.8		176.9		
1996	236.3	81.3		155.0		
1997	343.0	56.3		286.7		
1998	270.6	27.4	260.0	243.2	-16.8	-6.5%
1999	251.0	52.2	184.2	198.8	14.6	7.9%
2000	263.3	76.8	178.5	186.5	8.0	4.5%
2001	265.7	78.8	250.3	186.9	-63.4	-25.3%
2002	426.5	69.4	371.9	357.1	-14.8	-4.0%
2003	439.4	59.3	439.6	380.2	-59.4	-13.5%
2004	499.3	82.2	418.3	417.0	-1.3	-0.3%
2005	493.2	104.6	387.4	388.6	1.2	0.3%
2006	435.5	75.5	354.5	360.1	5.6	1.6%
2007	404.7	76.4	259.2	328.3	69.1	26.6%
2008	244.3	71.4	152.9	172.9	20.0	13.1%
2009	293.6	65.7	218.8	228.0	9.2	4.2%
2010	284.8	54.1	221.8	230.6	8.8	4.0%
2011	357.4	66.2	294.8	291.2	-3.6	-1.2%
2012	295.3	52.5	266.8	242.8	-24	-9.0%
2013	257.3	65.9	176.0	191.4	15.4	8.8%
2014	492.5	57.3	439.4	435.2	-4.2	-1.0%
2015	403.3	68.3	237.0	335.0	98	41.4%
2016	387.0	36.3	355.6	350.7	-4.9	-1.4%
2017	207.1	31.6	209.7	175.4	-34.3	-16.4%
2018	164.7	37.0	144.5	127.8	-16.7	-11.6%
2019[2]	175.1	34.8	140.3	140.3	0	0%

[1] 1999-2008 Treaty Harvest Limit determined by post-season PSC Chinook Model AI
2009-2018 Treaty Harvest Limit determined by pre-season PSC Chinook Model AI
2019-Present Treaty Harvest Limit determined by D113 Early Winter CPUE Model
[2]2019 deviations are slightly less than 0.

Troll Fishery

The accounting of Treaty Chinook salmon harvested by trollers begins with the winter fishery and ends with the summer fishery. The winter troll fishery is managed for a guideline harvest level (GHL) of 45,000 non-Alaska hatchery-produced Chinook salmon, with a guideline harvest range of 43,000−47,000 non-Alaska hatchery-produced fish, plus the number of Alaska hatchery-produced Chinook salmon harvested during the winter fishery. The 2018–2019 winter troll fishery was open from October 11, 2018 through March 15, 2019. To help reduce encounters of wild SEAK and TBR Chinook salmon, the winter season the fishery was closed from March 16 through April 30, prior to reaching the GHL. A total of 12,366 Chinook salmon were harvested. Of

these, 1,647 (13%) were of Alaska hatchery origin, of which 1,087 counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 11,279 (Table 13).

The spring troll fisheries target Alaskan hatchery-produced Chinook salmon and are conducted along migration routes or close to hatchery release sites. Terminal area fisheries, which begin during the spring, occur directly in front of hatcheries or at remote release sites. While there is no ceiling on the number of Chinook salmon harvested in the spring fisheries, the take of Treaty Chinook salmon is limited according to the percentage of the Alaskan hatchery fish taken in the fishery. Non-Alaska hatchery fish are counted towards the annual Treaty catch limit of Chinook salmon, while most of the Alaska hatchery (add-on) fish are not.

In 2019, spring troll fisheries were conducted between May 1 and June 30. To help reduce encounters of wild SEAK and TBR Chinook salmon during May and June, spring troll fisheries located in known wild Chinook salmon migration corridors did not open. A total of 17 fisheries opened during spring in 2019, which is a 66% reduction from the recent 10-year average. The combined harvest for spring troll fisheries was 12,325 Chinook salmon, of which 5,398 (44%) were of Alaska hatchery origin and 3,814 counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 8,511.

The 2019 summer troll fishery included two Chinook salmon retention periods, from July 1–5 and August 13–14. Following the two traditional summer retention periods, an allocated non-competitive limited harvest fishery was conducted from September 1–10 during the second summer coho-directed fishery to harvest the remaining portion of the annual troll Treaty Chinook salmon allocation. Alaska regulations state that if the number of Chinook salmon remaining on the annual troll allocation, following the second traditional summer retention period, is insufficient to prosecute a competitive fishery, the troll fishery may reopen to the harvest of Chinook salmon in a limited harvest fishery. In 2019, a maximum of two Chinook salmon per permit could be retained over the 10-day limited harvest fishery period. A total of 83,721 Chinook salmon were harvested during summer, of which 1,528 (2%) were of Alaskan hatchery origin and 1,008 counted toward the Alaska hatchery add-on. The resulting Treaty Chinook salmon harvest was 82,713 fish.

The total harvest for all troll fisheries in the 2019 accounting year was 109,364 Chinook salmon, of which 103,067 were Treaty Chinook salmon. This includes a total harvest of 736 in the Annette Island Metlakatla Indian Community tribal troll fishery of which 559 were Treaty Chinook salmon.

Table 13. Troll fishery Chinook salmon harvest by season, 2019.

Gear/Fishery	Total Harvest	Alaska Hatchery Harvest	Alaska Hatchery Add-on	Terminal Exclusion Harvest	Total Term. Exclusion/ Alaska Hatchery Add-on	Treaty Harvest
Winter Troll	12,366	1,647	1,087	0	1,087	11,279
Spring Troll[a]	12,536	5,398	3,814	211	4,025	8,511
Summer Troll						
First Period[b]	58,347	1,050	693	0	693	57,654
Second Period	24,699	478	315	0	315	24,384
LHF[c]	675	0	0	0	0	675
Total Summer	83,726	1,528	1,008	0	1,008	82,718
Total Traditional Troll	108,628	8,573	5,909	211	6,120	102,508
Annette Is. Troll	736	268	177	0	177	559
Total Troll Harvest	**109,364**	**8,841**	**6,087**	**211**	**6,297**	**103,067**

[a] Spring troll harvest includes all terminal and Wild Terminal Exclusion harvests for year.
[b] Total summer harvest includes confiscated harvest for year.
[c] The limited harvest fishery (LHF) occurred during the second Chinook Non-Retention coho-directed fishery.

Net Fisheries

A total of 14,419 Chinook salmon were harvested in the drift gillnet fisheries in 2019, of which 12,773 (89%) were of Alaska hatchery origin and 11,377 counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 3,042 fish (Table 11). This includes a harvest of 385 in the Metlakatla Indian Community tribal drift gillnet fishery of which 306 were Treaty Chinook salmon. A total of 21,367 Chinook salmon were harvested in the purse seine fisheries, of which 12,506 (59%) were of Alaska hatchery origin and 12,011 counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 9,356 fish. This includes a harvest of 188 in the Metlakatla Indian Community tribal purse seine fishery; all 188 were Treaty Chinook salmon. A total of 246 Chinook salmon were harvested in the set gillnet fisheries, none of which were of Alaska hatchery origin, resulting in a Treaty harvest of 246 fish (Table 11).

With the exception of directed gillnet harvests of Chinook salmon in SEAK terminal area regulatory Districts 108 and 111, as provided in the Transboundary River chapter of the PST (Chapter 1), harvests of Chinook salmon in net fisheries are primarily incidental to the harvest of other species, and in 2019 only constituted a small fraction (<1.0%) of the total net harvest of all species.

Recreational Fisheries

The Southeast Alaska Chinook salmon sport fishery is managed under the directives of the Southeast Alaska King Salmon Management Plan (5 AAC 47.055). This plan prescribes management measures based upon the SEAK early winter troll CPUE metric and the harvest management plan adopted by the Alaska Board of Fisheries. In 2019, 25,844 Treaty Chinook salmon were allocated to the sport fishery. To avoid implementation of the payback provisions in the new PST agreement which requires the payback of any overages to the Alaska all-gear catch limit the following year, the sport fishery was managed conservatively with a harvest target of 25,300 treaty Chinook salmon in 2019. As directed by the Southeast Alaska King Salmon Management Plan, if restrictions are necessary to keep the sport fishery within its harvest allocation, nonresident anglers will be restricted first, and the department shall only restrict resident anglers if nonresident angler restrictions are insufficient to keep the sport harvest within the sport harvest allocation.

The following regulations applied during the 2019 sport fishery as dictated by the *Southeast Alaska King Salmon Management Plan:*

Alaskan Resident

- The resident bag and possession limit was one Chinook salmon, 28 inches or greater in length.
- In those inside waters where the sport fishery for Chinook salmon was closed to retention during the spring and early summer (Juneau area, Petersburg/Wrangell area, Ketchikan area), when those waters reopen the resident bag and possession limit was two Chinook salmon 28 inches or greater in length through December 31, 2019.

Nonresident

- The nonresident bag and possession limit was one Chinook salmon, 28 inches or greater in length;
- From January 1 through June 30, a nonresident's annual catch limit was three Chinook salmon, 28 inches or greater in length;
- From July 1 through December 31, a nonresident's annual catch limit was one Chinook salmon, 28 inches or greater in length, and any Chinook salmon 28 inches or greater in length harvested by a nonresident from January 1 through June 30 applied toward the one fish annual catch limit;

The sport fishery was monitored closely throughout the season to ensure it stayed below the PST catch limit and the conservative harvest target. In mid-July, the sport fishery was projected to exceed the harvest target and PST allocation unless restrictive action was taken. Following directives of the Southeast Alaska King Salmon Management Plan, restrictions specific to nonresident anglers were announced in late July, which included a period of non-retention of Chinook salmon, August 1 – September 15th. As monitoring of the sport fishery continued, and harvest levels dropped due to Chinook salmon non-retention by nonresidents, updated PST harvest projections confirmed that a non-retention period could be rescinded August 16th for nonresident anglers while still ensuring the sport fishery stayed within its allocation. The 2019 sport fishery had an estimated total harvest of 29,700 Chinook salmon, of which 24,596 counted as PST or treaty harvest (Table 11).

SOUTHEAST ALASKA COHO SALMON FISHERIES

Attachment B of the June 30, 1999 U.S.-Canada Agreement relating to the Pacific Salmon Treaty specifies provisions for inseason conservation and information sharing for northern boundary coho salmon. In 2019, troll CPUE in Area 6 in the early weeks of the fishery averaged 16 coho/day, which was within the boundary area conservation trigger range of 15–22 coho/day. Accordingly, as provided for in paragraph 3 (section c), both parties agreed to a 10-day conservation closure, from July 28 through August 6. The mid-July projection of region-wide total commercial harvest of 1.70 million was greater than the 1.1 million trigger for an early region-wide troll closure, specified in Alaska Board of Fisheries regulation and the PST conservation agreement.

The 2019 region-wide summer troll coho salmon fishery began by regulation on June 1, and with a 10-day seasonal fishery extension, continued in all waters of SEAK through September 30. All waters of SEAK were open to troll gear during the September 21–30 extension. The 2019 all-gear catch of coho salmon totaled 1.72 million fish, of which 1.54 million (89%) were taken in commercial fisheries (Table 14). The troll harvest of 975,000 coho salmon was 40% below the 10-year average of 1.58 million fish and accounted for 63% of the commercial catch. Power troll wild coho salmon CPUEs were below the 20-year average for the majority of the summer season. The overall wild stock abundance (wild troll catch divided by an index of the troll exploitation rate) was estimated at 4.12 million fish and was 3% above the 20-year average. With pink salmon abundance down throughout much of SEAK in 2019, purse seine opportunities were reduced. Consequently, the purse seine coho salmon harvest of 249,800 fish was 19% below the 10-year average, while the drift gillnet harvest of 210,500 fish was 42% below the 10-year average. The set gillnet harvest of 100,500 fish in

the Yakutat area was 26% below the 10-year average, with 71% of the catch taken in the Situk-Ahrnklin Lagoon. A very preliminary estimate of the Southeast Alaska sport catch (185,400) is 29% below the 10-year average (261,400 fish).

Wild production accounted for 1.12 million fish (73%) in the commercial catch compared with a recent 10-year average of 1.83 million fish (77% wild). The hatchery percentage of the commercial catch was 27%. Of the estimated hatchery contribution of 410,800 fish, over 99% originated from facilities in Southeast Alaska, with facilities on or near the outer coast accounting for an estimated 65% of the return while inside hatchery returns contributed to the remaining 35%.

Preliminary all-fishery coho salmon exploitation rate estimates were low for all three wild indicator stocks, at 29% for Auke Creek, 22% for Berners River, and 54% for Hugh Smith Lake. The all-fishery exploitation rate for the Hugh Smith Lake stock was below the long-term average of 61%. Most of the reduction in the all-fishery exploitation rate was driven by decreases in the Alaska troll fleet. The Alaska troll fishery exploitation rate on the Hugh Smith Lake stock (23.4%) was below the 25-year (1994–2018) average of 30%. Alaska troll fishery exploitation rates on northern inside stocks were record lows, estimated at only 5.7% for Auke Creek and 6.7% for the Berners River compared with 25-year averages of 25% and 26%, respectively. While Alaska troll exploitation rates were below average, drift gillnet exploitation rates were within ranges of previously observed values. Compared with 25-year averages, Alaska drift gillnet fisheries accounted for an estimated 22% of the Auke Creek return (average 7%), 14% of the Berners River return (average 23%), and 11% of the Hugh Smith Lake return (average 13%).

Escapement counts and estimates were within or above goals for most coho salmon stocks. The total escapement of 1,239 adult coho salmon to Hugh Smith Lake was within the biological escapement goal of 500–1,600 spawners. Despite a 2018 smolt migration that was 59% above the long-term average, the estimated total run size of 2,678 adults was 32% below the 1983–2018 average. This disparity was likely caused by a marine survival rate (9.0%) that was slightly below the long-term average (12.2%). The Hugh Smith Lake marine survival of coho salmon is slightly higher than the recent five-year average (7.6%) and much higher than the record low of 2018 (2.7%).

Coho salmon escapements were within the respective goal ranges for three northern Southeast inside stocks (Chilkat River, Taku River, Auke Creek), above the goal for Berners River, and below the goal for Montana Creek. Survey estimates were not able to be collected on Peterson Creek due to high water condition and turbidity during peak abundance timing. The combined peak count of 7,916 coho salmon in the 14 surveyed streams in the Ketchikan area was slightly below the 1987–2017 average yet within the goal of 4,250–8,500 spawners. The combined peak count of spawners in five streams in the Sitka area (1,480 spawners) was approximately equal to the long-term average and exceed the escapement goal of 400–800 spawners.

Similar to Hugh Smith Lake, coho salmon marine survival for the northern inside stocks was above the five-year average yet still below the long-term average. Smolt-to-adult survival rates of 11.4% for the Berners River and 10.0% for Auke Creek represented a slight improvement over the five-year mean survival rates of 8.3% (Berners River) and 9.6% (Auke Creek). However, the marine survival estimates were far below historical averages of 15.0% for the Berners River (1990–2018) and 18.1% for Auke Creek (1980–2018). In 2019, the proportion of jack to adult coho salmon at Auke Creek (20%) was approximately the same as the long-term median (21%), indicating that marine survival will likely continue to improve compared to the recent poor conditions of 2016–2018.

Table 14. Coho salmon harvest in Southeast Alaska in 2019 by gear type (preliminary).

Gear Type	Harvest
Troll	975,000
Purse Seine	249,800
Drift Gillnet	211,000
Set Gillnet	100,500
Sport (marine and freshwater)	185,400
Total	1,721,700

PRELIMINARY 2019 CHINOOK AND COHO SALMON FISHERIES IN WASHINGTON AND OREGON

INTRODUCTION

This report describes the conduct of United States (U.S.) fisheries of interest to the Pacific Salmon Commission (PSC) that occurred during 2019 in the area north of Cape Falcon, Oregon and south of the U.S./Canada border. These fisheries were conducted under pre-season management plans that were consistent with Annex IV of the Pacific Salmon Treaty (PST 2019) including obligations defined within Chapter 3 for Chinook individual stock based management regimes (ISBM) and Chapter 5 for Southern Coho Management.

An overview of the Chinook (Oncorhynchus tshawytscha) and Coho (Oncorhynchus kisutch) salmon conservation challenges facing managers during the 2019 pre-season planning process in this region is provided in the following section. The conduct of major fisheries described, and estimates of landed catch, where available, are compared to pre-season catch limits or expectations for Chinook (Table 15) and Coho (Table 16). For perspective, landed catches for those fisheries since 2014 are also presented. Where available, preliminary estimates of the number of Chinook or Coho salmon released by anglers in 2019 mark-selective fisheries are also presented (Table 17). All estimates for the 2019 fisheries are preliminary and subject to change. Estimates of spawning escapements and abundance of Coho and Chinook stocks are not available at this time.

PRE-SEASON PLANNING

Pre-season planning for southern U.S. fisheries of interest to the PSC is a coordinated activity involving Tribal, State and Federal management entities, with the involvement of conservation and fishing interests. The Pacific Fishery Management Council (PFMC) conducted a series of public meetings to consider options for ocean fishery season structures while the Tribes and States conducted government-to-government and public, open meetings throughout the region to develop and analyze alternative season structures for fisheries in the inside waters of the Columbia River, coastal Washington and Puget Sound. Participants in these various planning sessions evaluated the biological and socio-economic consequences of the alternative season structures for the outside (ocean) and inside (marine and freshwater) fisheries (Figure 38) including the anticipated impacts on U.S. southern origin stocks in fisheries conducted under the PST in Canada and Southeast Alaska. Agreement was reached on season structures expected to achieve conservation goals, domestic fishery objectives and legal obligations, including the PST, assuming fisheries are conducted as planned and pre-season abundance estimates are accurate.

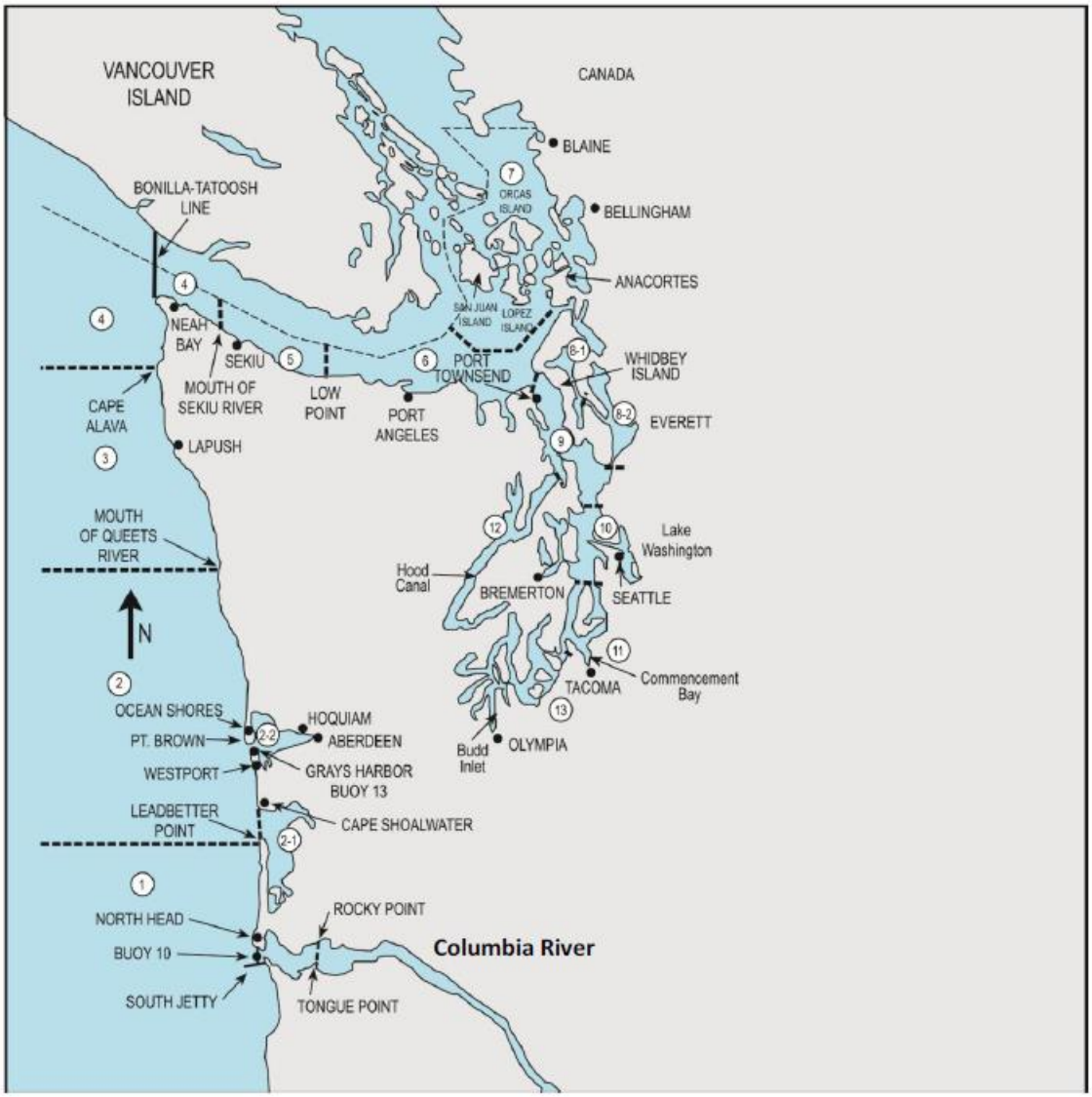

Figure 38. Map of Western Washington marine catch areas of the Washington coast (Areas 1 through 4) and Puget Sound (Areas 5 through 13) (WAC 220-22-030). Inside (Columbia River) fisheries reported in this document extend beyond the scope of this map.

Chinook Salmon Management

Under the 2019 Pacific Salmon Treaty Agreement, southern U.S. fisheries are subject to the Individual Stock Based Management provisions of Annex IV, Chapter 3. These provisions require that Southern U.S. fisheries on Chinook stocks shall be managed to limit the total adult equivalent mortality to the limits listed in Attachment I of Chapter 3.

Conservation obligations associated with the U.S. Endangered Species Act (ESA) for threatened and endangered Chinook salmon stocks originating from Puget Sound and the Columbia River have been more constraining to southern U.S. fisheries than PST obligations. Catch quotas for the 2019 U.S. ocean fisheries in the area north of Cape Falcon, Oregon, were defined by the impact limits on ESA-listed lower Columbia River natural tule fall Chinook stocks, ESA-listed Puget Sound Chinook stocks, and the abundance of other healthy, harvestable Chinook salmon stocks contributing to fisheries in this area. Puget Sound fishing seasons were structured to provide fishing opportunity on healthy salmon species or stocks within the impact limits defined for ESA-listed Puget Sound Chinook.

Coho Salmon Management

During the pre-season fishery planning process of 2019, Canadian fishery managers informed the U.S. that the Interior Fraser management unit was again expected to be in the low categorical abundance status, and U.S. fisheries were constrained to ensure that the exploitation rate on this management unit did not exceed 10.0% as defined by the PST Southern Coho Management Plan. Of the U.S. natural spawning Coho management units (MUs) managed under the PST, the Strait of Juan de Fuca MU was forecasted to be in low abundance status. The Skagit, Snohomish, and Hood Canal Coho MUs were predicted to be in moderate status, while the Grays Harbor, Queets, Quillayute, Hoh, and Stillaguamish MUs were forecasted to be in abundant status.

The impacts of planned Southern U.S. fisheries on natural Coho stocks, seasons, and catch limits were predicted using the Fisheries Regulation Assessment Model (FRAM). The total exploitation rate on the Interior Fraser Coho management unit was predicted to be 9.1% in Southern U.S. fisheries. Seasons and Coho quota levels for U.S. ocean fisheries were closed or severely constrained by the management objectives of Washington coastal and Puget Sound natural Coho and ESA-listed lower Columbia River natural Coho. Limits to fisheries in marine areas within northern Puget Sound and the Strait of Juan de Fuca were likewise constrained by management objectives reflecting very low forecasted returns for some Puget Sound natural Coho stocks.

NORTH OF CAPE FALCON OCEAN FISHERIES

Details regarding North of Cape Falcon ocean salmon fishing plans were reported in Preseason Report III, published by the Pacific Fishery Management Council in April 2019.
https://www.pcouncil.org/salmon/stock-assessment-and-fishery-evaluation-safe-documents/preseason-reports/

Fisheries in this area are managed to meet conservation objectives for ESA-listed stocks, natural stocks and brood stock goals for hatchery stocks. Within these stock management objectives, ocean fishing seasons are defined that meet legal requirements of Tribal treaties and allocations between Non-Tribal troll and sport fisheries. Ocean fishery seasons are also constructed to ensure a balance of opportunity for harvest with the inside fisheries. Lower Columbia River hatchery Coho and Columbia River fall Chinook have historically been the major stocks contributing to catches of ocean fisheries in the North of Cape Falcon area.

Chinook and Coho salmon catch quotas were established for the 2019 ocean Tribal, Non-Tribal troll and sport fisheries. Ocean fishery quotas for Chinook salmon were defined by exploitation rate limits on several ESA-listed Puget Sound Chinook stocks as well as the total exploitation rate limit of 38% on ESA-listed lower Columbia River natural tule fall Chinook stocks in all fisheries.

Non-Tribal Troll Fishery

Pre-season quota levels for the non-Tribal troll fisheries were 26,250 Chinook and 30,400 Coho with a clipped adipose fin, hereinafter referred to as marked. The preliminary estimate of non-Tribal harvest in the 2019 North of Falcon troll fishery is 24,200 Chinook (92% of the coast-wide quota) and 5,500 Coho (18% of the coast-wide non-Tribal troll quota). Trollers harvested 7,000 Chinook in the May 1 – June 30 fishery, and the remaining 17,200 Chinook were harvested in the summer all-species fishery between July 1 and September 30. All Coho were harvested during the summer all-species fishery.

Tribal Troll Fishery

The Tribal troll ocean fishery (also known as the Treaty troll fishery) quotas were defined by conservation concerns for ESA-listed Lower Columbia River natural tule fall Chinook and ESA-listed Puget Sound

Chinook. The coho quota was based on concerns for Puget Sound coho, Thompson River coho, and ESA-listed lower Columbia River natural coho.

The Treaty troll fishery was implemented in Ocean Areas 2, 3, 4 and 4B. The 2019 quotas were set at 35,000 Chinook and 55,000 coho. The Chinook quota was split into two sub-quotas—a 17,500 sub-quota during May-June and a 17,500 sub-quota during July-September. The 55,000 coho quota could be harvested during the July-September all-species fishery.

The May-June Chinook Tribal troll ocean catch (2,919 fish) was the lowest recorded in the past 10 years. The May-June fishery harvested 16.7% of the 17,500 Chinook sub-quota. Chinook landings were highest in June, which accounted for 71% of the Chinook landings during this time period. However the number of trips were fairly equal between May and June at 65 and 72 trips, respectively.

The all-species portion of the Tribal troll fishery ran from July 1 until September 15. The fishery harvested 88.1% of the 17,500 Chinook sub-quota and 100.9% of the 55,000 coho quota. Coho landings were highest in August accounting for 61% of the overall catch, followed by July and September at 26% and 13%, respectively. Similar to last year Chinook effort was highest in July, which accounted for approximately 80% of the Chinook landings during this time period. Chinook landings slowed in August (2,800 fish) and were minimal in September (299 fish). There were 761 landings during the all-species portion of the fishery.

Overall the Tribal troll fishery harvested 52.4% of the 35,000 Chinook quota and 100.9% of the 55,000 coho quota. The total ocean salmon harvest for the 2019 Tribal troll fishery was 18,332 Chinook and 55,476 coho.

Ocean Sport Fisheries

Pre-season quotas for the Washington coastal sport fishery (Ocean Areas 1 through 4) were 26,250 Chinook and 159,600 marked Coho. Preliminary total catch estimates for the ocean sport fisheries north of Cape Falcon were 10,800 Chinook (42% of the pre-season coast-wide quota) and 81,700 Coho (51% of the pre-season coast-wide sport quota). A description of the season structure and catches by management area follows.

Columbia Ocean Area (including Oregon)

All-species salmon sport fishing opened in Ocean Area 1 (Columbia Ocean Area) on June 22 with a pre-season quota of 79,800 marked Coho and a guideline of 7,150 Chinook. The fishery closed on its automatic closure date, September 30. The catch estimates for Area 1 were 4,000 Chinook (56% of the guideline) and 53,500 Coho (67% of the quota). The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches with a sub-area closure in the Columbia Control Zone. A preliminary overall legal-sized Coho mark rate of 59% was calculated from on-water data collection in this area.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 1 Coho mark-selective sport fishery, June 22 – September 30, 2019.

Coho retained	Coho released	Total encounters	Mark %
53,500	28,700	81,200	59%

Westport, Washington

Ocean Area 2 (Westport, WA) opened for all-species salmon sport fishing on June 22 with a pre-season quota of 59,050 marked Coho and a guideline of 12,700 Chinook. The fishery closed on its automatic closure date, September 3. The catch estimates for Area 2 were 2,300 Chinook (18% of the guideline) and 20,200 Coho (34% of the quota). The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches with a sub-area closure in the Grays Harbor Control Zone beginning August 12. A preliminary overall legal-sized Coho mark rate of 47% was calculated from on-water data collection in this area.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 2 Coho non-retention sport fishery, June 22 – September 30, 2019.			
Coho retained	Coho released	Total encounters	Mark %
20,200	24,300	44,500	47%

La Push, Washington

Ocean Area 3 (La Push, WA) opened for all-species salmon sport fishing on June 22 with a pre-season quota of 4,050 marked Coho and a guideline of 1,100 Chinook. The fishery closed on its automatic closure date, September 30, and a portion of the area reopened October 1 – 13 with additional quotas of 100 marked Coho and 100 Chinook. The catch estimates for Area 3 were 600 Chinook (50% of the overall guideline of 1,200) and 1,800 Coho (43% of the overall quota of 4,150). Of the total catch, 164 Chinook and 16 Coho were landed during the October limited-area fishery. The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches. A preliminary overall legal-sized Coho mark rate of 41% was calculated from on-water data collection in this area.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 3 Coho non-retention sport fishery, June 22 – October 13, 2019.			
Coho retained	Coho released	Total encounters	Mark %
1,800	4,000	5,800	41%

Neah Bay, Washington

Ocean Area 4 (Neah Bay, WA) opened for all-species salmon sport fishing on June 22 with a pre-season quota of 16,600 marked Coho and a guideline of 5,200 Chinook. Effective July 14, Chinook retention was prohibited in the area after 75% of the area Chinook guideline had been landed; the Chinook remaining on the guideline were reserved for hooking mortality impacts associated with Coho-directed fishing through September. The fishery closed on its automatic closure date, September 30. The catch estimates for Area 4 were 3,900 Chinook (75% of the guideline) and 6,200 Coho (37% of the quota). The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches. A preliminary overall legal-sized Coho mark rate of 37% was calculated from on-water data collection in this area.

Preliminary estimates of Coho encounters (retained and released), in the Area 4 Coho non-retention sport fishery, June 22 – September 30, 2019.			
Coho retained	Coho released	Total encounters	Mark %
6,200	16,900	23,100	37%

NORTH OF CAPE FALCON INSIDE FISHERIES

WASHINGTON COASTAL RIVER FISHERIES

North Washington Coastal Rivers

Net and sport fisheries directed at salmon in this region were implemented based upon pre-season, Tribal-State agreements and subject to in-season adjustments. Tribal net harvest includes non-selective catch from the Sooes, Quillayute, Hoh, Queets, and Quinault Rivers. The 2019 Tribal net fisheries in north coastal rivers harvested an estimated 11,100 Chinook salmon and 12,000 coho salmon through November 15, 2019.

Recreational fisheries conducted during 2019 in the Quillayute, Hoh and Queets River systems included mark-selective fisheries targeting hatchery Chinook and Coho in the Quillayute and Queets systems. The Hoh system had a hatchery chinook sport fishery in June but was non-selective when the fishery reopened from September 16 through November. Harvest or impact estimates for these fisheries are unavailable at this time.

Grays Harbor, Washington

Harvest numbers reported for Grays Harbor, Washington include catch from both the Humptulips and Chehalis Rivers through November 15, 2019. The non-selective Tribal net fisheries in Grays Harbor, and including fisheries in the Humptulips and Chehalis Rivers, harvested an estimated 2,400 Chinook salmon and 7,700 Coho salmon. The non-Tribal commercial fishery in the northern portion of Grays Harbor near the Humptulips River (Area 2C) was non-selective and harvested 43 Chinook and 19 Coho. There were 2 Chinook salmon (mark-selective) and 799 Coho harvested in the Non-Tribal commercial gillnet fishery in Areas 2A and 2D. Sport fisheries conducted in the Chehalis and Humptulips Rivers included mark-selective components for Chinook and Coho salmon. Harvest data for these fisheries are not available at this time.

COLUMBIA RIVER FISHERIES

Tribal and non-Tribal net and sport salmon fisheries were implemented in 2019 during the winter/spring (January – June 15), summer (June 16 – July) and fall (August – October) periods. All fisheries were constrained by impacts on ESA-listed stocks. Winter/spring fisheries were primarily constrained by impacts on ESA-listed upper Columbia River spring Chinook, Snake River spring/summer Chinook, and Cowlitz spring Chinook. Summer season fisheries were constrained by impacts to upper Columbia summer Chinook and ESA-listed sockeye. Fall fisheries were mainly constrained by impacts to ESA-listed Snake River fall Chinook and upriver summer steelhead. Additionally, careful in-season management to limit the fishery impacts on ESA-listed wild lower Columbia tule fall Chinook, and lower Columbia River Coho further constrained Columbia River fall fisheries during 2019.

Columbia River salmon fisheries are developed and regulated to meet conservation standards. Fisheries are managed to operate within the impact limits set for ESA-listed stocks, meet the objectives for healthy Columbia River natural stocks, and ensure broodstock needs are met for hatchery salmon. Mainstem Columbia River fisheries are also developed and managed to remain within the requirements of the 2018 – 2027 US v. Oregon Management Agreement (MA), which includes Tribal/Non-Tribal sharing agreements. All 2019 data are preliminary and subject to change; some fisheries are still ongoing at the time of this report. The following section includes harvest numbers from Columbia River fisheries that are considered to be of the interest to PSC; therefore, the data may not match other reports that include total harvest.

Winter-Spring Fisheries

Non-Tribal Net

The mainstem winter/spring commercial fishery operated under mark-selective fishery (MSF) regulations during 2002 - 2016. As a result of guidance from the Oregon and Washington Fish and Wildlife commissions, there were no winter/spring non-Tribal commercial salmon seasons in the mainstem Columbia River since 2016. Commercial fisheries during the winter/spring timeframe did occur in off-channel areas (Select Areas) in the Columbia River estuary but are not reported in this document.

Sport

Mainstem Columbia River mark-selective sport fisheries began in 2001. For 2019, the area below Bonneville Dam was open from January 1 – April 10, April 13-14, and April 20-21, and April 27-28for hatchery Chinook retention, and was closed downstream of the Lewis River beginning March 1. Catch estimates for this area totaled 1,677 hatchery adult spring Chinook kept and 480 non-adipose fin clipped Chinook released. From Bonneville Dam to the Washington-Oregon state line it was open March 1 – May 5 and May 11-12, there were 274 hatchery adult spring Chinook kept and 80 non-adipose fin clipped Chinook released. The Snake River fishery structure included two specific catch areas open on a days-per-week rotation as was open May

11-27. Catch in the Snake River fishery totaled 326 hatchery adult spring Chinook and 50 non-adipose fin clipped released. Fisheries also occurred in tributaries but are not reported in this document.

Preliminary estimated encounters of adult Spring Chinook in the 2019 Winter/Spring Columbia River mark-selective sport fishery.					
System	Area	Chinook Kept	Chinook Released	Total Encounters	% Kept
Columbia River	Below BON (LCR)	1,677	480	2,157	78%
Columbia River	BON to WA-OR S/L	274	80	354	77%
Snake River	Washington Waters	326	50	376	87%

Tribal

Tribal mainstem winter/spring fisheries typically occur from January 1 through June 15. Tribal mainstem fisheries are not mark-selective. Tribal fisheries are primarily conducted in the mainstem Columbia River from Bonneville Dam upstream to McNary Dam (Zone 6). Some additional harvest occurs just downstream of Bonneville Dam in platform and hook-and-line fisheries. Spring season fisheries may include three fishery sectors, a ceremonial permit gillnet fishery, a platform and hook and line fishery and a commercial gillnet fishery (during winter and periodically in the spring, after ceremonial needs have been met).

During 2019, the platform and hook-and-line fishery was open for subsistence fishing throughout most of the winter/spring period. Fisheries were temporarily closed for just 18 days to assess catches. Commercial sales did not occur in 2019 Tribal fisheries during the spring management period. Harvest estimates from the combined ceremonial and subsistence fisheries totaled approximately 4,688 upriver spring Chinook (includes harvest from below Bonneville Dam). Tribal harvest in tributaries is not included in this report.

Summer Fisheries

Non-Tribal Net

As a result of guidance from the Oregon and Washington Fish and Wildlife commissions in conjunction with a low run, non-Tribal commercial fisheries did not occur in the 2019 summer management timeframe. Commercial fisheries during the summer timeframe did occur in off-channel areas (Select Areas) in the Columbia River estuary but are not reported in this document.

Sport

Summer season recreational fisheries did not allow retention of any salmon from the Astoria-Megler Bridge near the mouth of the Columbia River upstream to Priest Rapids Dam with an estimated 530 summer Chinook released. The fishery above Priest Rapids Dam had a delayed opening of July 15 and was mark-selective, which are not reported in this document. In-river allocation agreements dictate that a substantial share of the non-treaty catch be provided for fisheries upstream of Priest Rapids Dam.

Tribal

Summer season Tribal fisheries occurred from June 16 through July 28. Tribal mainstem fisheries are not mark-selective. Tribal fisheries are primarily conducted in the mainstem Columbia River from Bonneville Dam upstream to McNary Dam (Zone 6). Some additional harvest occurs just downstream of Bonneville Dam in platform and hook-and-line fisheries. There was a brief period of permit gillnet fisheries followed by two weekly commercial gillnet fishing periods were conducted from June 24 – July 3. Platform and hook-and-line fisheries also occurred throughout the season, and fish were sold commercially or retained for

subsistence use. Tribal fisheries within the mainstem harvested a total of 5,637 Upper Columbia summer Chinook.

Fall Fisheries

Non-Tribal Net

Fall season mainstem fisheries are typically categorized into early and late fall seasons. The early fall season generally encompasses the month of August and in some years, early September, whereas the late fall season generally begins in mid-September and may continue through October. Time, area, and gear restrictions were in place for fall season commercial gillnet fisheries. Fall gillnet fisheries are non-MSF. No seine fisheries occurred in 2019 due to ESA constraints. In 2019, the early fall season consisted of four fishing periods during August 14-27 in commercial Zones 4-5 (Warrior Rock to Beacon Rock). The late fall season consisted of 1 fishing period during October 8-9 in the same area. Harvest estimates are estimated to include 8,148 Chinook and 220 Coho Salmon. Tangle net fisheries occurred with eleven fishing periods during September 30 – October 25 in commercial Zones 1-3 (mouth to Warrior Rock) and are MSF for Coho and non-MSF for Chinook. Harvest estimates are estimated to include 677 Chinook and 2,495 marked Coho Salmon (704 unmarked Coho Salmon were released). Commercial fisheries during the fall timeframe did occur in off-channel areas (Select Areas) in the Columbia River estuary but are not reported in this document.

Sport

Fall season recreational fisheries are mark-selective for Coho, and in recent years have included some mark-selective periods for Chinook in the Buoy 10 area and in the 69-mile stretch of the lower Columbia River from the Tongue Point line upstream to Warrior Rock, which is near the mouth of the Willamette River. There were no mark-selective periods for Chinook in the mainstem Columbia River during 2019.The Buoy 10 fishery opened August 1 and continued through December 31; Chinook retention was allowed August 1 through August 20. Additional regulations for the Buoy 10 fishery included minimum size limits for Chinook (24-inches) and Coho (16-inches), and in 2019, steelhead retention was prohibited August through September. Released Chinook typically consisted of fish that did not meet the minimum size requirement, fish released during non-retention periods, and any voluntary releases of legal-sized Chinook throughout the season.

Buoy 10 catches included 11,240 Chinook and 23,470 hatchery Coho Salmon kept. Released fish included 16,780 Chinook and 25,800 Coho Salmon.

The lower Columbia River (LCR) mainstem sport fishery from the Rocky Point – Tongue Point line upstream to Bonneville Dam opened August 1 through September 25 and October 18 – December 31. In the area from the Rocky Point – Tongue Point line upstream to the Lewis River, Chinook retention was open August 1-27, with Chinook retention closed beginning August 21 downstream of West Puget Island. Chinook retention was allowed August 1-September 5 from the Lewis River upstream to Bonneville Dam. The kept catch estimate for the LCR sport fishery was 7,165 adult Chinook; an additional 6,737 adult Chinook were released, and 1,046 hatchery Coho were kept (1,075 Coho were released). Steelhead retention was closed August through October.

The mainstem sport fishery from Bonneville Dam to the Highway 395 Bridge (near Pasco, Washington) was open August 1 – September 25 and October 18-31. Adult catch estimates for the Bonneville to McNary area totaled 3,351 fall Chinook and 729 Coho Salmon. Steelhead retention was closed August through December below the Dalles Dam, and September through December upstream. Additional fisheries occurred on the Columbia River in the Hanford Reach area (downstream of Priest Rapids Dam), in tributaries and in the Snake River, but are not reported in this document.

Adult Fall Chinook and Coho Salmon Handle in the 2019 Columbia River Fall Sport Fisheries					
System	Area	Chinook Kept	Chinook Released	Total Handle	% Kept
Columbia River	Buoy 10	11,240	16,780	28,020	40%
Columbia River	LCR Sport	7,165	6,737	13,902	52%
Columbia River	Bonneville-McNary	3,351	390	3,741	90%
System	Area	Coho Kept	Coho Released	Total Handle	% Kept
Columbia River	Buoy 10	23,470	25,800	49,270	48%
Columbia River	LCR Sport [1]	1,046	1,075	2,121	49%
Columbia River	Bonneville-McNary [2]	729	182	911	80%

Tribal

Fall season Tribal fisheries occur from August 1 through December 31. Tribal fisheries are not mark-selective. Tribal fisheries are primarily conducted in the mainstem Columbia River from Bonneville Dam upstream to McNary Dam (Zone 6). Some additional harvest occurs just downstream of Bonneville Dam in platform and hook-and-line fisheries. Platform and hook and line fisheries will remain open through December 31.

The Tribal commercial gillnet fishery consisted of a brief period of permit gillnet fishing followed by seven weekly fishing periods from August 21 through October 5. Preliminary harvest estimates for all fall season fisheries total 58,447 adult fall Chinook and 4,675 adult Coho; however, some additional fish may be landed in the ongoing platform fisheries. Harvest estimates reported herein include catch from Zone 6 tributary fisheries.

PUGET SOUND FISHERIES

Puget Sound marine fisheries of interest to the Pacific Salmon Commission were regulated to meet conservation and allocation objectives for Chinook, Coho, Chum, Pink, and Sockeye salmon stocks, per Tribal-State agreement. For Puget Sound Chinook listed under the ESA, fisheries were managed according to the Puget Sound Chinook Harvest Management Plan (PSIT and WDFW 2010). This management plan defines limits to total exploitation rates for natural stocks and was determined by the National Marine Fisheries Service (NMFS) to be consistent with requirements specified under the ESA 4(d) Rule.

Release requirements were applied to many sport and net fisheries for Chinook, Coho, and Chum salmon -- the latter to protect ESA-listed Hood Canal and Strait of Juan de Fuca summer Chum.

Puget Sound marine fisheries were constrained by the need to meet management objectives for ESA-listed Puget Sound Chinook and due to conservation concerns for some Puget Sound Coho stocks. The primary constraining Puget Sound Chinook stocks during 2019 pre-season planning included Mid-Hood Canal, Stillaguamish, and Nooksack Chinook. Strait of Juan de Fuca and Snohomish Coho were the primary Coho management units of concern for developing fisheries in the Strait of Juan de Fuca, San Juan Islands, and Puget Sound.

<u>Strait of Juan de Fuca Sport</u>

Marked Chinook retention was allowed for sport fishing in salmon management Area 5 from February 16, 2019 through April 30, 2019 and in Area 6 from February 1, 2019 through April 30, 2019. Sport fishing regulations allowed retention of marked Chinook and marked Coho from July 1 through August 15 in Areas 5 and 6, with marked Coho retention also permitted through September 30 in Area 5. Dungeness Bay was

open for marked Coho retention during the month of October. Preliminary estimates of Chinook encounters and the legal-size mark rate in the Area 5 sport mark-selective fishery are presented in the following table.

Preliminary estimates of Chinook retained, released (legal and sub-legal size), and the legal-size mark rate in the Area 5 sport mark-selective fishery, July 1 – August 15, 2019.			
Chinook retained	Chinook released	Total encounters	Mark % (legal size)
4,566	10,970	15,897	62.0%

A detailed report of this summer period sport fishery, including estimated catch, effort and other results of sampling and monitoring programs, will be available from the Washington Department of Fish and Wildlife in early 2019.

Strait of Juan de Fuca Tribal Troll (Area 4B, 5, and 6C)

During the winter Tribal troll fishery in Areas 4B, 5, and 6C (November 1, 2018 – April 15, 2019), 1,100 Chinook and zero Coho were caught. In the summer Tribal troll fishery in Areas 5 and 6C only (June 1 – September 30, 2019), 400 Chinook and 200 Coho were caught. The Tribal catch estimates from this area do not include catch from Area 4B during the May-September PFMC management period, which have been included in the North of Cape Falcon Tribal ocean troll summary.

Strait of Juan de Fuca Tribal Net

Preliminary estimates of the 2019 catch in the Strait of Juan de Fuca Tribal net fisheries (no non-Tribal net fisheries in the Strait of Juan de Fuca) are 0 Chinook and 200 Coho salmon.

San Juan Islands Net (Areas 6, 7, and 7A)

Preliminary estimates of the 2019 catch in the San Juan Island net fishery directed at Sockeye, Pink, or Chum salmon totaled 9 Chinook and 869 Coho salmon in the non-Tribal fishery. Tribal fishery landings from this area for all gear types totaled 3,600 Chinook and 1,500 Coho.

San Juan Islands (Area 7) Sport

Marked Chinook retention was allowed in the entire Area 7 during the winter/spring season from January 1, 2019 through April 15, 2019. Preliminary estimates of Chinook retained and released by anglers during this fishery were produced via an intensive sampling program and are presented in the table below. A detailed report of this fishery, including estimates of catch, effort and other results of sampling and monitoring programs, is available from the Washington Department of Fish and Wildlife.

Estimated Chinook retained, released (legal and sub-legal size) and the legal size mark rate in the Area 7 sport mark-selective fishery, January 1 through April 15, 2019.			
Chinook retained	Chinook released	Total encounters	Mark % (legal size)
3,776	5,120	8,894	73.6%

During the summer season in Area 7, recreational anglers were allowed to retain Chinook from July 1 through July 31. The southern Rosario Strait and eastern portions of Area 7 were closed from July 1 – September 30 to protect Puget Sound Chinook salmon. Additional sub-area closures are described in the 2019-20 Washington State Sport Fishing Rules Pamphlet. The table below presents estimated Chinook encounters (retained and released) and the legal-size mark rate in the Area 7 sport mark-selective fishery, from July 1-31, 2019.

Estimated Chinook retained, released (legal and sub-legal size) and the legal size mark rate in the Area 7 sport mark-selective fishery, July 1-31, 2019.			
Chinook retained	Chinook released	Total encounters	Mark % (legal size)
3,025	2,746	5,771	82%

Inside Puget Sound (Areas 8-13) Sport

Mark-selective sport fisheries (MSFs) targeting adipose fin-clipped (marked) hatchery Chinook were conducted in Area 8.1 (Deception Pass, Hope Island, and Skagit Bay), Area 8.2 (Port Susan & Port Gardner), Area 9 (Admiralty Inlet), Area 10 (Seattle-Bremerton), Area 11 (Tacoma-Vashon Island), Area 12 (Hood Canal), and Area 13 (South Puget Sound) during the winter (October 2018 – April 2019) period, and in Areas 9, 10, 11, 12, and 13 during the summer (May – September 2019) period. Additionally, marked and unmarked Chinook retention was permitted in the Tulalip Bay (Area 8-2) from June 1 through September 2 (Fridays through noon Mondays), and from September 7 through September 29 (Saturdays and Sundays), and in Elliot Bay (Area 10) from August 2 through noon August 5.

Puget Sound Chinook mark-selective sport fisheries conducted in marine areas during 2017-2019.	
Areas	Season
8.1 & 8.2	Winter: December 1, 2018 – April 11, 2019.
9	Winter: January 1, 2019 – April 15, 2019. Summer: July 25 – July 28, 2019; July 31 – August 4, 2019; August 6 – August 9, 2019.
10	Winter: January 1, 2019 – January 19, 2019. Summer: July 25 – August 17, 2019; Elliot Bay: August 2 – August 5 (noon); Sinclair Inlet: July 1 – September 30, 2019.
11	Winter: October 1, 2018 – April 30, 2019. Summer: July 1 – August 25, 2019.
12	Winter: October 1, 2018 – April 30, 2019. Summer: July 1 – September 30, 2019 (South of Ayock Point).
13	Year round: January 1 – December 31

Post-season reports detailing results of these Chinook MSFs, including estimates of retained and released encounters, effort and mark rates from sampling and monitoring programs, will be available from the Washington Department of Fish and Wildlife in the spring of 2019.

Mark-selective sport fisheries during 2019 directed at marked Coho were conducted in the following marine catch areas: Areas 5 and 6 from July 1 – September 30, Area 9 from July 16 – September 30 and in Area 13 from January 1 – December 31. Marked and unmarked Coho retention was permitted in Area 7 during the months of July and September, Area 8.1 from August 1 – October 31, 2019,Tulalip Bay from June 1 – September 2 (on Fridays through noon, Mondays only) as well as from September 7 – September 29 (Saturdays, Sundays), in Area 11 from July 1 – September 30; and in Area 12 from January 1 – April 30, 2019 in the whole area, as well as from August 1 – December 31, 2019 in the areas North of Ayock Point and from July 1 – December 31, 2019in the area South of Ayock Point.

Puget Sound Marine Net (Areas 8-13 & 7B-D)

To achieve conservation objectives for natural Puget Sound Chinook, limited marine net fishing opportunities directed at returns of hatchery Chinook and both hatchery and natural Coho were planned for 2019. Chinook and Coho were also intercepted in fisheries directed at Pink and Chum salmon. A total of 62,300 Chinook and 45,400 Coho were landed in the Tribal marine net fisheries in Puget Sound (Areas 8-13 & 7B-D) during 2019. Non-Tribal net fishery landings from these areas totaled 12,100 Chinook and 10,900 Coho. Nearly all Chinook landed in the non-Tribal net fishery occurred during Chinook-directed fisheries in Areas 7B, 7C, and 12C.

Puget Sound Rivers Fisheries

Tribal net and non-Tribal sport fisheries were implemented in freshwater systems based upon pre-season, Tribal-State agreements and subject in part to in-season adjustment. Harvest of Chinook and Coho in the Tribal in-river net fisheries (includes catch from river systems in the Strait of Juan de Fuca, Hood Canal, and Puget Sound) totaled 37,500 Chinook and 41,500 Coho during 2019.
Also, recreational fisheries targeting Chinook salmon were conducted in nine Puget Sound Rivers that have PSC Chinook coded wire tag (CWT) exploitation rate indicator stocks or double index tag (DIT) groups, as listed in the table below. Of these, seven rivers had mark-selective fisheries and two rivers had non-selective fisheries, as follows:

Chinook mark-selective sport fisheries conducted in Puget Sound rivers during 2019.	
River	Season
Nooksack River	September 1 - 30
Cascade River	June 1 – July 15
Skagit River	May 1 – May 31 from the highway 536 bridge; June 1 – July 15
Skykomish River	June 1 – July 31
Carbon River	September 1 – November 30
Puyallup River	August 15 – December 31
Nisqually River	July 1 – November 15
Chinook non-selective sport fisheries conducted in Puget Sound rivers during 2019.	
River	Season
Samish River	August 1 – September 22
Green River	August 20 – November 12

During the 2019 season there were mark-selective sport fisheries targeting hatchery Coho in the rivers of Puget Sound that have PSC Coho CWT exploitation rate indicator stocks or DIT groups on the Wallace River (Skykomish tributary) October 17 through December. A mark selective fishery was open on the Dungeness October 16 through November 30. Recreational non-selective Coho fisheries were conducted on the Nooksack River, Skagit River, Skykomish River (September only), Snohomish River, Snoqualmie River, Cascade River, Green River, Carbon River, Puyallup River, Nisqually River, and Quilcene River.

REFERENCES

Pacific Salmon Treaty (PST) Act of 1985. 2008 Agreement. U.S.-Canada. Public Law 99-5, 16 U.S.C. 3631.

Puget Sound Indian Tribes and Washington Department of Fish & Wildlife (PSIT and WDFW). 2010. Comprehensive Management Plan for Puget Sound Chinook: Harvest Management Component. Northwest Indian Fisheries Commission, Olympia, Washington. 237 p.
Pacific Fishery Management Council (PFMC). 2008. Fishery Regulation Assessment Model (FRAM): An Overview for Coho and Chinook v3.0. Pacific Fishery Management Council, Portland, Oregon. 43 p

Table 15. Preliminary 2019 Landed Chinook Catch for Washington and Oregon Fisheries of Interest to the Pacific Salmon Commission. Values are presented in number of fish rounded to the nearest 100. [9/]

	2019			Landed						
	Preseason [5/]									
Fisheries	Total Mortality [1/]	Landed [2/]	Preliminary Landed	2018	2017	2016	2015	2014	2013	2012
OCEAN FISHERIES										
Commercial Troll										
Neah Bay and La Push (areas 3,4,4B) [3/]	51,300	45,000	39,100	34,000	35,200	28,100	73,600	77,100	63,700	79,400
Columbia Ocean Area and Westport (area 1,2) [4/]	24,400	16,200	3,400	13,800	24,700	14,200	50,900	39,100	28,300	20,600
Sport (see text for quota information)										
Neah Bay (area 4)	6,200	5,500	3,900	3,000	7,300	3,300	8,500	5,900	6,200	5,600
La Push (area 3)	1,000	900	600	400	500	300	2,400	1,600	2,400	1,300
Westport (area 2)	14,200	12,700	2,300	4,900	6,600	8,400	19,100	23,500	13,700	19,500
Columbia Ocean Area (area 1)[13/]	9,200	7,100	4,000	2,200	7,600	6,000	12,200	11,300	8,500	9,100
INSIDE FISHERIES										
Sport [10/]										
Strait of Juan de Fuca (area 5,6)	20,300	11,100	-	16,700	9,810	15,000	11,800	11,100	14,900	13,900
San Juan Islands (area 7)	7,500	4,700	-	7,500	7,000	5,900	8,600	9,200	9,500	5,800
Puget Sound Marine (area 8-13)	29,100	17,200	-	34,400	21,600	16,700	9,000	12,100	16,600	22,000
Puget Sound Rivers [12/]	19,400	18,600	-	8,000	23,700	9,600	11,100	11,800	19,600	23,200
North WA Coastal Rivers	-	-	-	1,600	1,600	600	2,200	1,200	2,700	1,600
Grays Harbor [7/]	3,400	2,700	-	3,700	2,700	2,800	3,400	1,200	3,800	4,600
Columbia River (Spring) [6/]	-	-	2,000	9,100	9,100	14,100	23,100	21,400	8,400	17,000
Columbia River (Summer) [6/]	-	-	-	1,300	3,800	6,800	6,700	2,300	2,100	3,200

Columbia River (Fall) (incl. Buoy 10) [6/]	-	-	21,800	22,400	60,400	65,600	91,300	63,000	74,500	47,000
Commercial[11/]										
Strait of Juan de Fuca net and troll (area 4B,5,6C)	7,700	4,700	1,500	3,100	1,900	700	5,900	6,100	4,000	3,900
San Juan Islands (area 6,7, 7A)	8,500	8,400	3,600	3,900	2,600	100	4,800	6,900	3,800	400
Puget Sound Marine (8-13,7B-D)	45,800	45,000	62,300	70,600	90,600	55,800	33,100	28,400	70,100	75,700
Puget Sound Rivers[12/]	34,600	34,600	37,500	41,600	53,900	23,300	21,200	19,900	26,800	39,500
North WA Coastal Rivers	-	-	11,100	11,000	14,200	9,400	17,200	20,100	14,300	12,800
Grays Harbor (area 2A-2D) [7/]	1,800	1,600	2,400	2,700	3,700	2,100	10,500	5,100	2,900	4,000
Columbia River Net (Winter/Spring) [8/]	-	-	4,700	10,900	8,100	20,400	37,600	28,200	11,200	23,800
Columbia River Net (Summer) [8/]	-	-	5,600	9,500	16,300	23,400	41,700	22,200	15,300	9,500
Columbia River Net (Fall) [8/]	-	-	67,300	63,000	140,600	188,900	343,900	365,900	312,500	119,800

1/ Estimates of total mortality (not adjusted for adult equivalents) include non-retention mortality. Total Mortality is estimated by Fishery Regulation Assessment Model (FRAM) as catch + incidental mortality, where incidental mortality = drop off + non-retention mortality (PFMC 2008).

2/ For the ocean fisheries, this column shows the Chinook troll and recreational quotas used for 2018 pre-season fishery planning as distributed by ocean area (Landing Quotas = Landed). See text for any in-season adjustments.

3/ Includes Area 4B catch during the PFMC management period (May 1 – September 15); Area 4B Treaty troll catch outside PFMC period included under Strait of Juan de Fuca net and troll (October-April).

4/ Includes Oregon troll catch in Area 1.

5/ FRAM modeled pre-season fishery impacts cover the current fishery planning year, for Chinook defined as May 1 through April 30.

6/ Mainstem retained adult sport catch only (upstream to McNary Dam for spring, Priest Rapids Dam for summer and to Hwy 395 for fall). See tables 10, 22-23 in the current Joint Staff Report regarding spring and summer Chinook and tables 25-27 in the annual fall report.

7/ Includes Grays Harbor catch, as well as catch from the Chehalis and Humptulips Rivers and their tributaries for sport and Chehalis and Humptulips Rivers for net estimates.

8/ Mainstem retained catch only, includes tribal C&S and Commercial from all gear types and non-tribal (Columbia River mouth upstream to McNary Dam). Catch data from annual Joint Staff Reports. Winter and spring catch Tables 7 (Tribal) and T18 (non-Tribal). Summer catch is in Table10. Fall catch from annual fall report T21, 23 and 29. http://wdfw.wa.gov/fishing/crc/staff_reports.html.

9/ Includes catch from mark-selective fisheries as shown in table 3.

10/ Sport data for the most recent two years are preliminary. All data subject to change.

11/ Includes non-tribal & tribal commercial, as well as tribal C&S for all gear types.

[12/] Chinook fisheries in Puget Sound Rivers are modeled using the Terminal Area Management Module (TAMM), based upon FRAM output of terminal run sizes. Total Mortality is estimated in TAMM as catch + non-retention mortality (PFMC 2008).

[13/] Includes Oregon sport catch in Area 1.

Table 16. Preliminary 2019 Landed Coho Catch for Washington and Oregon Fisheries of Interest to the Pacific Salmon Commission. Values are presented in number of fish rounded to the nearest 100. [6/]

	2019			Landed						
	Preseason [9/]									
Fisheries	Total Mortality [1/]	Landed [2/]	Preliminary Landed	2018	2017	2016	2015	2014	2013	2012
OCEAN FISHERIES										
Commercial Troll										
Neah Bay and La Push (area 3,4,4B) [3/]	67,800	61,700	55,100	11,900	13,300	-	4,100	60,100	48,500	38,600
Columbia Ocean Area and Westport (area 1,2) [10/]	31,500	23,700	5,900	1,300	1,800	-	4,800	19,000	5,400	2,800
Sport (see text for quota information)										
Neah Bay (area 4)	20,100	16,600	6,200	4,900	3,500	100	7,800	5,600	6,500	7,500
La Push (area 3)	4,900	4,200	1,800	1,000	1,750	-	600	4,600	2,800	2,200
Westport (area 2)	68,800	59,100	20,200	15,400	15,750	-	30,700	54,500	20,400	11,900
Columbia Ocean Area (area 1)[12/]	90,700	79,800	53,500	20,500	21,600	18,600	44,600	75,100	20,500	11,400
INSIDE FISHERIES										
Sport [7/]										
Strait of Juan de Fuca (area 5,6)	25,400	21,800	-	28,500	5,450	200	62,900	63,000	41,300	76,200
San Juan Islands (area 7)	1,100	1,100	-	4,800	100	100	3,700	2,000	2,600	2,200
Puget Sound Marine (area 8-13)	49,800	44,500	-	51,000	35,200	5,200	77,200	59,200	72,100	91,300
Puget Sound Rivers	25,900	24,600	-	18,300	9,000	11,300	18,600	17,900	70,000	43,500
North WA Coastal Rivers	6,000	5,800	-	2,000	4,900	1,600	3,600	8,800	7,200	2,700
Grays Harbor [5/]	14,900	14,200	-	4,000	9,200	3,700	8,200	27,300	21,200	18,300
Columbia River Buoy 10[4/,11/]	58,700	50,000	23,500	6,800	18,800	9,200	36,900	57,700	7,600	7,400

Commercial [8/]										
Strait of Juan de Fuca net and troll (area 4B,5,6C)	2,700	2,700	400	5,000	1,200	700	1,700	2,300	2,700	3,500
San Juan Islands (area 6,7,7A)	10,900	7,500	1,900	4,000	3,400	4,100	3,900	19,800	19,400	10,500
Puget Sound Marine (area 8-13,7B-D)	133,300	130,400	47,000	124,600	134,400	210,900	28,800	108,400	168,500	236,300
Puget Sound Rivers	74,700	73,200	41,500	114,600	63,200	65,400	17,800	73,400	136,000	132,400
North WA Coastal Rivers	47,300	46,300	12,000	22,000	63,500	57,800	18,400	101,400	44,800	39,700
Grays Harbor (area 2A-2D) [5/]	33,100	32,500	7,700	9,800	12,700	3,200	14,700	80,100	30,400	43,400

[1/] Estimates of total mortality include non-retention mortality. Total Mortality is estimated by Fishery Regulation Assessment Model (FRAM) as catch + incidental mortality, where incidental mortality = drop off + non-retention mortality (PFMC 2008).

[2/] For ocean fisheries this column shows the Coho troll and recreational quotas used for 2019 pre-season fishery planning as distributed by ocean area (Landing Quotas = Landed). See text for any in-season adjustments.

[3/] Includes area 4B catch during the PFMC management period (May 1 – September 15); area 4B Treaty troll catch outside the PFMC period included under Strait Juan de Fuca net and troll (October-April).

[4/] Retained catch only. See table 26 in the current Fall Joint Staff report available on line at http://wdfw.wa.gov/fishing/crc/staff_reports.html.

[5/] Includes Grays Harbor catch, as well as catch from the Chehalis and Humptulips Rivers; their tributaries are included in sport estimates only.

[6/] Includes catch from mark-selective fisheries where estimates are available.

[7/] Sport data for the most recent two years are preliminary. All data subject to change.

[8/] Includes Non-Tribal and Tribal commercial and take home, as well as Tribal ceremonial and subsistence (C&S) for all gear types. Starting in 2012, the Copalis, Moclips, and Ozette Rivers have been removed from landed catch.

[9/] FRAM modeled pre-season fishery impacts cover the current fishery planning year, for Coho defined as January 1 through December 31.

[10/] Includes Oregon troll catch in Area 1.

[11/] Sport data are preliminary. For Buoy 10, see tables 25 in the annual fall report.

[12/] Includes Oregon sport catch in Area 1.

Table 17. Mark-Selective Chinook and Coho Fisheries by Area and Year. "Yes" denotes that a mark selective fishery occurred, even if it only occurred in a subset of the fishing area, season, gear type, or user group.

Selective Coho	**2019**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**	**2011**	**2010**	**2009**
Ocean Troll											
Cape Flattery & Quillayute (Areas 3/4)	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Columbia R & Grays Harbor (Areas 1 & 2)	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Ocean Sport											
Neah Bay (Area 4)	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
LaPush (Area 3)	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Grays Harbor (Area 2)	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Col. R. (Leadbetter Pt. to Cape Falcon)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Inside Fisheries											
Sport											
Juan de Fuca (Areas 5 & 6)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
San Juan Islands (7)	no	no	no	no	yes	yes	yes	yes	yes	yes	yes
Puget Sound Sport (Areas 8-13 all year)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
North WA Coastal Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Grays Harbor (Areas 2-2)	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes
Willapa Bay (Area 2-1)	no	no	yes	no	yes	no	no	no	no	yes	no
Columbia River Buoy 10	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Commercial											
North WA Coastal Rivers	no	no	no	no	no	no	no	no	no	no	no
Grays Harbor (Areas 2A-2D)	no	no	no	no	no	no	no	no	yes	yes	yes
Willapa Bay (Area 2-1)	no	no	no	no	no	no	no	no	no	yes	no
Columbia River Net/ - Fall	yes	no	no	no	yes	yes	yes	no	no	no	no
Strait of Juan de Fuca (Areas 4B/5/6C) Net & Troll	no	no	no	no	no	no	no	no	no	no	no
San Juan Islands (Areas 6, 7 & 7A)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Marine (Areas 8 - 13)	no	no	no	yes	no	no	no	no	no	no	no
Puget Sound Rivers	no	no	no	no	no	no	no	no	no	no	no
Selective Chinook	**2019**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**	**2011**	**2010**	**2009**
Ocean Troll											
Cape Flattery & Quillayute (Areas 3/4/4B)	no	no	no	no	no	no	no	no	no	no	no
Columbia. R & Grays Harbor (Areas 1&2)	no	no	no	no	no	no	no	no	no	no	no
Ocean Sport											
Neah Bay (Area 4)	no	no	no	no	yes	yes	yes	yes	yes	yes	no
La Push (Area 3)	no	no	no	no	yes	yes	yes	yes	yes	yes	no
Grays Harbor/Westport (Area 2)	no	no	no	yes	yes	yes	yes	yes	yes	yes	no
Col. R./Ilwaco (Leadbetter Pt. to Cape Falcon)	no	no	no	no	yes	yes	yes	yes	yes	yes	no
Inside Fisheries											

Sport											
Juan de Fuca (Area 5&6)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
San Juan Islands (Area 7)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Sport (Areas 8-13)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
North WA Coastal Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Grays Harbor (Areas 2-2)	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no
Columbia River Sport - Winter/Spring	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Columbia River Sport - Summer	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Columbia River Sport - Fall	yes	no	yes	yes	yes	yes	yes	yes	no	no	no
Willapa Bay (Area 2-1)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Commercial											
North WA Coastal Rivers	no	no	no	no	no	no	no	no	no	no	no
Grays Harbor (Areas 2A-2D)	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no
Willapa Bay (Area 2-1)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Columbia River Net-Winter/Spring	no	no	na	yes	yes	yes	yes	yes	yes	yes	yes
Columbia River Net - Summer	no	no	na	no	no	no	no	no	no	no	no
Columbia River Net - Fall	no	no	no	yes	yes	yes	yes	no	no	no	no
Strait of Juan de Fuca(4B/5/6C) Net & Troll	no	no	no	no	no	no	no	no	no	no	no
San Juan Islands (Areas 6, 7 & 7A)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Marine (Areas 8 - 13)	no	no	no	no	yes	no	no	no	yes	yes	no
Puget Sound Rivers	yes	yes	yes	no	yes	yes	yes	yes	yes	no	no

PRELIMINARY REVIEW OF THE 2019 WASHINGTON CHUM SALMON FISHERIES OF INTEREST TO THE PACIFIC SALMON COMMISSION

This summary report provides a preliminary review of the 2019 U.S. Chum salmon (Oncorhynchus keta) fisheries conducted by Puget Sound salmon co-managers (Puget Sound Treaty fishing tribes and the State of Washington) in the Strait of Juan de Fuca (Salmon Management and Catch Reporting Areas 4B, 5 and 6C), the San Juan Islands and the Point Roberts area (Areas 7 and 7A) (Figure 39), conducted in compliance with provisions of Chapter 6 of Annex IV of the Pacific Salmon Treaty (PST 2019). The harvest and abundance information provided are based on preliminary data reported through November 18, 2019. These preliminary data are subject to correction and revision as additional information becomes available.

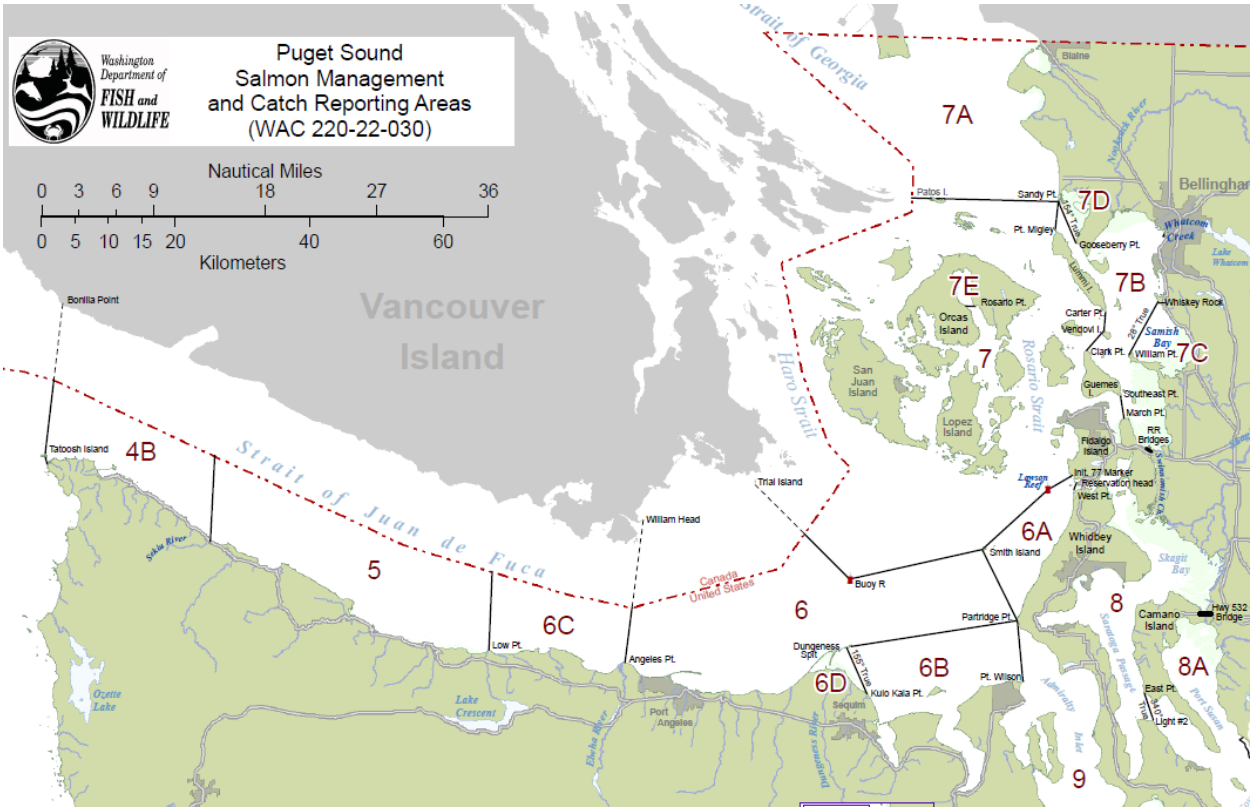

Figure 39. Puget Sound Salmon Management and Catch Reporting Areas with Chum salmon fisheries of interest to the Pacific Salmon Commission.

MIXED STOCK FISHERIES

<u>Areas 4B, 5 and 6C</u>

As in previous years, the 2019 Chum salmon fishery in Areas 4B, 5 and 6C was restricted to limited effort of Tribal fishers using gillnets. The fall Chum-directed salmon fishery opened the week of October 13, with a schedule of six days per week and continued through November 9. A total of 310 Chum salmon were harvested during this period (Table 18). During the fall Chum fisheries in Areas 4B, 5, and 6C, there was a reported by-catch of 6 Coho, 31 Chinook, and zero Steelhead.

Table 18. Preliminary 2019 Chum salmon harvest report for Washington Salmon Catch Reporting Areas 4B, 5, and 6C.

Areas 4B, 5, 6C	
Tribal Gill Net Only	
Time Periods	GN
Through 9/21	0
9/22-9/28	1
9/29-10/5	2
10/6-10/12	193
10/13-10/19	12
10/20-10/26	102
10/27-11/2	0
11/3-11/9	0
11/10-11/16	0
Total	310

Areas 7 and 7A

Chum salmon fisheries in Areas 7 and 7A are regulated to comply with a base harvest ceiling of 125,000 Chum salmon, unless Canada estimates chum stocks migrating through Johnstone Strait ("Inside Southern Chum salmon") are below the critical threshold of 1.0 million (PST 2019). Chapter 6 of Annex IV specifies that U.S. commercial fisheries for Chum salmon in Areas 7 and 7A will not occur prior to October 10. Paragraph 9 (a) specifies run sizes below 1.0 million as critical (estimated by Canada). For Inside Southern Chum run sizes below the critical threshold, Paragraph 10 (b) states the U.S. catch of Chum salmon in Areas 7 and 7A will be limited to those taken incidentally to other species and in other minor fisheries, and shall not exceed 20,000.

On October 7, 2019 Canada notified the U.S. that the Inside Southern Chum aggregate was estimated to be below the critical threshold of 1.0 million and the U.S. was expected to limit chum harvest to incidental and minor fisheries not exceeding 20,000. Following this notification, the U.S. cancelled Area 7 and 7A commercial chum fisheries that were scheduled to open on October 10. Additionally, beginning October 10, the U.S. required chum release from reef net fisheries targeting coho and scheduled the reef net fishery to close on October 16.

Paragraph 9 (d) states that Canada will provide an in-season estimate of Fraser River Chum salmon run size no later than October 22. If that estimate is below 1,050,000, then the U.S. will limit its fishery in Areas 7 and 7A to not exceed a catch of 20,000 additional Chum salmon from the day following notification. On October 16, 2019, Canada notified the U.S. that the Fraser River chum run size was estimated to be below the 1,050,000 fish threshold. Therefore, the U.S. was expected to limit chum harvest to not exceed 20,000 from the day following this notification. Areas 7 and 7A therefore remained closed to commercial chum fisheries through the remainder of the Chum management period.

Non-Tribal reef net fisheries targeting Coho salmon were conducted following the end of Fraser Panel control on September 17 with chum and unmarked coho retention prohibited prior to October 1. Chum salmon by-catch in this fishery was 574. Following notification from Canada on the prohibition of chum salmon retention, reefnets were required to release chum from October 10 through the end of the fishery on October 16.

The total 2019 Chum salmon catch by all gears in Areas 6, 7, and 7A (reported through November 18) was just 612 fish (Table 19). Because no fall Chum salmon-directed fisheries occurred in Areas 6, 7, and 7A, there was no reported by-catch of Coho, Chinook, or zero Steelhead (Table 19).

Table 19. Preliminary 2019 Chum salmon harvest report for Washington Salmon Catch Reporting Areas 6, 7 and 7A.

	Area 6	Area 7				Area 7A			Area 6,7,7A
Time Periods	GN	PS	GN	RN	Area Total	PS	GN	Area Total	Total
Through 9/21		24			24	14		14	38
9/22-9/28					0			0	0
9/29-10/5				6	6			0	6
10/6-10/12				568	568			0	568
10/13-10/19					0			0	0
10/20-10/26					0			0	0
10/27-11/2					0			0	0
11/3-11/9					0			0	0
11/10-11/16					0			0	0
Total	0	24	0	574	598	14	0	14	612
Gear Type Abbreviations: GN=Gill Net; PS=Purse Seine; RN=Reef Net									
10/10- 11/18 By-catch	Coho: 0		Chinook: 0		Steelhead: 0				

PUGET SOUND TERMINAL AREA FISHERIES AND RUN STRENGTH

Pre-season forecasts for Chum salmon returns to Puget Sound in 2019 predicted a fall Chum run size totaling approximately 1,092,085 fish, with 518,645 Chum predicted to return to Hood Canal and 449,345 predicted to return to South Puget Sound. As of the date of this report, in-season estimates indicate that Chum returns to Puget Sound are generally well below forecast. In-season run size estimates from the 2019 fall Chum fisheries in Hood Canal and South Puget Sound indicate that South Sound fall Chum is roughly half of the pre-season forecast and Hood Canal is about two-thirds of that forecast. As of the date of this report, spawning escapement surveys are in progress for most Puget Sound stocks and therefore escapement estimates are not yet available. Early indications from these surveys suggest that a number of natural chum stocks may fail to meet their escapement goals again this year. It is also now evident that a number of fall Chum hatchery programs throughout Puget Sound will likely not achieve their egg-take objectives for 2019.

REFERENCES

Pacific Salmon Treaty (PST) Act of 1985. 2019 Agreement. U.S.-Canada. Public Law 99-5, 16 U.S.C. 3631.

PRELIMINARY REVIEW OF 2019 UNITED STATES FRASER RIVER SOCKEYE FISHERIES

INTRODUCTION

The 2019 Fraser River Panel fishing season was implemented under Annex IV of the Pacific Salmon Treaty (PST 2014), and guidelines provided by the Pacific Salmon Commission to the Fraser River Panel. The treaty establishes a bilateral (U.S. and Canada) Fraser River Panel (Panel) that develops a pre-season management plan and approves in-season fisheries within Panel Area waters directed at sockeye and pink salmon bound for the Fraser River (Figure 40). In partial fulfillment of Article IV, paragraph 1 of the PST, this document

provides a season review of the 2019 U.S. Fraser River salmon fisheries as authorized by the Panel. Catch and abundance information presented is considered preliminary.

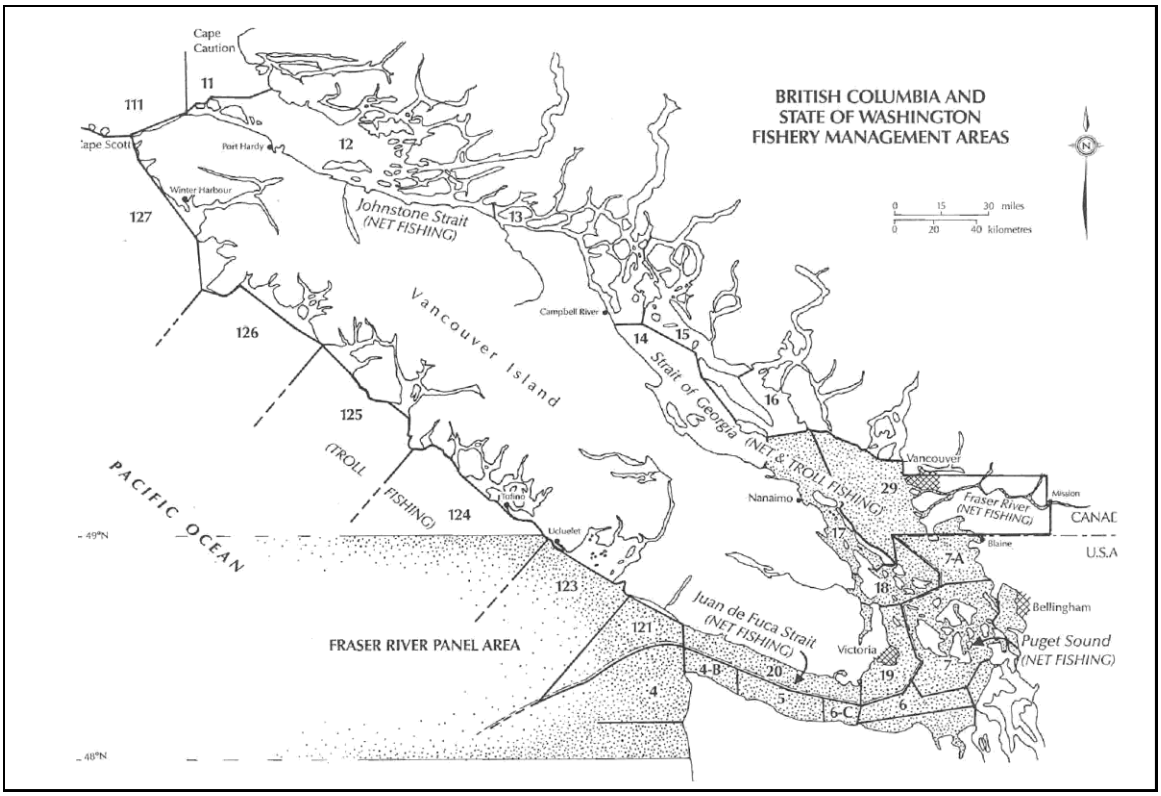

Figure 40. British Columbia and State of Washington Fishery Management Areas, 2019. The shaded area in the figure represents the marine waters managed by the Fraser River Panel.

PRE-SEASON EXPECTATIONS AND PLANS

Forecasts and Escapement Goals

Pre-season run size forecasts and escapement goals by run-timing group (run) at various probability levels were provided to the Panel by the Department of Fisheries and Oceans, Canada (DFO). Table 20 shows the 2019 pre-season sockeye forecasts based on the 50 percent probability level, which represent the mid-point of the range of forecast run sizes. Table 20 also provides the escapement goals for the sockeye run-timing groups based on the pre-season forecast of abundance. The escapement goals for all runs can change in-season as the run size estimates are updated.

Fraser River pink salmon returns were projected pre-season at 5,018,600 fish, with an escapement goal of 4,483,400.

Table 20. 2019 pre-season Fraser River sockeye forecasts and escapement goals by run-timing group.

	Early Stuart	**Early Summer**	**Summer**	**Late**	**Total**
Forecast of Abundance	41,000	465,000	3,930,000	359,000	4,795,000
Escapement Goal	41,000	186,000	1,572,000	336,600	2,135,600

Northern Diversion Rate

Northern diversion rate is defined as the percentage of Fraser sockeye migrating through Johnstone Strait (rather than the Strait of Juan de Fuca) in their approach to the Fraser River. The pre-season forecast for diversion was 69%, which is greater than the 1990-2017 median diversion of 63%. For pink salmon, a pre-season northern diversion rate of 50% was adopted.

Management Adjustment (MA) and Environmental Conditions

Management adjustments (MA) for sockeye salmon reflect the anticipated difference between escapement estimates at Mission (minus catch above Mission) and actual spawning escapements. Adjustments adopted by the Panel are added to the gross escapement goal, effectively increasing the spawner escapement goal for that run-timing group. MAs are modeled using forecasts of environmental conditions and return timing or median historical differences between estimates. Table 21 provides the pre-season projected MAs used for planning fisheries in 2019. In-season management adjustments use MA models that are based on both measured and forecasted temperatures and discharges or, for Late-run sockeye, upstream migration timing.

Table 21. 2019 pre-season proportional management adjustment (pMA) and corresponding proportional difference between estimates (pDBE[1]) for each run-timing group.

Early Stuart		**Early Summer**		**Summer**		**Late**	
pMA	pDBE	pMA	pDBE	pMA	pDBE	pMA	pDBE
0.69	-41%	0.45	-31%	0.09	-8%	0.56	-36%

[1] Early Stuart pDBE = "all years" historical median; Early Summer pDBE = "dominant/subdominant cycle" historical median; Summer pDBE = "all years" historical median; Late pDBE = weighted odd-year median for Lates excluding Birkenhead (-0.58) and all years Birkenhead (-0.27) using p50 forecast abundance.

Run Timing

Run timing is temporal information about the presence of a salmon stock in a specific time and area. Run timing is an important variable when planning fisheries and updating run sizes in-season. The following Area 20 50% dates (the dates when 50% of the run is forecast to have passed through Area 20) were predicted pre-season for the major Fraser River sockeye run groups.

Table 22. 2019 Area 20 median 50% run timing dates and updated pre-season timing forecasts in June.

Run-Timing Group	**Area 20 50% Run-Timing Median Date**	**Area 20 50% Run Timing (June)[1]**
Early Stuart	July 4	July 5
Early Summer	July 30	July 30
Summer	August 10	August 10
Late	August 18	August 18
Pink Salmon	August 28	August 28/25[2]

[1] DFO sockeye run-timing forecast used for Early Stuart and Chilko. All remaining components used the historical median run timing.

[2] The pink run-timing forecast from DFO was not available for the June meeting and pre-season modeling for pink salmon was based on the August 28 median.

U.S. Total Allowable Catch (TAC)

Following Annex IV of the PST, U.S. TAC is calculated as 16.5% of the TAC for international sharing for sockeye salmon and 25.7% for pink salmon. Pre-season, the U.S. TAC was established at 331,800 sockeye and 135,800 for pink salmon. The TAC available by sockeye run-timing group is shown in Table 23.

Table 23. 2019 U.S. total allowable catch (TAC) by run-timing group[1].

Run Timing Group	Pre-season U.S. TAC
Early Stuart	0
Early Summer	22,700
Summer	309,100
Late	0
Total	331,800
Pink Salmon	135,800

[1] Based on Panel-approved final pre-season model run.

Pre-season Management Plans

During the pre-season planning process the Panel evaluates and adopts management approaches for Fraser sockeye that address conservation and harvest objectives for each major run-timing group. The Panel develops fishing plans and in-season decision rules with the objective of meeting management goals. Managing Fraser River sockeye salmon involves a trade-off between catching abundant runs while meeting escapement objectives for less abundant run-timing groups.

In 2019, based on the pre-season forecast, only the Early Summer and Summer run-timing groups had U.S. TAC (Table 23) with the majority of TAC (~95%) in the Summer-run group which was expected to be dominated by the Chilko stock. The U.S. planned to begin fishing relatively early to avoid Late run sockeye which had no U.S. TAC. U.S. fisheries were planned to commence in late July in areas 4B/5/6C and in early August in areas 6/7/7A to target the Summer-run group while also harvesting co-migrating Early-Summer run sockeye and pink salmon.

IN-SEASON MANAGEMENT

In-season, the Pacific Salmon Commission staff analyzes a variety of information to produce best estimates of northern diversion, management adjustments, timing, abundance, and harvest by run-timing group. Stock identification information (both genetic data and scales), age data, test fishing data, escapement counts past Mission, harvest data, and environmental information are all used to provide in-season estimates that are critical to the Fraser Panel for making management decisions.

Run Assessment

The final in-season total sockeye abundance estimate adopted by the Fraser River Panel in 2019 was 500,000 (Table 24), which was about 10% of the pre-season forecast. This is the lowest sockeye return to the Fraser River since record keeping began. All run-timing groups returned below their pre-season forecast. The return of Summer-run sockeye, the group with the largest pre-season forecast, was only 9% of the pre-season forecast.

The 2019 Fraser sockeye run timing varied across run-timing groups. The Early Stuart run was three days later than the pre-season forecast, while the Early Summer run was one day early. Summer-run sockeye had the greatest discrepancy from expected pre-season forecast timing, arriving nine days later than expected, while Late-run sockeye returned one day late (Table 25). Fraser pink salmon were eleven days early relative to the pre-season median timing and eight days earlier than the in-season forecast provided by DFO.

Table 24. Comparison of 2019 pre-season to final adopted in-season abundance estimates for Fraser River sockeye salmon, by run-timing group.

Run Timing Group	Pre-Season 50% Probability Forecast	In-Season Run SizeEstimate[1]	Comparison: In-Season /Pre-Season
Early Stuart	41,000	26,000	63%
Early Summer	465,000	94,000	20%
Summer	3,930,000	360,000	9%
Late	359,000	20,000	6%
Total Sockeye	4,795,000	**500,000**	**10%**
Pink Salmon	5,018,600	8,900,000	173%

[1] As of September 24, 2019.

Table 25. Comparison of 2019 preliminary 50% run-timing dates through Area 20 to in-season estimates.

Run-Timing Group	Pre-season 50% Run- Timing Date	In-season 50% Run- Timing Date
Early Stuart	July 5	July 8
Early Summer	July 30	July 29
Summer	August 10	August 19
Late	August 18	August 19
Pink Salmon	August 28/August 25	August 17

Season Description

The Fraser Panel held 22 regular meetings either in-person or by conference call from July 9 through September 17 (usually on Tuesdays and Fridays) to receive updates from PSC staff on the abundance and timing of the sockeye and pink salmon returns and to review migration conditions in the Fraser River watershed. In 2019, a major landslide on the Fraser River at Big Bar (83 km north of Lillooet, B.C. by river) drastically altered flow conditions in-river limiting fish passage through the area. Water temperature and flow conditions however were not a major factor affecting management decisions in 2019 because of the extremely low number of sockeye returning. The last Fraser Panel in-season meeting was on September 17. Table 26 summarizes changes to run sizes made by the Fraser Panel during the 2019 season and the effect on U.S. TAC.

The following summarizes the major decisions related to U.S. fishing during the 2019 season. Prior to the first U.S. commercial fishery opening, the Panel reduced the adopted run sizes for all sockeye run-timing groups significantly and there was no U.S. TAC for sockeye after the August 13 Panel meeting. Therefore, all U.S. commercial fisheries in 2019 were pink-directed fisheries.

Week ending August 23, 2019

The first panel-approved U.S. commercial fishery opening was from August 21 to August 23 in areas 4B/5/6C and 7/7A for Treaty Indian fishers. The pink run size increased to 7,400,000 on August 23. The pink salmon northern diversion rate remained low at 4%.

Week ending August 30, 2019

The first All Citizens purse seine and gillnet fisheries were opened in areas 7/7A (excluding the apex) on August 24 and 25. The Treaty Indian fishery in areas 4B/5/6C was open from August 24-28. Treaty Indian and All Citizens reefnet fisheries were open in Area 7 on August 25 and 26. The Panel agreed to a provisional pink salmon run size of 5.0 million on August 27, reducing the U.S. TAC below the already landed catch. No further U.S. fisheries were planned. The pink salmon diversion rate increased to 59%. Purse seine test

fisheries in areas 12 and 20 finished on August 30, therefore no additional marine CPUE or diversion rate estimates were available for the remainder of the 2019 season.

Week ending September 6
No changes were made to the sockeye or pink salmon run sizes and U.S. fisheries remained closed.

Week ending September 13
On September 12, the Panel approved run size updates for all sockeye run timing groups and the pink salmon run size increased to 8,900,000, which increased U.S. pink salmon TAC and allowed for additional fisheries. All Citizens gillnet and purse seine fisheries were open in Area 7 on September 13 and in Area 7A (excluding the apex) on September 13 and 14 with the September 14 fishery opening having reduced hours. All Citizens and Treaty Indian reefnet fisheries were open in Area 7 on September 13 and 14. Treaty Indian fisheries in areas 4B/5/6/6C were open from September 15-16. No additional U.S. fisheries were planned thereafter.

The Fraser Panel relinquished control of U.S. fishery areas as follows:

- Areas 4B/5/6/6C/7 on 11:59 p.m. September 17, 2019,
- Area 7A (excluding the apex) on 11:59 p.m. September 21, 2019, and
- Area 7A (apex area) on 11:59 p.m. October 5, 2019.

Table 26. Summary of changes to Fraser River sockeye and pink salmon run sizes adopted by the Fraser Panel during the 2019 season and U.S. TAC.

Meeting Date	Run-Timing Group	Change Made	U.S. TAC	
			Sockeye	Pink
Pre-season			331,800	135,800
July 19, 2019	Early Stuart	decreased to 27,000	331,800	135,800
August 2, 2019	Early Summer	decreased to 221,000	308,900	135,800
August 9, 2019	Early Summer	decreased to 112,000	312,800[1]	135,800
August 13, 2019	Summer	Decreased to 1,065,000	0	136,200
August 16, 2019	Early Summer Summer Late	Decreased to 85,000 Decreased to 224,000 Decreased to 111,000	0	136,200
August 20, 2019	Early Summer Summer	Increased to 90,000 Increased to 400,000	0	131,600
August 23, 2019	Late Pink	Decreased to 40,000 Increased to 7,400,000	0	353,800
August 30, 2019	Pink	Decreased to 5,000,000	0	130,500
September 12, 2019	Early Stuart Early Summer Summer Late Pink	Decreased to 26,000 Increased to 94,000 Decreased to 360,000 Decreased to 20,000 Increased to 8,900,000	0	739,300

[1] Despite the Early-summer run size decreasing, the TAC increased due to revised test fishing deductions

Harvest

Based on the pre-season forecasts, U.S. harvest opportunities in 2019 was anticipated to be good for sockeye given the "sub-dominant" cycle return with ~ 332,000 sockeye available for U.S. harvest. However, pink

salmon harvest was expected to be modest with only ~136,000 U.S. TAC. From the beginning of in-season assessments, sockeye failed to meet pre-season expectations. On August 13th, the Summer run size was downgraded from 3,930,000 to 1,065,000 which eliminated all U.S. sockeye TAC. Pink-directed Treaty Indian fisheries which started on August 21, requested fishers to make all efforts to release sockeye alive, and All Citizens fisheries required sockeye release. In those fisheries 470 sockeye were harvested by Treaty Indian fishers and landed for C&S purposes (Table 27). Thereafter, sockeye were required to be released from pink-directed Treaty Indian fisheries due to the extremely low in-season abundance of sockeye. The pink salmon run size varied throughout the season and eventually increased to 8,900,000 on September 12, 2019. However, despite additional All Citizens and Treaty Indian fisheries following this run size increase, most of the returning pink salmon had passed through U.S. waters. A total of 232,904 Fraser pink salmon were harvested in U.S. fisheries in 2019 (Table 28). Of this, 159,380 pink salmon were harvested in the Treaty Indian fishery (68%) and 73,524 in the All Citizens fishery (32%). Treaty Indian commercial fisheries were open for 10 days in areas 4B/5/6C and 4 days in 7/7A. All Citizens fisheries were open for 4 days for each gear type.

Table 27. Preliminary summary of 2019 U.S. catches of Fraser River sockeye salmon in Panel area waters.

	Treaty Indian	All Citizens
Ceremonial and Subsistence (all areas)	470	0
Commercial Catch in Areas 4B/5/6C	0	0
Commercial Catch in Areas 6/7/7A	0	0
Total Catch	470	0
% of U.S. Catch	100%	0%

Table 28. Preliminary summary of 2019 U.S. catches of Fraser River pink salmon in Panel area waters.

	Treaty Indian	All Citizens
Ceremonial and Subsistence (all areas)	0	0
Commercial Catch in Areas 4B/5/6C	0	0
Commercial Catch in Areas 6/7/7A	159,380	73,524
Total Catch	159,380	73,524
% of U.S. Catch	68%	32%

The 2019 Fraser sockeye and pink salmon season presented many management challenges:

- The sockeye salmon return was only 10% of the pre-season forecast and the lowest on record (<500,000 fish).
- The run timing for the Summer run (August 19) was the second latest recorded and affected the scheduling of pink-directed fisheries in order to reduce sockeye impacts.
- The run timing for the pink salmon run (August 19) was the earliest recorded which also affected the scheduling of pink-directed fisheries in order to reduce sockeye impacts.
- The migration time of pink salmon from Area 20 to the Fraser River appears to have been the longest ever observed at > 20 days.

C. 2019 POST-SEASON REPORT FOR CANADIAN TREATY LIMIT FISHERIES

INTRODUCTION

The chapters in Annex IV of the Pacific Salmon Treaty outline the joint conservation and harvest sharing arrangements between Canada and the United States of America (U.S.) for key stocks and fisheries subject to the Treaty. 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. Chapter 4 (Fraser River Sockeye and Pink) expired on December 31, 2019. 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 2020 and will remain in place for 9 years, bringing Chapter 4 into alignment with the five other fishing Chapters under the PST.

Annex fisheries are reported in the order of the Chapters of Annex IV. Comments begin with expectations and management objectives, escapements (where available and appropriate) and catch results by species. The expectations, management objectives, catches and escapements focus on those stocks and fisheries covered by the Pacific Salmon Treaty.

Annually, DFO releases a Salmon Outlook document which is referenced in various sections of this report; this document provides a categorical indication of salmon production (using a 4 point rating scale), and associated fishing opportunities by geographic area and species stock groups called an Outlook Unit for the coming season. Pre-season quantitative forecasts are documented where they are produced.

The catch information reported in this document provides the best information available to September 30, 2019. The catches are based on in-season estimates (hailed statistics); on-grounds counts by DFO, logbooks, dockside tallies, landing slips (First Nation fisheries), fish slip data (commercial troll and net), creel surveys and observers (recreational and commercial). Table 39 summarizes 2003-2019 catches in Canadian fisheries that have at some time been under limits imposed by the Pacific Salmon Treaty. All Southern commercial, recreational, First Nations, Excess Salmon to Spawning Requirements (ESSR) and test fisheries are reported in appendices at the end of this report.

TRANSBOUNDARY RIVERS

STIKINE RIVER

Following the 2019 pre-season meeting of the Transboundary Panel, Canada developed its fishing strategy for Stikine River salmon fisheries based on the catch sharing and management arrangements outlined in Annex IV, Chapter 1 of the Pacific salmon Treaty (PST). The 2019 Canadian Stikine River salmon fishery management approach was designed to achieve the spawning escapement targets and the following harvest objectives: 1) to harvest 47% of the total allowable catch (TAC) of Stikine River Sockeye Salmon in existing fisheries; 2) to allow additional harvesting opportunities for Sockeye that were surplus to spawning requirements; and 3) to harvest up to 5,000 Coho Salmon through a directed fishery. A pre-season forecast of 8,300 Chinook was below the PST threshold run size of 24,500 which did not allow for a directed Chinook fishery in 2019. The low forecast abundance of Chinook salmon also resulted in the cancellation of the 2019 Chinook assessment fishery.

The 2019 Canadian Stikine River commercial fishing season opened on June 25 (statistical week 26) and ended September 7 (statistical week 36). From statistical weeks 26 through 29 a directed Sockeye fishery was

followed by a directed Coho fishery which began in statistical week 35 and ended in statistical week 36. No commercial harvest opportunity was provided during statistical weeks 30 through 34 due to low abundance of non-Tahltan Lake origin Sockeye Salmon.

Commercial fishing gear permitted for the 2019 season was limited to one 135-metre (443 ft.) gill net per licence holder. The maximum mesh size permitted was 140 mm (5.5") through July 20, followed by a maximum mesh size of 204 mm (8"). The lower Stikine commercial fishing zone covered the area from the international (U.S./Canada) border upstream to near the confluence of the Porcupine and Stikine Rivers, and also included the lower 10 km (6 mi.) reach of the Iskut River.

In the upper Stikine River commercial fishery, located upstream from the Chutine River, fishing periods generally mirrored those in the lower Stikine River commercial fishery, but lagged by one week. Each commercial fishery licence holder was permitted the use of one net. As in past years, the commercial fishing area was located upstream of the Chutine River to the mouth of the Tuya River. The Canadian First Nation Food, Social, and Ceremonial (FSC) fishery located near the community of Telegraph Creek, British Columbia (BC) was active from June to the first week of August, with no time or gear restrictions imposed in 2019. To facilitate Chinook salmon conservation, efforts were implemented within the First Nation FSC to minimize Chinook salmon catch.

Canadian recreational fishery effort was effectively absent in 2019 due to area, retention, and size restrictions for the duration of the Chinook salmon season. Opportunities were provided for Coho salmon but effort is generally low during the late summer and fall in the recreational fishery.

CHINOOK SALMON

The pre-season forecast of 8,300 large (i.e. fish with a mid-eye to fork length of > 660mm (~26") or a fork length of > 735mm (~29")) Chinook Salmon, as developed by the Canada/U.S. Transboundary Technical Committee (TTC), (TTC)did not result in a total allowable catch allocation that could accommodate directed fisheries. The current, bilaterally recognized fishery management strategy, specifies that a pre-season forecast run size of < 24,500 precludes either Canada or the U.S. from prosecuting a directed fishery. Specific management provisions were implemented within all Canadian fisheries to minimize the likelihood of interception of Chinook salmon in 2019.

The 2019 total Canadian fishery catch of Chinook salmon was 333 large Chinook salmon and 237 jacks (which occurred exclusively within the First Nation FSC fishery). This was well below the 10-year average of 2,300 large Chinook salmon and 1,000 jacks. No Chinook Salmon were harvested within the 2019 recreational or commercial fisheries as retention was prohibited.

The post-season estimate of the 2019 Stikine River Chinook Salmon terminal run was approximately 14,300 large Chinook salmon. Accounting for the total Canadian catch of Chinook Salmon, the total system-wide spawning escapement was estimated at approximately 13,800 large Chinook Salmon. The Chinook salmon escapement estimate of 13,800 is 21% below the target SMSY escapement goal of 17,400 large Chinook salmon and did not achieve the lower end of the escapement goal range.

SOCKEYE SALMON

The forecast for Stikine River Sockeye Salmon, as developed by the TTC, was for a terminal run size of 90,000 fish including: 66,000 Tahltan Lake origin Sockeye salmon (30,000 wild and 36,000 enhanced) and 24,000 non-Tahltan wild Sockeye Salmon. The 2019 Stikine River Sockeye Salmon terminal run size forecast was below the 10-year average terminal run size of approximately 120,000 fish.

The combined harvest of 2019 Stikine River Sockeye Salmon in Canadian fisheries was 16,213, which is below the 10-year average of 47,000 fish. The lower Stikine River commercial fishery harvested 10,772

Sockeye, while the upper Stikine River commercial and First Nation FSC fisheries harvested a total of 40 and 5,401 Sockeye Salmon respectively. The estimate of the total contribution of Sockeye Salmon from the Canada/U.S. Stikine Sockeye enhancement program to the combined Canadian harvest was approximately 7,600 fish (or 47% of the total harvest). The Sockeye Salmon stock assessment test fishery was not conducted in 2019.

A total of 36,999 Sockeye Salmon returned to Tahltan Lake in 2019. The 10-year average is 26,800, while the escapement goal range is 18,000 to 30,000 fish. An estimated 20,300 of the fish counted (55%) originated from the bilateral Stikine Sockeye Salmon enhancement program. A total of 3,579 Sockeye Salmon were collected for broodstock to support the Stikine Sockeye Salmon enhancement program while 212 fish were removed for stock identification purposes. It is estimated that approximately 33,000 fish successfully spawned in Tahltan Lake during 2019. The total estimated run size of 59,000 Tahltan Lake Sockeye Salmon was approximately 11% below the pre-season expectation of 66,000 fish.

The spawning escapement for the non-Tahltan Sockeye Salmon stock group is calculated using stock identification, test fishery and in-river commercial catch and effort data. Historical non-Tahltan contributions to the overall run was used as the principal tool in estimating the spawning ground escapement of the non-Tahltan Lake stock grouping in 2019. The escapement estimate for 2019 was 23,200 non-Tahltan Sockeye Salmon. The non-Tahltan spawning escapement estimate was within the escapement goal range of 20,000 to 40,000 and was slightly above the 10 year average of 22,500 fish.

Based on the in-river run reconstruction of the Tahltan Lake Sockeye Salmon run expanded by run timing, along with stock identification data from lower river assessment projects and estimated harvests of Stikine River Sockeye salmon in U.S. terminal gill net fisheries, the post-season estimate of the terminal Sockeye salmon run size is approximately 89,400 fish. This estimate includes 58,700 Tahltan Lake origin fish and 30,700 Sockeye Salmon of the non-Tahltan stock group. The 2019 Stikine River Sockeye Salmon run was below the 10-year average terminal run size of ~152,000 Sockeye Salmon and is near the preseason forecast of 90,000 fish.

Based on the post-season run size estimate, Canada was allocated an allowable catch of approximately 16,600 Stikine River Sockeye Salmon. The total Canadian fishery harvest of Stikine River Sockeye Salmon in 2019 was 16,213.

COHO SALMON

The total Canadian fishery harvest of Coho Salmon in 2019 was 5,228. All Coho Salmon were harvested during the directed Coho Salmon fishery in statistical weeks 35 to 36. The total Canadian fishery harvest was below the recent 10-year average of 5,548 fish.

A Coho Salmon test fishery was not conducted in 2019. The CPUE observed in the targeted Coho Salmon fishery was near average for statistical weeks 35 to 36. Aerial surveys of six index spawning sites yielded below average counts observed under excellent viewing conditions but it was felt that the surveys were conducted after the peak spawning period.

JOINT SOCKEYE SALMON ENHANCEMENT PROGRAM

Joint Canada/U.S. enhancement activities continued from 2018 through 2019 with the collection of Sockeye Salmon eggs from Tahltan Lake in British Columbia, transportation of eggs to the Snettisham Hatchery in Alaska where they were raised to fry, and subsequent transportation and release at out-plant sites in British Columbia.

From May 16 to May 18, 2019 approximately 1.9 million fry were out-planted into Tahltan Lake. All fry originated from the 2018 egg-take and were mass-marked at the Snettisham hatchery with thermally induced

otolith marks. Green egg to released fry survival was approximately 83%. No fry reared at the Snettisham hatchery was lost due to Infectious Hematopoietic Necrosis virus (IHNv). Sockeye Salmon enhancement programs have been subject to IHNv outbreaks before as the disease is naturally occurring in Stikine Sockeye Salmon stocks.

For 2019, the agreed bilateral Stikine River Enhancement Production Plan (TEPP) identified collection of 5.0 million Sockeye Salmon eggs from Tahltan Lake for transport to Snettisham Hatchery in Alaska for incubation and thermal marking. In the fall of 2019, the Sockeye Salmon egg collection target was revised to 4.5 million eggs to respect the projected 50/50 wild/enhanced fry population in Tahltan Lake as a result of adult escapement above the upper end of the spawning escapement goal. A total of 4.4 million sockeye salmon eggs were successfully collected and transported to Snettisham Hatchery. As in previous years additional efforts beyond beach seining were employed to acquire brood stock including angling and temporarily holding female Sockeye Salmon brood stock to mature in floating net pens in Tahltan Lake.

TAKU RIVER

Following the 2019 pre-season meeting of the Transboundary Panel, Canada developed its fishing strategy for Taku River salmon fisheries based on the catch sharing and management arrangements outlined in Annex IV, Chapter 1 of the Pacific Salmon Treaty (PST). Accordingly, the Canadian fishery strategy incorporated specific conservation considerations and contained the following harvest objectives: 1) to harvest 20% of the TAC of Taku River Sockeye Salmon (adjusted as necessary according to projections of the number of enhanced Sockeye), plus harvest any salmon in excess of spawning and brood stock needs; 2) to harvest enhanced Taku River Sockeye Salmon incidentally to wild Sockeye Salmon; and, 3) to harvest 5,000 Coho Salmon plus Canada's share of the TAC and any salmon surplus to spawning needs in a directed Coho Salmon fishery.

The 2019 commercial fishing season on the Taku River opened on July 2 (statistical week 27), and closed on October 15 (statistical week 42). Fishing area and gear restrictions were as per recent years, and incorporated the maximum gill net length of 36.6 metres, established in 2008 for drift gill nets and in 2009 for set gill nets.

The Taku River commercial fishing area in Canada consists of the mainstem of the river from the international border upstream approximately 18 km (11 mi.), to a geological feature known locally as Yellow Bluff. Nearly all commercial fishing activity takes place in the lower half of this area, downstream of the Tulsequah River / Taku River confluence.

The First Nation Taku River FSC fishery is primarily located in the lower Taku River in the same area as the Canadian commercial. Small numbers of fish are also harvested on the lower Nakina River and at the outlet of Kuthai and King Salmon lakes.

Canadian recreational fishery effort was largely absent in 2019 due to area, retention, and size restrictions for the duration of the Chinook salmon season. Restrictions were implemented within the recreational fishery to prohibit the harvest of Taku River Chinook Salmon as abundance was well below the minimum spawning escapement requirement. Recreational fishing for Coho salmon did not require additional restrictions in 2019 to address conservation concerns.

CHINOOK SALMON

The bilateral pre-season forecast was for a terminal run of 9,100 large Chinook Salmon, approximately 58% below the previous 10-year average of 21,700 fish. A run size of 9,100 fish was well below the SMSY escapement goal of 25,500 fish (below the lower end of the escapement goal range of 19,000 to 36,000), and as a result, there was no allowable catch (AC) for either the U.S. or Canada. In response, Canada did not prosecute a directed commercial Chinook salmon fishery. Additionally, significant efforts were made in all other fisheries to avoid the incidental harvest of Chinook salmon. For 2019, the in-river Chinook assessment

fishery was not conducted to allow for the maximum number of Chinook salmon to pass to the spawning grounds.

The catches of large Chinook salmon in the Canadian fisheries were: 0 large Chinook salmon harvested in the directed commercial Sockeye and Coho Salmon fisheries; 10 large Chinook salmon in the First Nation FSC fishery; and 0 large Chinook salmon in the recreational fishery. The total base level and test/assessment fishery harvest of 10 large Chinook salmon was well below the allowance of 2,900 fish.

The Taku River large Chinook salmon spawning escapement estimate for 2019 was approximately 11,600 fish, which was well below the SMSY target of 25,500 and the goal range of 19,000 to 36,000. The previous 10-year average spawning escapement was 17,800 large Chinook.

The total Canadian catch of large Chinook salmon was 10, which was well below the 10-year average of approximately 2,000 fish (excluding test/assessment fisheries).

SOCKEYE SALMON

The Canadian pre-season run outlook for wild Sockeye salmon was 154,000 fish, approximately 15% below the previous 10-year average total run size of 181,000 fish. In addition, approximately 2,500 adult Sockeye Salmon of Tatsamenie Lake origin were expected to return from fry out plants associated with the Canada/U.S. joint Taku Sockeye salmon enhancement program. The forecasted return of enhanced Tatsamenie Lake origin Sockeye Salmon was considered to be a below average return.

The Canadian Sockeye Salmon catch was 21,500 fish, of which 21,395 were taken in the commercial fishery, 105 in the First Nation FSC fishery, and 0 in assessment/test fisheries. This harvest was 8% below the 10-year average total of 23,400 fish, with the contribution of Sockeye salmon from the bilateral enhancement program estimated at 425 fish (2% of the total Canadian catch).

To reduce incidental harvest of Chinook salmon, the directed Sockeye Salmon fishery commenced 16 days late on July 2 (statistical week 27). Additionally, the use of set nets was not permitted for the first opening and fishers were not permitted to retain incidentally-caught Chinook salmon in the directed Sockeye Salmon fishery. The maximum permissible mesh size in the first three weeks of the directed Sockeye Salmon fishery was 140 mm (5.5”) which was intended to reduce the gilling of large Chinook salmon and permit release. Projections of the total wild Sockeye salmon run size, TAC, and total escapement were made weekly throughout the fishing season. As in past years, projections were based on the joint mark-recapture program, the estimated catch of Taku River Sockeye Salmon in U.S. fisheries, the catch in the Canadian fishery, and historical run timing information. The post-season run size estimate is 166,000 fish (comprising 162,000 wild and 4,000 enhanced Sockeye Salmon). Subtracting the interim (2019) escapement target of 59,000 from the wild run of 162,000 fish resulted in a TAC of approximately 103,000 wild fish. The Canadian allowable catch, based on a 20% harvest share (which in turn is associated with an enhanced return of 1 to 5,000 fish), was 20,600 wild fish; the actual catch was 21,055, representing 20% of the TAC. Under new Chapter 1 provisions for 2019, Canada was able to harvest any surplus fish above spawning and brood stock needs.

The estimated spawning escapement of wild Sockeye salmon in the Canadian section of the Taku River was 75,000 fish which was above the interim escapement goal range of 55,000 to 62,000 fish.

COHO SALMON

The catch of 12,252 Coho salmon (12,145 commercial and 107 First Nation FSC) was 29% above the 10-year average of 9,500 fish. The catch during the directed commercial/assessment Coho salmon fishery, i.e. after statistical week 33, was 9,746 fish. Based on the mark-recapture program, the bilateral estimate of the run into Canada is approximately 95,000 fish. In accordance with the new PST provisions beginning in 2019, a run size of this magnitude afforded Canada an allocation of approximately 25,000 Coho Salmon. The post-

season spawning escapement estimate is 83,000 fish, which is near the 10-year average of 82,000 fish. The 2019 escapement was above the target of 70,000 fish and within the escapement goal range of 50,000 to 90,000 fish.

JOINT SOCKEYE SALMON ENHANCEMENT PROGRAM

Joint Canada/U.S. enhancement activities continued from 2018 through 2019 with Sockeye salmon fry hatched at Snettisham Hatchery in Alaska transported back to Tatsamenie Lake, British Columbia (where these fish were collected as eggs in 2018). On May 19, 2019, approximately 1.4 million emergent Sockeye salmon fry were out-planted into Tatsamenie Lake from the 2.3 million eggs collected in 2018. No losses were experienced from Infectious Hematopoietic Necrosis virus (IHNv) for the eggs collected in 2018. In addition, as part of an extended rearing project, approximately 370,000 fry were released into net pens for rearing between May 25 and June 14. Net pen reared fry were released at approximately 2.1 grams on June 22 and July 5. Smolt production for 2019 was above average with an estimate of 1.7 million coming off a strong brood year in 2018. Analysis to determine the origin of smolts is underway in order to inform annual release strategies.

As a result of the large return of sockeye salmon to King Salmon Lake in 2019, the planned enhancement (egg take) program did not proceed. The success of natural production in a "high escapement" year will be evaluated to inform future enhancement program considerations.

For 2019, the agreed bilateral Taku River Enhancement Production Plan (TEPP) identified collection of up to 3.0 million Sockeye Salmon eggs from Tatsamenie Lake and 500,000 eggs from Little Trapper Lake for transport to Snettisham Hatchery in Alaska for incubation and thermal marking. Approximately 2.3 million Sockeye Salmon eggs were collected from Tatsamenie Lake and approximately 400,000 Sockeye Salmon eggs were collected from Little Trapper which was hampered by high brood stock holding mortality. The resulting fry will be released to Trapper Lake, upstream of a barrier, to establish a small escapement of salmon for barrier passage evaluation. Barrier removal project plans were established in 2016 and are ongoing in support of a potential Sockeye Salmon enhancement program for Trapper Lake.

ALSEK RIVER

Although catch sharing provisions for Alsek River salmon stocks between Canada and the U.S. have not yet been established, Annex IV, Chapter 1 of the Pacific Salmon Treaty calls for the development and implementation of cooperative abundance-based management plans and programs for Alsek River Chinook and Sockeye Salmon. In 2013, escapement goal ranges for Alsek River Chinook and Sockeye Salmon were recommended by the Transboundary Panel, these are: 3,500 to 5,300 Chinook salmon and 24,000 to 33,500 Sockeye Salmon. Additionally, the escapement targets were revised for Klukshu River Chinook and Sockeye Salmon; these are: 800 to 1,200 Chinook and 7,500 to 11,000 Sockeye. The principal escapement-monitoring tool for Chinook, Sockeye, and Coho Salmon stocks on the Alsek River is the Klukshu weir, in operation since 1976 by DFO in collaboration with the Champagne and Aishihik First Nations (CAFN).

The development of basin-wide stock assessment programs are being investigated as part of the development of abundance-based management regimes and to accurately assess whether the escapement goals for Alsek River Chinook and Sockeye Salmon stocks achieve sustainable stock conservation objectives. At this time, there are no programs in place to estimate the Coho Salmon returns or spawning escapement to the Alsek River watershed. A proportion of Chinook and Sockeye Salmon spawning escapement to the Alsek River watershed is enumerated at the Klukshu River using video enumeration techniques. Current escapement monitoring programs include the Klukshu River, Village Creek Sockeye Salmon enumeration, and post-season run reconstructions using genetic stock identification analyses which allow for annual comparisons of escapement indices. The most reliable long-term comparative escapement index for Alsek River drainage salmon stocks is the Klukshu River count. Chinook salmon stock assessment feasibility projects are being

conducted on the Blanchard and Takhanne Rivers to develop an improved understanding of Alsek River Chinook Salmon production.

The harvest estimate for the 2019 Canadian Alsek River First Nation FSC fishery was 32 Chinook, 648 Sockeye and 0 Coho Salmon. The Champagne and Aishihik First Nations encouraged their members to reduce salmon fishing effort in their traditional territory in response to the poor pre-season forecasts for Chinook and Sockeye Salmon. The 10-year average harvest in the Canadian First Nation FSC fishery on the Alsek River is 61 Chinook, 1,034 Sockeye, and 16 Coho Salmon, although noting that this most recent period has experienced significant reductions in Chinook and Sockeye Salmon returns (and associated fishery harvests). 2019 catch estimates for the Alsek River recreational fishery were 5 Chinook salmon retained, and 5 Sockeye Salmon retained. Notably, the retention of Chinook and Sockeye Salmon in the recreational fishery was not permitted for the majority of the 2019 the season in response to the poor pre-season forecasts and early in-season run abundance information. Approximately 10 Coho Salmon were harvested in the recreational fishery.

The 2019 count and escapement estimate for Klukshu River Sockeye Salmon was 19,073 and 18,749 fish. The count and escapement estimate were both below the 10-year average of 11,000 and 10,800, respectively. Sockeye Salmon spawning escapement was above the upper end of the escapement goal range. The Sockeye Salmon count at Village Creek was 1,497 fish; compared to the recent 10 year average of 700 fish.

The most reliable comparative Chinook salmon escapement index for the Alsek River drainage is considered to be the Klukshu River count. The Chinook salmon count and escapement estimate in 2019 was 1,589 and 1,573 fish, above the average of 1,200 and 1,170 fish respectively. Chinook salmon spawning escapement was above the upper end of the escapement goal range in 2019.

The Klukshu River Coho Salmon count was 2,180. The 2019 count, as in past years, is not considered a complete indicator of run strength as the assessment program is not operated for the entire duration of the Coho Salmon return to the Klukshu River.

NORTHERN BC

NORTHERN BC CHINOOK AGGREGATE ABUNDANCE-BASED MANAGEMENT (AABM) FISHERIES

OBJECTIVES AND OVERVIEW

Escapements of Northern Chinook salmon have declined in recent years. Reduced survival rates and reduced productivity have been observed across British Columbia and South East Alaska. Conservation measures were implemented in 2019 salmon fisheries in response to declines in Chinook salmon abundance. Chinook salmon fisheries implemented in Northern BC under the PST AABM management regime include the Northern British Columbia troll and Haida Gwaii recreational fisheries.

These fisheries are managed to an annual total allowable catch (TAC) based on the forecast abundance of the aggregate of stocks that contribute to each fishery. In Canada, conservation is the first priority in fisheries management. Once conservation obligations are met, priority access is given to First Nations for food, social, ceremonial, and treaty requirements. Once those obligations are met, priority access to Chinook salmon is provided to the recreational fishery, with commercial fisheries next in priority. Management constraints to the fishery include management for stocks of conservation concern, minimizing encounters of undersized Chinook Salmon and non-target species and minimizing fisheries where legal and sublegal-sized Chinook Salmon have to be released.

STOCK STATUS

The pre-season distribution of the NBC AABM TAC by fishery is shown in Table 29 below. The total Chinook catch in the Area F Troll fishery and recreational fishery can be found in Table 41.

Table 29. Pre-Season Total Allowable Catch Estimate for NC AABM Chinook

	Pre-Season	In-Season
NC BC Troll AABM and Haida Gwaii Sport Abundance Index	0.96	-
NC BC Troll AABM and Haida Gwaii Sport Chinook TAC	124,800	-
NC BC Troll AABM Chinook TAC	88,400	Actual catch: 42,801
Haida Gwaii Sport Chinook TAC	36,400	Actual catch: 45,200
Total NBC AABM	124,800	Actual catch: 88,001

RECREATIONAL FISHERIES

Estimates of AABM tidal sport catches near the mainland coast of Northern BC were obtained from creel surveys and lodge catch reports from lodges operating on Haida Gwaii. The recreational fishery maintained full daily limits of two daily and four possession. A minimum size limit of 45 cm was in effect and barbless hooks were mandatory in the sport fishery. Virtually all sport releases in AABM areas are legal sized.

In Area 1, the recreational salmon fishery primarily occurs between Masset and Lanagara Island along the north shore of Graham Island. In Area 2W, the recreational salmon fishery primarily occurs between Englefield Sound and Port Louis. The Chinook salmon fishery in east Skidegate during late winter and early spring was reported to be average. While the harvest of Chinook in Area 2E is unknown, it is assumed to be less than 500 pieces and a small proportion of the recreational catch in Areas 1 and 2W. Recreational effort (>99%) primarily occurs in Area 1 and 2W. The majority of the fishery occurs between mid-May and mid-September with little effort in the winter.

COMMERCIAL FISHERIES

The North Coast BC troll fishery opening for Chinook fishing was delayed and opened from August 20 to September 30 as part of fishery restrictions designed to pass through Fraser Summer 41 (South Thompson) Chinook to Fraser River fisheries. The entire 2019 Northern BC troll fishery was conducted under a system of individual transferable quotas. The size limit was 67 cm and barbless hooks and revival boxes were mandatory. No troll test fisheries were conducted in the North Coast of BC in 2019.

NORTHERN BC CHINOOK INDIVIDUAL STOCK-BASED MANAGEMENT (ISBM) FISHERIES

OBJECTIVES AND OVERVIEW

Northern BC Chinook Individual Stock-Based Management (ISBM) Fisheries include commercial net fisheries throughout north and central BC, marine sport fisheries along the mainland coast and in freshwater, and First Nations fisheries in marine and freshwater areas. The PST obligations in these fisheries are for a general harvest rate reduction (estimated in aggregate across fisheries) for ocean mixed stock fisheries and for stock-specific objectives (i.e., achieving the escapement goal) in terminal areas.

STOCK STATUS

Since assessments of the ISBM fisheries are relative to the escapements achieved in the Chinook indicator stocks, a brief overview of the 2019 returns is provided. Chinook escapements to the upper Nass River were

10,493 (based on mark-recapture data). The estimated 2019 escapement for the Skeena River aggregate was 24,536 using the historic index and 23,248 using the genetic-based estimate. The estimated total escapement in the Bella Coola/Atnarko River in 2019 (excluding jacks) was 11,675 fish with a wild escapement of 4,587 fish (below the agency escapement goal of 5,009 fish.)

The total Chinook catch in the Test fishery on the Skeena River was 550. ISBM catch data can be found in Table 41.

FIRST NATIONS FSC FISHERIES

A total of 11,214 Chinook were reported caught by First Nations in Areas 3 and 4. Nisga'a Treaty catch was reported at 6,336 Chinook (all in Area 3/Nass River). First Nations' catches in marine areas were not reported in Areas 1 through 6. A total of 2,520 Chinook were reported caught in Areas 6, 7 and 8. No Chinook catches were reported by First Nations in Rivers Inlet (Area 9) or Smith Inlet (Area 10).

RECREATIONAL FISHERIES

TIDAL WATERS

Estimates for tidal sport catches near the mainland coast of Northern BC were obtained from a creel survey conducted in Areas 3 and 4 in 2019. Chinook daily limits started at 2 per day, but was reduced in Area 3, 4, and 5 to 1 (one) Chinook per day from July 27, 2019 to August 5, 2019. This change was implemented as part of measures to address poor Sockeye returns to the Skeena River and provide First Nations priority access for FSC fisheries.

Area 6 had a daily limit of 2 per day for the 2019 season.

Tidal sport catch from lodges operating in the Smiths Inlet, Rivers Inlet, Hakai Pass and Bella Bella areas were estimated using log books.

NON-TIDAL WATERS

The Skeena River watershed started with normal daily limits and opening times for Chinook, Coho and Pink Salmon in 2019. Sockeye started with a daily limit of 2 per day on the Skeena River.

On July 27, 2019 the Department closed the entire Skeena River watershed to fishing for all salmon. This closure was an identified conservation measure to address Sockeye conservation. On Aug 15, 2019 sections of the Skeena River and specific tributaries re-opened to Coho and/or Pink Salmon. Chinook remained closed for the remainder of the season.

The Nass River watershed started with normal daily limits and opening times for Chinook.

On June 25, 2019 the Department reduced the daily limit to two (2) Chinook salmon, only one of which could be over 65 cm in the Nass River watershed. Additionally, the Nass River main stem waters near the Meziadin River confluence were closed for the remainder of the 2019 season.

COMMERCIAL FISHERIES

Chinook commercial fisheries were closed in the North Coast (Areas 3-10), except for Area 8. In Area 8, the gillnet fishery opened on June 3, 2019. Opportunities were generally limited to one fishing day a week and the last opening was on June 24. Total effort was 171 boat days. There was a small scale economic opportunity fishery in the Bella Coola Gill Net area, conducted by the Nuxalk First Nation for chinook and

chum. Three fisheries were held; June 25, July 25 and August 1 for the Nuxalk First Nation Commercial Salmon Allocation Framework (CSAF) fishery. Total effort was 46 boat days.

Refer to Table 41 for Chinook catch totals.

NORTHERN BC PINK SALMON FISHERIES

OBJECTIVES AND OVERVIEW

In 2019, Canada was to manage the Area 3-1 to 3-4 net fisheries to achieve an annual catch share of 2.49% of the annual allowable harvest (AAH) of Alaskan Districts 101, 102 and 103 Pink Salmon. The total return of Pink Salmon to Alaskan Districts 101, 102 and 103 was not available at the time of publication.

Canada was also to manage the Area 1 troll fishery to achieve an annual catch share of 2.57% of the annual allowable harvest (AAH) of Alaskan Districts 101, 102 and 103 Pink Salmon.

COMMERCIAL FISHERIES

Areas 3-1 to 3-4 Pink Net Catch

In the Canadian Northern Boundary Area, Pink Salmon returns were anticipated to be average to below average for Areas 3 and 4, based on brood year return strength. Actual returns to Area 3 were higher than anticipated, while the Area 4 returns were below average.

Area 1 Pink Troll Catch

The Canadian commercial troll fishery targeting Coho Salmon with retention of Pink Salmon was open in the northern portion of Area 1 (Dixon Entrance AB Line) from July 1 to July 17, and then expanded to the rest of Area 1 until it was closed on September 30. Pink retention was also permitted during the Chinook directed fishery in parts of Area 1 which opened from August 20 to September 30. Area 1 Pink Salmon directed effort was very minimal and the total Pink catch in the Area F Troll fishery and recreational fishery can be found in Table 41.

SOUTHERN BC CHINOOK SALMON

SOUTHERN BC AGGREGATE ABUNDANCE-BASED MANAGEMENT (AABM) CHINOOK

OBJECTIVES AND OVERVIEW

Chinook fisheries are managed by either an aggregate abundance-based management (AABM) or individual stock-based management (ISBM) regime. Allowable harvest impacts in AABM areas are determined by provisions in the Pacific Salmon Treaty and subject to domestic considerations, such as conservation and allocation. In Southern BC, all AABM Chinook fisheries are located off the West Coast Vancouver Island (WCVI), including components of the recreational fishery, First Nations fisheries, and the Area G troll fishery.

For the period October 2018 through September 2019, the forecast Chinook abundance index was 0.61 of the PST base period; therefore, under Treaty provisions, the maximum allowable catch was 79,900 Chinook for WCVI AABM fisheries, which includes a 12.5% reduction consistent with the treaty provisions that came into effect in January 2019.

Domestic considerations for managing Chinook catch in WCVI AABM fisheries are driven by concerns regarding the low status of natural WCVI, Lower Strait of Georgia (LGS), and Fraser River Chinook, as well

as Interior Fraser Coho and Interior Fraser River Steelhead populations. Management measures in AABM Chinook fisheries to limit impacts to these domestic stocks of concern are summarized in the fishery subsections.

To protect returning Fraser Chinook stocks of concern, the Area G troll fishery was closed until August 1, 2019. Additionally, a 27-day rolling window closure was applied in portions of September/October to protect Interior Fraser River Steelhead.

The pre-season planning distribution of the total WCVI AABM TAC by fishery is shown in Table 30 below.

Table 30. Pre-Season Total Allowable Catch Estimate for October 2018 to September 2019 WCVI AABM Chinook

	Pre-Season	In-Season
WCVI AABM Abundance Index	0.61	
WCVI AABM Chinook TAC	79,900	
AABM Recreational Harvest Projection	50,000	Actual catch: 35,418
First Nations Harvest Projection (FSC)	5,000	Actual catch: 71
Maa-nulth First Nations Domestic Allocation (FSC)	3,297	Actual catch: 1,184
Five Nations Allocation	7,039	Actual catch: 7,123
Area G Troll Allocation	14,564	Actual catch: 23,195
Total AABM	79,900	66,991

FIRST NATIONS DOMESTIC AND FSC FISHERIES

The 2019 WCVI AABM FSC Chinook reported catch (to date) can be found in Table 42. Catch from Maa-nulth Nations Domestic fisheries can also be found in Table 42.

FIRST NATIONS COMMERCIAL HARVEST

Five Nations Communal Sales Fishery

In 2019, the Department provided communal sale fishery opportunities for the Five Nations (five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht) that included AABM Chinook. These opportunities were categorized as Offshore Integrated Hook and Line communal sale fisheries.

The TAC was 7,039 pieces. The fishery was carried out in portions of Areas 24, 25, 26, 124, 125 and 126 on the west coast of Vancouver Island over several openings from May to November. A 100% independent dockside monitoring program was in place for the entire season. Retention of Chum, Pink and hatchery-marked Coho was also permitted, as well as several groundfish species. Total salmon catches from this fishery can be found in Table 42.

COMMERCIAL FISHERIES

For the 2018/2019 Chinook year (October 1, 2018 to September 30, 2019), fisheries were shaped by conservation concerns for the following domestic stocks: Fraser River Spring 42 Chinook, Fraser River Spring 52 and Summer 52 Chinook, WCVI wild Chinook, LGS Chinook, Interior Fraser River Coho, and Interior Fraser River Steelhead.

The distribution of the WCVI AABM TAC between fisheries is shown above in Table 30.

Area G Troll

The Area G troll annual management plan is designed to maintain exploitation rates on domestic stocks of concern within established limits through the use of fishing time and area closures in conjunction with fishing effort limits. The management plan is subject to change when required to address specific conservation concerns. For the 2019 fishing season, the following changes to the annual fishing plan were implemented:

- Additional conservation measures to further protect low returns of Fraser River Chinook were implemented. For Area G troll this addressed by implementing a fishery closure that remained in place until August 1.
- A 27-day rolling window closure starting in September was applied to protect Interior Fraser River Steelhead.

The Area G catch in 2019 occurred over two openings from August 1 to 8 and from August 29 to September 15. Catch is summarized in Table 42.

RECREATIONAL FISHERIES

The WCVI AABM recreational Chinook fishery primarily takes place in offshore Areas 121 to 127 from June to September. Chinook catch from inshore Areas 21 to 27 in June and Areas 21 to 24 in July are also included in the AABM estimate. Catch and effort are largely driven by abundance and weather, and together both have impacts on annual harvest. Previous sampling has indicated that there is minimal AABM catch and effort outside of this period.

Domestic Chinook management measures are in place in the near-shore AABM areas to protect migrating WCVI-origin Chinook. In 2019, management measures continued to include finfish closures in several areas, increasing terminal Chinook non-retention areas, and focussing recreational opportunities in areas where DNA samples indicated that WCVI Chinook presence is lower.

New domestic management actions were implemented to further protect Fraser River Chinook populations, which included a Chinook non-retention area from April 19 to July 14 (inclusive) in Areas 121 to 127 seaward of a 1 nm surfline boundary. As a result of the Big Bar landslide, and concerns around the successful migration of Fraser Chinook, further measures were put in place from July 15 to July 31 (inclusive) which restricted the maximum size to 80 cm for Chinook retention in these offshore areas.

Chinook catch in the AABM recreational fishery is estimated through several catch monitoring programs, including a creel survey, a logbook program and DFO's electronic survey information (iREC). The creel survey continues to be the most utilized catch monitoring program in this area particularly because it collects effort (number of boat trips), and catch per unit effort data. Catch for any given species within a defined time-area stratum is estimated by multiplying effort estimates by CPUE. Total effort is estimated through vessel counts, gathered through either aerial or on-water boat surveys of the fishing area. CPUE is estimated from interviews with anglers at specific landing sites and from trip logbooks and manifests submitted by lodges and guides through a voluntary monitoring program. Logbook effort is removed from effort estimates where there is overlap. Data regarding the daily activity profile of the fishery, fishing locations, and the proportion of guided versus un-guided effort are also gathered from angler interviews.

The Chinook recreational catch estimate from the creel survey for the 2019 WCVI AABM fishery is provided in Table 42.

See Figure 41 below which illustrates catch and effort from 1995 through 2019.

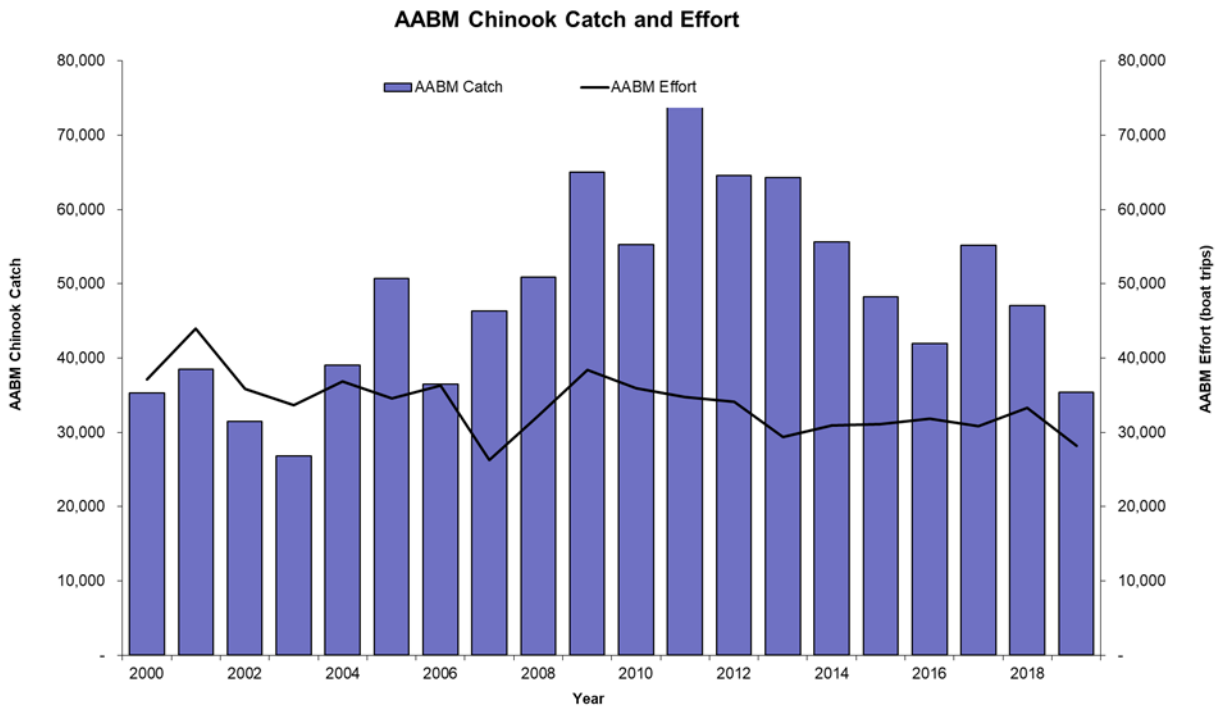

Figure 41. WCVI Recreational AABM Catch and Effort- Chinook, 2000-2019

SOUTHERN BC CHINOOK INDIVIDUAL STOCK BASED MANAGEMENT (ISBM) FISHERIES

OBJECTIVES AND OVERVIEW

In addition to the PST regime, Canada implemented management actions as required to ensure conservation of Canadian-origin Chinook and to meet domestic allocation requirements. These Chinook fisheries were managed to harvest rates on an individual stock basis (ISBM).

Measures were taken in 2019 in First Nations FSC, recreational and commercial Chinook fisheries to protect West Coast Vancouver Island (WCVI), Lower Strait of Georgia (LGS), and Fraser River Chinook stocks.

Specific management actions were taken to protect WCVI-origin Chinook in Canadian ocean fisheries (not including enhanced terminal areas), the harvest of which is managed to an exploitation rate of 10%. Fisheries to which this limit applies are the northern troll, Haida Gwaii recreational, WCVI troll and WCVI recreational. Most Southern BC fisheries were managed such that impacts on WCVI wild Chinook stocks were minimized, with the exception of terminal fisheries focussed on enhanced stocks.

LGS Chinook stocks are improving from historic lows seen in 2009 and are stable or rebuilding. Significant management measures in recreational and commercial fisheries continued to be in place to protect these stocks. Some LGS Chinook stocks are seeing a gradual increase in terminal returns, particularly in the Cowichan River.

For 2019, the management target for Spring 42, Spring 52, and Summer 52 Chinook was to reduce overall Canadian fishery mortalities on these populations to near 5% to support conservation and promote rebuilding. Expected fishery mortalities were not intended to be a management target and the objective was to allow as many fish to pass through to the spawning grounds as possible. In addition, the precautionary fishery measures

were expected to reduce Canadian fishery mortalities on Summer 41 and Fall 41 Chinook management units by at least 25%.

First Nations FSC management actions in the Fraser River included time and area closures, and reduced fishing times.

Recreational fisheries in Juan de Fuca Strait, the lower Strait of Georgia and the approach waters of the Fraser River had specific time, area, size and mark-selective restrictions designed to minimize the amount of exploitation on these Chinook stocks.

In 2019, commercial fisheries in Barkley Sound and Nootka Sound targeted ISBM Chinook. Chinook non-retention was in place for other southern BC commercial fisheries (excluding AABM Chinook).

ISBM Chinook catch and release information from all fisheries can be found in Table 42.

STOCK STATUS

WEST COAST VANCOUVER ISLAND CHINOOK

Wild West Coast Vancouver Island (WCVI) Chinook are a stock of concern. While stocks are low and stable, they are below target and have not rebuilt from low abundances that resulted from a decline in productivity observed during the early to mid-1990s. Of particular concern are those stocks that originate from the SWVI area conservation unit (i.e. Clayoquot Sound).

Hatchery production supports terminal fisheries directed at surplus production with extensive management measures in place to reduce impacts on wild origin stocks. For WCVI hatchery stocks, the terminal return is defined as total catch (First Nations FSC, sport and commercial) in the near approach areas of the hatchery plus escapement (brood collection plus natural spawners, and ESSR if applicable). In these approach areas, catch is dominated by the hatchery stock (e.g. > 95%); therefore, higher exploitation rates are permitted than in times and areas dominated by naturally produced WCVI Chinook stocks.

A small assessment fishery near the Mquq^{W}in / Brooks Peninsula occurred in 2019 in order to assess the ability to improve the precision and accuracy of annual WCVI Chinook return estimates. The total catch was 344 Chinook.

STRAIT OF GEORGIA CHINOOK

Fall Season

Adult returns of fall Chinook to SEP facilities south of Campbell River were average to above average in 2019. Puntledge River escapements continued to increase with 13,679 adults returning compared to the 10 year average of 6,834. Further south, the Big Qualicum River escapement was closer to the 4 year average of 6,830 and similar to 2018 at 7,482. Counts in the Little Qualicum River were well above average at 9,132 based on an AUC expansion of swim results.

Chinook escapement to mid-island streams was variable. The AUC expanded count in the Englishman River (1,580) was nearly double the 12 year average of 870. Nanaimo River counts were near the four year average with a total return of 2,844 adults and 2,298 jacks.

Cowichan River Chinook (a wild Chinook indicator stock) declined from a high of 16,982 adults in 1995 to 1,260 in 2009. Exploitation rates on CWT hatchery fish were estimated at 80 to 90% in the early 1990s but declined to an average of 56% for the period 2006 to 2012 as a result of various harvest restrictions implemented over the last 20 years. Additional conservation measures were introduced in 2005 to reduce the

harvest of Cowichan Chinook by the Strait of Georgia sport and WCVI troll fisheries. First Nations have substantially reduced harvests of Chinook in the Cowichan River in recent years. The declining trends after 1990 in various southern Strait of Georgia Rivers are attributed to high exploitation rates, a decline in marine survival, and habitat issues.

The Cowichan River counting fence was operational from September 9th to October 17th following significant repairs in 2017 and further modifications in 2018. In 2019, the fish passageways were significantly widened and new camera systems installed to reduce migration delays. A total of 10,527 adult Chinook were enumerated before the fence was removed due to increasing water levels. The final escapement estimate using a PIT tag based expansion (as in 2017 and 2018) was 17,946 adults, including brood captures, FSC fishery harvest and lower river spawners (below the fence). Hatchery contributions based on adipose clips were estimated at 11.4% for adults. Jack returns were down from the three year average of 6,800 to 3,303 while the proportion of adipose clips in the population was 12.5%.

The escapement target of 6,500 naturally spawning adults was met for a fourth consecutive year. As a result of increasing escapements in recent years as well as more restrictive fishing regulations throughout southern B.C. the Cowichan specific spot closures implemented in 2005 were lifted in the central and northern Strait of Georgia. Terminal closures in Area 18 remain in effect.

On the mainland side of the northern Strait of Georgia, Sliammon and Lang hatcheries continue to have variable returns; however, in the last five years the returns to Lang Creek have been stronger than in previous years with 1,739 adults in 2019 (4 year average 1,130). 300 adult Chinook returned to Sliammon Creek in 2019 which is above the 12 year average of 110. There are a few very small, wild populations remaining in the Theodosia and Skwakwa rivers, and those rivers entering Jervis Inlet, where assessment data are poor or not available. Historically, a large proportion of the Chinook stock aggregate originating from rivers north of Nanaimo migrate into central and northern BC and Alaska. Exploitation rates on this stock aggregate have gradually been reduced over the last 15 years, thus the stable trend in annual returns to rivers over this period suggests a reduction in marine survival.

Spring/Summer Season

The Puntledge, Nanaimo and more recently the Cowichan systems have identified early runs of Chinook in the Strait of Georgia. Efforts to recover Puntledge summers to viable levels have resulted in improved returns to the river since 1999. The 2019 escapement estimate for Puntledge was 645 adults, which is close to the four year average of 750. Monitoring of Nanaimo spring/summer Chinook escapement was improved in 2019 with a series of swims from June through September. Several surveys of the reach upstream of second lake where spring run fish are believed to reside produced a peak count of three jacks. A total of 206 summer run adults for 2019 was well below the 4 year average of 670. Two swim surveys of the Chemainus River revealed a peak count of just nine summer Chinook adults. Recent counts in this system have been very low but the rock slide in the lower canyon was cleared naturally in winter 2018/2019, restoring access to a significant portion of the system.

JOHNSTONE STRAIT MAINLAND INLET CHINOOK

Currently only three systems are monitored consistently. In Area 12, the Nimpkish River is assessed using standardized swim surveys and stream walks by hatchery staff. In Area 13, the Campbell/Quinsam and Phillips rivers are assessed by intensive mark-recapture programs. The Campbell/Quinsam is a long-term Chinook indicator, assessed yearly since 1984 (program carried out by Quinsam Hatchery). Other systems are covered using intermittent visual surveys. In 2019, surveys in Area 12 Mainland Inlet systems, such as Ahnuhati and Wakeman Rivers, indicated an increase in Chinook observations.

Nimpkish River

In 2019, observations of Chinook abundance were up relative to both the 2018 and 2015 returns. The estimate of 2,500 Chinook (peak count 1,543) is 69% higher than the 5-year average (1,476) and approximately 89% larger than the 2015 parental brood year (1,318). Hatchery broodstock targets were met.

Campbell/Quinsam System

The 2019 program has the combined system final Chinook estimate at 7,388 adults; an increase over the estimated 7,072 that returned in 2018, above both the 5-year average (6,130), and historic 1984-2018 average (6,979). The parental brood year for the returning age-4s was approximately 3,900. The 2019 Chinook broodstock target was attained by the hatchery.

Phillips River

The final results for the Phillips River program was a 2019 Chinook escapement of 2,531 adults; however, the estimate may be highly uncertain. Deadpitch effort remained similar to past years, however increased bear activity on the river impacted carcass availability. The 5-year historic average for this system is approximately 2,100.

FRASER RIVER CHINOOK

Fraser River Chinook are assessed as five naturally spawning stock groups for PSC management under the 2019 agreement including Fraser Spring-Run 42, Fraser Spring-Run 52, Fraser Summer-Run 52, Fraser Summer-Run 41, and the Harrison River (Fall-Run 41).

Within the Fraser, prior to 2019 there were five CWT-indicator stocks; Nicola River (Fraser Spring-Run 42), Lower Shuswap (Fraser Summer-Run 41), Harrison River and Chilliwack River (Fraser Fall 41), and Dome Creek (Fraser Spring-Run 52) that was discontinued in 2005. Two new CWT-indicator stocks are under development: Lower Chilcotin River (Fraser Spring 52) to replace Dome Creek, and Chilko River (Fraser Summer 52).

Escapements to the Fraser Summer-Run 41 increased during the 1990s and remained abundant until 2012; and were low from 2016-2018. The spawning escapement in 2019 based on the CTC index for the aggregate in 2019 was 169,234 Chinook, which is higher than the long-term average (1999-2018) of 95,820 and 94% of the parental brood. The 2019 Lower Shuswap River escapement estimate was 29,649, which exceeded the escapement goal of 12,300.

In 2019, the Big Bar Landslide on the Fraser Mainstem obstructed migration of some populations in the Fraser Spring-Run 52 and Fraser Summer-Run 52 stock groups. For Chinook returning to rivers upstream of the landslide, 13% of the Spring-Run and 48% of the Summer-Run were estimated to be able to pass the landslide and return to their spawning grounds in 2019. Since there are populations within these stock groups that are downstream of the slide, the overall mortality relative to the terminal runs were 81% for the Spring-Run 52 stock group and 39% for the Summer-Run stock group.

The Fraser Spring-Run 52 stock group spawning escapement in 2019 based on the CTC index for the aggregate was 3,054 Chinook, which is lower than the long-term average (1999-2018) of 20,349 and 9% of the parental brood. The Fraser Summer-Run 52 stock group spawning escapement in 2019 based on the CTC index for the aggregate was 5,506 Chinook, which is lower than the long-term (1999-2018) average of 19,910 and 23% of the parental brood.

The Fraser Spring-Run 42 stock group spawning escapement in 2019 based on the CTC index for the aggregate was 5,848 Chinook, which is lower than the long-term average (1999-2018) of 11,943 and 52% of

the parental brood. The Nicola River escapement estimate was 3,859 and has only met the escapement goal of 9,500 once in the past 15 years.

The Harrison River (Fraser wild Fall-Run 41 stock group) escapement estimate was 45,186, which is lower than the long-term (1999-2018) of 83,754 and 45% of brood. Harrison River escapement estimate has only met the escapement goal of 75,100 once in the past eight years.

There have been four consecutive years (2016-2019) of low escapements to the three Fraser stock groups with yearling smolt life history (Spring 42, Spring 52; and Summer 52) and also to the Harrison (Fall 41). These four stock groups are of continuing conservation concern. Canadian marine and Fraser River fisheries were further restricted in 2019 to continue to address these conservation concerns.

FIRST NATIONS DOMESTIC AND FSC FISHERIES

WCVI FSC Fisheries and Treaty Domestic Fisheries

Somass First Nations caught Chinook by gill net, rod and reel and as bycatch during other salmon fisheries in Area 23. Catch reports for Maa-nulth Treaty harvest and WCVI Nuu-chah-nulth non-treaty First Nations harvest can be found in Table 42.

Strait of Georgia FSC Fisheries and Treaty Domestic Fisheries

Chinook Salmon were harvested by hook and line from the Strait of Georgia between July 15 and early October. Terminal harvests of Chinook took place in Puntledge and Qualicum Rivers in October, using hatchery brailing and hand-picking/sorting methods. Chinook Salmon were also harvested in hook and line and gill net fisheries in Cowichan and Nanaimo Rivers from late September through October. Tla'amin Treaty and other First Nations catch reports in the Strait of Georgia can be found in Table 42.

Johnstone Strait FSC Fisheries

Chinook Salmon were harvested primarily by hook and line in Johnstone Strait from July 15 to mid-September. Chinook were also incidentally harvested through a small number of gill net and seine net fisheries targeting Pink Salmon that took place mid- to late August. A small number of Chinook Salmon were harvested terminally in the Campbell River by hook and line. First Nations catches in Johnstone Strait can be found in Table 42.

Fraser River FSC Fisheries

FSC fisheries took place in the Lower Fraser River between the mouth and Sawmill Creek from August through November 2019. The total number of Chinook harvested from Chinook-directed fisheries and Chum-directed FSC openings or limited participation openings, can be found in Table 41 and Table 42. No Sockeye-directed fisheries were authorized in 2019. Sockeye, Pink, Coho, and Chum bycatch that occurred during Chinook-targeted FSC openings is also listed in those appendices.

Chinook-directed FSC fisheries took place in the Fraser River and tributaries above Sawmill Creek from April through early October 2019. The total of Chinook harvested, as well as bycatch estimates can be found in those appendices.

FIRST NATIONS COMMERCIAL HARVEST

Somass Economic Opportunity (EO)

In 2019, an agreement was reached with the Hupacasath and Tseshaht First Nations for an Economic Opportunity fishery. The fisheries occurred in portions of Subareas 23-1 and 23-2, in upper Alberni Inlet, including the tidal portion of the Somass River. The target species was Chinook with a bycatch of Coho allowed. There were commercial Chinook openings on August 20, August 25, September 4, September 5, September 10, September 15, September 22, and September 29. The in-season Economic Opportunity TAC for Chinook was 30,750 in 2019 but the total TAC was not caught due to rapid fish migration behavior and lower than anticipated participation in the mid-September openings. The total Chinook catch and Coho bycatch can be found in Table 42.

Five Nations Communal Sales Fishery

In 2019, the Department provided communal sale fishery opportunities for the Five Nations (five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht) that included ISBM Chinook. These opportunities were categorized as Nearshore Integrated Hook and Line and Terminal salmon fisheries.
The Nearshore fishery targeted Conuma River enhanced Chinook returns using troll and gillnet. Fishery openings occurred between July 15 and August 29. The initial in-season TAC was 2,314 Chinook.
The Terminal fishery targeted Burman River enhanced Chinook returns using troll and gillnet gear. Fishery openings occurred between August 9 and September 19. The initial in-season TAC was 2,275 Chinook.
The total Chinook catch from the Conuma-targeted fishery and the Burman-targeted fishery can be found in Table 42. Chum, pink and Coho were also permitted to be sold.

Fraser River Economic Opportunity and Inland Demonstration Fisheries

Economic Opportunity or inland demonstration fisheries did not occur in 2019 for ISBM Chinook in either the upper or lower reaches of the Fraser River as part of additional management actions to provide protection for Fraser Chinook stocks.

In 2019, no Economic Opportunity or demonstration fisheries occurred for Fraser Sockeye due to extremely low returns and no available Canadian Commercial TAC (CCTAC). There is currently one Inland Commercial Fishing Enterprise (CFE) operating in the Lower Fraser: Harrison Fisheries Authority. This CFE was authorized to conduct a demonstration fishery for Sockeye using gill nets in the Harrison River; however, no fishing occurred as the run size for the Harrison River Sockeye return was not sufficient to support a fishery. Therefore, there were no incidental impacts on Chinook from these fisheries.
Economic opportunity and demonstration fisheries occurred for Fraser Pink in the lower Fraser River in 2019 and were conducted by the Harrison Fisheries Authority and 16 communities from the Port Mann Bridge to Sawmill Creek. Retention of Chinook was not permitted.

In 2019, no Economic Opportunity fisheries for Fraser Chum occurred in the lower reaches of the Fraser River due to the estimated poor in-season Fraser Chum terminal return.

There are currently three Inland CFEs that have operated in the BC Interior: Okanagan Nation Alliance, Upper Fraser Commercial Fishing Enterprise, and Riverfresh (Secwepemc Fisheries Commission). Riverfresh is the only CFE that receives allocation for Chinook (S. Thompson, Summer 41 Chinook). In 2019, Riverfresh was not provided a Chinook-directed opportunity due to additional management actions to provide protection for Fraser Chinook Stocks.

COMMERCIAL FISHERIES

Area B Seine

Due to a relatively large forecast of 130,000 Chinook for Robertson Creek Hatchery, Area B seine fisheries were provided in Area 23. The fisheries occurred in portions of Subarea 23-1 and 23-2, upper Alberni Inlet, targeting Chinook with a bycatch of Coho permitted. The fisheries were operated using a pool system with only designated vessels permitted to fish. The fishery opened daily from September 2 to 6 and September 8 to 17. The Area B in-season TAC was 10,762 Chinook. The fisheries in 2019 were not as successful as 2018. This was mainly due to fish migration behaviour, which made them less vulnerable to seine gear. The total Chinook catch and Coho bycatch can be found in Table 42.

Area D Gill Net

Area D gill net fisheries were provided in Area 23. The fisheries occurred in portions of Subarea 23-1 and 23-2, in upper Alberni Inlet, targeting Chinook with a bycatch of Coho allowed. The fisheries were opened one night a week in the last two weeks of August. After Labour Day there were two openings nightly in early and mid-September. The fisheries occurred on August 18, August 27, September 3, and September 25. The Area D in-season TAC was 19,988 Chinook. The Area D gill net fisheries were very successful this year, with high catch rates in the August openings. The total Chinook catch and Coho bycatch can be found in Table 42.

In 2019, gill net fisheries occurred in Tlupana Inlet (Area 25) targeting Chinook returns to the Conuma River hatchery. Fisheries occurred discontinuously from August 12 to September 12. The total estimated catch during the Chinook-directed fishery can be found in Table 42.

Area E Gill Net

There were no Area E gill net fisheries for ISBM Chinook in 2019.

There were no Area E gill net commercial openings in the Fraser River (Area 29) during the 2019 season and no Chinook bycatch.

RECREATIONAL FISHERIES

ISBM Chinook catch and release information from all fisheries can be found in Table 42.

West Coast Vancouver Island

In 2019, a strong return of Chinook was expected to the Robertson Creek hatchery and a moderate return to the Conuma River hatchery. Actual returns were near forecast for Robertson Creek and above forecast for Conuma River, and provided good recreational fishing opportunities in terminal areas supported by these enhanced stocks. The annual limit for Chinook salmon in tidal waters, including these areas, was reduced from 30 to 10.

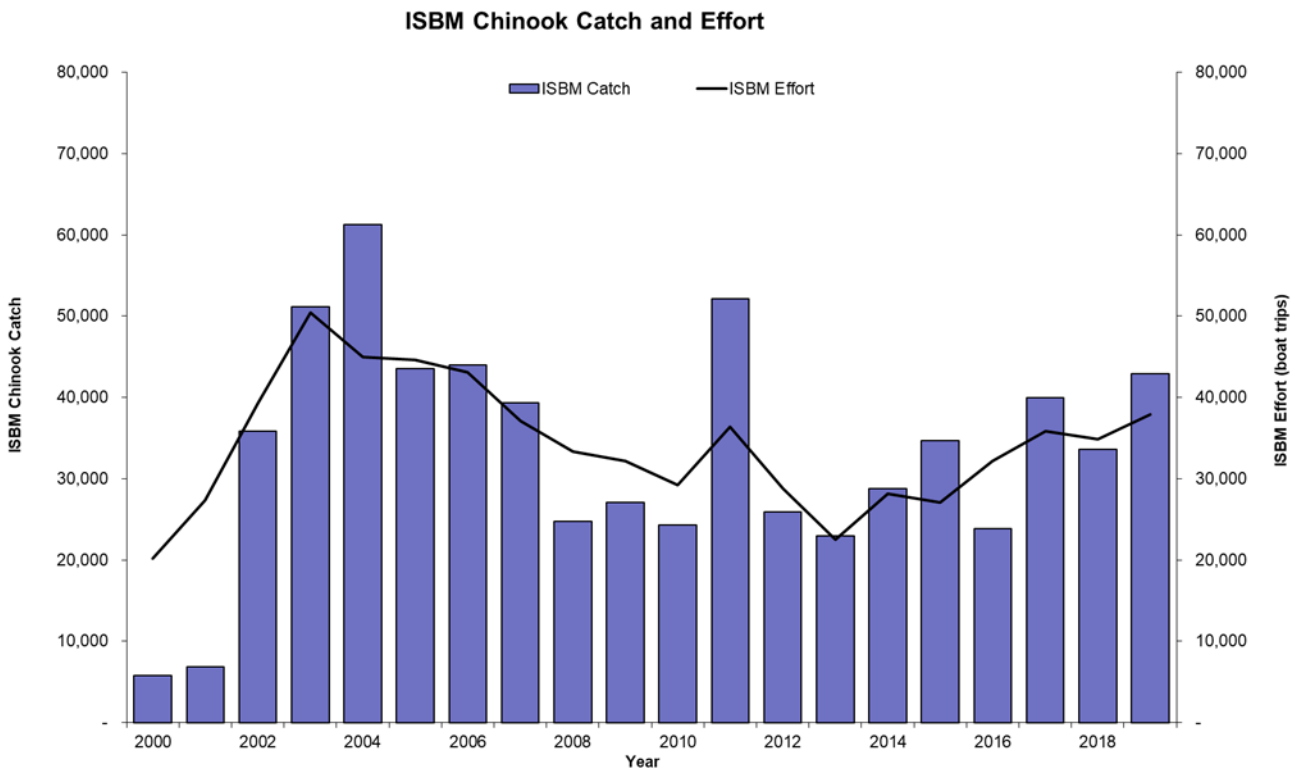

Figure 42. Recreational WCVI Chinook ISBM Catch and Effort, 2000 to 2019.

Inside Areas: Johnstone Strait, Strait of Georgia, and Juan de Fuca Strait

The 2019 recreational fisheries in the Inside Areas were further restricted this year to minimize impacts on returning Fraser River Chinook. Significant management measures were implemented to provide additional protection for these stocks and included maximum size limits in specific areas/times, and reductions in daily limits. Salmon closures and Chinook non-retention areas were also implemented in portions of the Fraser approach waters, Southern Gulf Islands and Juan de Fuca Strait to support the recovery of Southern Resident Killer Whales.

The following regulations were in place for the inside areas for 2019:

Queen Charlotte and Johnstone Straits (Subareas 12-1 to 12-13, 12-15 to 12-48):

- 00:01 hours January 1 to 23:59 hours April 18, 2 Chinook per day.
- 00:01 hours April 19 to 23:59 hours July 14, Chinook non-retention;
- 00:01 hours July 15 to 23:59 hours July 31, 1 Chinook per day with a maximum size limit of 80 cm;
- 00:01 hours August 1 to 23:59 hours August 29, 1 Chinook per day.
- 00:01 hours August 30 to 23:59 hours December 31, 2 Chinook per day.

Strait of Georgia - North - Areas 13 to 17, Area 28 and Subareas 29-1 and 29-2:

- 00:01 hours January 1 to 23:59 hours April 18, 2 Chinook per day.
- 00:01 hours April 19 to 23:59 hours July 14, Chinook non-retention;
- 00:01 hours July 15 to 23:59 hours July 31, 1 Chinook per day with a maximum size limit of 80 cm;
- 00:01 hours August 1 to 23:59 hours August 29, 1 Chinook per day.
- 00:01 hours August 30 to 23:59 hours December 31, 2 Chinook per day.

Strait of Georgia - South and Juan de Fuca - Areas 18, 19 and Subareas 20-3 to 20-7, 29-3 to 29-5 and 29-8:

- 00:01 hours January 1 to 23:59 hours April 18, 2 Chinook per day.
- 00:01 hours April 19 to 23:59 hours July 31, Chinook non-retention;
- 00:01 hours August 1 to 23:59 hours August 29, 1 Chinook per day;
- 00:01 hours August 30 to 23:59 hours December 31, 2 Chinook per day.

In consideration of the increased management measures for Fraser Chinook implemented in the Strait of Georgia and other mixed-stock areas, the previous annual finfish closure near Cape Mudge on Quadra Island and the Chinook non-retention closures near Sentry Shoals, Harwood Island, Denman Island-Hornby Island and Kitty Coleman are no longer in effect. Reductions to the annual limit to 10 Chinook salmon per year were also implemented in 2019 in BC tidal waters, including the inside areas listed above. Chinook management measures also include a minimum size limit of 62 cm in the Johnstone Strait/Queen Charlotte Strait and Strait of Georgia, and Areas South to Cadboro Point (Subarea 19-5). For the Canadian portion of Juan de Fuca Strait south of Cadboro Point, the minimum size limit is 45 cm.

Salmon fishing closures were also implemented from August 1 to October 31 in the following portions of the Southern Gulf Islands and Juan de Fuca to support SRKW:

- Subareas 18-9 and portions of 18-2, 18-4, and 18-5.
- Subareas 20-3 and 20-4.
- Subareas 29-7, 29-9, and 29-10.
- Subarea 29-6 was closed to salmon fishing from June 1 to July 31 and was Chinook non-retention from August 1 to September 30.

In 2019, marine sport fisheries were monitored by creel surveys in three main areas: 1) Juan de Fuca including Victoria (south of Cadboro Point) and Juan de Fuca Strait through Subarea 20-1; 2) Portions of the Strait of Georgia including Areas 14 through 18, that portion of Area 19 north of Cadboro Point, Areas 28 and 29; and 3) Johnstone Strait including Areas 11 to 13. Creel survey monitoring of these fisheries includes using an access point (landing site) survey for collecting catch, CPUE, and biological information combined with an aerial survey for effort counts. In addition, logbook programs, directed at estimating the sport catch by fishing guides during guided trips, were conducted in the Campbell River and intermittently throughout other areas in the South Coast. The Avid Angler program and the Area 13 remote lodges around Stuart Island provided the majority of logbook program data in 2019. Painters Lodge in Campbell River was a regular interview site in 2019 which providing guided catch as well. Electronic survey estimates from the iREC program will also be used to produce catch estimates for those areas where creel surveys did not take place.

The Johnstone Strait creel survey for Areas 11 and 12 was conducted from June through August.

The Strait of Georgia creel survey for Areas 13 and 14 was conducted from May to October, for Area 15 from June to September, for Area 16 from August to September, for Areas 17 and 18 from May to September, and for Areas 19 and the SOG portion of Area 20 from April to October.

Effort, catch and release information from marine fisheries are summarized in Figure 43.

Region 1 Vancouver Island Tributaries

River conditions in most tributaries on Vancouver Island were improved in 2019 compared to previous years due to an adequate snowpack, cooler temperatures over the summer and more precipitation during portions of the summer months. All systems in Region 1 that are typically open remained open in 2019, with the exception of Regions 1-1 to 1-6 that are managed using seasonal closures between July 15 to August 31. Many Chinook systems on the east and west coasts of Vancouver Island saw strong Chinook returns in 2019; particularly those from enhanced systems. These returns provided early and productive opportunities for

recreational fresh water fisheries. The Campbell River, Qualicum River, Little Qualicum River, Puntledge River, Nitinat River, Somass River and Conuma River all provided some recreational opportunities to harvest Chinook stocks during this time period.

Fraser River and Tributaries

Fraser River Chinook stocks required additional management measures in 2019 due to continued concerns about poor stock status.

Fraser River Mouth (Subareas 29-6, 29-7, 29-9 and 29-10):

- January 1 to December 31, fishing for salmon was closed in this area.

Tidal Fraser River:

In the tidal waters of the Fraser River the following regulations were in place for 2019:

- January 1 to September 13, fishing for salmon was not permitted.
- September 14 to September 20, fishing for Chinook salmon was permitted but Chinook salmon could not be retained.
- September 21 to November 1, fishing for salmon was not permitted.
- November 2 to December 31, fishing for Chinook salmon was permitted but Chinook salmon could not be retained.

Non-Tidal Fraser River:

Region 2

- January 1 to November 2, fishing for salmon was not permitted.
- November 3 to December 31, fishing for Chinook salmon was permitted but Chinook salmon could not be retained.

Region 3: January 1 to December 31, fishing for salmon was not permitted on the Fraser River.

Region 5: January 1 to December 31, fishing for salmon was not permitted on the Fraser River.

Region 7: January 1 to December 31, fishing for salmon was not permitted on the Fraser River.

Fraser River Tributaries:

<u>Fraser River Tributaries - Region 2</u>

There were several tributaries to the Fraser River in which Chinook retention was permitted. These included:

- Alouette River: daily limit of one Chinook from September 1 to December 31;
- Chehalis River: daily limit of four with only one over 50 cm from June 1 until August 31 and a daily limit of four Chinook with only one over 62 cm from September 1 until December 31;
- Chilliwack/Vedder River: daily limit of four with only one over 62 cm from July 1 until August 31, daily limit of four with two over 62 cm from September 1 to December 31; Coquitlam River: daily limit of one Chinook from September 1 to December 31;
- Harrison River downstream of the Highway No. 7 Bridge, daily limit of four with only one over 62 cm from September 1 to December 31.

The Chilliwack/Vedder River recreational fishery was assessed from September 1 to November 15 in 2019. Catch estimates can be found in Table 43.

Fraser River Tributaries - Region 3

Thompson River: That portion of the Thompson River from the WTFB signs just downstream of Gold Pan Provincial Park to the easterly border of the Skihist Ecological reserve along the Thompson River located at 50°15'N, 121°31'W; this is approximately 5 km northeast of Lytton at Skihist Park.

- September 13 to September 22, daily limit of four Chinook, zero over 50 cm.

Kamloops Lake: In the waters of Kamloops lake upstream of the fishing boundary signs at the outlet of Kamloops Lake.

- August 22 to September 22, 2019 daily limit of four Chinook, only one over 50 cm.

South Thompson River: That portion of the South Thompson River from the green can buoy near outlet of Little River, including Little Shuswap Lake, to the fishing boundary sign approximately 100 m downstream of Campbell Creek.

- August 16 to September 22, daily limit of four Chinook, only two greater than 50 cm. There is a monthly quota of six Chinook from the South Thompson River.

Fraser River Tributaries - Region 5

January 1 to December 31, fishing for salmon was not permitted in any portion of the Fraser watershed in Region 5.

Fraser River Tributaries - Region 7

January 1 to December 31, fishing for salmon was not permitted in any portion of the Fraser watershed in Region 7.

Fraser River Tributaries - Region 8

Note: there is a monthly limit of four Chinook in Region 8.

Mabel Lake: That portion of Mabel Lake that is both northerly of a line drawn from a white triangular fishing boundary sign situated at the northern edge of Mabel Lake Provincial Park to the prominent point of land on the western shore; and southerly of a line drawn between two white triangular fishing boundary signs located on opposite shores approximately 1 km from Wap Creek.

- August 16 to September 12, daily limit of four Chinook, only two over 50 cm.

Middle Shuswap River: No fishing for salmon.

Lower Shuswap River: That portion of the Lower Shuswap River upstream from white triangular fishing boundary signs upstream of the Mara Bridge to Mable Lake, except no fishing in those waters 50 metres upstream and downstream of the Trinity Valley Road Bridge.

August 16 to September 12, daily limit of four Chinook, only two over 50 cm.

EXCESS SALMON TO SPAWNING REQUIREMENTS (ESSR) FISHERIES

The Tseshaht and Hupacasath First Nations were issued a joint Excess Salmon to Spawning Requirements (ESSR) Licence for Chinook and Coho at the Robertson Creek Hatchery facility.
The Ditidaht First Nation was issued an ESSR Licence for Chinook, Coho and Chum at Nitinat Lake and Nitinat hatchery.

The Mowachaht/Muchalaht First Nation was issued an ESSR licence to harvest Chinook, hatchery-marked Coho, and Chum from the Conuma River and hatchery.

A Chinook Salmon ESSR fishery for the Qualicum First Nation took place at the Big Qualicum hatchery September 16 – October 18, 2019, and at Little Qualicum hatchery October 9-20, 2019.

The K'ómoks First Nation was issued an ESSR licence to harvest Fall Chinook Salmon and Chum Salmon at the DFO Puntledge River Hatchery between September 27 and December 31, 2019. Harvest of ESSR Fall Chinook Salmon took place between October 8 and October 22, 2019.

There were ESSR fisheries at the Capilano hatchery in 2019 that harvested Chinook salmon.

There were ESSR fisheries at the Chilliwack hatchery in 2019 that harvested Chinook salmon.

There were ESSR fisheries at the Chehalis hatcheries in 2019 that harvested Chinook salmon.

The A-Tlegay Fisheries Society was issued an ESSR licence to harvest Chinook salmon at the DFO Quinsam River Hatchery between October 15 and November 15, 2019, however the ESSR harvest did not take place due to insufficient surplus.

No Johnstone Strait ESSR opportunities on Chinook occurred in 2019.

There were no Interior BC ESSR opportunities on Chinook in 2019

All ESSR harvest information can be found in Table 45.

FRASER RIVER

SOCKEYE SALMON

OBJECTIVES AND OVERVIEW

In 2019 the Fraser River Panel (FRP) adopted the p50 probability run size forecast for all run timing groups (4.8 M Fraser Sockeye) for pre-season planning purposes. At the p50 and p25 run size forecasts TAC for international sharing was available and pre-season plans took this into consideration. All fishery planning focused on staying within constraints to minimize impacts on less abundant stock groups and species of concern. Actual in-season harvest opportunities were dependent on in-season stock assessments.

Fishing plans incorporate provisions to meet escapement objectives and meet conservation objectives for stocks of concern while considering other international and domestic objectives. Fishing plans include the following assumptions and guiding principles in no particular order:

The Fraser River Panel (FRP) operated in accordance with Chapter 4, Annex IV of the Pacific Salmon Treaty;

- The U.S. share of the annual Fraser River Sockeye Salmon total allowable catch (TAC), harvested in the waters of Washington State, was set at 16.5% of the aggregate. To the extent practicable, the FRP shall manage the United States fishery to implement a fishing plan that concentrates harvest on the most abundant management group or groups;
- It is understood that the U.S. harvest may exceed 16.5% of the TAC for one or more of the less abundant management groups by a small but acceptable amount despite concentrating the harvest in this manner;
- For computing TAC by stock management groupings, the Aboriginal Fishery Exemption (AFE) of 400,000 Fraser River Sockeye, shall be allocated to management groups as follows: The Early Stuart Sockeye exemption shall be up to 20% (maximum 80,000) of the Fraser River AFE, and the

remaining balance of the latter exemption shall be based on the average proportional distribution of First Nations Food, Social and Ceremonial catch for the most recent three cycles and modified annually as required to address concerns for Fraser River Sockeye stocks and other species, and as otherwise agreed to by the Fraser River Panel;

- It was anticipated that an in-season run size estimate for Cultus Lake Sockeye would not be possible due to low abundance relative to co-migrating Sockeye stocks. As a result the Cultus exploitation rate is assumed to be the same as the exploitation rate from the similarly timed Late run stocks (excluding the Birkenhead and Birkenhead-type miscellaneous stocks), caught seaward of the confluence of the Fraser and the Harrison Rivers;
- The four run timing aggregates identified under the Pacific Salmon Treaty Annex generally contain stocks with similar timing in the marine area. Recent trends in timing of some stocks, including Raft River and North Thompson (in the Early Summer run prior to 2012), and Harrison River (in the Late run prior to 2012) Sockeye now differ substantially from the other stocks in their respective historical run timing groups. Fisheries and Oceans Canada continues to manage these stocks as part of the summer run aggregate to better align these stocks with other stocks of similar run timing. Escapement plans, management adjustments and harvest rules have been adjusted to account for this change;
- Canada's escapement plan specified escapement requirements that varied with run size for each of the run timing aggregates;
- The Total Allowable Mortality (TAM) cap describes the upper range of the total mortality (including management adjustments and exploitation rate). The TAM cap was 60% for all run timing/management groups;
- At low abundances, low abundance exploitation rates (LAERs) are implemented to protect 80-90% of the run timing aggregate (10-20% LAER) while allowing for fisheries on more abundant co-migrating run timing groups and/or other species. In 2019 Canada's escapement plan permitted up to a 20% LAER for all stock groups with the exception of Early Stuart sockeye which permitted up to a 10% LAER;
- The allowable harvest in a LAER situation is not a target; the objective is to allow as many fish as possible to pass to the spawning grounds. In most circumstances harvests under a LAER scenario would be considered incidental harvest or bycatch only; however, in some circumstances limited directed harvest in terminal areas may be considered. All fishery impacts are to be accounted for under the LAER;
- In 2019, Early Stuart Sockeye window closures and other fishing restrictions were planned for commercial, recreational and First Nations fisheries to protect a significant proportion (90%) of the Early Stuart return. These measures included a 3-week rolling window closure based on the run timing of the Early Stuart Sockeye migration through various fishery areas. In some years, an additional week long closure has been added to the end of the Early Stuart window closure in order to protect the earliest of the early-timed Early Summer Sockeye that may have conservation concerns; and
- Conservation concerns for other Sockeye stocks and species continued to impact the planning of Sockeye fisheries. The stocks and species of concern in 2019 included: Cultus Lake Sockeye, Nimpkish River Sockeye, Sakinaw Lake Sockeye, Interior Fraser River Coho, Southern BC Chinook including Fraser River Chinook, and Interior Fraser River Steelhead.

STOCK STATUS

Please Note: Tables 32 and 33 are adapted from or courtesy of the Pacific Salmon Commission.

PRE-SEASON ASSESSMENT

Pre-season expectations were for a median run size (p50 level) of 4,795,000 Fraser River Sockeye Salmon with a one-in-two chance that the run size would be between 2,891,000 (p25 level) and 8,676,000 (p75 level).

Table 31. 2019 pre-season run size abundance forecast range by management group for Fraser Sockeye

Run timing group	Probability that return will be at/or below specified run size				
	10%	25%	50%	75%	90%
Early Stuart	18,000	27,000	41,000	61,000	92,000
Early Summer	112,000	221,000	465,000	898,000	1,753,000
Summer	1,553,000	2,454,000	3,930,000	7,048,000	11,187,000
Late	111,000	189,000	359,000	669,000	1,265,000
Total	1,794,000	2,891,000	4,795,000	8,676,000	14,297,000

The pre-season diversion rate forecast for Fraser River Sockeye through Johnstone Strait was 69%. Expected Area 20 50% migration timing dates were July 5th for Early Stuart, July 30th for Early Summer, August 10th for Summer, and August 18th for Late-run Sockeye.

Pre-season spawning escapement goals at the p50 run size forecasts were 41,000 Early Stuart, 186,000 Early Summer, 1,572,000 Summer and 336,600 Late-run Sockeye for a total of 2,136,600 Sockeye spawners (Table 32).

Table 32. Fraser Sockeye 2019 Pre-season (top) and Final In-season (bottom) Values for Total Allowable Catch (TAC) and Other Management Parameters.

Date		Management Group	Total Abundance	Spawning Escapement Target	TAM	pMA	Manage-ment Adjust.	Test Fishing	Aboriginal Fishery Exemption	Total Deductions	Total Allowable Catch	Harvest (includes for AFE)	Catch to date	Mission Escape. to date	50% Migration Date Area 20	Diversion Rate To-date
June 19	Pre-season	Early Stuart	41,000	41,000	0.00	0.69	28,300	500	3,600	41,000	0	0	0	0	5-Jul	
		Early Summer	465,000	186,000	0.60	0.45	83,700	9,500	48,200	327,400	137,600	185,800	0	0	30-Jul	
		Summer	3,930,000	1,572,000	0.60	0.09	141,500	53,000	290,100	2,056,600	1,873,400	2,163,500	0	0	10-Aug	
		Late	359,000	336,600	0.06	0.56	188,500	4,000	58,100	359,000	0	0	0	0	18-Aug	
		Sockeye	**4,795,000**	**2,135,600**			**442,000**	**67,000**	**400,000**	**2,784,000**	**2,011,000**	**2,349,300**	**0**	**0**		**69%**
September 24	In-season	Early Stuart	26,000	26,000	0.00	0.69	17,900	100	2,500	26,000	0	0	46	25,908	8-Jul	
		Early Summer	94,000	94,000	0.00	0.45	42,300	1,100	8,300	94,000	0	0	1,011	92,530	29-Jul	
		Summer	360,000	360,000	0.00	0.09	32,400	5,000	31,000	360,000	0	0	5,039	339,006	19-Aug	
		Late	20,000	20,000	0.00	0.56	11,200	500	1,500	20,000	0	0	343	21,679	19-Aug	
		Sockeye	**500,000**	**500,000**			**103,800**	**6,700**	**43,300**	**500,000**	**0**	**0**	**6,439**	**479,124**		**84%**

* The TAC is determined by the run sizes and TAC deductions (spawning escapement targets, management adjustments, projected test fishing catches and AFE Exemptions) that were in effect when the the Fraser River Panel control of the last U.S. fishery area was relinquished.

** In a no TAC situation, the allowable harvest is the maximum harvest allowed under LAER management as identified in Canada's Escapement Plan. However the LAER is not a target and is usually by-catch in fisheries directed on other stocks or species with some limited directed terminal harvest. All impacts from all fisheries count towards the LAER.

*** Available Harvest = total abundance minus spawning escapement target.

**** The Fraser River Panel relinquished control of U.S. Panel Area Waters on Sept. 17th in Areas 4B, 5, 6c, 6 & 7, Sept. 21th in Area 7A, and Oct. 5th in the Apex. Oct. 5th is the final relinquishment date.

The goals for each Sockeye management group were established by applying Canada's Spawning Escapement Plan to the forecasted pre-season run size. For pre-season planning purposes, the harvest rule for Early Stuart Sockeye was constrained by a Low Abundance Exploitation Rate (LAER) limit of up to 10%. The Early Summer, Summer, and Late Sockeye LAER limits were up to 20%. Harvest rules were further constrained by a 60% Total Allowable Mortality (TAM) rate for all management groups (Table 33).

Table 33. Fraser River Sockeye Salmon 2019 Escapement Plan and Application of the Plan to each Management Group across a Range of Forecast Abundances

Management Unit	Harvest Rule Parameters Low Abundance ER (LAER)	TAM Cap	Lower Fishery Reference Point	Upper Fishery Reference Point
Early Stuart	10%	60%	108,000	270,000
Early Summer (w/o misc)	20%	60%	100,000	250,000
Summer (w/o misc)	20%	60%	1,000,000	2,500,000
Late (w/o misc)	20%	60%	300,000	750,000

Management Unit		Pre-season Forecast Return p10	p25	p50	p75	p90
Early Stuart	forecast	18,000	27,000	**41,000**	61,000	92,000
	TAM Rule (%)	0%	0%	**0%**	0%	0%
	Escapement Target	18,000	27,000	**41,000**	61,000	92,000
	MA	12,400	18,600	**28,300**	42,100	63,500
	Esc. Target + MA	30,400	45,600	**69,300**	103,100	155,500
	LAER	10%	10%	**10%**	10%	10%
	Available ER at Return	0%	0%	**0%**	0%	0%
	Allowable ER	10%	10%	**10%**	10%	10%
	Allowable Harvest	1,800	2,700	**4,100**	6,100	9,200
	2019 Performance					
	Projected S (after MA)	9,600	14,300	**21,800**	32,400	48,900
	BY Spawners	10,096	10,096	**10,096**	10,096	10,096
	Proj. S as % BY S	95%	142%	**216%**	321%	484%
	cycle avg S	44,409	44,409	**44,409**	44,409	44,409
	Proj. S as % cycle S	22%	32%	**49%**	73%	110%

Management Unit		Pre-season Forecast Return p10	p25	p50	p75	p90
Early Summer (w/o RNT)	*lower ref. pt. (w misc)*	147,400	157,900	**167,900**	161,200	165,500
	upper ref. pt. (w misc)	368,400	394,600	**419,700**	403,100	413,800
	forecast (incl. misc)	112,000	221,000	**465,000**	898,000	1,753,000
	TAM Rule (%)	0%	29%	**60%**	60%	60%
	Escapement Target	112,000	157,900	**186,000**	359,200	701,200
	MA	50,400	71,100	**83,700**	161,600	315,500
	Esc. Target + MA	162,400	229,000	**269,700**	520,800	1,016,700
	LAER	20%	20%	**20%**	20%	20%
	Available ER at Return	0%	0%	**42%**	42%	42%
	Allowable ER	20%	20%	**42%**	42%	42%
	Allowable Harvest	22,400	44,200	**195,300**	377,200	736,300
	2019 Performance					
	Projected S (after MA)	61,800	122,000	**186,100**	359,400	701,500
	BY Spawners	137,845	137,845	**137,845**	137,845	137,845
	Proj. S as % BY S	45%	89%	**135%**	261%	509%
	cycle avg S	144,830	144,830	**144,830**	144,830	144,830
	Proj. S as % cycle S	43%	84%	**128%**	248%	484%

Management Unit		Pre-season Forecast Return				
		p10	p25	**p50**	p75	p90
Summer (w. RNT & Har)	*lower ref. pt. (w misc)*	1,109,500	1,109,500	**1,109,500**	1,109,500	1,109,500
	upper ref. pt. (w misc)	2,773,900	2,773,900	**2,773,900**	2,773,900	2,773,900
	forecast	1,553,000	2,454,000	**3,930,000**	7,048,000	11,187,000
	TAM Rule (%)	29%	55%	**60%**	60%	60%
	Escapement Target	1,109,500	1,109,500	**1,572,000**	2,819,200	4,474,800
	MA	99,900	99,900	**141,500**	253,700	402,700
	Esc. Target + MA	1,209,400	1,209,400	**1,713,500**	3,072,900	4,877,500
	LAER	20%	20%	**20%**	20%	20%
	Available ER at Return	22%	51%	**56%**	56%	56%
	Allowable ER	22%	51%	**56%**	56%	56%
	Allowable Harvest	343,600	1,244,600	**2,216,500**	3,975,100	6,309,500
	2019 Performance					
	Projected S (after MA)	1,112,600	1,112,600	**1,576,400**	2,827,100	4,487,300
	BY Spawners	977,005	977,005	**977,005**	977,005	977,005
	Proj. S as % BY S	114%	114%	**161%**	289%	459%
	cycle avg S	651,121	651,121	**651,121**	651,121	651,121
	Proj. S as % cycle S	171%	171%	**242%**	434%	689%

Management Unit		Pre-season Forecast Return				
		p10	p25	**p50**	p75	p90
Late (w/o Har)	*lower ref. pt. (w misc)*	336,600	336,600	**336,600**	336,600	336,600
	upper ref. pt. (w misc)	841,400	841,400	**841,400**	841,400	841,400
	forecast	111,000	189,000	**359,000**	669,000	1,265,000
	TAM Rule (%)	0%	0%	**6%**	50%	60%
	Escapement Target	111,000	189,000	**336,600**	336,600	506,000
	MA	54,400	98,300	**188,500**	198,600	323,800
	Esc. Target + MA	165,400	287,300	**525,100**	535,200	829,800
	LAER	20%	20%	**20%**	20%	20%
	Available ER at Return	0%	0%	**0%**	20%	34%
	Allowable ER	20%	20%	**20%**	20%	34%
	Allowable Harvest	22,200	37,800	**71,800**	133,800	435,200
	2019 Performance					
	Projected S (after MA)	59,600	99,500	**184,900**	336,100	504,400
	BY Spawners	68,022	68,022	**68,022**	68,022	68,022
	Proj. S as % BY S	88%	146%	**272%**	494%	742%
	cycle avg S	465,982	465,982	**465,982**	465,982	465,982
	Proj. S as % cycle S	13%	21%	**40%**	72%	108%
Allowable Harvest (TF, US, CDN)		390,000	1,329,300	**2,487,700**	4,492,200	7,490,200
Total projected spawners		1,243,600	1,348,400	**1,969,200**	3,555,000	5,742,100

Pre-season Management Adjustments (MAs) of 28,300 Early Stuart, 83,700 Early Summer, 141,500 Summer-run and 188,500 Late-run Sockeye were added to the spawning escapement targets to increase the likelihood of achieving the escapement targets. The application of a LAER for any management group indicates that spawning escapement targets are unlikely to be reached and therefore obviates the need for MAs. In 2019 this was the case pre-season for Early Stuart, as it was apparent that for the entire range of pre-season run size forecasts LAER management was necessary. Early Summer Sockeye would be in a LAER scenario around run sizes less than p50, Summer Sockeye would not be in a LAER until an abundance less than p10, and Late Sockeye would be in a LAER scenario at run sizes less than p75.

The pre-season MAs were derived from historical proportional differences between estimates (pDBEs). For all aggregates, except the Late run, the pre-season pDBEs were historical medians from all cycle years. For Late run the Panel agreed to use the weighted average of the historical odd-year median for Late run excluding Birkenhead and the all-year median for Birkenhead. If the Late run upstream timing was later than September 15th the MA would be the weighted average of the all years timing model for Late run excluding Birkenhead and the all years median for Birkenhead.

The projected Total Allowable Catch (TAC) of Fraser River Sockeye for international sharing based on the median forecasted abundances and bilaterally agreed deductions was approximately 2,011,000 Sockeye, of which 16.5% were allocated to the United States (U.S.).

Pre-season model runs indicated that if the in-season return was less than the median forecast and similar to the p25 forecast there would still be some international TAC. In Canada, at the p25 forecast, no TAC would be available for commercial or recreational fisheries directed on Sockeye and limited harvest opportunities would be available for First Nations FSC fisheries due to management constraints (e.g. Early Stuarts, Early Summers and Lates being in LAERs). Pre-season model runs also indicated it was unlikely the Summer run TAC could be fully harvested due to the overlap in return timing with other groups that would not have TAC (Figure 8-1).

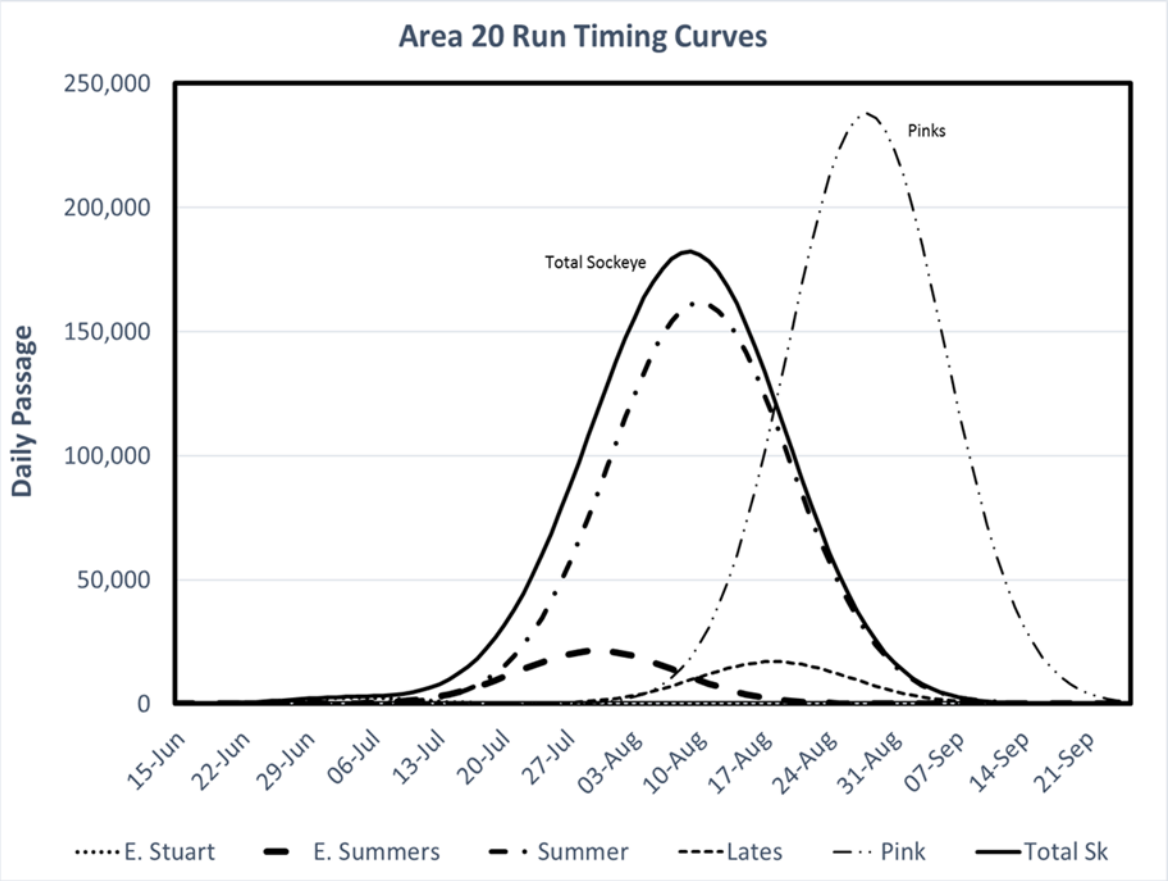

Figure 43. Pre-Season Projections of Daily Fraser River Sockeye Salmon Abundance by Management Group

IN-SEASON ASSESSMENT

Overall the marine migration timing was similar to pre-season expectations for all management groups with the exception of Summer runs which were much later than anticipated: 3 days later for Early Stuart, 1 day earlier for Early Summer, 9 days later for Summer, and 1 day later for Late-run Sockeye.

The Johnstone Strait post-season diversion rate was 84% compared to a pre-season adopted value of 69%.

Returns for all management groups were well below median pre-season forecast levels:

- The return of Early Stuarts was low: 26,000 or 37% lower than the pre-season 50% probability level (p50) forecast (41,000), i.e. closer to the p25 forecast (27,000).

- The return of Early Summers was very low: 94,000 or 80% lower than the pre-season p50 forecast (465,000), i.e. closer to the p10 forecast overall (112,000).
- The return of Summers was very low: 343,000 or 91% lower than the pre-season p50 forecast of 3,930,000. All stock groups were below the p10 forecast.
- The return of Lates was also very low: 23,000 or 94% lower than the pre-season p50 forecast of 359,000.

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-metre-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 Sockeye passage to the spawning grounds, especially prior to August 28, 2019 when water flow decreased enough to enable greater natural Sockeye migration above the slide. In-season estimates indicated that 100% of Early Stuart, 58% of Early Summer, 90% of Summer, and 0% of Late Sockeye were expected to migrate past the Big Bar slide. Preliminary passage estimates past the slide, with very limited natural passage as well as helicopter assisted passage, were only estimated to be approximately 20% for Early Stuart, 24% for Early Summer, and 70% for Summer Sockeye. Due to uncertainty surrounding the implications of the Big Bar landslide and the low in-season return estimates, the Department decided to: (i) delay and 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. Management Adjustments had no management implications in-season, but post-season, the Big Bar landslide will impact the Difference Between Estimates (DBEs) for Early Stuart, Early Summer and Summer runs.

A Unified Command that includes all levels of government (First Nations, provincial, federal) came together to lead response operations. Information about the Big Bar Slide was communicated through DFO fishery notices on Fraser River Sockeye Updates, Fraser River Panel meetings, the Province of BC's website (https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/emergency-response-and-recovery/incident-summaries/big-bar-landslide-incident), and the Fraser River Aboriginal Fisheries Secretariat (https://www.frafs.ca/node/75).

Fraser River discharge was far below the mean discharge (1981 to 2010) through most of June (near minimum discharge levels part of the time), slightly below the mean for most of July despite flooding on the Chilcotin River which was accompanied by higher water levels, turbulence and debris, near the mean for most of August, and near or above the mean for September. For most of the season, the Fraser River daily water temperatures fluctuated a few degrees above the historical mean reaching historical maximum observations at a few points during the season.

POST-SEASON ASSESSMENT

The preliminary post-season return of adult Fraser Sockeye was estimated to be ~90% below the pre-season median forecast and the smallest return on record (1893 to 2019) (Table 32). The run size was ~78% below the brood year run size (2.2 M) and ~90% below the 2019 cycle line average of 4.8 M).

Even though there were no licenced Sockeye-directed fisheries in 2019, there were fisheries for other species where Fraser Sockeye were encountered, notably Chinook and Pink salmon-directed fisheries (e.g. in Canada, FSC for Chinook and Pink, commercial (including economic opportunity and demonstration) for Pink; in Washington, in both Treaty Indian and All Citizens Pink fisheries). Fishery-induced mortality estimates were applied to all non-retained Sockeye encountered in these fisheries. There was no Fraser Sockeye TAC for international sharing, based on the calculation method set out in Annex IV, Chapter 4 of the Pacific Salmon Treaty. As such there was no U.S. share, the Canadian share of the TAC, including the Aboriginal fisheries exemption (AFE), comprised the entire TAC.

The total Canadian Fraser Sockeye catch (either directed or bycatch) can be found in Table 43 as well as Tables 39 and 40. The preliminary post-season exploitation rate is estimated to be 3.3%. See Table 33 for preliminary projected post-season exploitation rates relative to allowable exploitation rates.

Table 33. Preliminary 2019 Post-Season Exploitation Rate Estimates for All Fraser Sockeye Catch by Management Group

Management Group	Early Stuart	Early Summer	Summer	Late	Total
Preliminary Exploitation Rate	0.7%	2.8%	3.8%	1.7%	3.3%
Allowable Exploitation Rate*	10.0%	20.0%	20.0%	20.0%	19.4%
LAER?*	Yes	Yes	Yes	Yes	Yes

*The Low Abundance Exploitation Rate (LAER) is not a target. Due to the very low returns, as well as challenges and uncertainties surrounding the Big Bar landslide in 2019, all efforts were made to minimize fisheries impacts to Fraser Sockeye.

DFO's preliminary estimates of spawning escapements to streams in the Fraser River watershed are as follows:

Table 34. Preliminary 2019 Fraser Sockeye Salmon Escapement Summary by Management Unit.

Management Unit	Spawning Escapement	Spawning Success	% high precision
Early Stuart	89	100%	0%
Early Summer	45,057	96.8%	45.9%
Summer	246,871	97.8%	95.6%
Late	10,822	98.9%	49.8%
Total	302,839	97.7%	

Ongoing post-season work continues on the following topics that were highlighted during the 2019 season:

1. **Impacts of the Big Bar landslide:** The effect of the Big Bar landslide on 2019 passage and escapement on the Fraser River is still being evaluated. Work to mitigate the effects of the Big Bar slide are ongoing, and potential implications for passage in 2020 or in the future are still uncertain and will require ongoing evaluation.

2. **Low productivity:** In recent years there has been declining productivity, climate change and the increased variability that accompanies it, as well as low Sockeye abundances (the two lowest on record occurred in 2016 and 2019). As part of adaptive management, DFO will 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 will begin in 2019 through the Fraser River Sockeye Spawning Initiative (FRSSI) and is anticipated to be ongoing in 2020 and 2021. Forecast model methods may also be reviewed.

3. **Estimation of species composition and passage at Mission hydroacoustic site**: There are a variety of methods used to determine the number of Sockeye, Pink and Chinook salmon that pass by Mission. The Mission estimates are critical to in-season estimates of run size and migration timing. For example, Sockeye escapement estimates are typically based on total salmon past Mission minus Pink and Chinook. When Pink proportions increase, another method is used instead (i.e. Sockeye CPUE

at Whonnock multiplied by the expansion line). Species proportions are also derived from hydroacoustic-based length data and the previous year's species-specific average lengths. These methods and others have been reviewed by the Fraser River Panel Technical Committee but remain a considerable source of uncertainty. If numbers of one species are inaccurately or imprecisely estimated it may affect in-season estimates and expectations of catch of the other species in in-river fisheries. DFO is looking to further review these methods in future years.

4. **Species and stocks of concern:** In 2017, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determined that of the 24 Fraser Sockeye designatable units (DUs), 8 were endangered, 2 were threatened, and 5 were of special concern. Recovery Potential Assessments are underway in 2019.

FIRST NATIONS FSC AND TREATY DOMESTIC FISHERIES

Due to extremely low returns and uncertainty surrounding the impacts of the Big Bar rock slide, there were no licenced Sockeye-directed fisheries in 2019. There were fisheries in both marine and in-river for other species where Fraser Sockeye were encountered, notably Chinook and Pink Salmon-directed fisheries (e.g. in Canada, FSC for Chinook and Pink).

For marine FSC fisheries, the retention of Sockeye was not authorized in 2019. First Nations were encouraged to work with the Department to plan fisheries directed at other species (e.g. Fraser Pink Salmon) where Fraser Sockeye may be present. There was very little effort and catch of other species in 2019.

For FSC fisheries in the Fraser River, licences indicated that the fishery was limited to the target species (Chinook or Pink salmon), and all efforts and attempts shall be made to return all non-target species including Sockeye Salmon, Steelhead and Sturgeon to the water alive and unharmed. In Lower Fraser Above Port Mann (APM) areas, dead Sockeye could be retained in the first FSC fishery (August 9th to 10th), after which Sockeye could not be retained. Gear-specific fishery-induced mortality estimates, as described in the IFMP, were applied to all non-retained Sockeye encountered in these fisheries.

For catch estimates, see Table 43.

COMMERCIAL FISHERIES

There were no directed commercial fisheries on Fraser River Sockeye in Canada or the United States in 2019.

RECREATIONAL FISHERIES

TIDAL WATERS

In southern BC in all areas except Area 23 (Barkley Sound), the marine recreational fishery was not permitted to retain Sockeye Salmon in 2019. However, the creel survey reported a small number of Sockeye kept in areas closed to Sockeye retention.

The tidal waters of the Fraser River remained closed to fishing for Sockeye Salmon in 2019.

NON-TIDAL WATERS

The non-tidal waters of the Fraser River remained closed to fishing for Sockeye Salmon in 2019.
For catch estimates, see Table 43.

EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

There were no ESSR opportunities directed on Fraser River Sockeye in 2019.

PINK SALMON

OBJECTIVES AND OVERVIEW

In 2019 the Fraser River Panel (FRP) adopted a pre-season fishing plan at the p50 probability run size forecast for Fraser Pink Salmon (5.02 M) for pre-season planning purposes. At the p50 run size forecast TAC for international sharing was available and pre-season plans took this into consideration. All fishery planning focused on staying within constraints to minimize impacts on other pink stocks and species of concern. Actual in-season harvest opportunities were dependent on in-season stock assessments.

Fishing plans incorporate provisions to meet escapement objectives and meet conservation objectives for stocks of concern while considering international and domestic objectives. Fishing plans include the following assumptions and guiding principles (in no particular order):

- The FRP operated in accordance with Chapter 4, Annex IV of the Pacific Salmon Treaty;
- The U.S. share of the annual Fraser River Pink Salmon total allowable catch (TAC), harvested in the waters of Washington State shall not exceed 25.7% of the TAC;
- Canada's escapement plan specified escapement requirements that varied with run size;
- The escapement target varies with run size and the maximum exploitation rate cap was 70%;
- Harvest of Fraser Pink Salmon may be constrained by the management objectives for Fraser Sockeye and for other stocks or species of concern, particularly Interior Fraser River (IFR) Coho Salmon and IFR Steelhead;
- Due to conservation concerns alternative fishing gear and fishing strategies may be employed to access Fraser Pink TAC. Alternative gears used in the past have included beach seines, shallow seines, and fish wheels in the Fraser River. In the marine areas, varying fishing strategies and gear are considered such as allowing purse seines with independent observer coverage to access areas at the mouth of the river and possibly within the river.
- Further, when Pink TAC is available and there are bycatch constraints for other species (i.e. Fraser Sockeye) the Department may consider decision rules similar to recent years where the total Sockeye mortalities associated with a gear specific Pink fishery is 1% or less for Sockeye. This calculation takes into account the release mortality rate of the gear being used to harvest Pink Salmon as well as the estimated proportion of Sockeye expected to be encountered in the fishery.

STOCK STATUS

Please Note: Figure 43 and Table 32 are adapted from or courtesy of the Pacific Salmon Commission.

PRE-SEASON ASSESSMENT

Pre-season expectations were for a median run size (p50 level) of 5.02 million Fraser River Pink Salmon with a 50% chance that the run size would be between 3.58 million (at p25) and 7.51 million (p75).

Pre-season expectations of diversion rate for Fraser River Pink through Johnstone Strait was 50% and the projected Area 20 50% migration timing date was August 28th.

The pre-season spawning escapement target was 4.48 million Fraser River Pink spawners at the median forecast (p50).

Harvest constraints were established by applying Canada's Fraser Pink Escapement Plan to the forecasted pre-season run size distribution. The harvest rate for Fraser River Pink Salmon varied with abundance and was constrained by a 70% exploitation rate.

The projected Total Allowable Catch (TAC) of Fraser River Pink for international sharing based on the median forecasted abundance and bilaterally agreed deductions was 535,600 Fraser Pink, of which 25.7% were allocated to the United States (U.S.).

Table 35. Fraser Pink Escapement Plan and Application Across a Range of 2019 Forecast Abundances

2019 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	2,530,000	3,577,000	**5,018,600**	7,513,000	10,610,000
escapement target	2,394,000	3,305,000	**4,483,000**	6,000,000	6,000,000
allowable ER	5%	8%	**11%**	20%	43%
Available Harvest (TF, US, CDN)	136,000	272,000	**535,600**	1,513,000	4,610,000

IN-SEASON ASSESSMENT

Marine migration timing was 11 days earlier than pre-season expectations which created more run timing overlap with the very weak Sockeye returns. The Pink Area 20 peak return timing of August 17th was also the earliest on record (1959 to 2019).

The Pink salmon return was bimodal with a larger second mode, and the return timing spread of 19 days was the narrowest for the years 1987 to 2019, and the longest Pink travel time of 23 days from Area 20 to Mission for the years 2009 to 2019, all of which contributed to significant challenges in estimating return abundance in season.

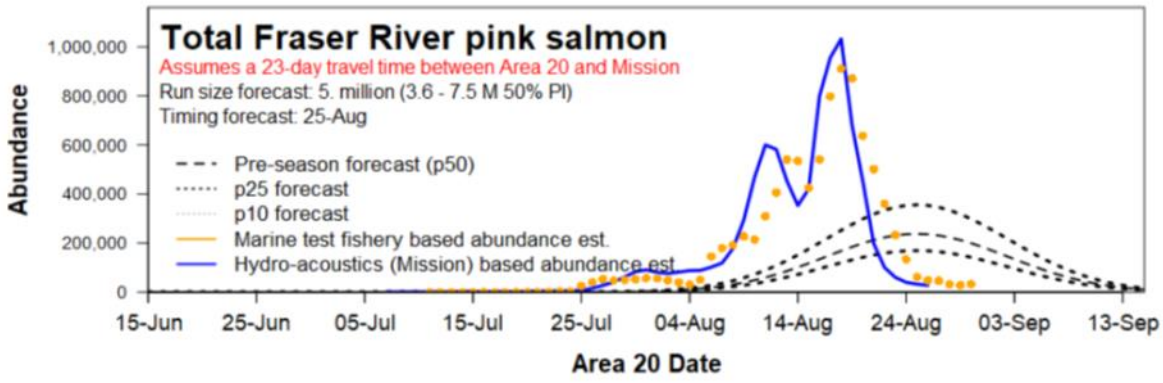

Figure 44. Pre-Season Projections and In-Season Reconstruction of Daily Fraser River Pink Salmon Abundance

The Johnstone Strait diversion rate was estimated to be 11% which was much lower than the pre-season forecast of 50%. This was the lowest Pink northern diversion rate between 1987 and 2019.

The total estimated Pink return (Table 36) of 8.9 million was substantially above (approximately 73%) the median pre-season forecast of 5.019 million.

The TAC of Fraser River Pink for international sharing based on the final Fraser River Panel adopted in-season run size (8.9 million) was 2,882,900 Pinks, of which 25.7% (740,900) were allocated to the U.S. and the remainder to Canada (2,142,000).

Table 36. 2019 Pre-Season (top) and Post-Season (bottom) Values for TAC and Other Management Parameters.

Date	Management Group	Total Abundance	Spawning Escapement Target	Test Fishing	Total Deductions	Total Allowable Catch	Harvest (includes for AFE)	Catch to date	Mission Escape. to date	% Migrati Date Area 20	Diversion Rate To-date
June 19	Pre-Season Pink	5,018,600	4,483,000	7,200	4,490,200	528,400	528,400	0	0	28-Aug	50%
September 24	In-Season Pink	8,900,000	6,000,000	23,500	6,023,500	2,876,500	2,876,500	263,087	8,463,160	17-Aug	11%

* The TAC is determined by the run sizes and TAC deductions (spawning escapement targets, management adjustments, projected test fishing catches and AFE Exemptions) that were in effect when the Fraser River Panel control of the last U.S. fishery area was relinquished.

** Available Harvest = total abundance minus spawning escapement target.

*** The Fraser River Panel relinquished control of U.S. Panel Area Waters on Sept. 17th in Areas 4B, 5, 6c, 6 & 7, Sept. 21th in Area 7A, and Oct. 5th in the Apex. Oct. 5th is the final relinquishment date.

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 metre 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, especially prior to late August when water flow decreased enough to enable greater 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 the range was between 5 and 30%. It was noted in-season that although natural passage of Pink Salmon was observed, mainstem spawning was prevalent directly downstream of the slide. Due to uncertainty surrounding the implications of the Big Bar landslide and the very low in-season Sockeye return estimates, the Department decided to plan fisheries directed on species other than Sockeye, including Pink fisheries, in a way that allowed as many Sockeye to reach the spawning grounds as possible. This included measures to minimize bycatch impacts such as requiring the use of selective fishing gear like shallow seines, beach seines, and fish wheels.

A Unified Command that includes all levels of government (First Nations, provincial, federal) came together to lead response operations. Information about the Big Bar Slide was communicated through DFO fishery notices on Fraser River Sockeye Updates, Fraser River Panel meetings, the Province of BC's website (https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/emergency-response-and-recovery/incident-summaries/big-bar-landslide-incident), and the Fraser River Aboriginal Fisheries Secretariat (https://www.frafs.ca/node/75).

Fraser River discharge was far below the mean discharge (1981 to 2010) through most of June (near minimum discharge levels part of the time), slightly below for most of July, near the mean for most of August, and near or above the mean for September. For most of the season, the Fraser River daily water temperatures fluctuated a few degrees above the historical mean, reaching historical maximum observations at a few points during the season. Although Fraser River discharge and temperature can have effects on salmon migration, environmental conditions rarely play the same kind of role in Pink management as they do for Fraser Sockeye given timing and migration differences between the species as well as the lack of terminal escapement estimates for Pink Salmon.

POST-SEASON ASSESSMENT

The 2019 Fraser Pink return was ~73% higher than the median forecast (5.0 M) and ~145% higher than the brood year (3.5 M).

Fraser River Pink Salmon catch numbers are available in Table 43. Canadian catch occurred in Pink-directed First Nations Food, Social and Ceremonial (FSC), economic opportunity, and demonstration fisheries, as well

as recreational fisheries and very limited commercial fisheries. The post-season exploitation rate is estimated to be 6.2%, which is well below the preliminary post-season allowable exploitation rate of 32%.

DFO spawning escapement enumeration programs are not conducted on Fraser Pink Salmon. Spawner abundance is estimated indirectly by subtracting the total estimated catch from the total estimated run size. Total Allowable Catch (TAC) calculated for Fraser Pink was based on the calculation method set out in Annex IV, Chapter 4 of the Pacific Salmon Treaty and the July 7, 2017 Commission Guidance. In these calculations, the TAC is fixed on the date that Panel control of the last U.S. Panel Area was relinquished (October 5th in 2019).

Ongoing post-season work will continue to review 2019 assessment challenges, some of which include:

1. Impacts of the Big Bar landslide: The effect of the Big Bar landslide on 2019 passage and escapement on the Fraser River is still being evaluated. Work to mitigate the effects of the Big Bar slide going forward are ongoing, and potential implications for passage in the future are still uncertain and will require ongoing evaluation.
2. In-season data used to estimate the daily abundance of Pink Salmon, including: test fishery expansion lines and the incorporation of various data sources (e.g. U.S. Area 7 commercial fishery data has proven useful in a number of years but was not in 2019), daily passage of Pink Salmon past the Mission hydroacoustic site including high density passage days, and the incorporation of behaviour anomalies observed (spread of the run and migration speed) into assessment tools.

FIRST NATIONS DOMESTIC AND FSC FISHERIES

The Marine area was open for First Nations directed FSC harvest on Fraser Pink Salmon and First Nations were encouraged to work with the Department to plan fisheries using selective gear and to fish in areas that would have reduced impact on co-migrating Fraser River Sockeye. There was very little effort and catch in Marine area Fraser Pink FSC fisheries in 2019.

There were directed harvest opportunities for Fraser Pinks in First Nations FSC fisheries in the Fraser River where only selective gear was permitted (e.g. shallow seines, beach seines, fish wheels, dip nets and rod and reel). Incidentally caught Pink Salmon were also licensed for retention in the lower and mid-Fraser.
There were no provisions for directed Pink Salmon harvest for FSC-type purposes in any Final Agreements. See Table 43 for estimates of kept Fraser Pink catch.

FIRST NATIONS COMMERCIAL HARVEST

There were Comprehensive Fisheries Agreements (CFAs) signed for Pink Salmon for commercial purposes in the Fraser River. Limited First Nations commercial Economic Opportunity (EO) and demonstration beach seine and fish wheel fisheries occurred September 17th to 27th. See Table 43 for catch estimates.

COMMERCIAL FISHERIES

There was Fraser Pink Commercial TAC identified in-season and there were limited commercial fishery openings in Canada. Commercial Area B seine and Area H troll Fraser Pink ITQ demonstration fisheries occurred in Area 29 from September 14th to 17th with very minimal effort and catch. By the time TAC was identified and the commercial fisheries opened, most Pink Salmon had already migrated through the terminal marine area and into the river. See Table 43 for catch estimates.

RECREATIONAL FISHERIES

TIDAL WATERS

Fraser River Pink harvest opportunities were available in marine areas with a daily limit of four Pink Salmon in 2019. These recreational harvest opportunities occur where Fraser Pink salmon are present along with other Southern and US origin Pink salmon.

In the tidal waters of the Fraser River, the retention of Pink Salmon was permitted from September 14 to September 20 and from November 2 to December 31 with a daily limit of four. From September 20 until November 1 the window closure to protect Steelhead Trout was in place and fishing for any species of salmon was closed.

The in-river tidal Fraser River recreational fishery was assessed from September 14 to September 20 and from November 2 to November 30. Catch estimates can be found in Table 43.

NON-TIDAL WATERS

Region 2:

Non-tidal Fraser River - In 2019, the retention of Pink Salmon was not permitted in the non-tidal Fraser River due to concerns for co-migrating Sockeye.

Chilliwack River – From July 1 to December 31, the retention of two pink salmon per day was permitted from a line between two fishing boundary signs on either side of the Chilliwack River 100 m from the confluence of the Chilliwack River and Slesse Creek downstream including that portion of the Sumas River from the Barrow Town Pump Station downstream to fishing boundary signs near the confluence with the Fraser River.

Harrison River – From January 1 to December 31, the retention of two pink salmon per day was permitted in those waters from the Hwy 7 Bridge downstream to the confluence with the Fraser River.

In 2019, the Chilliwack River recreational fishery was assessed from September 1 to November 15. Catch estimates can be found in Table 43. No assessment was conducted on the recreational fishery occurring on the Harrison River.

Region 3:

Pink Salmon retention did not occur due to concerns for co-migrating Sockeye.

Region 5:

Recreational Pink Salmon fisheries did not occur due to concerns for co-migrating Chinook salmon and the Big Bar rock slide.

EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

There were limited ESSR fisheries for Fraser Pink Salmon in 2019. There were licences issued for ESSR fisheries that included Pink salmon that were in surplus of escapement requirements at the Chilliwack, Chehalis, and Inch Creek hatcheries, as well as the Weaver Creek spawning channel. However Pink Salmon were only harvested at the Chilliwack Hatchery. See Table 45 for catch estimates.

SOUTHERN BC COHO

OBJECTIVES AND OVERVIEW

Coho stocks in Southern BC are managed domestically and through international Abundance Based Management provisions which are outlined in the Pacific Salmon Treaty. Harvest levels are outlined in the Treaty's Southern Coho Management Plan, which provides maximum exploitation rates dependent on abundance, and it is Canada's responsibility to ensure that its domestic stocks are not harvested beyond the maximum exploitation rate as outlined in the Treaty.

In Southern BC, Coho management measures in commercial and recreational fisheries are implemented based on their impacts to specific stocks. Southern BC Coho management is primarily based on managing Interior Fraser River, Lower Fraser River, Strait of Georgia, Johnstone Strait and West Coast Vancouver Island (WCVI) Coho stocks or Management Units (MUs).

The Canadian objective for Interior Fraser River (IFR) Coho in 2019 was to manage Canadian fisheries in a highly precautionary manner with fisheries management measures similar to those in place prior to 2014. This approach was expected to achieve an overall exploitation rate in Canadian waters within the 3 to 5% range.

Assessments of IFR Coho salmon stocks in the mid-1990s revealed that alarming declines in spawning populations were occurring at 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. 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. However, there have been improved returns of Coho in Northern B.C., WCVI, and inside Strait of Georgia stocks in recent years.

No specific management measures were in place in 2019 to protect Strait of Georgia Coho stocks beyond measures put in place for IFR Coho.

Management measures in place for WCVI Coho provided opportunities for recreational and commercial fisheries harvest in WCVI areas where IFR Coho were not considered to be impacted. These were largely terminal opportunities in portions of Area 23-27, where stock composition information showed that IFR Coho are not present. In WCVI areas/times where IFR Coho are known to be prevalent, non-retention of unmarked Coho remained in effect.

Coho catch and release information from all fisheries can be found in Table 42.

STOCK STATUS

STOCK STATUS - UPPER FRASER RIVER

Interior Fraser

The preliminary estimate for Coho returns to the Interior Fraser in 2019 is 44,400.

STOCK STATUS – LOWER FRASER RIVER

Currently there is no whole system escapement estimate available for Lower Fraser River (LFR) Coho.

A hatchery Coho indicator stock at Inch Creek hatchery provides estimated rates of survival and minimum estimates of exploitation on marked LFR Coho. Catch monitoring and escapement work in support of the Inch Creek indicator program produced data for survival information for the 2016 brood. Survival for coded-wire-tag marked LFR Coho from the 2016 brood was estimated to be 2.8%.

STOCK STATUS - STRAIT OF GEORGIA

Coho salmon production within the Strait of Georgia (SoG) has declined dramatically since the early 1990s. Marine survivals have been fluctuating the 1 to 4% range. 2019 escapement estimates were in most cases below recent average and similar to pre-season expectations based on recent returns and ocean conditions throughout the SoG.

Hatchery stocks

Coho returns to most hatcheries north of Nanaimo were average to below average in 2019. Escapement to the Puntledge River was near the 12-year average at 6,179 but down from 2018 (8,169). The Big Qualicum River, which had a significant mortality of smolts in 2018, had as expected a poor return in 2019 with 2,700 fish compared to the 12-year average of 10,520. Swim surveys of the Little Qualicum River suggest abundance for this system was near the recent 4-year average at 2,100 fish. Similarly, Nanaimo River returns were close to the 4-year average at 2,800. In the southern Strait of Georgia, Coho escapements were variable, some below average and some above average.

Wild stocks

Observed counts on the Englishman River were near the 4-year average in 2019 with an AUC (Area Under the Curve) estimate of 5500 adults. Returns to the Colquitz River (near Victoria) were reported to be 25% of the 4-year average at 116 fish.

New Coho escapement and survival indicators are currently under development in several systems with PST funding. A camera was operated at the Sakinaw Lake fence for the first time producing a count of 570 adults and 270 jacks. A camera was also operated in the Skutz Falls fishway at Cowichan River producing a count of 8,271 adult Coho. A PIT tag program was used to expand the count to a population estimate of 16,534 fish.

Black Creek is the primary wild stock indicator in the SoG. Limited fall rains allowed crews to operate the counting fence continuously through the Coho migration window without the fence being over-topped by high flows. Video counts from periods when the fence was open were added to the number handled at the fence to create the final estimate of 976 adult Coho and 2,909 jacks in fall 2019. The parental brood year (2016) estimate was 4,000 adults. The 2019 return was approximately 25% of its parental brood, but is within the range of survival rates in recent years.

The smolt production contributing to 2019 return was 40,309. This was below the 24-year average smolt production of 51,109 smolts.

STOCK STATUS - WEST COAST VANCOUVER ISLAND

In most recent years, spawning abundances for wild West Coast Vancouver Island (WCVI) Coho populations are near historic levels. However, the overall production of WCVI Coho has likely fallen from historic levels as spawning abundances have not increased despite reductions in harvest of these stocks. Hatchery production

has also been reduced. Initial surveys suggest that 2019 escapement is below recent-year averages in most systems.

STOCK STATUS - JOHNSTONE STRAIT AND MAINLAND INLET

The Keogh River plays an important role as the wild Coho indicator stock for the upper Johnstone Strait area. Historically, the Keogh River adult Coho Salmon return has averaged 2,586 (range: 230 to 9,465), while the juvenile abundance has averaged 62,213 (range 26,940 to 110,565). Following a peak in adult abundance in 2014 (9,465), annual escapement decreased to reach its lowest level in 2016 (230). Returns have increased modestly since, and the final estimate of adult Keogh River Coho Salmon in 2019 was 749 fish. The 2020 enumeration program is ongoing and estimates will be provided as they become available. The number of migrant Coho smolts in 2020 (86,770) was higher than in 2019 (71,779), despite low adult abundance for the brood year (405 adults), suggesting continuation of high freshwater productivity that first began in 2011. Coho tend to be extremely productive at low abundance, and individual productivity has increased dramatically in recent years, peaking with the 2016 brood year at 270 smolts per spawner (average 38 smolts per spawner, brood years 1998 to 2015). Expectations in 2020 are for below-average returns, but with the hope that marine conditions improve to result in a positive trend in Coho returns.

Quinsam River Hatchery is the Coho marine survival indicator for Area 13. In 2019, the Quinsam Coho return of ~3,300 adults is well below both the 4- and 12-year escapement averages. Seven thousand jacks are also estimated to have returned to the Quinsam this year, surpassing the adult returns by more than 2-fold. The 2019 adult return is lower than expected, indicating poorer than anticipated marine survival. Expectations in 2020 are for below-average returns with low survival conditions continuing.

In 2019, Village Bay Creek on Quadra Island continued with video monitoring of returning Coho. A total of 700 adults were counted through the fence; more than triple the 2016 escapement. The 2019 return was higher than expected, and exceeds the 4- and 12-year escapement averages. This system appears to be bucking the poor escapement trend widely seen in the local area.

Heydon Bay Creek in Loughborough Inlet is in the process of being developed into a mainland inlet Coho indicator system. One hundred and fifty Coho were counted through the fence in 2019, which is well below the historical average (as determined during the period the fence was in operation prior to 2013).

Extensive escapement reports for Coho in many systems are indicating below-average escapements in 2019. As anticipated, Coho marine survivals over the past year were poor, and similar conditions are expected through 2020; consequently, a continued trend of low escapement is anticipated next year.

FIRST NATIONS DOMESTIC AND FSC FISHERIES

WCVI FSC and Treaty Fisheries

First Nations Coho catch reports are preliminary at this time. Estimates based on catch reports from Maa-nulth Treaty harvest and WCVI Nuu-chah-nulth non-treaty First Nations harvest can be found in Table 42

Lower Fraser

There were no Coho-directed fisheries in the Lower Fraser in 2019. Both hatchery-marked and wild Coho were authorized to be retained in FSC fisheries before and after the Interior Fraser Coho window closure. During the window closure, harvest was limited to hatchery-marked Coho. The total hatchery-marked and wild Coho harvested and released during Chinook, Pink and Chum FSC fisheries can be found in Table 43.

BC Interior

FSC fisheries in the area target Sockeye, Chinook or Pink salmon. In 2019, First Nations harvesters were requested to release unharmed any incidentally caught Coho. Directed opportunities on Coho are permitted in terminal areas subject to abundance. In 2019, a small fishery took place based on data obtained at the Dunn Creek enumeration fence. Dunn Creek is a tributary to the North Thompson River. The total Coho catch (either directed or bycatch) in First Nations fisheries can be found in Table 43.

Strait of Georgia FSC Fisheries and Treaty Domestic Fisheries

There were no Coho Salmon-directed fisheries in the Strait of Georgia in 2019. Coho Salmon were harvested terminally in Puntledge, Qualicum, Nanaimo, and Cowichan Rivers using hatchery brailing and hand-picking/sorting methods, hook and line, and gill net. Estimates based on catch reports from Tla'amin Treaty harvest and non-treaty First Nations harvest can be found in Table 42.

Johnstone Strait

Small numbers of Coho Salmon were harvested in Johnstone Strait by hook and line and gill net between late May and late September. Terminal harvest of Coho Salmon by hatchery brailing and hand-picking/sorting methods took place in the Quinsam River in mid-October. Estimates for the Johnstone Strait are found in Table 42.

FIRST NATIONS COMMERCIAL HARVEST

WCVI Economic Opportunity

In 2019, DFO reached an agreement with Hupacasath and Tseshaht First Nations for an Economic Opportunity (EO) fishery targeting Coho in Subareas 23-1 and 23-2. The fishery took place in upper Alberni Inlet in the tidal portions of the Somass River south to Hocking point. The allocation for Coho was 3,000 pieces. Directed Coho EO fisheries occurred on September 22 and September 29, but catch in these openings were poor. Most of the Coho catch retained in 2019 was bycatch from EO Chinook-directed fisheries which took place in late August and September. The total Coho catch from these fisheries can be found in Table 42.

Five Nations Communal Sales Fishery

In 2019, communal sale fishery opportunities for the Five Nations (five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht) included southern BC Coho. These opportunities are categorized as: offshore integrated hook-and-line communal sale fisheries; nearshore integrated hook-and-line communal sale fisheries; or terminal communal sale fisheries. The TAC for the offshore fishery was 2,000 Coho (hatchery-marked only) and for the nearshore fishery was 1,200 (hatchery-marked and unmarked).

There was no directed Coho Five Nations communal sale fishery in 2019; however, hatchery-marked Coho retention for sale was permitted in the offshore integrated hook-and-line fishery. Both hatchery-marked and unmarked Coho were permitted to be sold in the nearshore integrated hook-and-line communal sale fishery and the terminal communal sale fishery. Total Coho catch in these fisheries can be found in Table 42.

Lower Fraser

There were no directed Coho fisheries authorized in the Lower Fraser in 2019.

In 2019, Fraser Pink EO and demonstration fisheries took place in the Fraser River with the Harrison Fisheries Authority, and 16 communities from Port Mann Bridge to Sawmill Creek; retention of hatchery-marked and unmarked Coho was not permitted in these fisheries. The total hatchery-marked and unmarked Coho encountered and released in Pink EO/demonstration fisheries can be found in Table 43.

BC Interior

There were no EO or demonstration fisheries in the BC Interior (Fraser River above Sawmill Creek) targeting Coho in 2019.

COMMERCIAL FISHERIES

Southern BC commercial fisheries are regulated so that impacts on Coho, in particular Interior Fraser Coho stocks, are minimized. Retention of Coho bycatch was not permitted in most of these fisheries in, including the Fraser River. Some limited opportunities for Coho retention occurred in terminal fisheries targeting Chinook and Sockeye in areas where Interior Fraser River Coho were not present.

WCVI Offshore Area Coho

Coho retention was not permitted in the 2019 Area G WCVI AABM Chinook troll fishery.

WCVI Terminal Area Coho

In 2019, Chinook-targeted commercial gill net and seine fisheries occurred in Area 23 (Alberni Inlet). Retention of both hatchery-marked and unmarked Coho were permitted. The total Coho bycatch can be found in Table 42.

Coho retention in other terminal WCVI commercial fisheries was not permitted in 2019. The total WCVI Coho bycatch in commercial terminal fisheries can be found in Table 42.

RECREATIONAL FISHERIES

TIDAL WATERS

Tidal recreational fisheries can be categorized as occurring in: mixed-stock areas, where multiple stocks are found concurrently in the same fishing area, and in terminal areas where local stocks dominate the catch. Areas where mixed stocks occur typically have more restrictive management measures in place that are designed to protect Interior Fraser Coho stocks. In terminal areas, opportunities may be permitted based on abundance forecasts, and local enhancement programs where Coho stocks are enhanced. The table below outlines the areas in Southern BC and the general Coho regulations pertaining to them.

Table 37. Southern BC Coho Fishery Regulations in 2019

Mixed stock fishing area	Daily Limit (marked or unmarked)	Size Limit	Coho Season
Johnstone Strait	2, 1 may be unmarked	30 cm.	June 1 – Jul 31
Johnstone Strait	2 marked	30 cm.	Aug 1 – Dec 31
Northern Georgia Strait	2 marked	30 cm.	June 1 – Dec 31
Southern Georgia Strait	2 marked	30 cm.	June 1 – Dec 31
Southern Georgia Strait (19)	2, 1 may be unmarked	30 cm.	Oct 1 – Dec 31
Juan de Fuca Strait	2 marked	30 cm.	Jun 1 – Dec 31
Juan de Fuca Strait (20-5 to 20-7)	4, 1 may be unmarked	30 cm.	Oct 1 – Dec 31
WCVI - Inshore	2	30 cm.	June 1 – Dec 31
WCVI - Offshore	2 marked	30 cm.	June 1– Dec 31

* for specific management measures in specific areas refer to the information provided in the Fishery Notices.

Catch and release information for Coho can be found in Table 42.

WCVI - Inshore

In 2019, hatchery marked Coho retention was increased to 4 per day (with unmarked retention remaining 2 per day) in Areas 23 and 25 where stocks are supported by hatchery production.

Tidal Waters Fraser River

In the tidal waters of the Fraser River downstream of the CPR Bridge at Mission, BC, from November 2 to December 31 the retention of two hatchery-marked Coho per day was permitted.

This recreational fishery was assessed from November 2 to November 30, 2019. Catch estimates can be found in Table 43.

NON-TIDAL WATERS

Region 1 Vancouver Island Tributaries

Fresh water conditions continued to remain favourable in 2019 compared to past years and no additional restrictions were in effect on Vancouver Island due to drought-like conditions.

Northern Vancouver Island

Typical non-tidal openings for Coho were available on:

- Campbell/Quinsam River from October 1 to December 31 for four per day, two of which could be marked over 35 cm;
- Cayeghle River (including the Colonial River) from April 1 to March 31 for one per day;
- Cluxewe River from April 1 to March 31 for two per day, hatchery-marked only;
- Kokisilah River from April 1 to March 31 for one per day, maximum size limit of 35 cm;
- Nahwitti River from April 1 to March 31 for one per day; and
- Quatse River from June 15 to March 31 for two per day, hatchery-marked only.

Anglers were restricted to the use of barbless hooks. Catch is not estimated in these freshwater fisheries.

Strait of Georgia

In 2019 Coho openings were provided on:

- Cowichan River from November 8 to December 31 for one Coho per day, minimum size limit of 25 cm;
- Nanaimo River from November 1 to December 31 for 2 hatchery-marked only Coho per day, minimum size limit of 25 cm;
- Puntledge River from October 1 to November 30 for 1 hatchery-marked only Coho per day, minimum size limit of 25 cm; and
- Chemainus River from October 15 to March 31 for one per day, maximum size limit of 35 cm.

Catch is not estimated in these freshwater fisheries.

West Coast Vancouver Island

Typical non-tidal openings for Coho were available on:

- Somass/Stamp River from August 25 to December 31 the daily limit was two, hatchery-marked or unmarked. A single, barbless hook restriction is in effect all year and there was a bait restriction in the Upper Somass and Stamp rivers from May 1 to October 31.
- Nitinat River from October 15 to December 31 the daily limit for Coho was two, hatchery-marked or unmarked. A two-week closure occurred between October 1 and October 14 to protect Chinook salmon during their peak spawning period. The area above Parker Creek is closed to fishing. A single barbless hook restriction and bait restriction is in effect all year.
- Conuma River from August 25 to December 31with a daily limit of two Coho, hatchery-marked or unmarked.
- Washlawlis River and Waukwass River and other west coast rivers are open year-round with a daily limit of one Coho, hatchery-marked or unmarked. Barbless hooks are required. No creel survey information is collected. Other rivers receiving some directed catch and release effort for Coho stocks are the Wakeman, Artlish, Zeballos, Tahsis, Burman, Ash, Taylor, Pacheena, Toquart and Leiner. The quota for all west coast streams, unless identified above, is zero (0).

Catch is not estimated in these freshwater fisheries.

Non-tidal Fraser River and Tributaries

Region 2: The retention of two hatchery-marked Coho per day was permitted once the majority of the Interior Fraser wild Coho population was through the area and following the Steelhead window closure in the following area:

- From the CPR Bridge at Mission, BC upstream to the Highway #1 Bridge at Hope - November 3 to December 31.

In 2019, no assessment was conducted on this Fraser River recreational fishery in Region 2.
There are no directed Coho openings in the Fraser River or tributaries upstream of the Highway #1 Bridge at Hope, BC. This includes all of Regions 3, 5, 7 and 8.

The following tributaries to the Fraser River in Region 2 were open during the dates stated below:

- Alouette River and De Boville Slough from October 1 to December 31 for one hatchery-marked Coho per day.
- Coquitlam River from September 1 to December 31 for one hatchery-marked Coho per day.
- Kanaka Creek from November 1 to November 30 for one hatchery-marked Coho per day.
- Chilliwack River/Vedder for four hatchery-marked Coho per day from January 1 to March 31 and from July 1 to December 31.
- Chehalis River from January 1 to December 31 for four hatchery-marked Coho per day.
- Harrison River for four hatchery-marked Coho per day from January 1 to March 31 and from September 1 to December 31.
- Nicomen Slough, Norrish Creek and the Stave River for four hatchery-marked Coho per day from January 1 to December 31, with only two over 35 cm.

In 2019, the Chilliwack/Vedder recreational fishery was assessed from September 1 to November 15 and the Nicomen/Norrish fishery was assessed from October 1 to December 15. Catch estimates can be found in Table 5. No assessments were conducted on the recreational fisheries occurring on the remaining rivers listed above.

During 2019, there were limited non-tidal openings for hatchery-marked Coho on the following systems which enter Boundary Bay:

- Little Campbell River, Nicomekl River and the Serpentine River one hatchery-marked Coho per day from September 1 to December 31.

These recreational fisheries were not assessed in 2019.

EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

WCVI ESSR Fisheries

The Somass First Nations were issued an ESSR licence at the Robertson Creek Hatchery in 2019 that included Coho and Chinook salmon. The Ditidaht First Nation was issued an ESSR Licence for Chinook, Coho and Chum at Nitinat Lake and Nitinat hatchery.

The Mowachaht/Muchalaht First Nation was issued an ESSR licence at the Conuma Hatchery in 2019 that included hatchery marked Coho and Chinook salmon, however no Coho were harvested.

All ESSR harvest information can be found in Table 45.

Lower Fraser ESSR Fisheries

In 2019, there were ESSR fisheries at the Capilano, Chilliwack, Inch Creek and Chehalis hatcheries; harvest of Coho Salmon was permitted. All ESSR harvest information can be found in Table 45.

Strait of Georgia ESSR Fisheries

A Coho salmon ESSR fishery for Qualicum First Nation took place at Big Qualicum hatchery from November 15 – December 16, 2019. See Table 45 for catch numbers.

Johnstone Strait ESSR Fisheries

For 2019, there were no ESSR opportunities on Coho in Johnstone Strait.

SOUTHERN BC CHUM

JOHNSTONE STRAIT CHUM SALMON

OBJECTIVES AND OVERVIEW

The Johnstone Strait Chum Salmon fishery targets Southern BC Chum that spawn primarily in the Fraser River and in tributaries of Johnstone Strait and the Strait of Georgia. This fishery also intercepts a small proportion of Puget Sound Chum. Since 2002, the Johnstone Strait Chum fishery has been managed using a 20% fixed exploitation rate (ER) strategy. This approach has provided predictable harvest opportunities for the commercial sector, and has increased the probability of meeting escapement goals across the many populations contributing to this fishery. Of the 20% exploitation rate, 15% is allocated to commercial fisheries and the remaining 5% is set aside for test fisheries, First Nations FSC, sport harvesters, and to also provide a buffer to commercial exploitation. Since the implementation of this management strategy, annual fisheries have been planned well in advance of the Chum return.

On July 11th, 2019, the Government of Canada and the Province of British Columbia announced a joint Steelhead Action Plan identifying new conservation measures for Thompson and Chilcotin Steelhead Trout (two population components of the Interior Fraser River (IFR) Steelhead aggregate). Based on our current understanding, there is considerable overlap in the timing and location of the return migration of IFR Steelhead and several South Coast salmon fisheries. The timing of this stock of concern is particularly overlapped with that of Fraser River Chum. Given the potential for salmon fisheries to incidentally harvest co-migrating IFR Steelhead, the Steelhead Action Plan outlines a series of window closures for fisheries occurring in times and areas that overlap with the IFR Steelhead migration, in both marine and freshwater fishing areas.

The announcement of these closures precipitated significant changes to the 20% fixed exploitation rate strategy for the Johnstone Strait Chum fishery. In 2019, the pre-season commercial fishing plan was modified to maintain opportunity in Johnstone Strait, while ensuring that fishing did not occur within the outlined IFR Steelhead closure times and areas. With the window closures reducing access to the earlier timed components of the Inside Southern Chum (ISC) run, fisheries were planned at a reduced exploitation rate (below the typical 20% ER).

As outlined in Chapter 6 of the Pacific Salmon Treaty, commercial Chum fisheries in Johnstone Strait are suspended when it is estimated that less than 1.0 million Chum salmon will migrate through Johnstone Strait. Early indications from the Johnstone Strait test fishery were that ISC abundance was tracking below the 1.0 million critical threshold. On October 7, 2019, the US was notified, as per the treaty language, that the aggregate Chum Salmon abundance for ISC through Johnstone Strait was predicted to be below the 1.0

million critical threshold, based on the Johnstone Strait test fishery. In accordance with the Pacific Salmon Treaty, below this critical threshold Canada shall only conduct assessment fisheries and non-commercial fisheries. Therefore, Canada also suspended operation of commercial fisheries that target Chum Salmon in Johnstone Strait as of October 7. Chum catch and release information from all fisheries can be found in Table 42.

STOCK STATUS

Mixed Stocks

In 2019, the main components of the Inside Southern Chum (ISC) return were expected to be both Fraser and non-Fraser stocks. These stocks are typically dominated by four-year-old fish, and the abundance of the 2015 brood return that out-migrated in 2016 was below average. Other salmon species that out-migrated in 2016 had encountered poor survival conditions (i.e. local Pink and Coho returns in 2017 were poor). The pre-season expectation for ISC was therefore for below to near target returns to the area. Based on the very strong 2016 brood year, it was expected that the age 31 component would contribute more than average to the 2019 Chum return.

The Johnstone Strait test fishery, which ran from September 10th through October 24th, provided timing and abundance information for the 2019 return, which is important in assessing the performance of the 20% fixed exploitation rate strategy. It also provided an index of abundance, used to determine the likelihood of the number of returning Chum being over the 1.0 million critical level (requirement for commercial openings). From the onset of the program, the Chum catch per unit effort (CPUE) in the test fishery was well below what was encountered during 2010, one of the lowest Chum returns on record (1980-2018). On October 7th it was determined that the ISC index of abundance was likely below the 1.0 million critical level (Figure 45) and any planned Johnstone Strait commercial mixed stock fisheries were suspended. The Chum CPUE from the test fishery continued to track well below 2010 for the remainder of the season (Figure 45), and wound up being the lowest on record. The age composition derived from the test fishery and commercial samples exhibited a lower than average contribution of 4-year-olds throughout the season, confirming the reduced survival of the 2015 brood.

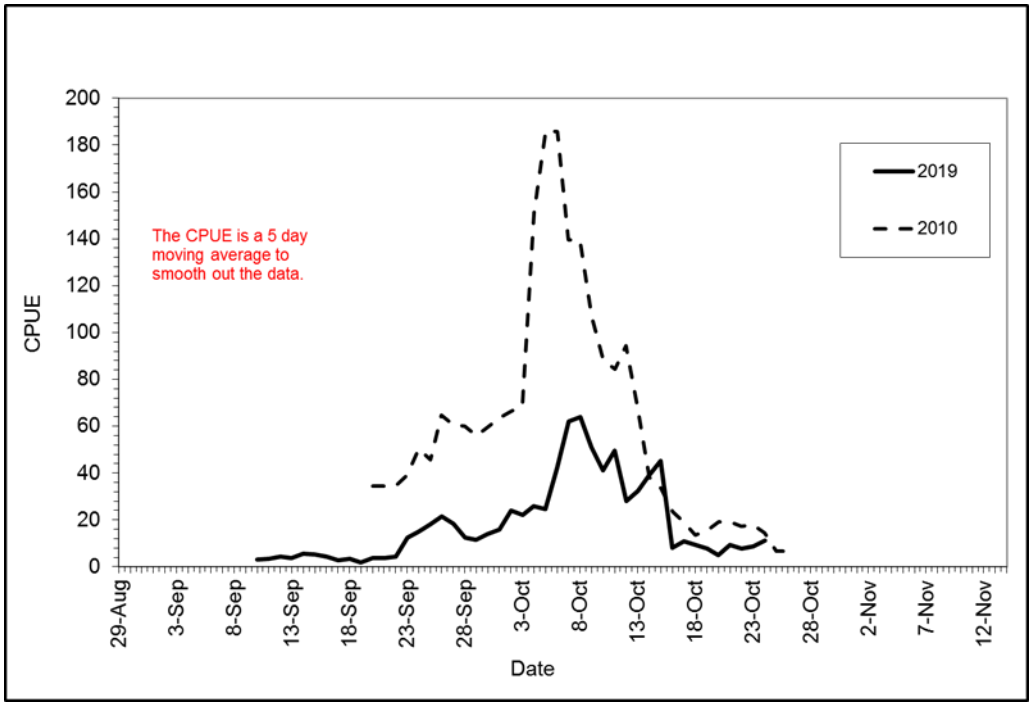

Figure 45. 2019 Johnstone Strait Chum Test Fishery Catch per Unit Effort (CPUE) compared to 2010 (one of the lowest returns in recent years).

Terminal returns

Although escapement monitoring is limited, summer Chum returns tended to be well below average. Escapements and catches of ISC aggregate returns (Johnstone Strait, Strait of Georgia and Fraser combined) were well below average and most populations were well below their respective escapement goals throughout the ISC area.

FIRST NATIONS DOMESTIC AND FSC FISHERIES

Johnstone Straits First Nations fisheries for Chum Salmon were not restricted in 2019. Chum Salmon harvests took place using gill nets and seine nets in Johnstone Strait as early as August, with most of the effort in October. The total Chum Salmon catch in the Johnstone Strait FSC fishery can be found in Table 42.

FIRST NATIONS COMMERCIAL HARVEST

There was no First Nations commercial harvest of Johnstone Strait Chum in 2019.

COMMERCIAL FISHERIES

Commercial Chum fisheries in 2019 were planned as per the Pacific Salmon Treaty, however a modified approach was taken to maintain opportunity in Johnstone Strait while aligning with the intent of the Interior Fraser Steelhead rolling window closure. Fisheries are usually scheduled to achieve a 20% fixed exploitation rate (ER) on Inside Southern Chum (ISC) stocks passing through Johnstone Strait with 15% ER for commercial and 5% ER for test, FSC, recreational and a commercial buffer. Shares of the 15% commercial ER are usually shared among the Area B seine (11.55%), Area D gill net (2.55%), and Area H troll fleets (0.9%). With the Steelhead window closure reducing access to a portion of the ISC, the 2019 fisheries were planned pre-season to a reduced commercial ER of 9.83%, shared between the Area B seine (6.54%), Area D gill net (2.27%), and Area H troll (1.01%) fleets.

As returns were below the critical threshold abundance, there were no commercial Chum fisheries in Johnstone Strait directed at southern Chum in 2019.

RECREATIONAL FISHERIES

TIDAL WATERS

The marine recreational daily limits for Chum are four (4) with a possession limit of eight (8) salmon. Chum opportunities are typically opened at full limits in the Johnstone Strait area, but may be reduced if Chum returns are low. Peak participation in the recreational Chum fishery typically occurs over the Thanksgiving weekend in mid-October, and activity is usually driven by abundance. The Strait of Georgia creel survey for Areas 13 and 14 was conducted from May to October. Recreational catches were reported as very low, as Chum abundance in the marine area was poor in 2019. The majority of the recreational Chum Salmon fishing effort occurs in Area 13, which is included in the Strait of Georgia catch estimate.

NON-TIDAL WATERS

There are no Chum-retention fisheries in non-tidal waters in the Johnstone Strait area. Some catch-and-release fisheries do take place, and are considered to very minimal.

EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

There were no ESSR opportunities for Johnstone Strait Chum in 2019.

FRASER RIVER CHUM

OBJECTIVES AND OVERVIEW

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. Spawning locations are predominately located in the Fraser Valley downstream of Hope, BC, with major spawning aggregations occurring 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 Hell's Gate.

The escapement objective for Fraser River Chum is 800,000. Since 2001, this objective has been achieved in all but four years; escapement to spawning grounds in 2009, 2010, 2017, and 2018 did not meet the escapement goal, with approximately 460,000, 590,000, 620,000, and 650,000 returning to spawn in those years, respectively.

Fraser River Chum are typically harvested in Johnstone Strait, the Strait of Georgia, U.S. waters of Area 7 and 7A, and in the Fraser River.

Within the Fraser River, Chum-directed fisheries include First Nations FSC fisheries, recreational fisheries, and commercial fisheries. In recent years, significant conservation measures have been implemented in-river during the Fraser River Chum migration period to protect co-migrating stocks of concern (including Interior Fraser River (IFR) Coho and IFR Steelhead). Depending on the fishery, these measures have included both time and area closures and gear restrictions. These conservation measures have restricted Fraser River commercial Chum fishing opportunities in recent years.

To address conservation concerns for IFR (Thompson and Chilcotin) Steelhead, the Department implemented management measures for 2019 to reduce the incidental impacts of Chum fisheries on co-migrating IFR Steelhead. Moving window closures 42 days in duration were put in place for all commercial 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. This 42-day rolling window closure also applied to recreational salmon fisheries within the Fraser River and tributaries (including areas immediately off the Fraser River mouth). Commercial troll fisheries in the marine area and 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 were subjected to a 27-day moving window closure.

STOCK STATUS

The number of adult Chum Salmon returning to the Fraser River each fall (terminal return) is estimated in-season with a Bayesian model based on Albion test fishery catch.

The Fraser River Chum test fishery at Albion operated every other day from September 1 until October 19, alternating days with the Albion Chinook test fishery. From October 21 until November 9, the Chum net fished every day, and then every other day from November 11 until November 23. Total Chum catch for the Albion test fishery can be found in Table 40.

For fishery planning purposes, DFO provided a provisional in-season terminal return estimate on October 16 of 564,000 Chum Salmon. The estimated 50% migration date of the run was October 24. Because the model estimated a 50% migration date 9 days later than average, an alternate estimate was also provided that assumed the 50% migration date was the same as average (October 17). This resulted in a median run size estimate of 414,000 Chum Salmon.

A subsequent estimate of Fraser River Chum terminal return was provided on October 23. The estimated terminal return on that date was 518,000 (80% probability that the run is between 407,000 to 661,000), with a 50% migration date through the lower river of October 22. This peak date is later than that observed in recent years (average peak date from 1997-2018 is October 17). It was estimated there was a 1% probability that the run would exceed the escapement goal of 800,000.

Additional in-season terminal return estimates were not provided, as subsequent test fishing information was consistent with a run size of 518,000.

Fraser River Chum Salmon return to numerous spawning locations in the lower Fraser River and its tributaries. Spawning escapement for Fraser River Chum Salmon is currently assessed for five of the largest Chum producing systems, as well as for a number of smaller tributaries. The largest observed escapement of Fraser River Chum (greater than 3 million fish), was seen in 1998. From 1999 to 2010, Fraser Chum Salmon escapement (for the annually assessed systems) trended downward. The escapement decline was then halted and reversed with an estimated 1.1 million spawners reported in 2011. Spawning escapement had remained stable through 2016 and achieved the escapement goal in each year (2011-2016 estimated escapement averaged 1.3 million spawners). However, the escapements in both 2017 (660,000) and 2018 (690,000) were estimated to be below the escapement goal of 800,000 Chum Salmon spawners. The preliminary estimate of Fraser River Chum Salmon escapement is 300,300; this is significantly below the escapement goal and is the third year in a row where the escapement goal has not been met.

FIRST NATIONS DOMESTIC AND FSC FISHERIES

First Nations Food, Social and Ceremonial (FSC) Chum-directed gill net fisheries commenced October 25 (below Port Mann Bridge) and October 26 (above Port Mann Bridge), following closures to protect co-migrating Interior Fraser River Coho (IFR Coho) and Interior Fraser River Steelhead (IFR Steelhead).
The total Fraser River Chum catch (either directed or bycatch) in First Nations FSC fisheries can be found in Table 43.

FIRST NATIONS COMMERCIAL HARVEST

In 2019, there were no Chum-directed economic opportunity or demonstration fisheries in the Lower Fraser due to a poor in-season Chum Salmon terminal return estimate. However, during the Pink Salmon economic opportunity beach seine fishery for the Harrison Fisheries Authority and the 16 signatory communities on September 17-21, and the Pink Salmon economic opportunity access from the Yale First Nation's fish wheel on September 19-25, retention and sale of Chum Salmon was permitted.

The total Fraser River Chum catch (either directed or bycatch) in First Nations Commercial fisheries can be found in Table 43.

COMMERCIAL FISHERIES

Area B

There were no Area B fisheries in Area 29 for Sockeye or Chum salmon in 2019 and, therefore, no catch of Chum Salmon to report.

Area E

Commercial salmon fisheries in the lower Fraser River (below Mission) remained closed during the Interior Fraser River (IFR) Coho window closure, and further closures were in place until later in October to meet the IFR Steelhead management objectives. There were no Area E fisheries in the Fraser River for Fraser Chum in 2019 and, therefore, no catch of Chum Salmon to report.

Area H

There were no Area H fisheries in Area 29 for Sockeye or Chum salmon in 2019 and, therefore, no catch of Chum Salmon to report.

RECREATIONAL FISHERIES

TIDAL WATERS

In most southern BC marine waters, the daily limit for Chum Salmon was four (4) in 2019.

Tidal Fraser River:

January 1 to September 13, 2019, this area was closed to fishing for salmon.

September 14 to September 20, open to the retention of Chum Salmon with a daily limit of four (4).

September 20 to November 12, this area was closed to fishing for all species of salmon to protect Interior Fraser River Steelhead.

November 23 to December 31. Chum retention was not permitted following the end of the Interior Fraser River Steelhead window closure due to the low returns of Chum Salmon to the Fraser River in 2019.

An assessment of the in-river tidal Fraser River recreational fishery occurred from September 14 to September 20 and from Nov.2 to Nov.30. Catch estimates can be found in Table 43.

NON-TIDAL WATERS

Chum salmon fisheries only take place in Region 2 of the Fraser River downstream of the Highway No. 1 Bridge at Hope, BC. Above Hope the number of Chum Salmon likely to be encountered is very low. Chum Salmon are not known to migrate into Regions 3, 5, 7 or 8.

Non-tidal Fraser River:

January 1 to November 2, 2019, closed to fishing for salmon.

November 3 to December 31, the non-tidal Fraser River from the CPR Bridge at Mission, BC to the Highway No. 1 Bridge at Hope, BC was open to fishing for salmon. The retention of Chum Salmon was not permitted, however, due to the low returns of Chum Salmon to the Fraser River.

Fraser River Tributaries

The following Fraser River tributaries were open to Chum Salmon retention during the dates noted in 2019.

- Alouette River – October 1 to 17, daily limit of one (1) Chum Salmon.
- Chilliwack and Vedder Rivers – July 1 to October 22, daily limit of one (1) Chum Salmon.
- Harrison River – April 1 to October 17, daily limit of two (2) Chum Salmon.
- Nicomen Slough – April 1 to October 17, daily limit of two (2) Chum Salmon.
- Stave River – April 1 to October 17, daily limit of two (2) Chum Salmon.

The Chilliwack and Vedder Rivers recreational fishery was assessed from September 1 to November 15 in 2019. Catch estimates can be found in Table 43. In 2019, no assessment was conducted on the fisheries in the Alouette, Harrison and Stave Rivers; however, the Nicomen Slough/Norrish Creek fishery was assessed from October 1 to December 15, 2019. Catch estimates can be found in Table 43.

The following systems that flow into Boundary Bay were open to Chum Salmon retention during the dates noted.

- Serpentine River – October 1 to October 31, 2019, daily limit of one (1) Chum Salmon.

This fishery was not assessed.

EXCESS-TO-SPAWNING REQUIREMENT (ESSR) FISHERIES

There were ESSR fisheries at the Chilliwack hatchery in 2019 that harvested Chum Salmon.

There were ESSR fisheries at the Inch Creek hatchery in 2019 that harvested Chum Salmon.

There were ESSR fisheries at Chehalis hatchery in 2019 that harvested Chum Salmon.

All ESSR harvest information can be found in Table 45.

STRAIT OF GEORGIA CHUM

OBJECTIVES AND OVERVIEW

Strait of Georgia Chum fisheries consist of terminal opportunities for Chum returning to their natal spawning streams. Many of the terminal fishing areas have enhancement facilities and/or spawning channels associated

with adjacent river systems. Terminal fishery strategies consist of monitoring and assessing stocks (escapement and returning abundance), with the objective of ensuring adequate escapement and providing harvest opportunities where possible. Stock assessments may include test fisheries, escapement enumeration including swim surveys, stream walks, channel entry counts, fence counts, sonar (DIDSON) counts and over flights. In some areas where stocks receive considerable enhancement or where stocks have above average productivity, limited fishing may occur prior to escapement objectives being reached.

STOCK STATUS

Historically, Chum returns have been highly variable relative to brood year escapements. For 2019, the forecasts were as follows:

- Jervis/Narrows Inlet Chum abundance was expected to be below the target level,
- Mid-Vancouver Island systems were expected to vary from well below to near the target level,
- Nanaimo was forecasted to be well above target levels,
- Cowichan was forecasted to be at target level,
- Goldstream Chum abundance was forecasted to be above to well above the target levels.

All of these forecasted expectations are highly uncertain and a review of the procedures and data used for forecasting these systems is planned for the near future.

Conditions for returning Chum migration and spawning in October began with drier conditions followed by significant rainfall. The end of October through mid-November were marked by below average precipitation. River levels were moderate during the peak of migration and spawning providing suitable conditions in most systems.

Returns for the Jervis/Narrows Inlet aggregate (which includes Brittain River, Skwawka River, Deserted River, Vancouver River and Tzoonie River) continued to be poor following several record-low counts in 2018. Returns came in consistently below forecast for mid-Vancouver Island systems and escapement targets were not met. Puntledge River counts were less than 20% of the 4 year average while Little Qualicum escapements were similarly poor. Big Qualicum returns did not surpass 3,000 and were less than 5% of the 15 year average. South Island systems fared slightly better with Nanaimo River reaching about 50% of the escapement target at 22,000. Cowichan River escapement was stronger at 95K but still below the forecast and target of 160K (Table 38). Goldstream River was the only system to reach the escapement target but fell short of the forecast.

Table 38. Strait of Georgia Chum Spawning Escapements

System	Target Escapement Target	2019 Forecast Expected Range	2019 Escapement	% of Target
Jervis Inlet	85K	43K – 64K	6.6K	8%
Mid-Island	230K	176K – 264K	18K	8%
Puntledge	60K	31K - 47K	6.5K	11%
Little Qualicum	85K	70K - 106K	9.5K	11%
Big Qualicum	85K	74K-111K	2K	2%
Nanaimo	40K	60K – 90K	22K	55%
Cowichan	160K	129K – 194K	95K	59%
Goldstream	15K	28K – 42K	21.5K	143%

FIRST NATIONS DOMESTIC AND FSC FISHERIES

Strait of Georgia First Nations fisheries for Chum Salmon were not restricted in 2019. There were few Chum Salmon fisheries in the marine mixed stock areas as well terminally and within rivers. FSC Chum Salmon catch reports from Tla'amin Treaty and non-Treaty First Nations in the Strait of Georgia can be found in Table 42.

FIRST NATIONS COMMERCIAL HARVEST

Area 14

Discussions with the K'omoks First Nation occurred around the harvest of surplus Chum for a Demonstration Fishery, however the Chum returns were poor and no commercial demonstration fisheries occurred.

Area 17

Pre-season discussions with the Nanaimo First Nation occurred to identify potential triggers and develop fishing plans to harvest surplus Nanaimo River Chum. During the season communication happened on a day to day basis to discuss stock status and potential fishing opportunities in Area 17. In 2019 there were no First Nations commercial fisheries in Area 17.

Area 18

A bi-weekly conference call was held with the Cowichan Fisheries Harvest Roundtable to discuss stock status and potential fishing opportunities in Area 18. In 2019 there were no First Nations commercial fisheries.

Area 19

At pre-season meetings with Saanich Tribes potential triggers and fishing plans were made to harvest surplus Goldstream Chum. In 2019 there were no First Nations commercial fisheries.

COMMERCIAL FISHERIES

There were no commercial Chum fisheries in the Strait of Georgia in 2019. In all mid-Vancouver Island streams, except the Goldstream River, Chum returns did not reach target escapements.

Area 14

Chum returning to this area have been enhanced since the late 1960s and terminal fisheries have occurred in October and November since the 1970s. The returning Area 14 Chum abundance is forecasted pre-season using brood escapement, average survival and age composition. In-season run strength is assessed from any early catches, visual observations at river estuaries and by escapement counts to the three major river systems.

The Area 14 Chum fishery is directed at the enhanced stocks of three systems: Puntledge, Qualicum and Little Qualicum Rivers. The Qualicum River is often referred to as the 'Big' Qualicum River, to better distinguish it from the Little Qualicum River. The escapement goals for the three river systems are 60,000 for Puntledge River, 85,000 for Little Qualicum River, and 85,000 for Qualicum River, adding up to an overall interim escapement goal of 230,000 Chum, not including enhancement facility requirements (about 10,000 Chum, bringing the total escapement goal to 240,000).

Area 14 commercial Chum fisheries are managed based on forecasted abundance. In-season, the management strategy for considering fishery openings falls under one of two categories; Area 14 pre-season forecast

greater than or less than 340,000 Chum. When the pre-season forecast is greater than 340,000, early Chum openings can target up to 65% of the anticipated surplus above 340,000. When pre-season forecast is less than 340,000, an early-timed small fleet gillnet fishery may be used to evaluate the mid-Vancouver Island aggregate abundance.

In 2019 the mid-Vancouver Island aggregate was managed based on the pre-season forecast of less than 340,000 Chum. Preparations for an Area D gill net assessment fishery were made should Chum returns perform better than expected. However, Chum returns were extremely poor and no assessment or commercial Chum fisheries occurred in Area 14 in 2019. Escapement targets were not met; total Chum returns to the Puntledge, Qualicum, and little Qualicum, as of November 13, was 21,626.

Area 16

This fishery targets wild Chum stocks returning to river systems in the Jervis Inlet area. The main systems are Tzoonie, Deserted and Skwawka Rivers. The overall escapement goal for rivers in Jervis/Narrows Inlet is 85,000. Terminal fisheries may occur in these areas when the individual or combined escapement goals have been assured, but fishing opportunities do not occur on a regular basis. There were no fisheries in Area 16 in 2019.

Area 17

This fishery is a terminal fishery targeting Nanaimo River stocks. The Nanaimo River Chum stocks are supplemented by the Nanaimo River hatchery. Hatchery supplementation occurs is on a sliding scale, where increased enhancement occurs during poor escapement years. Escapements fluctuate annually and fishery openings are planned in-season based on escapement estimates. The overall escapement goal for the Nanaimo River is 40,000.

Nanaimo River assessments include swims by Nanaimo River Hatchery staff, a sonar counting system (DIDSON) and spot counts or helicopter counts by DFO during the peak of the return when possible. The DIDSON was installed and operational on October 2. In-season assessments indicated that the escapement goal was unlikely to be met.

In 2019, there were no commercial fisheries for Nanaimo River Chum.

Area 18

This fishery is directed at Cowichan River stocks, with some incidental harvest of Goldstream-bound Chum. Fishery openings in mid- to late-November are limited to Satellite Channel, to minimize impacts on Goldstream stocks. Chemainus River stocks may also be impacted if fisheries occur earlier in November, but likely to a lesser extent.

Fishery openings are planned in-season based on escapement estimates from a DIDSON counter. Management is also guided by advice from the Cowichan Fisheries Roundtable and the Mid-Vancouver Island (MVI) Chum Subcommittee, and an in-season Chum Escapement Forecast Tool based on the DIDSON count and date. The overall escapement goal for the Cowichan River is currently 160,000 Chum passing by the DIDSON counter.

A bi-weekly conference call was held with the Cowichan Fisheries Roundtable to discuss stock status and potential fishing opportunities in Area 18. In 2019 there were no commercial fisheries for Cowichan River Chum.

Area 19

This fishery is directed primarily at Goldstream River stocks, although some Cowichan River Chum salmon are also harvested. Fisheries are planned in-season based on escapement estimates. Area 19 falls under the same management regime as Area 18. The overall escapement goal for the Goldstream River is 15,000. Weekly stream walks are conducted on Goldstream River by Goldstream Hatchery staff to estimate Chum escapement. In 2019, enumerations began on October 2.

In 2019 there were no commercial fisheries for Goldstream River Chum.

RECREATIONAL FISHERIES

TIDAL WATERS

Marine recreational Chum fisheries are subject to the normal salmon daily and possession limits (limit of four per day and possession of eight), and are typically open throughout the area. The majority of the recreational effort directed at Chum Salmon in the Strait of Georgia occurs in the upper portions of Discovery Passage between Seymour Narrows and Chatham Point, not far from Campbell River. The annual Brown's Bay Charity Chum derby which took place on the weekend of October 25-27 is usually the most active Chum recreational fishery in the area. Catches in the derby were reported to be very low, likely based on the lower abundances of Chum observed in 2019. There was a creel survey during the month of October in the Strait of Georgia (Areas 13-14).

Marine Chum fisheries also occur in the approach waters of the Puntledge, Qualicum, Little Qualicum, Nanaimo and Cowichan Rivers on Vancouver Island, as well as in Howe Sound, with effort increasing with Chum abundance. Due to the poor Chum abundances observed in the marine area, effort in 2019 was minimal. Catch estimates for chum in the marine recreational fisheries can be found in Table 42.

NON-TIDAL WATERS

Chum fisheries in Region 1 were largely non-retention fisheries in 2019 due to low abundance. Normally the Courtenay, Cowichan, Nanaimo, Puntledge and Qualicum Rivers on Vancouver Island provide Chum opportunities commencing in October but these all became non-retention fisheries on November 1, 2019. Recreational freshwater retention opportunities are typically based on escapement estimates from hatchery operations, and where escapement goals are expected to be met, opportunities are provided.

EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

The Qualicum First Nation was issued an ESSR Licence for Chum in 2019, however no Chum ESSR was executed.

An ESSR licence for the Snuneymuxw First Nation for Chum and hatchery-marked Coho was developed; however, due to poor Chum returns the licence was not issued.

The K'ómoks First Nation was issued an ESSR licence to harvest Chum Salmon and Fall Chinook Salmon at the DFO Puntledge River Hatchery between September 27 and December 31, 2019. There were no surplus Chum Salmon available so an ESSR harvest did not take place.

There were no ESSR fisheries at the Capilano hatchery in 2019 that included Chum Salmon.

WEST COAST VANCOUVER ISLAND CHUM

OBJECTIVES AND OVERVIEW

Commercial Chum Salmon fisheries normally occur in West Coast Vancouver Island (WCVI) from late September to early November in years of Chum abundance. The majority of Chum fishing on WCVI takes place adjacent to Nitinat Lake (Area 21). In some years there have been limited-effort gill net fisheries in Barkley Sound (Area 23), Clayoquot Sound (Area 24), Nootka Sound and Esperanza Inlet (Area 25) and Kyuquot Sound (Area 26).

Commercial fisheries for WCVI Chum employ a two-tiered strategy for managing harvest; either a constant harvest rate strategy or a surplus-to-escapement goal strategy.

1. 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 to 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 to 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 Sound (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 production in the area. The harvest rate is controlled by limiting effort (i.e. number and duration of openings and, in some areas, the number of permitted vessels) and limiting fishing areas to approach areas only (i.e. to those areas where fish are migrating not holding).

Since 2013, a fixed harvest rate strategy has also been used to harvest Nitinat Hatchery Chum when the stock abundance is considered above the lower fishery reference point but below the target fishery reference point. The maximum harvest rate for the Nitinat stock is 25% when it is below the target fishery reference point.

2. Surplus-to-Escapement Goal Strategy (fisheries targeting hatchery stocks at high abundance):

For fisheries that target primarily hatchery surpluses, the allowable harvest rate is determined by the escapement goal when it is determined the stock above the Upper Fishery Reference Point and broodstock capture targets have been or will be met. These fisheries occur only in 'terminal areas', defined as an area in close proximity to the origin watershed of the target stock where little or no interception of other stocks occurs. Surplus to escapement goal fisheries for Conuma Hatchery stock have occurred within the Tlupana Inlet portion of Area 25. Surplus to escapement goal fisheries for Nitinat Hatchery stock have occurred in Area 21 near the mouth of Nitinat Lake or in Area 22 in Nitinat Lake. All Nitinat and Conuma hatchery Chum are thermally marked, which allows for assessment of the hatchery contribution to fisheries and spawning.

STOCK STATUS

The current stock status is considered poor. Over the last three brood cycles, naturally spawning populations have been below target abundance in most years despite the precautionary harvest regime. In addition, hatchery production levels have declined in recent years partially as a result of low abundance (i.e. hatcheries have not been able to achieve brood-stock targets in some years). In recent years, overall catches have declined relative to historic levels. There was some improvement observed for the Nitinat Hatchery stock in 2016 and 2017 but returns in 2018 and 2019 were low.

FIRST NATIONS FSC AND TREATY FISHERIES

The 2019 WCVI FSC Chum reported catch (to date) can be found in Table 42 which includes fish retained for food, social and ceremonial purposes from Nuu-chah-nulth First Nations and Treaty harvests from Maa-nulth Nations.

FIRST NATIONS COMMERCIAL HARVEST

WCVI Economic Opportunity (EO)

In 2019, an agreement was reached with the Hupacasath and Tseshaht First Nations (Somass First Nations) for an Economic Opportunity (EO) fishery targeting Chum (Area 23). The pre-season forecast was 31,000, which was below the lower reference point of 48,000 and no commercial surplus was identified in-season; therefore, there was no EO fishery for Chum in 2019.

Five Nations Communal Sales Fishery

In 2019, the Department provided communal sale fishery opportunities for the Five Nations (five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht) that included WCVI Chum. These opportunities were categorized as Nearshore Integrated Hook and Line communal sale fisheries.

The Nearshore fishery targeted Nootka Sound Chum using troll and gillnet. One fishery opening occurred on September 25 however there was no effort and therefore no catch.

COMMERCIAL FISHERIES

Commercial fisheries on the WCVI targeted three Chum stocks in 2019: Nootka (Area 25), Esperanza (Area 25) and Kyuquot (Area 26).

Nitinat (Area 21/121)

In 2019, the preseason forecast for Nitinat Chum was of 362,000. This forecast allowed for commercial Area E gill net and Area B seine fisheries. Due to ongoing declines in Interior Fraser River (IFR) Steelhead escapement, DFO implemented 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, a fishing window closure was in took place from September 11 to October 22 to address IFR Steelhead bycatch concerns. Following the window closure, fisheries were permitted within a two mile boundary of the shore line between Bonilla Point and Pachena Point. Due to an extremely low Chum return, escapement goals to the Nitinat system were not met in season; therefore, no commercial fisheries were authorized in 2019.

Nootka Sound (Area 25)

Based on pre-season forecasts no fisheries were planned in Nootka Sound. A “Stage 1” limited-effort assessment fishery was initiated in-season due to higher than expected Chum bycatch in early September Chinook fisheries. Effort was limited to a maximum of two Area D gill net vessels and was open for 1.5 days per week during daylight hours. Catch rates were low and the fishery was discontinued after 2 weeks. The total catch for the Nootka Sound Area D gill nets can be found in Table 42.

Esperanza Inlet (Area 25)

Based on pre-season forecasts, a limited effort gill net Chum fishery opened in Esperanza Inlet on September 25, 2019. Effort was limited to a maximum of five vessels. The fishery was open for 1.5 days per week during daylight hours for 4 weeks. The total catch for the Esperanza Inlet Area D gill nets can be found in Table 42.

Kyuquot Sound (Area 26)

Based on pre-season forecasts, a limited effort gill net Chum fishery opened in Kyuquot Sound on September 25, 2019.

Effort was limited to a maximum of four vessels the fishery was open for 1.5 days per week during daylight hours for 3 weeks. The total catch for the Kyuquot Sound Area D gillnet fishery can be found in Table 42.

RECREATIONAL FISHERIES

TIDAL WATERS

The WCVI recreational fishery is open year-round with a daily limit of four (4) and possession limit of eight (8) Chum. Anglers are restricted to the use of barbless hooks and there is a minimum size limit of 30 cm. In both offshore and inshore areas of WCVI the recreational catch of Chum is minimal non-tidal recreational.

Recreational freshwater opportunities are typically based on escapement estimates from hatchery operations, and where escapement goals are expected to be met, opportunities are provided. Chum returns to the WCVI were very low in all systems in 2019. Daily and possession limits are typically half of those provided in marine waters, with daily limits on most rivers being two (2) per day and four (4) in possession. Catch is not estimated in these freshwater fisheries. Chum catch and effort from this fishery is low.

Chum retention fisheries took place in the Nitinat River on Vancouver Island from September 27 to 30, and from October 15 to December 31, with a daily limit of two (2) per day and four (4) in possession.

EXCESS SALMON TO SPAWNING REQUIREMENTS (ESSR) FISHERIES

The Ditidaht First Nation was issued an ESSR Licence for Chinook, Coho and Chum at Nitinat Lake and Nitinat hatchery. The Mowachaht/Muchalaht First Nation was issued an ESSR licence to harvest Chinook, hatchery-marked Coho, and Chum from the Conuma River and hatchery; however no surplus was identified in-season for Chum.

The total Chum ESSR catch can be found in Table 45.

There were no other Chum ESSR fisheries on the WCVI in 2019.

APPENDICES

TABLE 39: CATCHES IN CANADIAN TREATY LIMIT FISHERIES, 2003 TO 2019

Fisheries/Stocks	Species	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
Stikine River (all gears)	Sockeye	16,213	16,915	41,749	86,729	60,046	42,800	36,146	30,352	55,623	50,543	48,049	33,614	59,237	101,209	85,890	84,866	58,784
	Coho	5,228	3,685	5,502	5,346	5,619	4,992	4,835	5,748	4,703	4,952	5,061	2,398	47	72	276	275	190
	Chinook-lg	570	-	593	2,731	4,157	3,308	3,415	4,573	2,307	1,766	2,330	7,860	10,576	15,776	18,997	3,857	1,396
	Chinook-jk		-	788	794	1,537	759	1,594	1,213	1,165	1,001	714	1,067	1,735	2,078	2,177	2,574	1,052
Taku River (commercial gill net)	Sockeye	21,486	17,948	30,209	37,624	19,747	17,872	21,163	30,209	24,012	20,211	11,057	19,445	16,564	21,093	21,932	19,860	32,730
	Coho	12,239	9,503	7,726	9,513	7,886	14,568	10,374	8,689	6,102	10,349	5,649	4,866	5,399	9,180	6,860	5,954	3,168
	Chinook-lg	5	-	246	1,021	868	2,472	738	1,909	2,333	4,658	7,031	1,184	862	7,312	7,534	2,074	1,894
	Chinook-jk		-	88	205	-	657	N/A	478	514	697	1,183	330	337	198	821	334	547
Alsek River (all gear)	Sockeye	653	-	644	815	1,084	1,140	508	1,786	2,110	1,716	717	-	1,340	1,327	594	2,122	2,795
	Coho	10	-	-	-	-	-	29	N/A	29	7	3	34	1	-	71	127	192
	Chinook	37	-	74	10	87	39	73	85	214	294	125	7	41	19	114	185	228
Areas 3 (1-4)* (commercial net)****	Pink	-	101,267	704,450	430,435	80,266	450,671	1,249,570	118,164	160,757	30,686	404,460	8,330	1,740,270	228,378	878,552	402,459	667,103
Area 1 (commercial troll)****	Pink	60,003	266	38,763	32,343	41,551	31,775	84,216	57,013	52,221	19,948	60,402	29,295	61,276	34,854	39,430	27,751	98,347
North Coast AABM** (troll + sport)	Chinook	88,001	106,976	143,330	190,180	158,903	221,001	115,914	120,305	122,660	136,613	109,470	95,647	144,235	215,985	243,606	241,508	191,657
		42,801+ 45,200	70,276 + 36,700	97,730 + 45,600	147,381+ 42,800	106,703 + 52,200	172,001 + 49,000	69,264 + 46650	80,256 + 40050	74,660 + 48000	90,213 + 46400	75,470 + 34,000	52,147 + 43500	83,235 + 61000	151,485 + 64500	174,806 + 68,800	167,508 + 74,000	137,357 + 54,300
West Coast Vancouver Island AABM (troll + sport + FN)	Chinook	66,992	76,958	103,260	93,294	113,293	178,558	108,710	130,719	206,569	137,660	125,488	143,817	139,150	145,970	195,791	210,875	179,706
		23,195+ 35,418+ 8,378	28,840 + 45,233 + 2,885	54,411 + 46,707 + 2143	55,168 + 37,809 + 317	60,572 + 48,775 + 3,946	127,177 + 48,365 + 3,655	43,043 + 61,712 + 3955	62,573 + 61,822 + 4300	123,930 + 78,350 + 4289	79,123 + 52,698 + 5839	53,191 + 68,775 + 3381	89,704 + 50,319 + 3794	87,921 + 46,229 + 5,000	103,978 + 36,992 + 5,000	143,614 + 52,177	168,837 + 42,038	152,677 + 27,029
Fraser River Canadian Commercial Catch	Sockeye	-	3,682,561	-	-	-	7,945,474	2,124	-	443,000	9,305,104	-	16,942	-	4,633,623	137,000	1,993,800	1,042,986
	Pink	6	91,337	-	-	452	-	2,855,441	-	4,751,800	-	1,442,840	-	333,300	68,325	338,000	-	1,149,189
Fraser River U.S. Commercial Catch	Sockeye	-	989,459	-	-	44,100	691,000	4,609	105,100	266,000	1,970,000	-	49,800	3,900	701,300	-	192,200	244,000
	Pink	232,904	-	105,930	-	334,700	-	3,057,222	-	2,893,400	-	2,726,230	-	377,600	-	-	-	773,000
West Coast Vancouver Island (commercial troll)	Coho	2,920	-	331	774	18,126	32,992	5,499	1,988	-	458	-	369	1,424	2,399	5,989	-	-
Johnstone Strait (commercial catch)***	Chum	-	52,139	401,957	1,333,478	492,841	318,984	597,003	391,324	751,560	62,510	510,708	298,931	494,944	800,363	787,226	1,089,100	1,026,029

*AREA 5-11 CATCHES INCLUDED PRIOR TO 1995 AND EXCLUDED FROM 1995-1998 INCLUSIVE. NOT PART OF 1999 ANNEX IV PROVISIONS.

** NORTH COAST CATCH EXCLUDES TERMINAL EXCLUSION CATCHES OF 6,000 ('91), 6,100 ('92), 7,400 ('93), 6,400 ('94), 1,702 ('95), 16,000 ('96), 5,943 ('97), and 2,182 in 1998. NO TERMINAL EXCLUSION IN THE 1999 AGREEMENT - COVERED UNDER THE AABM ARRANGEMENT; CENTRAL COAST AREAS NOT PART OF 1999 ANNEX IV PROVISIONS.

*** CANADIAN CATCH INCLUDES COMMERCIAL, FSC AND TEST-FISH CATCHES IN AREAS 11-13 FOR 1991-94 INCLUSIVE, AND IN AREAS 12-13 FOR 1995 TO 2004 INCLUSIVE. 2002-PRESENT, CATCHES FROM FISHERIES MANAGED TO FIXED HARVEST RATE OF 20%.

****ALL PINK CATCHES FOR ALL YEARS (1995-2012) IN AREAS 3(1-4) AND AREA 1 HAVE BEEN UPDATED TO REFLECT FINAL ESTIMATES.

NOTE 1: WCVI CHINOOK CATCHES FROM 1995-1998 ARE REPORTED BY CALENDAR YEAR; CATCHES FROM 2008-1999 ARE REPORTED BY CHINOOK YEAR (OCT-SEPT)

NOTE 2: 1999 CATCHES ARE REPORTED ACCORDING TO FISHERIES/STOCKS UNDER THE 1999 ANNEX IV PROVISIONS.

TABLE 40: TRANSBOUNDARY CATCH TABLE

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	Stikine	5,401								570	
	Taku	105		107						10	
	Alsek	648								32	
Total First Nations FSC Catch		**6,154**		**107**						**612**	
Commercial											
	Stikine	10,812		5,228							648
	Taku	21,395		12,145							135
Total Commercial Catch		**32,207**		**17,373**							**783**
Recreational											
	Alsek	5		10						5	
Total Recreational Catch		**5**		**10**						**5**	
TOTALS		**38,366**		**17,490**						**617**	**783**

TABLE 41: NORTHERN BC CATCH TABLE

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	Skeena	28,205		613	-	8,072		34	3	4,659	
	Nass	53,829		2,288		6,542		157		6,555	
	Central Coast	1,949		382		8		498		2,520	
Total First Nations FSC Catch		**83,983**	**-**	**3,283**	**-**	**14,622**	**-**	**689**	**3**	**13,734**	**-**
Commercial											
Area C Gillnet	North & Central Coast	20,747	28	11	1,991	20,794	151	91,352	457	5,109	896
Demo	Central Coast			2,388		1,456					
Area F Troll	Haida Gwaii AABM	-	952	22,002	27	3,723	1,311	891	827	42,801	4,425
Area F Troll	Haida Gwaii Pink/Coho	11	1,739	155,195	173	56,280	6,108		2,573		35,673
Total Commercial Catch		**20,758**	**2,719**	**179,596**	**2,191**	**82,253**	**7,570**	**92,243**	**3,857**	**47,910**	**40,994**
Recreational											
	Skeena/Nass	49	219	23,904	2,292	3,471	6,282	62	12	16,052	11,150
	Central Coast			16,270		944		221		8,431	
	Haida Gwaii	125	-	36,100	15,300	910		700		45,200	24,000
Total Recreational Catch		**174**	**219**	**76,274**	**17,592**	**5,325**	**6,282**	**983**	**12**	**69,683**	**35,150**
TOTALS		**104,915**	**2,938**	**259,153**	**19,783**	**102,200**	**13,852**	**93,915**	**3,872**	**131,327**	**76,144**

TABLE 42: SOUTHERN BC CATCH TABLE

Not including Fraser River – see Table 43

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	WCVI - Inshore ISBM			1,582	341			1,738	700	5,551	
	WCVI - Offshore AABM			2,364	15	99		17		1,450	10
	Strait of Georgia	1		1,560		14		322		1,024	8
	Johnstone Strait		302	635	4	7,561		7,878	100	358	3
Total First Nations FSC Catch		1	302	6,141	360	7,674	-	9,955	800	8,383	21
First Nations Commercial											
EO	WCVI - Inshore ISBM			659						26,424	
Total First Nations Commercial Catch				659						26,424	
T'aaq-wiihak											
	WCVI - Offshore AABM	2	20	188	1,195	172	512	1	15	7,123	277
	WCVI - Inshore ISBM			94				38		3,058	
Total T'aaq-wiihak Catch		2	20	282	1,195	172	512	39	15	10,181	277
Commercial											
Area B	WCVI - Inshore			2,744			1		2	6,562	254
Area D	WCVI - Inshore		1	176	58			6,897	2	38,913	22
Area G	WCVI - Offshore		4		7,445	117	175	1	12	23,195	557
Total Commercial Catch		-	5	2,920	7,503	117	176	6,898	16	68,670	833
Recreational											
	Johnstone Strait	9	111	2,278	4,206	4,094	3,219	14	14	11,228	14,681
	Strait of Georgia	34	410	6,502	34,384	20,702	10,502	448	12	45,974	132,648
	Juan de Fuca	-	177	8,811	27,947	29,262	17,652	50	50	12,355	20,775
	WCVI - Inshore ISBM	28	14	19,028	10,542	989	1,147	6	-	51,430	29,323
	WCVI - Inshore AABM	570	-	8,836	8,147	230	55	-	-	20,155	29,099
	WCVI - Offshore AABM	-	5	9,392	23,719	1,623	2,246	-	-	15,712	8,689
Total Recreational Catch		641	717	54,847	108,945	56,900	34,821	518	76	156,854	235,215
TOTALS		**644**	**1,044**	**64,849**	**118,003**	**64,863**	**35,509**	**17,410**	**907**	**270,512**	**236,346**

TABLE 43: FRASER RIVER CATCH TABLE

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	Fraser	9,942	3,854	225	935	37,239	17,657	15,827	28	29,238	390
Total First Nations FSC Catch		9,942	3,854	225	935	37,239	17,657	15,827	28	29,238	390
First Nations Commercial											
	Fraser		377	1	1,034	220,936	15,035	30	133	1	932
Total First Nations Commercial Catch			377	1	1,034	220,936	15,035	30	133		932
Commercial											
	Fraser										
Total Commercial Catch											
Recreational											
	Fraser	0	0	18,474	10,525	5,709	4,729	923	8,887	12,236	4,869
Total Recreational Catch		0	0	18,474	10,525	5,709	4,729	923	8,887	12,236	4,869
TOTALS		**9,942**	**4,231**	**18,700**	**12,494**	**263,884**	**37,421**	**16,780**	**9,048**	**41,474**	**6,191**

TABLE 44: TEST FISHING CATCH TABLE

Test-Fisheries	Start Date	End Date	Boat Days	Sockeye kept	Sockeye released	Coho kept	Coho released	Pink kept	Pink released	Chum kept	Chum released	Chinook kept	Chinook released	GRAND TOTAL
Albion Chinook Gillnet	21-Apr-19	20-Oct-19	158	73	-	8	-	179	-	369	-	1,675	-	**2,304**
Albion Chum Gillnet	1-Sep-19	23-Nov-19	52	10	-	75	-	568	-	3,436	-	521	-	**4,610**
Maquqwin / Brooks Chinook Troll	20-Jul-19	27-Aug-19	16	-	3	368	-	15	53	-	-	339	5	**783**
Juan De Fuca Chum Seine	1-Oct-19	8-Nov-19	24	-	-	-	157	-	-	694	68	-	11	**930**
Area 12 Chum Seine	12-Sep-19	24-Oct-19	56	-	32	4	151	2	695	4,489	230	1	47	**5,651**
Naka Creek Sockeye Gillnet *	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Area 13 Sockeye Seine	10-Aug-19	23-Aug-19	14	1,500	3,176	-	43	3,234	45,101	-	74	-	74	**53,202**
Area 23 Sockeye Seine	10-Jun-19	16-Jul-19	14	3,953	6	-	1	-	1	-	-	-	126	**4,087**
Blinkhorn Sockeye Seine	25-Jul-19	30-Aug-19	36	2,883	2,884	-	254	698	36,003	-	378	-	401	**43,501**
Round Island Sockeye Gillnet	11-Jul-19	11-Aug-19	32	172	-	57	49	221	-	13	-	29	16	**557**
Round Island Sockeye Gillnet AT 90 Mesh Net Study **	1-Aug-19	30-Jul-19	20	133	-	56	51	223	1	12	-	32	22	**530**
San Juan Sockeye Seine	26-Jul-19	30-Aug-19	36	614	51	-	2,208	8,540	66,783	3	1	-	1,758	**79,958**
San Juan Sockeye Gillnet	10-Jul-19	13-Aug-19	68	236	-	52	150	721	-	9	-	162	315	**1,645**
Whonnock Gillnet	24-Jun-19	28-Sep-19	96	463	-	179	-	5,252	-	102	-	1,102	-	**7,098**
Cottonwood Gillnet	12-Jul-19	16-Sep-19	66	222	-	30	48	2,977	-	9	-	267	47	**3,600**
Qualark Gillnet	2-Jul-19	29-Sep-19	90	558	-	1	17	585	-	-	-	651	12	**1,824**
Tyee				2,205		224		1,180		126		380		**4,115**
Grand Total				**13,022**	**6,152**	**1,054**	**3,129**	**24,395**	**148,637**	**9,262**	**751**	**5,159**	**2,834**	**214,395**

All test fish catches include assessment and non-assessment sets

* Did not operate in 2019

** New for 2019

Note: Jacks are included in the above test fishing catches, if encountered

TABLE 45: ESSR CATCH TABLE

Hatcheries	Sockeye kept	Sockeye released	Coho kept	Coho released	Pink kept	Pink released	Chum kept	Chum released	Chinook kept	Chinook released	GRAND TOTAL
Robertson Creek	-	-	4,375	-	-	-	-	-	18,811		**23,186**
Quinsam River					241,016						**241,016**
Puntledge River									6,840		**6,840**
Nitinat River	-	-	11	-	-	-	11,387	-	3,436	-	**14,834**
Conuma River	-	-	-	-	-	-	-	-	1,991	-	**1,991**
Weaver Spawning Channel											**-**
Chehalis Hatchery	-	-	-	-	-	-	-	-	-	-	**-**
Inch Hatchery	-	-	3,241	-	-	-	1,056	-	-	-	**4,297**
Chilliwack Hatchery	-	-	24,834	-	22	-	1,462	-	3,333	-	**29,651**
Capilano Hatchery	-	-	3,326	-	-	-	-	-	1,449	-	**4,775**
Tenderfoot Hatchery											**-**
Big Qualicum River			1,186		13,493		-		3,561		**18,240**
Little Qualicum River							-		1,367		**1,367**
											-
											-
Grand Total	**-**	**-**	**36,973**	**-**	**254,531**	**-**	**13,905**	**-**	**40,788**	**-**	**346,197**

D. 2019 UPDATE REPORTS FOR SALMONID ENHANCEMENT PROGRAMS IN THE UNITED STATES AND CANADA

The Pacific Salmon Treaty between Canada and the United States requires that information be exchanged annually regarding operation of and plans for existing enhancement projects, plans for new projects, and views concerning the other country's enhancement projects. In 1988, a committee was formed to develop recommendations for the pre- and post-season and enhancement report formats. In summary, the committee proposed that:

- detailed reports on existing enhancement facilities of the type produced in 1987 be prepared every four years;
- the Parties will annually update information on eggs taken, fry or smolt released and adults back to the facility; significant changes in facility mission or production will be highlighted in narratives; and
- the Parties will provide periodic reports through the appropriate panels on new enhancement plans.

2004 ANNUAL REPORT ON THE SALMON ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2005 ANNUAL REPORT ON THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2006 ANNUAL REPORT ON THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2007 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2008 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2009 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2010 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2011 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2012 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2013 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2014 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2015 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2016 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2017 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2018 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2019 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2020.

2006 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2020.

2007 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2020.

2008 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

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2015 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2020.

2016 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2020.

2017 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2020.

2018 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2020.

2019 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2020.

Reports of the Joint Technical Committees

PART V
REPORTS OF THE JOINT TECHNICAL COMMITTEES

Executive summaries of reports submitted to the Commission by the joint technical committees during the period April 1, 2019 to March 31, 2020 are presented in this section. Copies of the complete reports are available from the library of the Pacific Salmon Commission.

A. JOINT CHINOOK TECHNICAL COMMITTEE

NEW DEVELOPMENTS FOR THE COMPUTATION OF POSTSEASON ISBM INDICES AND CALENDAR YEAR EXPLOITATION RATES.
TCCHINOOK-ISBM SPECIAL REPORT – April 2019

The Pacific Salmon Treaty (PST) requires the Chinook Technical Committee (CTC) to report annual estimates of exploitation rates for all Chinook salmon stocks harvested within the Treaty area. Two of the exploitation rate metrics the CTC reports on annually are the individual stockbased management (ISBM) index and calendar year exploitation rate (CYER). Limitations in how these two metrics are calculated was identified over the course of the 2018 negotiations of the Chinook Chapter of the PST. A small group of the CTC (hereafter referred to as the ISBM subgroup) was created to address these issues. Specifically, the ISBM Subgroup was tasked to modify two CTC programs:

1. Postseason ISBM Program

2. Mortality Distribution Table (CYER) Program

In addition to correcting errors in these programs, the Bilateral Concept Paper Drafting Group, which assisted with the 2018 negotiations, requested additional features to be added to both the CTC's ISBM and Mortality Distribution programs to enable selective exclusion of the first and second mature ages (Appendix A).

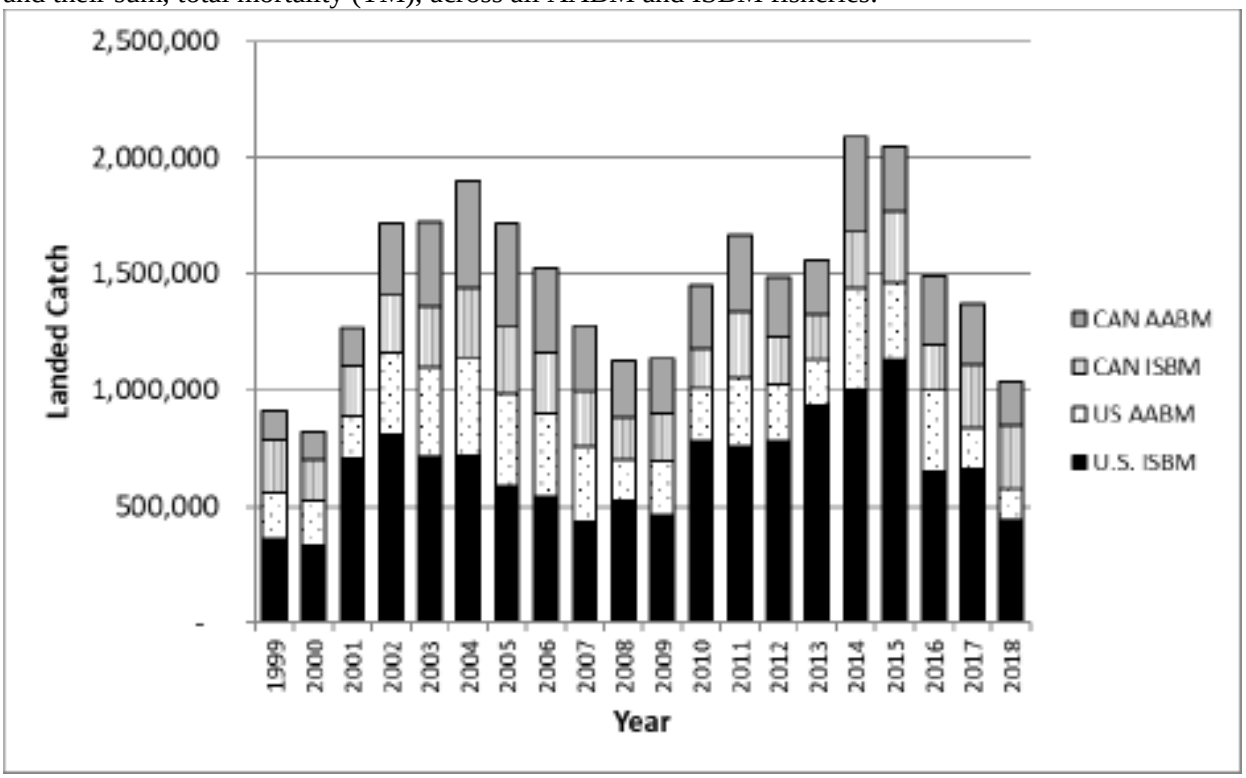
Both CTC programs are used to calculate management performance metrics, the results of which can be found in many CTC reports. The postseason ISBM program is used to calculate the 'pass through' index, which is used to assess ISBM compliance under the 2009 Agreement. The mortality distribution table program is used to calculate the 'calendar year exploitation rates', which will be used to assess ISBM compliance under the 2019 Agreement. Both metrics are computed using results from the CTC's annual exploitation rate analysis; however, due to unique aspects of each metric, the two programs often rely on auxiliary data. This report documents the methods and equations used to compute the ISBM index, summarizes the changes made to both CTC programs, and provides a user guide for how to operate these programs.

ANNUAL REPORT OF CATCH AND ESCAPEMENT FOR 2018
TCCHINOOK (19)-01 – June 2019

The Pacific Salmon Treaty (PST) requires the Chinook Technical Committee (CTC) to report annual catch and escapement data for Chinook salmon stocks that are managed under the Treaty. The CTC provides an annual report to the Pacific Salmon Commission (PSC) to fulfill this obligation. This report contains three sections to provide an indication of stock performance in the context of management objectives for 2018: Chinook salmon catches, escapements, and stock status.

Section 1 summarizes, for 2018, fishery catches by region and available estimates of incidental mortality (IM) by fishery, with accompanying commentary on the fisheries, management, and derivation of IM. Canada and the US compile annual catch data for their respective jurisdictions within the PST area according to fishery regimes, regional locations, and gear type with estimates of IM. Landed catch (LC) is fully reported in the appendices for each geographic area covered under the PST; a summary for all PSC Aggregate Abundance

Based Management (AABM) and Individual Stock Based Management (ISBM) fisheries, from 1999 to 2018, is provided in the figure below. Time series of available IM estimates are provided in Appendix A for individual fisheries. Appendix A also includes a coastwide summary of the historical time series of LC, IM, and their sum, total mortality (TM), across all AABM and ISBM fisheries.

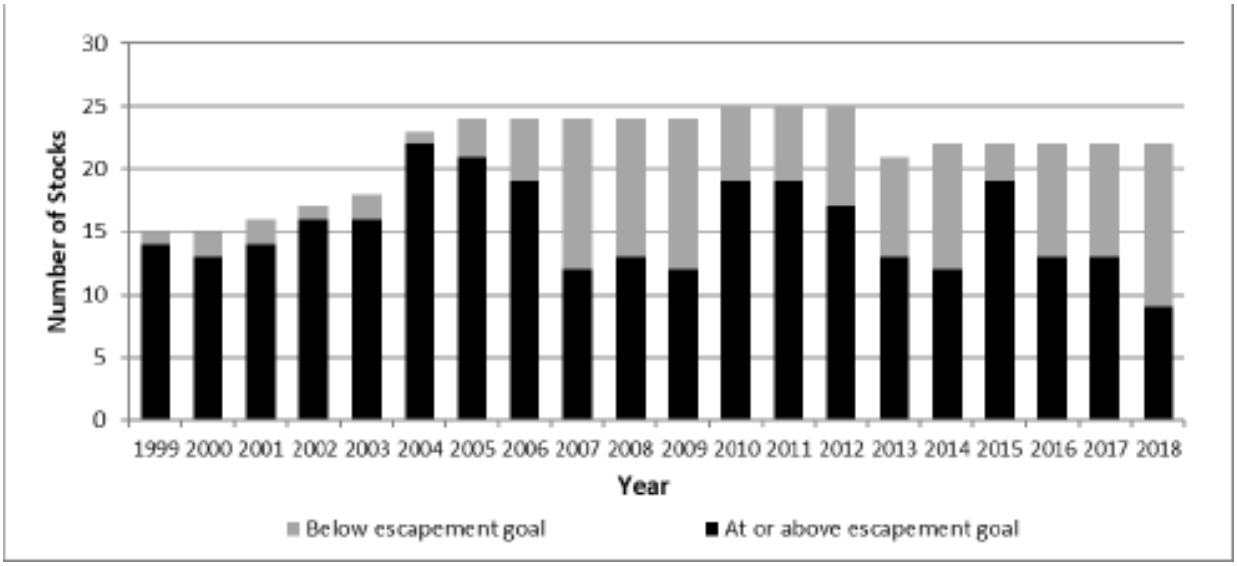


Estimates of landed catch for US and Canada AABM and ISBM fisheries, 1999–2018.

The preliminary estimate of Treaty LC of Chinook salmon for all PST fisheries in 2018 is 1,038,937, of which 572,965 were taken in US fisheries and 465,972 were taken in Canadian fisheries. Total estimated IM associated with this harvest is 198,472 nominal Chinook salmon. The TM for all PST fisheries in nominal fish was 1,237,408 Chinook salmon, of which 673,425 were taken in US fisheries and 563,983 occurred in Canadian fisheries. The TM for all PST fisheries in 2018 was approximately 373,172 fish less than that estimated for 2017. For US fisheries, 78% of the LC and 71% of IM occurred in ISBM fisheries; in Canada, 58% of the LC and 69% of IM occurred in ISBM fisheries. For some sport fisheries, 2018 LC and IM estimates are not yet available.

Section 2 includes an assessment of escapement for PST escapement indicator stocks/stock aggregates with PSC-agreed biologically based goals (22 stocks) as well as escapement data for the other indicator stocks/stock aggregates (24 stocks). For eight of the PST escapement indicator stocks/stock aggregates, the escapement goal is defined as a range; for the remaining 14, the escapement goal is the point estimate of SMSY (escapement producing maximum sustained yield). Annual escapements that are more than 15% below the lower end of the range or the SMSY point estimate are noted. The CTC will continue to review escapement goals for stocks as they are provided by respective agencies.

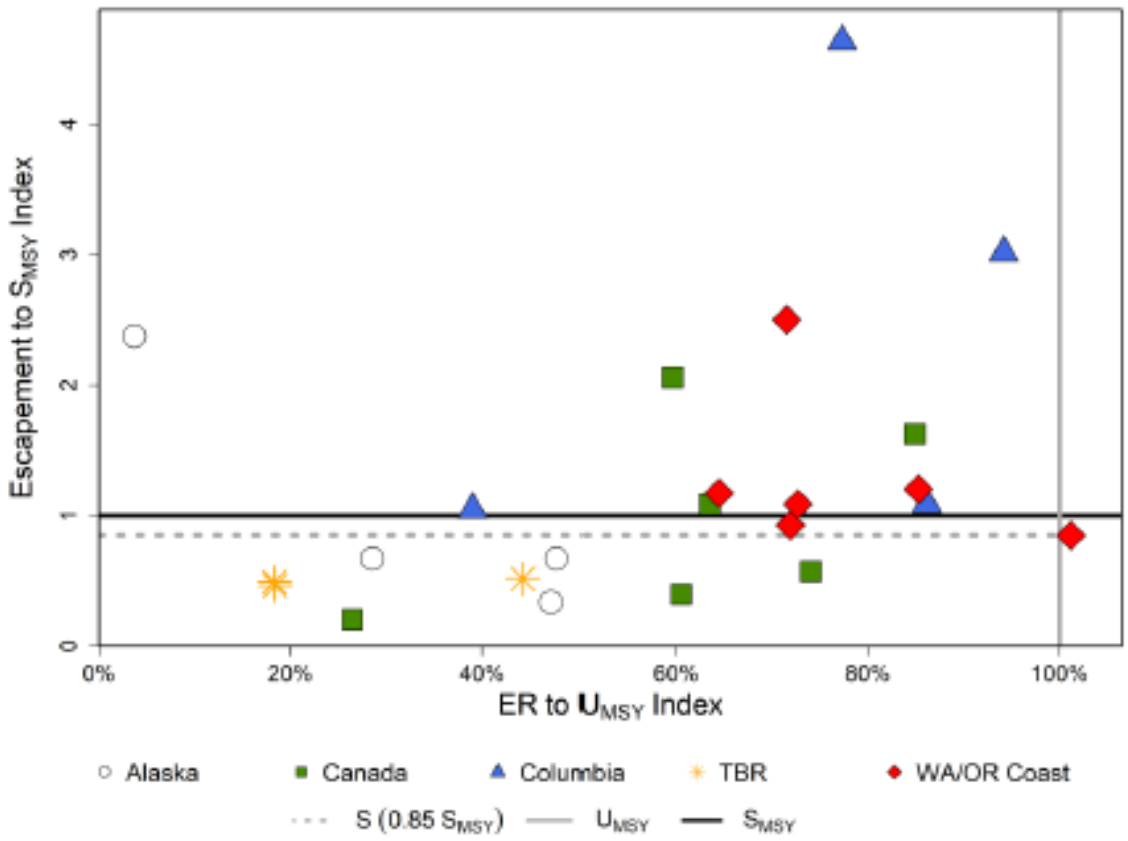
From 1999 to 2018, the percentage of stocks that met or exceeded escapement goals or goal ranges has varied from 41% to 96% (see figure below). In 2018, 9 of 22 stocks (41%) met or exceeded escapement objectives; the lowest number during the period of record. Of the 13 stocks below goal, 5 stocks (Chickamin, Hoh spring/summer, Lewis, Deschutes, and Nehalem,) were within 15% of the target goal. Eight stocks were more than 15% below goal: Situk, Chilkat, Taku, Stikine, Harrison, Queets spring/summer, Queets fall, and Siuslaw.



Number and status of stocks with PSC-agreed escapement goals, 1999–2018.

Note: The Keta, Blossom, and King Salmon rivers and Andrews Creek stocks were dropped as escapement indicator stocks in 2013 and Grays Harbor fall was added in 2014, bringing the total number of current indicator stocks with PSC-agreed escapement goals to 22 since 2014.

Section 3 presents a synoptic evaluation of stock status that summarizes the performance of those stocks relative to established goals over time for many of the escapement indicator stocks. This evaluation draws upon catch information (Section 1), escapement information (Section 2), and exploitation rates and other information to evaluate the status of stocks. Synoptic plots present both the current status of stocks and the history of the stocks relative to PST management objectives; this information clearly summarizes the performance of fisheries management relative to stocks achieving established or potential goals. A synoptic summary figure for 23 stocks with 2017 data shows that the majority of stocks were in the safe zone (exploitation below UMSY and escapement above SMSY). One stock, Siuslaw, was in the high-risk zone. One stock, Nehalem, was in the buffer zone. No stocks experienced exploitation above UMSY and still the escapement exceeded SMSY. Nine stocks were in the low escapement and low exploitation zone: Alsek, Stikine, Taku, Unuk, Chickamin, Chilkat, Kitsumkalum, Nicola, and Harrison. In general, Columbia River stocks showed a higher escapement to SMSY index than the other regions.



Synoptic summary by region of stock status for stocks with escapement and exploitation rate data in 2017 (escapement and exploitation rate data for each stock was standardized to the stock-specific escapement goal and UMSY reference points).

2018 EXPLOITATION RATE ANALYSIS AND MODEL CALIBRATION – VOLUME ONE TCCHINOOK (19)-02 – December 2019

The 2009 Pacific Salmon Treaty (PST) Agreement requires the Chinook Technical Committee (CTC) to report annual catches, harvest rate indices, estimates of incidental mortality (IM) and exploitation rates for all Chinook salmon fisheries and stocks harvested within the Treaty area. The CTC provides an annual report to the Pacific Salmon Commission (PSC) to fulfill this obligation, as agreed by Canada and the US under Chapter 3 of the Treaty. This report contains 4 sections: an introduction and description of the Chinook model procedures; a review of the results from the annual Exploitation Rate Analysis (ERA) based on coded wire tag (CWT) data; a description of the calibration procedure and results from the calibration of the PSC Chinook Model; and CWT analyses for mark-selective fisheries (MSFs). This report includes the results of the annual exploitation rate assessment of CWT data through 2016 (stocks in WA and OR) and 2017 (stocks in Canada, southwest Alaska and the Transboundary area), the preseason PSC Chinook Model calibration results for 2018 (CLB 1804), and postseason PSC Chinook Model calibration results through 2017 (CLB 1804). Results include the abundance indices (AIs) for the aggregate abundance-based management (AABM) fisheries and individual stock based management (ISBM) indices for each country.

The Canadian Department of Fisheries and Oceans (CDFO) initiated a new internet-based recreational catch reporting system (iRec) for salmon and other marine species in 2012. This new source of information results in revised catch estimates in Canadian Chinook marine recreational fisheries which are anticipated to be introduced into CTC modelling and reporting procedures beginning in 2019 as data becomes available. The revised catch estimates will increase those previously reported since 2012 as catch from times and areas not

monitored under DFO recreational creel surveys will be included. As each year of data from iRec becomes available, calibrated estimates will be updated.

AABM Abundance Indices and Associated Catches

The pre- and postseason AIs for the 3 AABM fisheries—Southeast Alaska (SEAK), Northern British Columbia (NBC), and West Coast Vancouver Island (WCVI) are presented in Table 1. The 2009 PST Agreement also specifies an allowable catch associated with each AI for each AABM fishery. Each model calibration provides the postseason AIs for the previous year and the preseason AIs for the current year. Preseason AIs are used to estimate the total allowable catch limits in the upcoming fishing season. Catch overages and underages, however, are tracked relative to postseason AIs and their associated allowable catches which are calculated by the first CTC-accepted postseason model calibration for a fishing year, per PST subparagraph 11(a)(i).

Table 1. Abundance Indices for 2009–2018 for the SEAK, NBC, and WCVI AABM fisheries. Postseason Indices for each year are from the first postseason calibration following the fishing year.

	SEAK		NBC		WCVI	
Year	Preseason	Postseason	Preseason	Postseason	Preseason	Postseason
2009	1.33	1.20	1.10	1.07	0.72	0.61
2010	1.35	1.31	1.17	1.23	0.96	0.95
2011	1.69	1.62	1.38	1.41	1.15	0.90
2012	1.52	1.24[1]	1.32	1.15[1]	0.89	0.76[1]
2013	1.20[1]	1.63	1.10[1]	1.51	0.77[1]	1.04
2014[2]	2.57	2.20	1.99	1.80	1.20	1.12
2015[2]	1.45	1.95	1.23	1.69	0.85	1.05
2016	2.06	1.65	1.70	1.39	0.89	0.70
2017	1.27	1.31	1.15	1.14	0.77	0.64
2018	1.07		1.01		0.59	

[1] Due to changes in calibration procedures (reviewed in section 3.1.4), 2012 postseason (CLB 1309) and 2013 preseason (CLB 1308) AIs are based on different calibrations; the procedures and assumptions CLB 1309 mirror those used during the 2012 preseason calibration.

[2] Due to a disagreement over Model calibration 1503, the Commission agreed to use CLB 1602 to estimate the 2014 and 2015 postseason AIs and 2016 preseason AI.

The maximum allowable preseason and postseason treaty catch by fishery for each year and the observed treaty catches (total catch minus any hatchery add-on and exclusion catch) are shown for AABM fisheries for 2009–2017 in Table 2.

Table 2. Preseason allowable catches (2009–2018), and postseason allowable catches and observed catches (2009–2017) for AABM fisheries. Postseason values for each year are from the first postseason calibration following the fishing year.

PST Treaty Allowable and Observed Catches									
	SEAK (T, N, S)[1]			NBC (T, S)			WCVI (T, S)		
Year	Preseason Allowable Catch	Postseason Allowable Catch	Observed Catch	Preseason Allowable Catch	Postseason Allowable Catch	Observed Catch	Preseason Allowable Catch	Postseason Allowable Catch	Observed Catch
2009	218,800	176,000	228,033	143,000	139,100	109,470	107,800	91,300	124,617
2010	221,800	215,800	230,750	152,100	160,400	136,613	143,700	142,300	139,047
2011	294,800	283,300	290,669	182,400	186,800	122,660	196,800	134,800	204,232
2012	266,800	205,100	242,549	173,600	149,500	120,307	133,300	113,800	134,468
2013	176,000	284,900	191,428	143,000	220,300	115,914	115,300	178,000	113,598
2014[2]	439,400	378,600	435,166	290,300	262,600	216,901	205,400	191,700	188,374
2015[2]	237,000	337,500	335,029	160,400	246,600	158,903	127,300	179,700	116,737
2016	355,600	288,200	353,704	248,000	183,900	190,181	133,300	104,800	99,650
2017	209,700	215,800	178,348	149,500	148,200	143,330	115,300	95,800	108,588
2018	144,500			131,300			88,300		

[1] T = troll, N = net, and S = sport.

[2] Due to a disagreement over Model calibration 1503, the Commission agreed to use output from CLB 1602 to estimate the catches associated with the 2014 and 2015 postseason AIs and 2016 preseason AIs.

Overages and underages in AABM catches, relative to the first postseason calibration for a fishing year (Table 3), can arise due to the inseason management system, errors in the preseason calibration process (e.g., forecast error), or a combination of the two. The relative influence of each was evaluated by inspecting differences in actual landed catch and allowable catches from both preseason and postseason calibrations (Table 3). Regarding the inseason management system in 2017, actual landed catch was less than preseason allowable catch by 31,352 (15%) in SEAK, 6,170 (4%) in NBC, and 6,712 (6%) in WCVI. In terms of the postseason allowable catches for evaluation of the provisions of the PST (subparagraph 11(a)(i)), 2017 actual catches were less than the postseason allowable catches by 37,452 (17%) in SEAK and 4,870 (3%) in NBC, and greater than the postseason allowable catch by 12,788 (13%) in WCVI.

From 2009–2017, the SEAK AABM observed catch was greater than postseason allowable catch in 6 of 9 years, whereas in NBC observed catch was greater than postseason allowable catch in 1 of 9 years and WCVI observed catch was greater than postseason allowable catch in 4 of 9 years (Table 3).

Table 3. Summary of AABM fishery performance and deviations between pre- and postseason allowable catches and observed catches, 2009–2017.

Year	Mgmt error Obs - Pre #	Mgmt error Obs - Pre %	Model error Pre - Post #	Model error Pre - Post %	Total error Obs - Post #	Total error Obs - Post %
SEAK (T, N, S)						
2009	9,233	4%	42,800	24%	52,033	30%
2010	8,950	4%	6,000	3%	14,950	7%
2011	-4,131	-1%	11,500	4%	7,369	3%
2012	-24,251	-9%	61,700	30%	37,449	18%
2013	15,428	9%	-108,900	-38%	-93,472	-33%
2014	-4,234	-1%	60,800	16%	56,566	15%
2015	98,029	41%	-100,500	-30%	-2,471	-1%
2016	-1,896	-1%	67,400	23%	65,504	23%
2017	-31,352	-15%	-6,100	-3%	-37,452	-17%
NBC (T, S)						
2009	-33,530	-23%	3,900	3%	-29,630	-21%
2010	-15,487	-10%	-8,300	-5%	-23,787	-15%
2011	-59,740	-33%	-4,400	-2%	-64,140	-34%
2012	-53,293	-31%	24,100	16%	-29,193	-20%
2013	-27,086	-19%	-77,300	-35%	-104,386	-47%
2014	-73,399	-25%	27,700	11%	-45,699	-17%
2015	-1,497	-1%	-86,200	-35%	-87,697	-36%
2016	-57,819	-23%	64,100	35%	6,281	3%
2017	-6,170	-4%	1,300	1%	-4,870	-3%
WCVI (T, S)						
2009	16,817	16%	16,500	18%	33,317	36%
2010	-4,653	-3%	1,400	1%	-3,253	-2%
2011	7,432	4%	62,000	46%	69,432	52%
2012	1,168	1%	19,500	17%	20,668	18%
2013	-1,702	-1%	-62,700	-35%	-64,402	-36%
2014	-17,026	-8%	13,700	7%	-3,326	-2%
2015	-10,563	-8%	-52,400	-29%	-62,963	-35%
2016	-33,650	-25%	28,500	27%	-5,150	-5%
2017	-6,712	-6%	19,500	20%	12,788	13%

Note: Due to a disagreement over Model calibration 1503, the Commission agreed to use output from CLB 1602 to estimate the catches associated with the 2014 and 2015 postseason AIs and 2016 preseason AIs.

ISBM Indices

For ISBM fisheries, Paragraph 8 of the Chinook Chapter of the 2009 PST Agreement specifies that Canada and the US will reduce base period exploitation rates on specified stocks by 36.5% (Canada) and 40% (US), equivalent to ISBM indices of 63.5% (Canada) and 60% (US). This requirement is referred to as the general obligation and does not apply to stocks that achieve their CTC-agreed escapement goal. The 2009 PST Agreement also specifies that for those stocks in which the general obligation is insufficient to meet the CTC-agreed escapement goal, the Party in whose waters the stock originates shall further constrain its fisheries to an extent that is not greater than the average ISBM exploitation rate which occurred in the years 1991 to 1996 (Paragraph 8 (c)). This requirement is referred to as the additional obligation.

Postseason ISBM Indices

For 2016, all 7 of the 7 Canadian ISBM indices that could be calculated from CWT data were reduced more than required under the Agreement (Table 4). For 2017, the computation of CWT-based ISBM indices was possible for 4 Canadian stocks, 3 were reduced more than required under the 2009 PST Agreement and WCVI Falls (0.577) exceeded the additional obligation rate (0.475; Table 4).

Table 4. Review of performance in the Canadian ISBM fisheries, 2009–2017.

Stock Group	Stock (CTC agreed goal year)	2009	2010	2011	2012	2013	2014	2015	2016	2017
North/ Central B.C.	Yakoun, Nass, Skeena, Atnarko, Dean (no goal)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
WCVI Falls	Artlish, Burman, Kauok, Tahsis, Tashish, Marble, Gold (no goal)	0.489	0.207	0.635	0.619	0.328	0.290	0.630	0.392	0.577
L. Georgia Strait	Cowichan (2005)	0.461	0.372	0.182	0.412	0.377	0.443	0.296	0.469	0.240
	Nanaimo (no goal)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
U. Georgia Strait	Klinaklini, Kakweikan, Wakeman, Kingcome, Nimpkish (no goal)	0.202	0.372	0.092	0.142	0.070	0.047	0.210	0.190	0.160
Fraser Late	Harrison (2001)	0.06	0.107	0.091	0.132	0.149	0.273	0.169	0.187	0.197
Fraser Early (spring & summers)	Upper Fraser, Mid-Fraser, Thompson	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Puget Sound Spring	Nooksack (no goal)[1]	0.148	0.029	0.135	0.057	0.059	0.084	0.094	0.055	N.A.
	Skagit (no goal)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Puget Sound Falls	Skagit (no goal)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Stillaguamish (no goal)[2]	0.22	0.147	0.21	0.257	0.2	0.588	0.409	0.334	N.A.
	Snohomish (no goal)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Lake Wash. (no goal)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Green River (no goal)[2]	0.270	0.130	0.261	0.300	0.277	0.406	1.026	0.521	N.A.

Notes: General obligation (0.635) or additional obligation (1991-1996 ISBM rate average for the Party in whose waters the stock not meeting escapement goal originates), whichever is lower, for stocks listed in Annex 4, Chapter 3, Attachment V.

NA = no data available; NC = not calculated.

In 2016, 13 of the 14 US stocks for which CWT-based ISBM indices could be calculated in the U.S. ISBM fishery either met their escapement goals (10 stocks) or had an ISBM index below 0.600 (Table 5). Additionally, the US ISBM index for the Harrison stock (Fraser Late) was well below the general obligation (0.152). Only the Grays Harbor US ISBM index exceeded the general obligation (0.653); this stock has a PSC-agreed escapement goal that was not met so the general obligation applies.

Table 5. Review of performance in the US ISBM fisheries, 2009–2017.

Stock Group	Stock (CTC agreed goal in year)	2009	2010	2011	2012	2013	2014	2015	2016	2017
Fraser Late	Harrison (2001)	0.134	0.295	0.285	0.351	0.441	0.377	0.285	0.152	N.C.
Puget Sound Spring	Nooksack (no goal)	0.585	0.757	0.889	1.866	0.874	1.290	0.585	0.289	N.C.
	Skagit (no goal)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Puget Sound Fall	Skagit (no goal)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Stillaguamish (no goal)	0.140	0.127	0.134	0.101	0.226	0.757	0.373	0.258	N.C.
	Snohomish (no goal)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Lake Wash. (no goal)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Green (no goal)	0.487	0.289	0.418	0.522	0.302	0.407	0.615	0.372	N.C.
WA Coast Falls	Hoko (no goal)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Grays (2014)	0.689	0.623	0.741	0.943	0.782	0.748	0.861	0.653	N.C.
	Queets (2004)	0.648	0.477	0.698	1.018	0.920	0.511	0.260	0.422	N.C.
	Hoh (2004)	0.998	0.838	1.752	1.592	2.640	1.254	1.211	0.267	N.C.
	Quillayute (2004)	1.815	1.375	1.691	1.963	1.782	2.572	2.037	1.127	N.C.
Columbia Fall	Brights (2002)	2.668	1.669	2.616	2.713	2.225	1.942	1.602	1.650	N.C.
	Deschutes (2010)	0.821	0.696	0.768	0.775	0.795	0.758	0.699	0.776	N.C.
	Lewis (1999)	0.217	0.554	1.374	0.868	1.113	0.821	0.559	0.448	N.C.
Columbia Summers	Summers (1999)	5.229	6.957	12.327	7.496	8.612	10.773	6.493	10.171	N.C.
N. Oregon Coast	Nehalem (1999)	0.343	1.030	2.073	1.779	2.305	2.888	3.358	1.794	N.C.
	Siletz (1999)	1.340	0.636	3.058	1.685	1.785	1.796	3.485	1.822	N.C.
	Siuslaw (1999)	1.380	1.395	2.237	1.519	2.392	1.873	2.476	2.639	N.C.

Notes: General obligation (0.600) or additional obligation (1991-1996 ISBM rate average for the Party in whose waters the stock not meeting escapement goal originates), whichever is lower, for stocks listed in Annex 4, Chapter 3, Attachment V.

NA = no data available; NC = not calculated.

Mark Selective Fisheries

Section 4 of this report contains harvest information by region from mark-selective fisheries (MSFs). Mark-selective fisheries occurred along the Oregon Coast, Washington Coast, and in the Columbia River, Puget Sound, Canadian Strait of Juan de Fuca, and Southeast Alaska in 2017. The magnitude of impact of a MSF relative to the total exploitation of a stock can be measured using the percentage of the total landed catch in net, sport, and troll fisheries of tagged and marked PSC indicator stocks that occurs in MSFs. Traditionally, the CTC has used PSC indicator stocks that have been double index tagged (DIT) to evaluate the impact of MSFs on the unmarked stocks represented by the unmarked tag group in a DIT pair,1 however many CWT indicator stocks do not have a DIT pair (e.g., Canadian- and Alaskan-origin stocks). Accordingly, an approach was applied in 2017 to estimate mortality distributions for natural stocks that have single index tag (SIT) indicator stocks under conditions where the MSF impacts mainly occur on mature SIT fish proximal to their terminal area.

B. JOINT CHUM TECHNICAL COMMITTEE

2016 POST SEASON SUMMARY REPORT
TCCHUM (19)-01 – September 2019

This Pacific Salmon Commission (PSC) Joint Chum Technical Committee report presents the information on Chum salmon stocks and fisheries in southern British Columbia (B.C.) and Washington (WA) for the year

2016 to address the specific provisions and requirements of Chapter 6, Annex IV (Chum Annex) of the Pacific Salmon Treaty (PST or Treaty) (Appendix A). The Treaty between the governments of Canada and the United States of America (U.S.) concerning Pacific salmon is designed to facilitate co-operation in the management, research and enhancement of Pacific salmon stocks. The Chum Annex requires that Canada and the U.S. maintain a Joint Chum Technical Committee reporting to the Southern Panel and the Commission and that certain fisheries for Chum salmon in southern B.C. and WA be managed in a specified manner (Appendix A). Certain fisheries of each country, while not specifically mentioned in the PST, are known to harvest Chum salmon originating in the other country.

This report presents various aspects of Chum salmon found in B.C. waters between Vancouver Island and the mainland, off the west coast of Vancouver Island, and in WA waters. This report also discusses the management actions of Canada and the U.S. in relation to the PST requirements for Chum salmon and provides a summary of the last 10 years of catch and escapement information for Chum salmon of concern to the Treaty. Returns in 2016 were well above the recent 9-yr average in B.C and slightly below in WA. Catch overage was noted in US 7/7A fisheries 2014 and a portion of the overage was paid back in 2015 with the outstanding balance paid off in 2016 consistent with the Treaty. The Chum Technical Committee continued work on components of the strategic plan outlined in the 2010 report, which included collecting and exchanging tissue samples from mixed-stock fisheries and spawning escapements.

C. JOINT COHO TECHNICAL COMMITTEE

No reports were finalized for publication during this reporting period.

D. JOINT NORTHERN BOUNDARY TECHNICAL COMMITTEE

U.S. / CANADA NORTHERN BOUNDARY AREA 2017 SALMON FISHERIES MANAGEMENT REPORT AND 2018 PRELIMINARY EXPECTATIONS
TCNB (19)-01 – May 2019

This report reviews:

1) catch, effort, and management actions in the 2017 Northern Boundary Area troll and net fisheries of southern Southeast Alaska Districts 101 to 108 and northern British Columbia Areas 1, 3, 4, and 5;

2) management performance relative to Pacific Salmon Treaty requirements for sockeye and pink salmon;

3) preliminary expectations and fishing plans for 2018.

2017 FISHERIES

Pink salmon returns were below average throughout southern Southeast Alaska, but were strong through much of northern Southeast Alaska inside waters. The southern Southeast Alaska pink salmon harvest was 9.4 million (Districts 101-108, all harvest codes, all gear), which was 41% of the recent ten-year average. For all Southeast Alaska, excluding the Yakutat area, the pink salmon harvest was 34.7 million fish, which was below the preseason forecast point estimate of 43 million, but within the 27-59 million 80% confidence interval range of the forecast. The overall harvest of 34.7 million pink salmon was 91% of the 2007–2016 average of 38.0 million.

The total 2017 Southeast Alaska pink salmon escapement index of 13.9 million index fish ranked 14th since 1960. Biological escapement goals are in place for three subregions in Southeast Alaska (Southern Southeast, Northern Southeast Inside, and Northern Southeast Outside) and goals were met in all three subregions. On

a finer scale, escapements met or exceeded management targets for all 15 districts in the region and for 40 of the 46 pink salmon stock groups in Southeast Alaska. The Southern Southeast Subregion includes all of the area from Sumner Strait south to Dixon Entrance (Districts 101–108). The escapement index value of 6.4 million was within the escapement goal range of 3.0 to 8.0 million index fish.

Sockeye salmon harvests in the Alaska boundary area were well below the 1985–2016 average in the District 101–104 traditional purse seine fisheries, and in the District 101 drift gillnet fishery. The Hugh Smith Lake adult sockeye salmon escapement was 14,800, which was within the optimal escapement goal range of 8,000 to 18,000 adult sockeye salmon. Based on the expanded peak foot survey count, the escapement of sockeye salmon into McDonald Lake was estimated to be 24,000 fish, which was below the sustainable escapement goal range of 55,000 to 120,000.

Summer chum salmon harvests in the Alaska boundary area were below the 1985–2016 average in the District 101, 103, and 104 traditional purse seine fisheries and the District 101 drift gillnet fishery, and above average in the District 102 purse seine. The Southern Southeast chum salmon stock group is composed of an aggregate of 15 summer-run chum salmon streams on the inner islands and mainland of southern Southeast Alaska, from Sumner Strait south to Dixon entrance, with a sustainable escapement goal of 62,000 index spawners (based on the aggregate peak survey to all 15 streams). Summer chum salmon escapements were average at most index streams in southern Southeast Alaska, and the index of 84,000 in 2017 was above goal.

Coho salmon harvests in the Alaska boundary area were below average in the District 101–104 traditional purse seine fisheries and the District 101 drift gillnet fishery. Coho salmon escapement counts and estimates were within or above goal ranges. The combined peak count of 11,557 coho salmon in the 14 surveyed streams in the Ketchikan survey index was above the escapement goal of 4,250–8,500 fish. The total escapement of 1,266 coho salmon to Hugh Smith Lake was within the biological escapement goal range of 500–1,600 fish.

In Canadian Area 1, there are no longer commercial net interception fisheries on passing salmon stocks. Area 1 pink salmon return on a two-year cycle, with dramatic differences in return strength between even and odd calendar years. Most streams have a strong return of Haida Gwaii pink salmon during even calendar years only. Directed harvests are only anticipated during even years. Returns from the 2015 brood were very poor, leading to no harvestable surpluses being identified. In addition, no chum salmon surpluses were identified in-season. As such, no terminal chum-directed gillnet or seine fisheries occurred in 2017.

The Area 3 commercial net fishery anticipated a harvestable surplus of 150,000 Nass sockeye salmon, along with seine opportunities to harvest surpluses associated with a below average odd year pink salmon return. With the continued increasing trend in earlier timed Area 3/Nass coho salmon abundance, coho retention was again permitted throughout the fishing season, along with a coho directed troll fishery. Specific measures continue to be in place to rebuild local wild chum and Chinook salmon populations, including time and area closures and retention restrictions.

Sockeye salmon catches were modest at the beginning of the season in Area 3, but declined as the season progressed. Catches of sockeye salmon at the Nass Fishwheels indicated that the Nass sockeye return was much poorer than the pre-season prediction, and the gillnet fleet had their final opportunity on July 3. Gillnets last fished Area 3 on July 3, while seines continued fishing for pink salmon with a non-possession/non-retention restriction of sockeye salmon. The gillnet fleet harvested 34,940 sockeye salmon in 2017, while seines were non-retention for sockeye salmon for the season. Pink salmon catches were well above average in Area 3 for seines, with a total harvest of 703,702 pinks. Due to the early closure of gillnets to protect weak Nass River sockeye salmon, the harvest of pink salmon by gillnets was minimal at 748 fish.

In Area 4 and 5, there were no commercial gillnet or seine opportunities targeting Skeena salmon in 2017. Sockeye salmon abundance was low throughout the season with preseason and in-season forecasts remaining below commercial reference points.

The preliminary sockeye salmon net escapement estimate of 229,000 to the Nass River exceeded the escapement target of 200,000 and is below the 2007–2016 average of 247,000. The preliminary Skeena River sockeye salmon net escapement estimate of 887,647 was much lower than the 2007 to 2016 average of 944,322 and fell short of the target escapement of 900,000. Pink salmon returns throughout the North Coast have been extremely variable. Area 1 escapements were as expected, while Area 3 showed modest improvement over the brood year. As was the case in 2016, early stocks returning to the Nass and Skeena rivers fared better than later-timed and coastal populations. Similarly to 2016, some Areas 4 and 5 coastal and lower Skeena River tributary systems experienced complete failures. Although Chum salmon escapements in Area 4 had been improving with the added protection provided by management actions, 2017 escapements remained well below escapement targets. Chum escapements to Area 3 remained consistent with 2016 escapements; however, while stronger than many years in the past decade, fell well short of historical escapements.

MANAGEMENT PERFORMANCE

Pacific Salmon Treaty based harvest sharing agreements were renewed in 2009 for the Northern Boundary area fisheries—Alaska District 104 purse seine, Alaska District 101 drift gillnet, Canadian Area 3 net, and Canadian Area 1 troll. The agreements are "abundance based" where the allowable harvest is a percentage of the Annual Allowable Harvest (AAH). The AAH is the total return of applicable stocks minus the lesser of: 1) the actual escapement, or 2) the escapement goal. Catches over or under the AAH are summed over the period of the agreement to allow for annual variation.

In Alaska's District 104 purse seine fishery, the Nass and Skeena sockeye salmon run size determines the AAH of these stocks prior to Statistical Week 31. In Alaska's District 101 gillnet fishery, the AAH is based solely on the run size of Nass River sockeye salmon. The run size of Alaskan pink salmon returning to Districts 101-103 determines the allowable harvests of these stocks in Canada's Area 3 (1-4) net and Area 1 troll fisheries.

The agreement specifies a harvest in the District 104 purse seine fishery, from the beginning of the season through Statistical Week 30, of 2.45% of the combined AAH of both the Nass and Skeena River sockeye salmon runs. The District 104 purse seine fishery opens by regulation on the first Sunday in July. In 2017, the first potential opening was July 2 (week 27), but due to Skeena River sockeye salmon concerns ADF&G kept the fishery closed for the first two weeks of the season. The pre-week 31 fishing plan for District 104 was based on the preseason Canadian Department of Fisheries and Oceans (DFO) forecast returns of approximately 1,049,000 Nass and Skeena sockeye salmon. In the 2017 Treaty period (Alaska statistical weeks 27-30), 12,036 sockeye salmon were harvested during 10-hour openings in Week 29 and 30 (Table 1). A total of 24 purse seine vessels fished at some time in the district during the Treaty period. The final estimate of Skeena and Nass River sockeye salmon harvested in the District 104 purse seine fishery in 2017 was 6,916 fish.

In the District 101 (Tree Point) drift gillnet fishery, the AAH is calculated as the total run of Nass sockeye salmon minus either the escapement requirement of 200,000 or the actual in-river escapement, whichever is less. The agreement specifies a harvest of 13.8 percent of the AAH of the Nass River sockeye salmon run. The return of Nass sockeye salmon was forecast at 454,000 in 2017 which, minus an escapement goal of 200,000, would result in an AAH of about 254,000 fish. Using this forecast, the 2017 allowable harvest in the District 101 drift gillnet fishery was approximately 35,100 Nass River sockeye salmon. A total of 25,073 sockeye salmon were harvested, which was only 21% of the 1985-2016 average of 117,456 fish and was the lowest harvest since the inception of the Pacific Salmon Treaty. The final estimate of Nass River sockeye salmon harvested in the District 101 drift gillnet fishery in 2017 was 12,445 fish.

The District 101 drift gillnet fishery opens by regulation on the third Sunday in June, which was June 18 (week 25) in 2017. During the early weeks of the fishery, management is based on the run strength of Alaska

wild stock chum and sockeye salmon and on the strength of the Nass River sockeye salmon. Beginning in the third week of July, when pink salmon stocks begin to enter the fishery in large numbers, management emphasis shifts by regulation to that species. By regulation, the District 101 Pink Salmon Management Plan sets gillnet fishing time in this district in relation to the District 101 purse seine fishing time when both fleets are concurrently harvesting the same pink salmon stocks.

For 2017, Canada was to manage the Area 3-1 to 3-4 net fisheries to achieve an annual catch share of 2.49% of the AAH of Alaskan Districts 101, 102 and 103 pink salmon. With a total return of approximately 21.57 million pinks, the Alaskan Districts 101, 102 and 103 AAH was approximately 10.82 million pinks. The resulting Area 3-1 to 3-4 Canadian commercial net total allowable catch of this AAH was approximately 269,504 pinks of Alaskan Districts 101, 102 and 103 origin.

In the Canadian northern boundary area, pink salmon returns were anticipated to be below average for Area 3 and Area 4, based on brood year return strength. Actual returns to Area 3 and 4 were below average. The 2017 preliminary Canadian pink salmon catch in Sub-areas 3-1 to 3-4 was 231,197, and the Alaska stock component of this catch is estimated to be 207,268, or 1.91 % of the AAH. This result is below the annex agreement of 2.49%.

Also in 2017, Canada was to manage the Area 1 troll fishery to achieve an annual catch share of 2.57% of the AAH of Alaskan Districts 101, 102 and 103 pink salmon. With a Total Return of 21.57 million pinks, the resulting Area 1 Canadian commercial troll total allowable catch of this AAH was approximately 278,163 pinks of Alaskan Districts 101, 102 and 103 origin.

The Canadian commercial troll fishery targeting pink salmon was open in the northern portion of Area 1 (Dixon Entrance AB Line) from July 1 to September 30. Pink retention was also permitted during the Chinook-directed fishery in parts of Area 1, which was open from June 21 to August 4 and from August 25 to September 30. Effort directed at pink salmon in Area 1 was minimal in 2017, with pinks being harvested as by-catch in fisheries directed at coho and Chinook salmon. The fishery harvested a total of 33,299 pink salmon, with an estimated 31,471 being of Alaskan origin. This equates to 0.3% of the Alaskan District 101, 102 and 103 pink AAH, well below the annex agreement of 2.57%.

2018 FORECASTS

The Southeast Alaska pink salmon harvest in 2018 is predicted to be in the average range, with a point estimate of 23 million fish (80% confidence interval: 3–44 million fish). An actual harvest of 23 million pink salmon would be below the recent 10-year average harvest of 38 million pink salmon. The 2018 SEAK pink salmon harvest forecast was based on the average of 5 recent even-year harvests (2008, 2010, 2012, 2014, and 2016).

A below average Nass River sockeye salmon total return of 377,000 (with a 25% probability of the return exceeding 415,000 and a 75% probability the return will exceed 343,000) is expected. The sibling model forecast predicts a 50% probability of approximately 645,000 sockeye salmon returning to the Skeena River in 2018 with a 10% probability of a return exceeding 1.47 million and a 90% probability the return would exceed 280,000. Below average pink salmon returns are anticipated to Areas 1, 3, 4, and 5, based on brood year escapements and recent escapement trends.

U.S. / CANADA NORTHERN BOUNDARY AREA 2018 SALMON FISHERIES MANAGEMENT REPORT AND 2019 PRELIMINARY EXPECTATIONS
TCNB (20)-01 – February 2020

This report reviews:

1) catch, effort, and management actions in the 2018 Northern Boundary Area troll and net fisheries of southern Southeast Alaska Districts 101 to 108 and northern British Columbia Areas 1, 3, 4, and 5;

2) management performance relative to Pacific Salmon Treaty requirements for sockeye and pink salmon;

3) preliminary expectations and fishing plans for 2019.

2018 FISHERIES

Pink salmon returns were below average throughout Southeast Alaska and the southern Southeast Alaska pink salmon harvest was 5.4 million (Districts 101-108, all harvest codes, all gear), which was only 26% of the recent ten-year average. For all of Southeast Alaska, excluding the Yakutat area, the pink salmon harvest was 8.1 million fish, which was below the preseason forecast point estimate of 23 million, but within the 3-44 million 80% confidence interval range of the forecast.

The total 2018 Southeast Alaska pink salmon escapement index of 8.15 million index fish ranked 35th since 1960. Biological escapement goals are in place for three subregions in Southeast Alaska (Southern Southeast, Northern Southeast Inside, and Northern Southeast Outside) and goals were met in the Southern Southeast and Northern Southeast Outside subregions. On a finer scale, escapements were below management targets for 8 of 15 districts in the region and for 22 of the 46 pink salmon stock groups in Southeast Alaska. The Southern Southeast Subregion includes all of the area from Sumner Strait south to Dixon Entrance (Districts 101–108). The escapement index value of 4.87 million was within the escapement goal range of 3.0 to 8.0 million index fish.

Sockeye salmon harvests in the Alaska boundary area were well below the 1985–2017 average in the District 101–104 traditional purse seine fisheries, and in the District 101 drift gillnet fishery. The Hugh Smith Lake adult sockeye salmon escapement was 2,039, which was well below the optimal escapement goal range of 8,000 to 18,000 adult sockeye salmon. Based on the expanded peak foot survey count, the escapement of sockeye salmon into McDonald Lake was estimated to be 11,000 fish, which was also below the sustainable escapement goal range of 55,000 to 120,000 fish.

Summer chum salmon harvests in the Alaska boundary area were below the 1985–2017 average in the District 101–104 traditional purse seine fisheries and the District 101 drift gillnet fishery. The Southern Southeast chum salmon stock group is composed of an aggregate of 15 summer-run chum salmon streams on the inner islands and mainland of southern Southeast Alaska, from Sumner Strait south to Dixon entrance, with a sustainable escapement goal of 62,000 index spawners (based on the aggregate peak survey to all 15 streams). Summer chum salmon escapements were above average at most index streams in southern Southeast Alaska, and the index of 127,000 in 2018 was above goal.

Coho salmon harvests in the Alaska boundary area were below average in the District 101–104 traditional purse seine fisheries and the District 101 drift gillnet fishery. Coho salmon escapement counts and estimates in southern Southeast Alaska were within or above goal ranges. The combined peak count of 13,764 coho salmon in the 14 surveyed streams in the Ketchikan survey index was above the escapement goal of 4,250–8,500 fish. The total escapement of 619 coho salmon to Hugh Smith Lake was within the biological escapement goal range of 500–1,600 fish.

In Canadian Area 1, there are no longer commercial net interception fisheries on passing salmon stocks. Area 1 pink salmon return on a two-year cycle, with dramatic differences in return strength between even and odd calendar years. Most streams have a strong return of Haida Gwaii pink salmon during even calendar years only. Directed harvests are only anticipated during even years. Returns in 2018 were very poor, leading to no harvestable surpluses being identified. In addition, no chum salmon surpluses were identified in-season. As such, no terminal chum-directed gillnet or seine fisheries occurred in 2018.

The Area 3 commercial net fishery anticipated a harvestable surplus of Nass sockeye salmon, along with potential seine opportunities to harvest surpluses associated with a below average even year pink salmon return. With the weaker trend in earlier timed Area 3/Nass coho salmon abundance, coho retention was not permitted in net or troll fisheries in Area 3. Specific measures continue to be in place to rebuild local wild chum and Chinook salmon populations, including time and area closures and retention restrictions. Due to the concerns over weak Nass Chinook, commercial fisheries were delayed to avoid these fish.

Sockeye salmon catches were weak at the beginning of the season in Area 3 and did not improve significantly as the season progressed. Catches of sockeye at the Nass fish wheels indicated that the Nass River sockeye salmon return was weaker than the pre-season prediction, and the gillnet fleet had their final opportunity on July 3. Gillnets last fished Area 3 on July 3, while seines continued fishing for pink salmon with a non-possession/non-retention restriction of sockeye. The gillnet fleet harvested 6,821 sockeye salmon in 2018, while seines were non-retention sockeye salmon for all but one day (where they retained 159 fish). Pink salmon catches below average in Area 3 for seines, with a total harvest of 101,287 pinks. Due to the early closure of gillnets to protect weak Nass sockeye salmon, the harvest pink salmon by gillnets was minimal at 818 fish.

Pre-season forecast suggested that there would be no harvestable surplus to Skeena River sockeye salmon, and as such, no commercial fisheries were expected for Area 4 and 5. It was clear by the last week of July that returns were coming back stronger than initially forecast, and a harvestable surplus was identified. Gill nets fished a total of 10 openings between July 24 and August 10, with a total of 626 boat days and retained 79,225 sockeye salmon and 10,917 pink salmon. The seine Individual Transferrable Quota fishery occurred between statistical weeks 31-34, with a total of 52 boat days and a catch of 24,370 sockeye salmon and 5,940 pink salmon.

The preliminary sockeye salmon net escapement estimate of 230,508 to the Nass exceeded the escapement target of 200,000 and is near the 2009–2018 average of 229,000. The preliminary Skeena sockeye salmon net escapement estimate of 1,490,159 sockeye salmon was improved over the 2007 to 2018 average of 991,063. Pink salmon returns throughout the North Coast have been extremely variable. Area 1 escapements were stronger than the brood year, while Area 3 showed a decline over the brood year. Similar to previous years, some Areas 4 and 5 coastal and lower Skeena tributary systems experienced very weak pink and chum salmon escapements. Although chum salmon escapements in Area 4 had been improving with the added protection provided by management actions, 2018 escapements remain well below escapement targets. Chum salmon escapements to Area 3 improved over 2017; however, while stronger than many years in the past decade, fall short of historical escapement targets.

MANAGEMENT PERFORMANCE

Pacific Salmon Treaty based harvest sharing agreements were renewed in 2009 for the Northern Boundary area fisheries—Alaska District 104 purse seine, Alaska District 101 drift gillnet, Canadian Area 3 net, and Canadian Area 1 troll. The agreements are “abundance based” where the allowable harvest is a percentage of the Annual Allowable Harvest (AAH). The AAH is the total return of applicable stocks minus the lesser of: 1) the actual escapement, or 2) the escapement goal. Catches over or under the AAH are summed over the period of the agreement to allow for annual variation.

In Alaska's District 104 purse seine fishery, the Nass and Skeena sockeye salmon run size determines the AAH of these stocks prior to statistical week 31. In Alaska's District 101 gillnet fishery, the AAH is based solely on the run size of Nass River sockeye salmon. The run size of Alaskan pink salmon returning to Districts 101-103 determines the allowable harvests of these stocks in Canada's Area 3 (1-4) net and Area 1 troll fisheries.

The agreement specifies a harvest in the District 104 purse seine fishery, from the beginning of the season through statistical week 30, of 2.45% of the combined AAH of both the Nass and Skeena River sockeye salmon runs. The District 104 purse seine fishery opens by regulation on the first Sunday in July. In 2018, the first potential opening was July 1 (week 27), but due to Skeena River sockeye salmon concerns ADF&G kept the fishery closed for the first two weeks of the season. The pre-week 31 fishing plan for District 104 was based on the preseason Canadian Department of Fisheries and Oceans forecast returns of approximately 1,030,000 Nass and Skeena sockeye salmon.

In the 2018 Treaty period (Alaska statistical weeks 27-30), 19,743 sockeye salmon were harvested during an18-hour opening in statistical week 29 and a 30-hour opening in statistical week 30 (Table 1). A total of 55 purse seine vessels fished at some time in the district during the Treaty period. In past years 60% to 80% of Treaty-period sockeye salmon have been of Nass and Skeena origin, therefore we would anticipate between 11,800 and 15,800 Nass and Skeena sockeye may have been harvested in the District 104 purse seine fishery during the 2018 Treaty period. The final number of Nass and Skeena sockeye salmon harvested, and the actual harvest by stock, will not be available until harvest, escapement, and stock composition estimates are finalized for the year.

In the District 101 (Tree Point) drift gillnet fishery, the AAH is calculated as the total run of Nass sockeye salmon minus either the escapement requirement of 200,000 or the actual in-river escapement, whichever is less. The agreement specifies a harvest of 13.8 percent of the AAH of the Nass River sockeye salmon run. The return of Nass sockeye salmon was forecast at 377,000 in 2018 which, minus an escapement goal of 200,000, would result in an AAH of about 177,000 fish. Using this forecast, the 2018 allowable harvest in the District 101 drift gillnet fishery was approximately 24,426 Nass River sockeye salmon. A total of 19,920 sockeye salmon were harvested, which was only 17% of the 1985-2017 average of 114,656 fish and was the lowest harvest since the inception of the Pacific Salmon Treaty. The preliminary estimate of Nass River sockeye salmon harvested in the District 101 drift gillnet fishery in 2018 was 11,303 fish.

The District 101 drift gillnet fishery opens by regulation on the third Sunday in June, which was June 17 (week 25) in 2018. During the early weeks of the fishery, management is based on the run strength of Alaska wild stock chum and sockeye salmon and on the strength of the Nass River sockeye salmon. Beginning in the third week of July, when pink salmon stocks begin to enter the fishery in large numbers, management emphasis shifts by regulation to that species. By regulation, the District 101 Pink Salmon Management Plan sets gillnet fishing time in this district in relation to the District 101 purse seine fishing time when both fleets are concurrently harvesting the same pink salmon stocks.

For 2018, Canada was to manage the Area 3-1 to 3-4 net fisheries to achieve an annual catch share of 2.49% of the AAH of Alaskan Districts 101, 102 and 103 pink salmon. With a total return of approximately 13.43 million pinks, the Alaskan Districts 101, 102 and 103 AAH was approximately 3.86 million pinks. The resulting Area 3-1 to 3-4 Canadian commercial net total allowable catch of this AAH was approximately 96,212 pinks of Alaskan Districts 101, 102 and 103 origin.

In the Canadian northern boundary area, pink salmon returns were anticipated to be below average for Area 3 and Area 4, based on brood year return strength. Actual returns to Area 3 and 4 were below average. The 2018 preliminary Canadian pink salmon catch in Sub-areas 3-1 to 3-4 was 68,764, and the Alaska stock component of this catch is estimated to be 58,043, or 1.5 % of the AAH. This result is below the annex agreement of 2.49%.

Also in 2018, Canada was to manage the Area 1 troll fishery to achieve an annual catch share of 2.57% of the AAH of Alaskan Districts 101, 102 and 103 pink salmon. With a total return of 13.43 million pinks, the resulting Area 1 Canadian commercial troll total allowable catch of this AAH was approximately 69,132 pinks of Alaskan Districts 101, 102 and 103 origin.

The Canadian commercial troll fishery targeting pink salmon was open in the northern portion of Area 1 (Dixon Entrance AB Line) from July 1 to September 30. Pink retention was also permitted during the Chinook-directed fishery in parts of Area 1, which was open from July 10 to August 6 and from August 20 to September 30. Effort directed at pink salmon in Area 1 was minimal in 2018, with pinks being harvested as by-catch in fisheries directed at coho and Chinook. The fishery harvested a total of 27,194 pink salmon, with an estimated 24,490 being of Alaskan origin. This equates to 0.63% of the Alaskan District 101, 102 and 103 pink AAH, well below the annex agreement of 2.57%.

2019 FORECASTS

The Southeast Alaska pink salmon harvest in 2019 is predicted to be in the weak range, with a point estimate of 18 million fish (80% confidence interval: 15–26 million fish). An actual harvest of 18 million pink salmon would be approximately half the recent 10-year average harvest of 36 million pink salmon. The harvest forecast was primarily based on juvenile pink salmon abundance indices collected by the NOAA/ADF&G Southeast Coastal Monitoring Project in northern Southeast Alaska inside waters during June and July. A linear multiple regression model was developed, using monthly peak juvenile CPUE (standardized catch based on 20-minute trawl sets) for the June and July surveys and an Icy Strait Temperature Index.

An average to below average Nass River sockeye salmon total return of 456,000 (with a 25% probability of the return exceeding 429,000 and a 75% probability the return will exceed 484,000) is expected. The sibling model forecast predicts a 50% probability of approximately 1.71 million sockeye salmon returning to the Skeena River in 2018 with a 10% probability of a return exceeding 3.27 million and a 90% probability the return would exceed 1.06 million fish. Below average pink salmon returns are anticipated to Areas 1, 3, 4, and 5, based on brood year escapements and recent escapement trends.

E. JOINT TRANSBOUNDARY TECHNICAL COMMITTEE

FINAL ESTIMATES OF TRANSBOUNDARY RIVER SALMON PRODUCTION, HARVEST AND ESCAPEMENT AND A REVIEW OF JOINT ENHANCEMENT ACTIVITIES IN 2017
TCTR (19)-02 – April, 2019

Final estimates of harvests and escapements of Pacific salmon returning to the transboundary Stikine, Taku, and Alsek rivers in 2017 are presented and compared with historical patterns. Average, unless defined otherwise, refers to the most recent 10-year average (2007–2016). Relevant information pertaining to the management of appropriate U.S. and Canadian fisheries is presented and the use of inseason management models is discussed. The TBR sockeye salmon Oncorhynchus nerka enhancement projects are also reviewed.

Stikine River

The postseason estimate of the 2017 Stikine River sockeye salmon terminal run was 98,800 fish, of which approximately 67,300 fish were harvested in various fisheries including assessment/test fisheries. An estimated 31,500 Stikine River fish escaped to spawn; 2,900 fish were removed for brood stock, and an estimated 580 fish migrated to the barrier in the Tuya River and were not harvested. The terminal run was below average and the harvest was below average (even when Tuya was excluded). The Tahltan Lake sockeye salmon total weir count was 19,200 fish was within the goal range of 18,000 to 30,000 fish. The estimated spawning escapement of 11,700 mainstem Stikine River sockeye salmon was below the goal range of 20,000 to 40,000 fish. The estimated U.S. commercial harvest of Stikine River sockeye salmon in Districts 106 and

108, including the Stikine River subsistence fishery, was 23,600 fish. The sockeye salmon harvest in the Canadian inriver commercial was 32,900 fish and the AF harvest was 8,600 fish. The inriver test fisheries harvested 1,900 sockeye salmon. Weekly inseason run projections from the SMM ranged from 141,900 to 154,300 sockeye salmon; the inseason model prediction was 154,300 fish, with a TAC of 94,200 fish. The postseason terminal run estimate was 98,800 fish and an AC estimate of 23,000 Stikine River sockeye salmon for each country, Canada harvested 191% and the U.S. harvested 108% of their respective TACs.

There were no directed fisheries for Stikine River Chinook salmon in either the U.S. or Canada in 2017. The 2017 Stikine River large Chinook salmon terminal run was estimated at 8,150 fish, of which approximately 800 fish were harvested in various fisheries. The estimated escapement of Stikine River large Chinook salmon was 7,210 fish; below both the escapement goal target of 17,400 fish and the escapement goal range 14,000 to 28,000 fish. The run and harvest were well below their respective averages. The Little Tahltan River large Chinook salmon escapement of 430 fish was well below the Canadian escapement target of 3,300 fish and below the lower bound of the Canadian target range of 2,700 to 5,300 fish. The estimated incidental U.S. commercial harvest of Stikine River Chinook salmon in Districts 108 gillnet, test, troll, subsistence, and sport fisheries was 210 fish. The estimated Canadian incidental commercial, Aboriginal, assessment/test, and sport fisheries harvest was 600 fish. Managers used only model outputs in 2017 to generate inseason run sizes after SW 20. The extremely low catches at the Kakwan Point tagging site and the lack of early assessment and commercial fisheries did not allow the use of MR data inseason. The model projections of inseason run size were consistent throughout the course of the fishery in predicting a terminal run size that was substantially lower than the preseason expectation of 18,300 large Chinook salmon. Weekly inseason run size projections ranged from less than 14,000 to less than 10,000 large Chinook salmon.

The 2017 run size of Stikine River coho salmon cannot be quantified. The U.S. harvest of Stikine River coho salmon is also unknown since there is no stock identification program for this species. Mixed stock coho salmon harvest in District 106 49,400 fish (19% Alaska hatchery) and District 108 was 13,700 fish (10% Alaska hatchery). The Canadian inriver coho salmon harvest of 5,500 fish was above average. The annual aerial surveys indicated an average return to the 6 index sites that were surveyed by Canada. The inseason weekly CPUE of coho salmon from the lower Stikine River Canadian fishery was above average.

Taku River

The estimate of the 2017 Taku River sockeye salmon terminal run is 213,400 fish; 199,300 wild fish, and 14,200 hatchery fish. The U.S. harvested 68,500 wild fish, Canada harvested 27,600 wild fish, and the estimated above border spawning escapement was 103,200 wild sockeye salmon. The terminal run size was above average while the wild fish escapement was average and above the goal range of 71,000 to 80,000 fish. The U.S. and Canada harvested an estimated 70% and 105% of their respective ACs calculated using a 79% / 21% (U.S./Canada) harvest sharing split based on enhanced fish production.

The estimated 2017 Taku River large Chinook salmon terminal run was 8,650 fish; above border run was 8,470 fish and spawning escapement was 8,220 fish. The run was the lowest on record and the harvests were well below average. The total harvest of large Chinook salmon in the Canadian commercial fishery in the Taku River was 250 fish. The traditional District 111 mixed stock drift gillnet fishery total harvest was 1,080 Chinook salmon of all sizes and an estimated 140 Taku River large Chinook salmon.

The estimated above border run of Taku River coho salmon in 2017 is 65,700 fish, which was 66% of average. The Canadian inriver commercial harvest was 7,800 coho salmon. After all Canadian harvests are subtracted from the above border run the above border spawning escapement is estimated at 57,900 coho salmon, slightly above the bottom end of the newly adopted escapement goal range of 50,000 to 90,000 fish. The U.S. harvest of 13,500 coho salmon in the traditional District 111 mixed stock fishery was well below average. Alaskan hatcheries contributed an estimated 800 fish, or 5% of the District 111 harvest.

Alsek River

The 2017 Alsek River harvest of 5,000 sockeye salmon in the U.S. commercial fishery was below average. The Canadian inriver recreational fishery reported a harvest of 40 sockeye salmon while the Aboriginal food fishery harvest was approximately 580 fish. The Klukshu River weir count of 3,900 sockeye salmon was below average and the escapement of 3,700 fish was below the escapement goal range of 7,500 to 11,000 fish. The count of 1,100 early run sockeye salmon (i.e. through August 15) and the late run count of 2,800 fish were both below average.

The 450 Chinook salmon counted through the Klukshu River weir was below average and the estimated escapement (440 fish) was below the escapement goal range of 800 to 1,200 Chinook salmon. The U.S. Dry Bay harvest of 130 large Chinook salmon was below average. The Canadian recreational and Aboriginal fishery harvests of 60 and 10 fish, respectively, were both below average.

Current stock assessment programs prevent an accurate comparison of the Alsek River coho salmon run with historical runs. There was minimal effort during the U.S. Dry Bay coho salmon fishery and harvest figures are negligible. The Canadian recreational and Aboriginal fisheries harvested no coho salmon. The operation of the Klukshu River weir does not provide a complete enumeration of coho salmon into this system since it is removed before the run is complete.

Enhancement

In 2017, eggs and milt were collected from sockeye salmon at Tahltan, Tatsamenie, and Trapper lakes. An estimated 3.85 million eggs were collected at Tahltan Lake, 2.0 million eggs at Tatsamenie Lake, and 280 thousand eggs at Trapper Lake. Prior to the start of egg collection at Tahltan Lake, Canada revised the egg-take goal to 3.5 million sockeye salmon eggs based on actual escapement into Tahltan Lake and matching estimated enhanced smolt production to expected wild smolt production. Canadian technical staff has determined that the fry from a 3.5 million level egg take can all be planted into Tahltan Lake without exceeding agreed to stocking guidelines.

In 2017, outplants of brood year 2016 sockeye salmon fry were as follows: 3.1 million fry into Tahltan Lake; 1.02 million fry were released directly and 138 thousand net pen reared fry were released into Tatsamenie Lake; and 212,000 fry were released into Trapper Lake. Green-egg to planted-fry survivals were 59%, 68% and 68% for Tahltan, Tatsamenie and Trapper lakes; respectively.

Adult sockeye salmon otoliths were processed inseason by the ADF&G otolith lab to estimate weekly contribution of fish from U.S./Canada TBR fry planting programs to District 106, 108, and 111 drift gillnet fisheries and to Canadian lower commercial and test fisheries in the Stikine and Taku rivers. Postseason estimates of stocked fish to Alaskan harvests were 7,152 Stikine River fish to District 106 and 108, and 6,100 Taku River fish to District 111. Postseason estimates of stocked fish to Canadian fisheries included 16,600 fish to Stikine River fisheries and 2,800 fish to the Taku River fisheries.

SALMON MANAGEMENT AND ENHANCEMENT PLANS FOR THE STIKINE, TAKU AND ALSEK RIVERS, 2019
TCTR (19)-03 – April 2019

Management of transboundary river salmon to achieve conservation, allocation and enhancement objectives, as stipulated by the PST, requires a cooperative approach by Canada and the United States. It is important that both Parties have a clear understanding of the objectives and agree upon procedures to be used in managing the fisheries, including the criteria upon which modifications of fishing patterns will be based. This document is intended to facilitate cooperative salmon management, stock assessment, research and enhancement by ADF&G, CAFN, DFO, TFN, and TRTFN on transboundary stocks of salmon originating in the Canadian portions of the Stikine, Taku, and Alsek rivers.

This report contains, by river system (starting in the south and moving north) and species, the 2019 salmon run outlooks, spawning escapement goals, a summary of harvest sharing objectives, and an outline of management procedures to be used during the 2019 fisheries. Numerical forecasts are presented for Stikine River large Chinook (MEF > 659 mm; typically age 5–7) and sockeye salmon; Taku River large Chinook, sockeye and coho salmon; and Alsek River Chinook and sockeye salmon. Outlooks for other stocks are given qualitatively with reference to brood year escapement data where available. This report also contains joint plans for fry stocks and egg collections and a detailed list of proposed field projects for 2019, identifying agency responsibility and contacts for the various functions within the projects. Information shown for 2018 and 2019 is preliminary. Unless otherwise defined, the 10-year average is 2009–2018 and the 5-year average is 2014–2018.

F. JOINT TECHNICAL COMMITTEE ON DATA SHARING

No reports were finalized for publication during this reporting period.

G. JOINT SELECTIVE FISHERY EVALUATION COMMITTEE

REVIEW OF MASS MARKING AND MARK-SELECTIVE FISHERY ACTIVITIES PROPOSED TO OCCUR IN 2019
SFEC (19)-01 – July 2019

This report provides a summary of the proposed coastwide plans for mass marking (MM) of Coho Salmon (Oncorhynchus kisutch) and Chinook Salmon (O. tshawytscha) and the conduct of mark-selective fisheries (MSFs) in 2019. Issues with implications for maintenance of the coastwide coded-wire-tag program are identified and recommendations are proposed.

Summary of 2019 Mass Marking Proposals

Throughout this report a mass marked fish refers to a fish with an adipose-fin clip (and not coded-wire tagged) and a double-index-tag (DIT) group includes two related coded-wire-tag (CWT) groups, one marked and one unmarked. A clipped fish that is tagged with a coded-wire tag is not considered mass marked in this report.

Mass Marking and DIT Programs

Twenty-two proposals (8 for Coho and 14 for Chinook) were received for mass marking occurring in 2019 (Appendix A). Of these, two were received from southern British Columbia (BC) and 20 from southern United States (SUS). The Selective Fishery Evaluation Committee (SFEC) believes these proposals cover all MM programs of relevance to the Pacific Salmon Commission (PSC). Following the submission of these proposals to the PSC last October, Washington Department of Fish and Wildlife (WDFW) in January released a report that lists hatchery production programs that have been increased to benefit southern resident killer whales (Orcinus orca) (WDFW 2019). The intention is to mass mark all of these fish if capacity allows. Not all of these increases were in the proposals submitted to SFEC; however, all of the increases in production identified in WDFW (2019) are included in the data provided within this report.

Proposed mass marking of Coho and Chinook salmon in 2019

Agency	Coho (in millions)		Chinook (in millions)	
	2018	2019	2018	2019
ADFG	-		-	
CDFO	4.2	4.2	-	0.3
USFWS	1.7	1.9	24.2	25.0
WDFW/Tribes	23.0	23.3	70.6	76.7
ODFW/Tribes	6.1	4.7	19.7	23.5
Total	**35.1**	**34.2**	**114.4**	**125.5**

Approximately 34.2 million Coho are proposed to be mass-marked in 2019 from southern BC and SUS hatcheries, roughly 900,000 fewer than proposed in 2018 (Table 2-1). This reduction in proposed releases is due to changes in production within the Columbia River and broodstock shortages at some facilities. Essentially, all hatchery Coho production intended for harvest, from southern BC and SUS hatcheries will continue to be mass marked. In 2019, there are 14 proposed Coho Salmon DIT groups (Table 2-1; Appendix B), of which seven are from Puget Sound, four from the Washington (WA) coast, and three from the Columbia River Basin. This is one fewer than the number proposed for 2016, because the last remaining DIT group in Canada is being discontinued because the data from this tagging effort has not been used by PSC technical committees.

Approximately 125.2 million Chinook are proposed to be mass marked in 2019 from SUS hatcheries, and for the first time 0.3 million are proposed to be mass marked and released from Canadian west coast of Vancouver Island hatcheries (Table 2-1). The 2019 total level is roughly 11.1 million more than was proposed in 2018. This difference is mainly due to increased production to address concerns for availability of prey for endangered southern resident killer whales (WDFW 2019). Most hatchery Chinook production from SUS hatcheries intended for harvest will continue to be mass marked. Currently there are 14 proposed Chinook Salmon DIT groups (Table 2-1, Appendix C), of which seven are from Puget Sound facilities, two from WA coastal facilities, and five from Columbia River facilities. These DIT groups are unchanged from what was proposed for 2018.

Sampling Programs

Prior to MM, the adipose fin clip was employed as a visual indicator for fish containing a CWT. Consequently, sampling programs were designed to collect heads from fish with missing adipose fins, resulting in all heads containing CWTs. With MM, a large number of marked fish do not contain CWTs; further, CWTs must be recovered from both marked and unmarked fish to obtain data for DIT releases to estimate fishery impacts. Electronic tag detection (ETD) equipment has been developed as a means to efficiently identify marked and unmarked fish containing CWTs. However, ETD is not employed coastwide because of continuing reservations by some agencies regarding the cost, accuracy, and practical feasibility of incorporating this technology into their sampling programs. The Alaska Department of Fish and Game (ADFG), Canadian Department of Fisheries and Oceans (CDFO), Oregon Department of Fish and Wildlife (ODFW), and California Department of Fish and Wildlife (CDFW) all conduct sampling programs which will not recover the unclipped component of DIT programs required to assess impacts of MSFs. Visual sampling creates gaps and increased uncertainty in the estimated impacts of fisheries on unmarked (wild) fish. Addressing these gaps and increased uncertainties is time consuming.

Considering sampling programs coastwide, some agencies already implement comprehensive electronic sampling strategies to recover CWTs from sport and commercial fisheries, while other agencies have not fully implemented electronic tag detection. Washington State agencies continue to electronically sample at most locations and report CWT recoveries of the unmarked components of DIT groups in recreational marine and some freshwater MSFs, as well as in nonselective fisheries (NSFs). Starting in 2008, Canada committed to full electronic sampling and reporting of all CWTs in all commercial fisheries for Chinook. Coho in Canadian commercial fisheries are electronically or visually sampled, depending on location. Canada continues to rely on the Sport Head Recovery Program (SHRP) to recover CWTs from NSFs and MSFs alike and thus, no unmarked coded-wire-tagged recoveries are available from them. Oregon Department of Fish and Wildlife continues to use visual sampling for fall Chinook and electronic sampling for spring Chinook and Coho in the Columbia River. Beginning in 2011, ODFW initiated electronic sampling of all ocean recreational and commercial salmon fisheries off the coast of Oregon (OR). Alaska primarily conducts visual sampling; however, uses electronic screening of heads for commercial fisheries and in most ports for sport fisheries, to send only tagged heads to the dissection lab. ADFG plans to sample unmarked Chinook for CWTs at a rate of 10% for troll fisheries in 2019 and continue a pilot program to sample unmarked fish for CWTs in the sport
fishery.

Encounters of large numbers of mass marked Chinook Salmon are impacting catch sampling programs in northern fisheries; for example, approximately 58% of the Chinook sampled in the southeast Alaskan troll fishery with a missing adipose fin did not contain a CWT in 2018 (Figure 2-4). The increased costs to deal with the additional marked fish (e.g., storage, and shipping to and sorting of heads in the dissection laboratories) are not quantified, but do have a substantial fiscal impact on these programs.

Summary of 2019 Mark-Selective Fishery Proposals

Mark-selective fisheries have been prosecuted for Coho Salmon since 1998 and for Chinook Salmon since 2003. For 2019, the SFEC received 68 MSF proposals for Coho and Chinook salmon in Alaska, Canada, Washington, and Oregon fisheries. The SFEC believes these proposals cover most MSFs planned for 2019 of relevance to the PSC. The proposals submitted to the SFEC for review are listed in Table 3-1 (also see Appendix D). Further details describing the proposed MSFs and comments made by the SFEC are provided in Appendix E.

In 2019, 26 proposals were received for Coho Salmon MSFs and 42 proposals were received for Chinook Salmon MSFs. The SFEC received one new Coho proposal and three new Chinook proposals from WDFW for test fisheries in the lower Columbia River. One new Chinook proposal was submitted by CDFO for an MSF in selected portions of the Strait of Georgia, Johnstone Strait, and Strait of Juan de Fuca. Five Chinook proposals from the previous year were dropped from the list for 2019 two from ODFW and three from WDFW. Agencies provided the majority of the requested information in each of the proposals and the proposals were submitted on time.

Proposals received by the SFEC for Coho and Chinook salmon mark-selective fisheries, 2018–2019

Agency	Coho		Chinook	
	2018	2019	2018	2019
ADFG	0	0	3	3
CDFO	5	5	1	2
WDFW	12	13	27	28
ODFW	5	5	6	4
WDFW/ODFW	3	3	5	5
IDFG	0	0	0	0
Lummi	0	0	1	0
Total	**25**	**26**	**43**	**42**

Up until 2008, Chinook MSFs were largely restricted to Puget Sound and Columbia River spring Chinook Salmon. Since then, Chinook MSFs have expanded substantially in both marine and freshwater areas. In 2007, 12 Chinook MSFs were prosecuted; in 2018, that number tripled to 36.

The combined increase in numbers and geographic distribution of Chinook MSFs increases the likelihood that a larger number of indicator stocks will be encountered in MSFs. The majority of MSF proposals are for terminal marine or freshwater areas, each of which will impact mature fish of one to several stocks originating from nearby river systems. Multiple MSFs for both Coho and Chinook salmon are also expected to continue to occur in ocean areas in 2019 in BC, WA, and OR. These fisheries will impact many stocks and also multiple broods of Chinook Salmon.

Recommendations and Issues Requiring PSC Direction

Continued Submission of Mark-Selective Fishery Proposals
It is recommended that the PSC continue to request that agencies submit proposals for all potential MSFs by November 2019. Proposals for new or substantially changed proposals should continue to be requested by June 1 of the year prior to implementation.

Mark-Selective Fishery Reports are Needed
It is recommended that the PSC continue to request that agencies provide SFEC with post-season mark-selective fishery reports (see PSC website for current MSF table templates). The information in these tables should be completed prior to the PSC post-season meeting of the year following the fishery year. For instance, reports on fisheries occurring in 2018□2019 should be available by the post-season meeting in 2020. This information has only been received for some fisheries, such as Puget Sound, Oregon Coastal, Lower Columbia River, and SE Alaska, but not for others.

Post-season reports on MSFs are required for each MSF prosecuted. One of the basic functions of these reports is to provide a record of how fisheries were actually prosecuted (whether they took place) and whether there were any changes in the way the fisheries and sampling programs were conducted relative to the proposal. These reports are to be submitted in the form of tables (see PSC website for current templates). The first two tables should be submitted by the annual PSC post-season meeting following the year of the fishery.

Both United States and Canadian PSC post-season reports continue to be missing SFEC post-season report/tables for most MSFs. Although these SFEC tables are not included in the PSC post-season reports, CDFO and WDFW do provide fishery regulations and preliminary landed catch estimates for mark-selective fisheries in these reports.

SFEC representatives have been stepping up efforts in recent years to coordinate with key staff within the agencies in order to meet these reporting requirements. Although the information may be available in larger agency reports, the SFEC needs agencies to submit the post-season MSF information using the report templates provided (see PSC website for current table templates), which will enable more efficient dissemination of post-season data to PSC's technical committees such as the CTC and CoTC. It is recommended that agencies prioritize this task and work with their SFEC representatives to develop these reports annually and provide them to the PSC in the required time frame.

New Database is Needed to Facilitate Analyses of MSFs

To facilitate analyses by the technical committees, a database housing regulations and impact estimates of MSFs is needed. The Regional Mark Information System (RMIS) does not include all of the necessary data (i.e., regulations) to estimate fishery impacts on unmarked, tagged fish. In addition, the resulting estimates of impacts of MSFs on unmarked fish are needed for the PSC technical committees to perform cohort analyses on all stocks of concern. A prototype online database with impact estimates and summarized CWT data for Chinook MSFs conducted in WDFW marine areas 1□13 was developed jointly by WDFW and the NWIFC. This database is no longer being maintained. To facilitate compilation and accessibility of post-season MSF data, SFEC recommends the PSC develop and maintain a similar database for both Coho and Chinook MSFs coastwide.

CWT Indicator Programs Need Further Review by Technical Committees

A DIT group is needed for each PSC indicator stock in order to evaluate the impacts of MSFs on each natural stock represented by an indicator stock. Comparison of the escapement of the unmarked and marked components of a DIT group provides a measure of the total impact of MSFs. Mark-selective fisheries have tripled in number since 2007, with new areas and stocks being fished under mark-selective regulations. It is recommended that agencies review their indicator stock programs in light of the expansion of MSFs and any other new MSFs likely to be proposed in future years and evaluate the need for including additional DIT groups.

All Mixed-Stock Chinook Salmon MSFs Need to be Electronically Sampled

Electronic tag detection (ETD) is necessary for detecting unmarked and tagged fish in fisheries and escapement. In order to carry out exploitation rate analysis for unmarked stocks, aside from estimation of unmarked mortalities in MSFs, it is necessary to have estimates of harvest of unmarked and tagged DIT groups in NSFs. This requires ETD be used in NSFs, where unmarked and tagged fish are present, in particular if the stock has been subjected to MSFs in other areas or periods. The SFEC recommends that agencies review their sampling methods with respect to the current expansion of MSFs into coastal fisheries. It is specifically recommended that ODFW and WDFW implement ETD for Columbia River fall Chinook to recover DIT release groups for Chinook exploitation rate indicator stocks.

Agencies Proposing Mixed-Bag Regulations in MSFs Need to Provide New Analytical Tools to Assess These Fisheries

Regulations to implement MSFs for recreational fisheries have become more complex, making analyses to estimate impacts challenging in a number of ways. We continue to be concerned about monitoring, sampling, and estimation methods keeping pace with increases in regulation complexity. Different types of mixed-bag regulations continue to be proposed by Canada, Washington, and Oregon for recreational fisheries. A mixed-bag fishery is one where an angler may retain different proportions of clipped or unclipped fish, and often may include jacks as well as adults in their daily bag limits. There are no reliable methods for estimating impacts on marked and unmarked fish under mixed-bag regulations. The agencies proposing these mixed-bag regulations should assist in developing the analytical tools to measure the impacts of these fisheries.

Publications of the Pacific Salmon Commission

PART VI
PUBLICATIONS OF THE PACIFIC SALMON COMMISSION

Documents listed herein are available to domestic fishery agencies of Canada and the United States, research organizations, libraries, scientists and others interested in the activities of the Commission, through the offices of the Secretariat, 600 - 1155 Robson Street, Vancouver, B.C., V6E 1B5. Photocopying charges may be levied for documents which are out of print.

Reports published by the Pacific Salmon Commission after March 31, 2000 including Commission annual reports, annual reports of the Fraser River Panel, Joint Technical Committee reports and technical reports of the Pacific Salmon Commission are also available in full text format on the Commission's website at www.psc.org.

Documents listed here are those which were published during the period from 2019/20 inclusive. For previous publications, please refer to the Pacific Salmon Commission's website at www.psc.org/publications.

A. ANNUAL REPORTS

Pacific Salmon Commission 2018/2019 Thirty Fourth Annual Report. December 2019.

B. REPORTS OF JOINT TECHNICAL COMMITTEES

i. Joint Chinook Technical Committee

TCCHINOOK ISBM SPECIAL REPORT *ISBM Subgroup Technical Note – New Developments for the computation of postseason ISBM indices and Calendar Year Exploitation Rates.* April 2019

TCCHINOOK (19)-1 *Annual Report of Catch and Escapement for 2018.* June 2019.

TCCHINOOK (19)-2 V1 *2018 Exploitation Rate Analysis and Model Calibration, Volume One.* December 2019.

TCCHINOOK (19)-2 V2 *2018 Exploitation Rate Analysis and Model Calibration, Volume Two: Appendix Supplement.* December 2019.

ii. Joint Chum Technical Committee

TCCHUM (19)-1 *2016 Post Season Summary Report.* September 2019.

iii. Joint Coho Technical Committee

No reports were finalized for publication during this reporting period.

iv. Joint Data Sharing Technical Committee

No reports were finalized for publication during this reporting period.

v. Joint Northern Boundary Technical Committee

TCNB (19)-1 U.S./Canada Northern Boundary Area 2017 Salmon Fisheries Management Report and 2018 Preliminary Expectations. May 2019.

TCNB (20)-1 U.S./Canada Northern Boundary Area 2018 Salmon Fisheries Management Report and 2019 Preliminary Expectations. February 2020.

vi. Joint Transboundary Technical Committee

TCTR (19)-2 *Final Estimates of Transboundary River Salmon Production, Harvest and Escapement and a Review of Joint Enhancement Activities in 2017*. April 2019.

TCTR (19)-3 *Salmon Management and Enhancement Plans for the Stikine, Taku and Alsek Rivers, 2019.* April 2019.

vii. Selective Fishery Evaluation Committee

SFEC (19)-1 *Review of Mass Marking and Mark-Selective Fishery Activities Proposed to Occur in 2019*. July 2019.

C. REPORTS OF THE FRASER RIVER PANEL

Report of the Fraser River Panel to the Pacific Salmon Commission on the 2013 Fraser River Sockeye Salmon Fishing Season. January 2020.

D. TECHNICAL REPORT SERIES OF THE PACIFIC SALMON COMMISSION

PSC Technical Report No. 41. *Hydroacoustics Review and Technical Summary*. September 2019.

PSC Technical Report No. 42. *A Summary of Okanagan Chinook Information Requested by the Pacific Salmon Commission.* January 2020.

PSC Technical Report No. 43. *Taku River Sockeye Salmon Assessment Review and Updated 1984-2018 Abundance Estimates*. February 2020.

E. PUBLICATIONS BY PACIFIC SALMON COMMISSION SECRETARIAT STAFF

No reports were finalized for publication during this reporting period.

F. REPORTS OF THE INTERNATIONAL PACIFIC SALMON COMMISSION

Responsibility for maintenance of the library of the International Pacific Salmon Fisheries Commission, on its termination December 31, 1985, was transferred to the Pacific Salmon Commission. Documents in the Library include historical archival papers which are available to researchers and other interested parties through contact with the Pacific Salmon Commission's Librarian.

Publication of John F. Roos' History of the International Pacific Salmon Fisheries Commission, and P. Gilhousen's Estimation of Fraser River Sockeye Escapements ended all publication series of the International Pacific Salmon Fisheries Commission. Copies of all in-print Progress Reports and Bulletins of the International Pacific Salmon Fisheries Commission are available free of charge through the Library of the Pacific Salmon Commission. Copies of the History of the International Pacific Salmon Fisheries Commission may also be ordered through the Library of the Pacific Salmon Commission.

G. DOCUMENTS SUBMITTED BY THE PARTIES

In compliance with provisions of the Treaty, the Parties provide annual post-season fishery reports and updates on their respective salmonid enhancement programs to the Commission. Documents received during 2019/20 were:

1. *Post Season Report for 2018 Canadian Treaty Limit Fisheries.* Fisheries and Oceans Canada. October 2019.

2. *2018 Post Season Report United States Salmon Fisheries of Relevance to the Pacific Salmon Treaty.* United States Section. October 2019.

Report of the Auditors for 2019/2020

PART VII
AUDITORS' REPORT AND FINANCIAL STATEMENTS FOR THE PERIOD APRIL 1, 2019 TO MARCH 31, 2020

Financial Statements of

PACIFIC SALMON COMMISSION

And Independent Auditors' Report thereon

Year ended March 31, 2020

INDEPENDENT AUDITORS' REPORT

To the Commissioners of the Pacific Salmon Commission

Opinion

We have audited the financial statements of Pacific Salmon Commission (the "Entity"), which comprise:

- the statement of financial position as at March 31, 2020
- the statement of operations and fund balances for the year then ended
- the statement of cash flows for the year then ended
- and notes to the financial statements, including a summary of significant accounting policies

(hereinafter referred to as the "financial statements").

In our opinion, the accompanying financial statements as at and for the year ended March 31, 2020, of the Entity are prepared, in all material respects, in accordance with the financial reporting provisions of Chapter IX of the Pacific Salmon Commission Bylaws amended and adopted February 15, 2018.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the ***"Auditors' Responsibilities for the Audit of the Financial Statements***" section of our auditors' report.

We are independent of the Entity in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada and we have fulfilled our other ethical responsibilities in accordance with these requirements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Emphasis of Matter – Basis of Accounting

We draw attention to Note 2(a) in the financial statements, which describes the applicable financial reporting framework and the purpose of the financial statements.

As a result, the financial statements may not be suitable for another purpose.

Our opinion is not modified in respect of this matter.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation of the financial statements in accordance with the financial reporting provisions of Chapter IX of the Pacific Salmon Commission Bylaws amended and adopted February 15, 2018; this includes determining that the applicable financial reporting framework is an acceptable basis for the preparation of the financial statements in the circumstances, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Entity's ability to continue as a going concern, disclosing as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Entity or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Entity's financial reporting process.

Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists.

Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit.

We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion.

  The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Entity's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditors' report. However, future events or conditions may cause the Entity to cease to continue as a going concern.

- Communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Chartered Professional Accountants

Vancouver, Canada
September 23, 2020

PACIFIC SALMON COMMISSION

Statement of Financial Position
(Expressed in Canadian dollars)

March 31, 2020, with comparative information for 2019

		Restricted						
	General Fund	Working Capital Fund	Test Fishing Fund	Special Research and Project Fund	Capital Assets Fund	Capital Asset Replacement Reserve Fund ("CARRF")	Total	2020	2019
Assets									
Current assets:									
Cash and cash equivalents	$ 88,126	$ -	$ 252,972	$ 3,275	$ -	$ -	$ 256,247	$ 344,373	$ 2,972,700
Short-term investments	1,953,948	110,750	1,000,000	-	-	117,709	1,228,459	3,182,407	3,366,446
Accounts receivable	234,402	816	4,144	192,522	-	-	197,482	431,884	102,303
Prepaid expenses	398,881	-	-	-	-	-	-	398,881	387,106
Due from Yukon River Fund (note 6)	7,768	-	-	-	-	-	-	7,768	1,414
Due from Northern Fund (note 6)	412,302	-	-	-	-	-	-	412,302	43,144
Due from Southern Fund (note 6)	-	-	-	-	-	-	-	-	27,255
	3,095,427	111,566	1,257,116	195,797	-	117,709	1,682,188	4,777,615	6,900,368
Prepaid expenses	536,114	-	-	-	-	-	-	536,114	700,664
Capital assets (note 4)	-	-	-	-	542,081	-	542,081	542,081	583,042
	$ 3,631,541	$ 111,566	$ 1,257,116	$ 195,797	$ 542,081	$ 117,709	$ 2,224,269	$ 5,855,810	$ 8,184,074
Liabilities and Fund Balances									
Current liabilities:									
Accounts payable and accrued liabilities	$ 793,411	$ -	$ -	$ 76,206	$ -	$ -	$ 76,206	$ 869,617	$ 842,329
Government remittances payable	38,197	-	-	-	-	-	-	38,197	31,585
Due to Southern Fund (note 6)	9,378	-	-	-	-	-	-	9,378	-
Deferred revenue (note 3)	1,513,511	-	-	-	-	-	-	1,513,511	3,067,443
	2,354,497	-	-	76,206	-	-	76,206	2,430,703	3,941,357
Accrued employee future benefits (note 5(ii))	499,938	-	-	-	-	-	-	499,938	542,728
	2,854,435	-	-	76,206	-	-	76,206	2,930,641	4,484,085
Fund balances:									
Unrestricted	777,106	-	-	-	-	-	-	777,106	879,137
Restricted	-	111,566	1,257,116	119,591	-	117,709	1,605,982	1,605,982	2,237,810
Invested in capital assets	-	-	-	-	542,081	-	542,081	542,081	583,042
	777,106	111,566	1,257,116	119,591	542,081	117,709	2,148,063	2,925,169	3,699,989
Contractual obligations (note 7)									
Subsequent event (note 9)									
	$ 3,631,541	$ 111,566	$ 1,257,116	$ 195,797	$ 542,081	$ 117,709	$ 2,224,269	$ 5,855,810	$ 8,184,074

See accompanying notes to financial statements.

Approved on behalf of the Commission:

W. Ron Allen

Chair, Standing Committee on Finance and Administration

Vice-Chair, Standing Committee on Finance and Administration

PACIFIC SALMON COMMISSION

Statement of Operations and Fund Balances
(Expressed in Canadian dollars)

Year ended March 31, 2020, with comparative information for 2019

		Restricted							
	General Fund	Working Capital Fund	Test Fishing Fund	Special Research and Project Fund	Capital Assets Fund	Capital Asset Replacement Reserve Fund ("CARRF")	Total	2020	2019
Revenue:									
Contributions from contracting parties (note 3)	$ 3,759,272	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,759,272	$ 3,892,908
Special contributions - pension	325,704	-	-	-	-	-	-	325,704	325,704
Grants	146,829	-	-	400,714	-	-	400,714	547,543	130,325
Interest	71,344	2,389	25,110	-	-	-	27,499	98,843	94,340
Administration fees	232,682	-	-	-	-	-	-	232,682	192,956
Foreign exchange gain (loss)	38,562	-	8,228	-	-	-	8,228	46,790	21,934
Gain (loss) on disposal of capital assets	-	-	-	-	(10,909)	-	(10,909)	(10,909)	9,761
Used equipment sales	-	-	-	-	-	-	-	-	1,000
Test fishing	-	-	127,965	-	-	-	127,965	127,965	1,179,102
	4,574,393	2,389	161,303	400,714	(10,909)	-	553,497	5,127,890	5,848,030
Expenses:									
Amortization	-	-	-	-	211,166	-	211,166	211,166	240,693
Salaries and employee benefits	3,137,389	-	-	-	-	-	-	3,137,389	3,093,916
Unfunded pension liability payments	325,704	-	-	-	-	-	-	325,704	325,704
Travel and transportation	155,168	-	-	-	-	-	-	155,168	143,820
Rents and communication	206,817	-	-	-	-	-	-	206,817	201,232
Contract services	598,313	-	-	-	-	-	-	598,313	795,114
Materials and supplies	30,033	-	-	-	-	-	-	30,033	64,129
Other	-	-	-	-	-	-	-	-	960
Test fishing	-	-	937,954	-	-	-	937,954	937,954	538,157
Consultations and workshops	-	-	-	300,166	-	-	300,166	300,166	461,408
	4,453,424	-	937,954	300,166	211,166	-	1,449,286	5,902,710	5,865,133
Excess (deficiency) of revenue over expenses	120,969	2,389	(776,651)	100,548	(222,075)	-	(895,789)	(774,820)	(17,103)
Fund balance, beginning of year	879,137	109,177	2,033,767	19,043	583,042	75,823	2,820,852	3,699,989	3,717,092
Interfund transfers:									
Contribution to CARRF	(223,000)	-	-	-	-	223,000	223,000	-	-
Purchase of capital assets, net	-	-	-	181,114	(181,114)	-	-	-	-
Fund balance, end of year	$ 777,106	$ 111,566	$ 1,257,116	$ 119,591	$ 542,081	$ 117,709	$ 2,148,063	$ 2,925,169	$ 3,699,989

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION

Statement of Cash Flows
(Expressed in Canadian dollars)

Year ended March 31, 2020, with comparative information for 2019

	2020	2019
Cash provided by (used in):		
Operations:		
Deficiency of revenue over expenses	$ (774,820)	$ (17,103)
Items not involving cash:		
Amortization	211,166	240,693
Loss (gain) on disposal of capital assets	10,909	(9,761)
Accrued employee benefits	(42,790)	9,536
Changes in non-cash operating working capital:		
Accounts receivables	(329,581)	292,336
Prepaid expenses	152,775	(171,212)
Accounts payable and accrued liabilities	27,288	130,887
Government remittances payable	6,612	293
Due from/to Yukon River Fund and Northern Fund and Southern Fund	(338,879)	(8,659)
Deferred revenue	(1,553,932)	325,698
	(2,631,252)	792,708
Investing:		
Purchase of capital assets	(181,114)	(279,241)
Proceeds on disposal of capital assets	-	9,761
Redemption of short-term investments	5,366,446	4,757,404
Purchase of short-term investments	(5,182,407)	(4,566,446)
	2,925	(78,522)
Increase (decrease) in cash and cash equivalents	(2,628,327)	714,186
Cash and cash equivalents, beginning of year	2,972,700	2,258,514
Cash and cash equivalents, end of year	$ 344,373	$ 2,972,700

See accompanying notes to financial statements.

1. Nature of organization:

Pacific Salmon Commission (the “Commission”) was established by a Treaty between the Governments of Canada and the United States of America (the “Contracting Parties”) to promote cooperation in the management, research, and enhancement of Pacific Salmon stocks. The Treaty was ratified on March 18, 1985 and amended most recently on January 1, 2019.

2. Significant accounting policies:

(a) Basis of accounting:

These financial statements have been prepared in accordance with the financial reporting provisions of Chapter IX of the Pacific Salmon Commission Bylaws amended and adopted February 15, 2018. The financial reporting provisions of Chapter IX of the Pacific Salmon Commission Bylaws require the financial statements to be prepared in a manner consistent with generally accepted accounting principles (“GAAP”) with the following exceptions:

(*i*) Expenses are recognized at the time that the commitment for goods and services are made through purchase orders, rather than at the time the goods or services are received. This exception is to comply with Chapter IX, Section D, Rule 10 of the Bylaws.

(*ii*) The Commission uses the triennial pension valuation report provided by the International Fisheries Commissions Pension Society (“IFCPS”) to determine the yearly pension expense. The pension expense consists of the employer portion of the current service pension contribution plus any additional yearly payments required by the IFCPS (as shown in the current valuation report) that are necessary to extinguish the unfunded portion of the pension obligation. Other post-employment benefits such as extended medical plans and life insurance are recorded as an expense in the fiscal year in which the respective invoice is dated. This exception is to comply with Chapter IX, Section D, Rule 11 of the Bylaws.

GAAP has been interpreted to mean Canadian Accounting Standards for Not-for-Profit Organizations in Part III of the CPA Canada Handbook (“Not-for-Profit Standards”).

(b) Cash and cash equivalents:

Cash and cash equivalents are comprised of cash on hand and short-term deposits with original maturities of three months or less.

(c) Fund accounting and revenue recognition:

The Commission follows the restricted fund method of accounting for contributions.

Restricted contributions related to general operations are initially deferred and recognized as revenue of the General Fund in the year in which the related expenses are incurred. All other restricted contributions are recognized as revenue of the appropriate restricted fund.

2. Significant accounting policies (continued):

(c) Fund accounting and revenue recognition (continued):

Unrestricted contributions are recognized as revenue of the General Fund in the year they are received or receivable, if the amount to be received can be reasonably estimated and collection is reasonably assured.

The Fund classifications are as follows:

(*i*) The General Fund includes funds provided annually through contributions from the Contracting Parties. By agreement of the Contracting Parties, any unexpended balance remaining at the end of one fiscal year may be used to offset contributions in the following year or may be used to offset a shortfall between contributions and approved expenses in the following year. As a result, all amounts are recognized as revenue once received or receivable.

(*ii*) The Working Capital Fund represents monies contributed by the Contracting Parties to be used on a temporary basis to satisfy the capital requirements of the Commission until receipt of new contributions from the Contracting Parties at the beginning of a fiscal year, or for special programs not contained in the regular budget but approved during the fiscal year. Any surplus above a pre-determined fixed limit in the account at the end of the fiscal year is transferred to the general fund and is treated as unrestricted income.

(*iii*) The Test Fishing Fund is established as a revolving fund in which a portion of net test fishing revenues realized in years of high abundance are reserved, to be used to support test fishing programs in years of low abundance and when conservation concerns are an issue.

(*iv*) The Special Research and Project Fund represents monies set aside to fund additional programs as determined by the Contracting Parties, including, U.S. Section grant funds for contracts and U.S. Section travel and workshop, Chinook Sentinel Stocks Program, and Mark-Selective Fishery project.

(*v*) The Capital Assets Fund reflects the Commission's capital asset transactions. Amortization is charged to the Capital Assets Fund.

(*vi*) The Capital Asset Replacement Reserve Fund ("CARRF") was established to ensure regular availability of funds for lifecycle replacement of capital assets. On an annual basis, a fixed amount, as determined by the Commission, shall be transferred from the General Fund to the CARRF. The fund is to be used for the Commission's capital asset purchases.

Transfers between the funds are reviewed and approved by the Commissioners.

2. Significant accounting policies (continued):

(d) Financial instruments:

Financial instruments are recorded at fair value on initial recognition. Freestanding derivative instruments that are not in a qualifying hedging relationship and equity instruments that are quoted in an active market are subsequently measured at fair value. All other financial instruments are subsequently recorded at cost or amortized cost, unless management has elected to carry the instruments at fair value. The Commission has not elected to carry any such financial instruments at fair value.

Transaction costs incurred on the acquisition of financial instruments measured subsequently at fair value are expensed as incurred. All other financial instruments are adjusted by transaction costs incurred on acquisition and financing costs, which are amortized using the straight-line method.

Financial assets are assessed for impairment on an annual basis at the end of the fiscal year if there are indicators of impairment. If there is an indicator of impairment, the Commission determines if there is a significant adverse change in the expected amount or timing of future cash flows from the financial asset. If there is a significant adverse change in the expected cash flows, the carrying value of the financial asset is reduced to the highest of the present value of the expected cash flows, the amount that could be realized from selling the financial asset or the amount the Commission expects to realize by exercising its right to any collateral. If events and circumstances reverse in a future period, an impairment loss will be reversed to the extent of the improvement, not exceeding the initial carrying value.

(e) Capital assets:

Capital assets are stated at cost less accumulated amortization. Costs of repairs and replacements of a routine nature are charged as a current expense while those expenses which improve or extend the useful life of the assets are capitalized. Amortization is provided using the straight-line method as follows:

Asset	Rate
Automobiles	5 years
Boats	5 years
Computer equipment and software	3 years
Equipment	5 years
Furniture and fixtures	10 years
Leasehold improvements	Over life of lease

2. Significant accounting policies (continued):

(e) Capital assets (continued):

Effective April 1, 2019, the Commission adopted the new guidance in Section 4433, *Tangible Capital Assets Held by Not-for-Profit Organizations*. Section 4433 directs organizations to apply the accounting guidance of Section 3061, *Property Plant and Equipment*, in Part II of the CPA Canada Handbook. In so doing, the new section requires that organizations annually assess for partial impairment of tangible capital assets, to be recorded where applicable, as a non-reversible impairment expense. In addition, where practical, organizations are to componentize capital assets when estimates can be made of the useful lives of the separate components. This Section is applied on a prospective basis with the exception of the transitional provision to recognize an adjustment to opening net assets for partial impairments of tangible assets that existed as at April 1, 2019. The implementation of this Section had no significant impact on the financial statements.

(f) Income taxes:

The Commission is exempt from income taxes under the Foreign Missions and International Organizations Act (1991).

(g) Post-employment benefits:

(*i*) Pension plan:

The Commission has a defined benefit pension plan covering its employees. The benefits are based on years of service and highest average salary. The Commission also sponsors a defined benefit life insurance and health care plan for substantially all retirees and employees. In accordance with the basis of accounting (note 2(a)), the Commission recognizes, annually, an expense equal to the amount of the required payment set forth by the pension plan, which is based on a triennial pension valuation. The Commission does not recognize an unfunded obligation related to the defined benefit pension plan, as referenced in note 5(*i*).

(*ii*) Severance:

Severance is accrued based on employees' current salary and number of years of service.

(h) Foreign exchange translation:

Transactions originating in foreign currencies are translated at the exchange rate prevailing at the transaction dates. Assets and liabilities denominated in foreign currency at the year-end date are translated to equivalent Canadian amounts at the rate of exchange in effect at that date. Foreign exchange gains and losses resulting from translation are included in the determination of excess or deficiency of revenue over expenses.

2. Significant accounting policies (continued):

(i) Use of estimates:

The preparation of financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Significant areas requiring the use of management estimates relate to the determination of the valuation of accounts receivable, useful lives of capital assets for amortization, the estimate of liabilities and contingencies, and the assumptions with respect to post-employment benefits. Actual results could differ from those estimates.

(j) Short-term investments:

The short-term investments, consisting of Guaranteed Investment Certificates with interest rates ranging from 1.65% to 1.98% (2019 - 89% to 2.38%), are due on dates between April and November 2020. These investments are managed by an external investment manager and are recorded at cost plus accrued interest.

(k) Life insurance and medical benefits:

The Commission recognizes, annually, an expense equal to the total amounts invoiced by health and life insurance benefit providers during the fiscal year.

3. Related parties and deferred revenue:

During the year ended March 31, 2020, the Commission recognized operating contributions from the Contracting Parties totaling $3,759,272 (2019 - $3,759,272). The Commission received nil (2019 - nil) of operating contributions from the Government of Canada and nil (2019 - $1,879,636) of operating contributions from the Government of the United States of America relating to future periods. The Commission recognized $651,408 (2019 - $488,550) from the Government of Canada and nil (2019 - $162,852) from the Government of the United States of America in special contributions relating to future payments to International Fisheries Commission Pension Society for the unfunded pension liability. These amounts have been included in deferred revenue and will be recognized when the related expense has been incurred. The Commission recognized nil (2019 - nil) in contributions from the Government of Canada and nil (2019 - $133,636) of contributions from the Government of the United States of America to supplement the Test Fishing Fund.

The Commission retains $189,690 (2019 - $189,690) of funding provided by Canada, to be used upon authorization from the Government of Canada to help fund test fishing operations administered by Fisheries and Oceans Canada and/or other parties in non-Panel-approved area waters.

3. Related parties and deferred revenue (continued):

The office and warehouse premises of the Commission are provided by the Government of Canada at no charge.

Deferred revenue consists of unspent funds provided by the Contracting Parties that are reserved for future operating and capital expenditures of the Fund.

	2020	2019
Balance, beginning of year	$ 3,067,443	$ 2,741,745
Operating contributions received	-	1,879,636
Special contributions	651,408	651,402
Recognized as revenue	(2,205,340)	(2,205,340)
Balance, end of year	$ 1,513,511	$ 3,067,443

4. Capital assets:

March 31, 2020	Cost	Accumulated amortization	Net book value
Automobiles	$ 231,607	$ 201,992	$ 29,615
Boats	130,455	103,183	27,272
Computer equipment	357,221	318,101	39,120
Computer software	252,273	242,584	9,689
Equipment	1,675,546	1,464,858	210,688
Furniture and fixtures	290,679	177,566	113,113
Leasehold improvements	257,638	145,054	112,584
	$ 3,195,419	$ 2,653,338	$ 542,081

March 31, 2019	Cost	Accumulated amortization	Net book value
Automobiles	$ 231,606	$ 184,572	$ 47,034
Boats	127,270	104,321	22,949
Computer equipment	339,833	291,250	48,583
Computer software	257,644	220,772	36,872
Equipment	1,714,858	1,435,291	279,567
Furniture and fixtures	265,628	187,093	78,535
Leasehold improvements	202,574	133,072	69,502
	$ 3,139,413	$ 2,556,371	$ 583,042

5. Employee future benefits:

(*i*) Pension plan:

The Commission and its employees contribute to the Pension Plan of the International Fisheries Commissions Pension Society for Employees of Participating Commissions, a multi-employer defined benefit plan, with Headquarters in Canada. The Plan covers 94 employees, of which 50 are current or past employees of the Commission.

The last actuarial valuation for the pension plan was performed as at January 1, 2020 and the next valuation is scheduled for January 1, 2023. Selected information about the Commission's defined benefit plan is as follows:

	January 1, 2020
Fair value of plan assets	$ 15,466,000
Benefit obligation	18,791,000
Funded status - plan deficit	$ (3,325,000)

The funded status of the plan is not included in the statement of financial position.

A significant actuarial assumption adopted in measuring the Commission's benefit obligation is the use of a discount rate of 5.1% and expected rate of return on assets of 5.1%.

During the year ended March 31, 2020, the Commission made payments totaling $162,852 (2019 - $488,550) with respect to the unfunded pension obligation.

(*ii*) Severance, life insurance and medical benefits:

The Commission also provides employee future benefits including severance, life insurance and medical benefits. Employees are entitled to severance payments calculated based on the length of continuous service completed by the employee. The accrued liability associated with these benefits is included in the statement of financial position.

6. Trust funds:

The Commission administers and holds, in trust, the following funds, which are not included in the Commission's financial statements:

(a) Northern Boundary and Transboundary River Restoration and Enhancement Trust Fund and Southern Boundary and Transboundary River Restoration and Enhancement Trust Fund:

Northern Boundary and Transboundary River Restoration and Enhancement Trust Fund ("Northern Fund") was created by the Governments of the United States of America and Canada to manage their interests in the Commission to promote cooperation in the management, research and enhancement of Pacific Salmon stocks. The Northern Fund is exempt from income taxes under the Foreign Missions and International Organizations Act (1991). The income earned on these contributions is distributed by the Commission staff as directed by the Northern Fund Committee.

Southern Boundary and Transboundary River Restoration and Enhancement Trust Fund ("Southern Fund") was created by the Governments of the United States of America and Canada to manage their interests in the Commission to promote cooperation in the management, research, and enhancement of Pacific Salmon stocks. The Southern Fund is exempt for income taxes under the Foreign Missions and International Organizations Act (1991). The income earned on these contributions is distributed by the Commission staff as directed by the Southern Fund Committee.

During the fiscal year ended March 31, 2020, the Commission received funding for projects from the Northern Fund and Southern Fund totaling $115,166 (2019 - $60,536). During the year, the Northern Fund and Southern Fund paid $345,853 (2019 - $339,416) to the Commission for allocated salaries and benefits, and administrative services. As at March 31, 2020, the Commission had a net receivable from the Northern Fund and Southern Fund of $402,924 (2019 - $70,399).

(b) Payroll Trust Funds:

The Commission administers and holds trust funds on behalf of the Government of the United States to distribute U.S. section salary under a Memorandum of Understanding. These amounts have been excluded from the statement of financial position and statement of operations and fund balances of the Commission.

(c) U.S. Expenditures Trust Funds:

The Commission administers and holds trust funds on behalf of the Government of the United States of America. They are to be expended at the direction of the Government of the United States of America. These amounts have been excluded from the statements of financial position and statement of operations and fund balances of the Commission.

6. Trust funds (continued):

(d) Yukon River Salmon Restoration and Enhancement Fund:

Under the terms of an interim Yukon River Salmon Agreement in 1995, the United States and Canada established the Yukon River Salmon Restoration and Enhancement ("R&E") Fund and the Commission created an account to hold associated monies. The R&E Fund and its governing Yukon River Panel were finalized in the 2002 Yukon River Salmon Agreement and associated treaty amendments. The Commission Secretariat administers and holds R&E trust funds on behalf of the Yukon River Panel. The Yukon River Panel provides direction on how the monies are to be disbursed from the Fund. These amounts have been excluded from the statements of financial position and statement of operations and fund balances of the Commission.

During the year, the R&E Fund paid $92,000 (2019 - $89,146) to the Commission for administrative services. As at March 31, 2020, the Commission had a net receivable from the R&E Fund of $7,768 (2019 - $1,414) which represents the unspent project grant returned to the Fund and received by the Commission on behalf of the R&E Fund.

(e) Summary of trust fund balances:

	Northern Fund	Southern Fund	Yukon River Fund	U.S. Payroll Trust Funds	U.S. Expenditure Trust Funds	Total 2020	Total 2019
Assets	$ 159,249,696	$ 134,048,000	$ 568,595	$ 16,808	$ 1,275,391	$ 295,158,490	$ 305,221,112
Liabilities	$ 660,202	$ 111,884	$ 22,311	$ 16,808	$ 1,275,391	$ 2,086,596	$ 2,295,290
Fund balances	158,589,494	133,936,116	546,284	-	-	293,071,894	302,925,822
	$ 159,249,696	$ 134,048,000	$ 568,595	$ 16,808	$ 1,275,391	$ 295,158,490	$ 305,221,112

	Northern Fund	Southern Fund	Yukon River Fund	U.S. Payroll Trust Funds	U.S. Expenditure Trust Funds	Total 2020	Total 2019
Fund balance, beginning of year	$ 164,885,483	$ 137,534,491	$ 505,848	$ -	$ -	$ 302,925,822	$ 291,384,441
Revenue	748,553	511,801	1,629,656	-	-	2,893,010	24,108,589
Expenses	7,047,542	4,110,176	1,589,220	-	-	12,746,938	12,567,208
	(6,295,989)	(3,598,375)	40,436	-	-	(9,853,928)	11,541,381
Fund balance, end of year	$ 158,589,494	$ 133,936,116	$ 546,284	$ -	$ -	$ 293,071,894	$ 302,925,822

	Northern Fund	Southern Fund	Yukon River Fund	U.S. Payroll Trust Funds	U.S. Expenditure Trust Funds	Total 2020	Total 2019
Cash flow provided by (used in): Operations	$ (1,601,865)	$ (219,867)	$ (1,548,857)	$ -	$ -	$ (3,370,589)	$ 40,367

7. Contractual obligations:

The Commission has entered into a number of project grant contracts as at March 31, 2020 for the future funding of research projects to be completed subsequent to the year-end.

These contractual obligations are funded in installments and payments are due based on conditions included in the contract being satisfied. As such, no liability has been accrued in the financial statements as the Commission is not liable until these conditions have been met.

As at March 31, 2020, the research project contractual obligations are $20,216 (2019 - $19,043).

8. Financial instruments and concentration of risks:

(a) Credit risk:

Credit risk is the risk that a third party to a financial instrument might fail to meet its obligations under the terms of the financial instrument. For cash and accounts receivable, the Commission's credit risk is limited to the carrying value on the statement of financial position. Management does not believe that the Commission is subject to any significant concentration of credit risk.

(b) Liquidity risk:

Liquidity risk is the risk that an entity will not be able to meet its obligations associated with financial liabilities.

The Commission manages liquidity risk by maintaining adequate cash and available credit facilities with its banking provider. The Commission monitors the cash flow to ensure a sufficient continuity of funding from the Contracting Parties.

(c) Interest rate risk:

The Commission is not exposed to significant interest risk as it does not have amounts payable that are charged interest.

(d) Currency risk:

The Commission has some exposure to foreign exchange risk through fluctuation of the U.S. dollar. The Commission receives contributions from the Government of the United States of America and also funds various projects in the U.S.

There have been no changes to the risk exposures from the prior year except for risks associated with COVID-19 (note 9).

9. Subsequent event:

The declaration of the COVID-19 virus as a pandemic by the World Health Organization in March 2020, and the subsequent shut-downs have had a significant impact on the Commission and its operations throughout the province of British Columbia. The current situation is dynamic and the ultimate duration and magnitude of the impact on the economy and the financial effect on the Commission's operations cannot be estimated reliably at this time.

Appendices

Appendix A
Northern Fund Projects for 2019/2020

No.	Description	Proponent	Org * Acronym List	Species
	Enhancement			
1	Trapper Lake sockeye enhancement 2019	Mercer	Metla	Sockeye
2	2019 Tatsamenie Lake sockeye fry extended rearing and smolt project	Mercer	Metla	Sockeye
3	DFO Lower Iskut River Sockeye Salmon Enhancement Feasibility (Stikine River Watershed) 2019	Collins	DFO	Sockeye
4	King Salmon Lake sockeye enhancement	Erhardt	TRT	Sockeye
5	Alsek River Sockeye and Chinook Salmon Stock Restoration Task Group – Initial Transboundary Panel Project Scoping Initiative (2019)	Collins & Pryor	DFO/ADFG/ CAFN	Sockeye & Chinook
6	Recovery Enhancement of Kilbella-Chuckwalla Chinook, 2019-20	Riddell	PSF	Chinook
	Habitat			
1	Kuthai Lake access improvement	Hudson	TRT	Sockeye
2	King Salmon Creek passage improvement	Connor	TRT	Sockeye
3	Tahltan Lake sockeye access improvement	Frocklage	TAF	Sockeye
4	Tahltan River Slide Remediation Year 3 (Stikine River Watershed)	Salomi	DFO	Chinook & Sockeye
5	Tahltan River Telemetry Study – Assessment of Salmon Passage Past Known Migration Barriers (Stikine River Watershed)	Collins	DFO	Chinook & Sockeye
6	Decheeka Falls Salmon Passage Assessment, Tahltan River (Stikine River Watershed)	Collins	DFO	Chinook & Sockeye
	Information			
1	Taku River Sockeye Salmon Telemetry	Andel	ADFG	Sockeye
2	Taku River Chinook Salmon Telemetry	Richards	ADFG	Chinook
3	Transboundary Sockeye Thermal Mark Recovery	Oxman	ADFG	Sockeye
4	Boundary Area Coho Escapement	Shaul	ADFG	Coho
5	Mixed Stock Analysis of Districts 101, 102, and 103 sockeye seine fisheries.	Shedd	ADFG	Sockeye
6	Mixed stock analysis of districts 106, 108 & 111 sockeye gillnet fisheries	Shedd	ADFG	Sockeye
7	NB & TBR Sockeye Matched Sampling	Reynolds Manney	ADFG	Sockeye
8	SEAK Chinook stock assessment	Jones	ADFG	Chinook
9a	Origins of Chinook harvested in SEAK fisheries in 2018	Shedd	ADFG	Chinook
9b	Mixed Stock Analysis of distrcts 108 and 111 Chinook Salmon Fisheries	Shedd	ADFG	Chinook
10	Chinook salmon genetic baseline update for Southeast Alaska and Canadian AABM Fisheries	Shedd Gilk Beacham	ADFG DFO	Chinook
11	Assessing Effects of Supplementation on Fitness of Sockeye Salmon in Auke Creek, Alaska, Phase 2, Year 3	McPhee Gilk-Baumer	UAF/ADFG	Sockeye
12	Genetic changes associated with in-basin supplementation of a population of sockeye salmon, Phase 2.	Vulstek	NOAA	Sockeye
13	Northern Boundary Area Sockeye Salmon Genetic Stock Identification for 2019	Guyon	NOAA	Sockeye
14	Southeast Alaska Coastal Monitoring of Epipelagic Fish and Marine Ecosystem Conditions Associated with Salmon	Gray Piston	NOAA ADFG	Pink
15	Chum Salmon Hatchery Wild Interactions	Reifenstahl	NSRAA	Chum
16	Stikine River Canadian Fishery Sampling & Stock Assessment	Foos	DFO	Chinook & Coho
17	Stikine River Chinook Salmon Mark-Recapture Program	Foos	DFO	Chinook
18	Stikine River Coded Wire Tagging of Chinook and Coho Salmon Smolts	Foos	DFO	Chinook & Coho
19	Stikine River - Tahltan Lake Sockeye Salmon Smolt Enumeration and Sampling	Foos	DFO	Sockeye
20	Stikine River - Tahltan Lake Sockeye Salmon Adult Enumeration	Foos	DFO	Sockeye
21	Development of Stikine River Coho Salmon Stock Assessment Options	Boyce	DFO	Coho
22	Alsek River Chinook and Sockeye Salmon Assessment	Foos	DFO	Chinook & Sockeye
23	Taku River - Little Trapper Sockeye Salmon Enumeration (Kowatua Chinook Sampling)	Foos	DFO	Sockeye
24	Taku River Canadian Fishery Sampling & Stock Assessment	Foos	DFO	Chinook & Sockeye
25	Taku River - Chinook Headwater Sampling	Foos	DFO	Chinook
26	Taku River - Nahlin River Chinook Salmon Enumeration	Foos	DFO	Chinook
27	Taku River Sockeye Salmon Genetic Stock Identification Analysis for 2019 Commercial Samples	Boyce	DFO	Sockeye
28	Taku River Coho Salmon Smolt Tagging	Foos Williams	DFO ADFG	Coho
29	Taku River Coho Adult Project Augmentation	Foos Andel	DFO ADFG	Coho

30	Taku River Sockeye Salmon Stock Assessment Review and Escapement Goal Revision – Part II	Foos Piston	DFO ADFG	Sockeye
31	Transboundary Rivers Otolith Thermal Mark Recovery	Foos	DFO	Sockeye
32	Video enumeration for sockeye into Kuthai and King Salmon Lakes	Connor	TRT	Sockeye
33	Genetic Analyses of samples collected in the Recreational Chinook Fisheries in Northern BC 2019	Winther	DFO	Chinook
34	Chinook salmon Escapement Estimation to the Skeena River using Genetic techniques 2019	Winther	DFO	Chinook
35	Area 3 and 4 Creel Survey, 2019	Addison	NCSFNSS	Chinook
36	Tracing the impacts of Canadian commercial fisheries on Northern BC chum stocks using DNA and otolith analysis	Beach	DFO	Chum
37	Estimation of stock composition of Coho Salmon in northern and central coastal fisheries in BC 2019	Beacham	DFO	Coho
38	Nass Area Coastal Chum Escapement Project 2019 (Year 6)	Desson Alexander	NLG LGL	Chum
39	Nass Sockeye Fishwheel DNA Analyses Project 2019	Desson Alexander	NLG LGL	Sockeye
40	Nass Chinook Mark-recapture Project 2019	Desson Alexander	NLG LGL	Chinook
41	Kitwanga River Salmon Enumeration, 2019	Cleveland	GFA	all species
42	2019 Babine Lake watershed sockeye smolt population estimation project - mark-recapture	MacIntyre Rosenberger	LBFN	Sockeye
43	2019 Skeena lakes juvenile sockeye hydroacoustic surveys	Doire	SFC	Sockeye
44	Skeena River Aggregate Coho Salmon Escapement Estimator	Whitmore Doire	GWA SFC	Coho
45	Lower Skeena River Recreational Fishery Creel Survey, 2019	English	LGL	Chinook
46	Lower Skeena River Coho Indicators Program	Riemenschneider	TSES	Coho
47	Multi-species salmon assessment for the Waanukv (Wannock) River, 2019	English	LGL	Chinook
48	Yakoun River, Haida Gwaii, annual chinook & coho assessments	Spoljaric	HFP	Chinook & Coho
49	Tlell River, Haida Gwaii, Coho Salmon Weir Indicator Program	Vigneault	TWS	Coho
50	Increased Chinook salmon stock coded-wire tagging to improve the quality of Chinook indicator stock analyses	Churchland Mahoney	DFO	Chinook
51	Gulf of Alaska Salmon Expedition	Beamish Riddell	PSF	all species

US projects

Canadian projects

Gitanyow Fisheries Authority	GFA
Gitksan Watershed Authorities	GWA
Nisga'a Lisims Government	NLG
North Coast - Skeena First Nations Stewardship Society	NCSFNSS
Northern Southeast Regional Aquaculture Association	NSRAA
Skeena Fisheries Commission	SFC
Taku River Tlingit First Nation	TRT
Terrace Salmonid Enhancement Society	TSES
Mainstream Fish Research	MFR
Lake Babine First Nation	LBFN
Tahltan Fisheries	TAF
Tlell Watershed Society	TWS

Appendix B
Southern Fund Projects for 2019/2020

1	A Fishwheel-ARIS study to evaluate the ARIS length-based discrimination estimates of species composition for the Mission Hydroacoustic monitoring site	English	LGL	FR	sockeye pink
2	Improving preseason planning and in-season assessments of Fraser River sockeye stocks through stock- and cycle line-specific estimates	Michielsens	PSC	FR	sockeye
3	Coho FRAM Model Validation and Mixed Stock Model (MSM) Updating	Hagen-Breaux	WDFW	PNW	coho
4	Improving CTC Efficiency in Chinook Forecasting and Stock Assessment through enhanced Data Quality, Consistency, Integrity, and Accessibility	Carlile & Brown	CTC	PNW	chinook
5	Gillnet calibration study for the Round Island Test Fishery	McConnell	DFO	JS	sockeye
6	Monitoring the biological condition of juvenile Fraser sockeye in relation to stock-specific survival	Patterson	DFO	FR	sockeye
7	Coho salmon GSI: SNP baseline development	Seamons	WDFW	SoBC WC PS	coho
8	Abundance estimates for Stillaguamish River Chinook salmon using trans-generational genetic mark recapture	Small	WDFW	PS	chinook
9	Feasibility of estimating Chilko River Sockeye Smolt abundance using upward facing SONAR	Benner	DFO	FR	sockeye
10	Determining the influence of the environment on sockeye salmon catchability in Area 12 and 13 purse seine test fisheries	Ma	ESSA	JS	sockeye
11	Improving preseason forecasts for U.S. coho salmon management units by accounting for spatially structured temporal variation in age-at-maturity	Schindler & Zimmerman	UW & WDFW	WC PS	coho
12	The Fraser salmon cross-species productivity and escapement database for investigating habitat stressors	Grant	DFO	FR	sockeye
13	Puget Sound Chum salmon GSI	Litz	WDFW	PS	chum
14	Fraser River Chum Salmon Spawning Ground Survey Life Study, 2019	Tadey	DFO	FR	chum
15	The role of variable stressor impacts on juvenile sockeye salmon in return abundance and escapement	Miller-Saunders	DFO	FR	sockeye
16	Identification of key metrics collected during first marine year for improving early stock specific forecasting of Fraser River Sockeye salmon	Neville	DFO	SoG	sockeye
17	Fraser Sockeye Upstream Juvenile Monitoring	Benner	DFO	FR	sockeye
18	Increased CWT application in Southern B.C. coho indicator stocks	Sandher	DFO	FR	coho
19	Cowichan River – Stoltz Bluff Sediment Remediation Maintenance	Evans (Wightman)	BCCF	SoG	chinook chum
20	Framework for assessing the socioeconomics of food, social, and ceremonial salmon harvests	Kocian	Earth Economics	PNW	all
21	DIDSON Chum Enumeration, East Coast Vancouver Island	Pellett	DFO	SoG	chum
22	Initiation and improvement of select estimates of Fraser River Coho & Chinook escapements using electronic augmentation	Bailey	DFO	FR	coho chinook
23	Feasibility of Escapement monitoring of the Lillooet River Coho Salmon CU via Digital Imaging	Noble & Bruce	LGL & Lil'wat FN	FR	coho
24	Bedwell River Smolt Outmigration Assessment	Swan	Ahousaht FN	WCVI	chinook
25	Calibration and multi-year synthesis of 7 years of data from the Mission Juvenile Sockeye Project evaluating the abundance and stock composition of downstream migrating juvenile Sockeye Salmon in the lower Fraser River, 2012-2018	Whitehouse	DFO	FR	sockeye
26	Toolkit to enhance understanding of factors influencing Fraser Sockeye survival	Pestal	Solv Consulting	FR	sockeye
27	A spatially-explicit model for evaluating threats to coho salmon in freshwater and marine life stages in the Northeast Pacific Ocean	Shelton	NOAA	PNW	coho
28	Improving CWT sampling and submission adequacy through better understanding of barriers and improved web presence	Barrett	M&C Panel ESSA	PNW	coho chinook
29	Estimation of Coho Escapement to Nicomen Slough to support a whole system estimate for Lower Fraser River Coho	Dionne	DFO	FR	coho
30	Burman River hydrology method validation project: indexing WCVI Chinook spawning area residence time beyond the Burman River (Year 1 of 5)	Dunlop	Nuu-chah-nulth	WCVI	chinook
31	Scale Analysis of Puget Sound Chum	Claiborne	WDFW	PS	chum
32	Enhanced Southern BC Chum Historical Data Analysis	Lynch	DFO	SoBC	chum
33	Optimization of hatchery Chinook salmon releases in the Salish Sea through ecosystem-based management: adapting hatchery practices to pink and chum salmon abundance	Kendall	WDFW	PS SoG	chinook pink chum
34	Nanoose Area Coho and Chum Salmon Escapement Surveys 2019	Bob & Alexander	Nanoose FN & LGL	SoG	coho chum
35	Coldwater River Adult Coho Enumeration	Urquhart & Wimbush	Nicola Tribal	SoBC	coho
36	Bessette Creek Resistivity Counter	H. Wright	Okanagan Nation	SoBC	coho
37	Southern British Columbia and Puget Sound Chum mixed-stock fisheries genetic identification for 2016-2019 (Year 4 of 4)	Candy	DFO	SoBC	chum
38	Strait of Juan De Fuca Chum Salmon Sampling program	van Will	Chum Tech Ctte	JDF	chum
39	Modifications to the Chum Genetic and Environmental Management Model (ChumGEM), a run reconstruction computer model	van Will	Chum Tech Ctte	SoBC WC	chum
40	Independent Evaluation of Wild Coho Marine Survival Rates in the Strait of Georgia (Black Creek)	Meldrum	A-Tlegay Fisheries	SoG	coho
41	An investigation of Cowichan Coho run timing and marine survival	Pellett	DFO	SoG	coho
42	Cowichan Adult Chinook Enumeration methodology change	Pellett	DFO	SoG	chinook
43	Investigation of Yearling Chinook Hatchery Production as a Conservation Strategy for West Coast Vancouver Island Chinook	Willis & Brouwer	DFO	WCVI	chinook
44	Using Barcode Scanners to Automate CWT Data Management in Escapement	Lynch & Churchland	DFO	FR	chinook
45	Increased Chinook salmon stock coded-wire tagging to improve the quality of Chinook indicator stock analyses	Churchland & Mahoney	DFO	SoBC	chinook

GB	Georgia Basin
PS	Puget Sound
FR	Fraser River
JDF	Juan de Fuca
SoBC	Southern BC
OR	Oregon State
WA	Washington State
WCVI	West Coast Vancouver Is
Can	Canada coast wide
US Can	US and Canada coast wide

US projects

Canadian projects

Appendix C
Appointment of Officers for 2019/2020

Effective December 1, 2019 a new slate of officers for the Pacific Salmon Commission was identified as follows:

OFFICE	COUNTRY	REPRESENTATIVE
Commission Chair	Can	Ms. Rebecca Reid
Commission Vice-Chair	U.S.	Mr. Charlie Swanton
Fraser River Panel Chair	Can	Ms. Jennifer Nener
Fraser River Panel Vice-Chair	U.S.	Ms. Lorraine Loomis
Northern Panel Chair	Can	Mr. Mel Kotyk
Northern Panel Vice-Chair	U.S.	Mr. Lowell Fair
Southern Panel Chair	Can	Mr. Andrew Thomson
Southern Panel Vice-Chair	U.S.	Ms. Laurie Peterson
Transboundary Panel Chair	Can	Mr. Steve Gotch
Transboundary Panel Vice-Chair	U.S.	Dr. John H. Clark
Stan. Comm. on F&A - Chair	Can	Ms. Bonnie Antcliffe
Stan. Comm. on F&A - Vice-Chair	U.S.	Mr. Ron Allen
Stan. Comm. on Scientific Cooperation - Chair	Can.	Dr. Carmel Lowe
Stan. Comm. on Scientific Cooperation - Vice-Chair	U.S.	Mr. Alex Wertheimer
Technical Committee on Data Sharing - Co-Chair	Can	Ms. Kathryn Fraser
Technical Committee on Data Sharing - Co-Chair	U.S.	Mr. George Nandor
Fraser River Panel Technical Committee - Co-Chair	Can	Ms. Ann-Marie Huang
Fraser River Panel Technical Committee - Co-Chair	U.S.	Mr. Robert Conrad
Northern Boundary Technical Committee - Co-Chair	Can	Mr. Steve Cox-Rogers
Northern Boundary Technical Committee - Co-Chair	U.S.	Mr. Andrew Piston
Transboundary Technical Committee - Co-Chair	Can	Mr. Steve Smith
Transboundary Technical Committee - Co-Chair	U.S.	Mr. Ed Jones
Enhancement Subcommittee of the Transboundary Technical Committee - Co-Chair	Can	Mr. Corino Salomi
Enhancement Subcommittee of the Transboundary Technical Committee - Co-Chair	U.S.	Mr. Garold Pryor
Joint Chinook Interface Group Co-Chair	Can.	Mr. Paul Sprout
Joint Chinook Interface Group Co-Chair	U.S.	Mr. Phil Anderson
Joint Technical Committee on Chinook - Co-Chair	Can	Dr. Gayle Brown
Joint Technical Committee on Chinook - Co-Chair	U.S.	Mr. John Carlile
Joint Technical Committee on Coho - Co-Chair	Can	Dr. Arlene Tompkins
Joint Technical Committee on Coho - Co-Chair	U.S.	Dr. Gary Morishima
Joint Technical Committee on Chum - Co-Chair	Can	Mr. Pieter Van Will
Joint Technical Committee on Chum - Co-Chair	U.S.	Mr. Bill Patton
Joint Technical Committee on Habitat and Restoration Co-Chair	Can.	Vacant
Joint Technical Committee on Habitat and Restoration Co-Chair	U.S.	Mr. Thom Hooper
Selective Fishery Evaluation Committee - Co-Chair	Can	Dr. Rob Houtman
Selective Fishery Evaluation Committee - Co-Chair	U.S.	Dr. Gary Morishima

Appendix D
Approved Budget FY 2019/2020

	PACIFIC SALMON COMMISSION	
	APPROVED BUDGET 2019/2020	
		Proposed Budget 2019/2020
1	**INCOME**	
A.	Contribution from Canada	1,879,636
	Special contribution pension CA	162,852
B.	Contribution from U.S.A.	1,879,636
	Special contribution pension U.S.A.	162,852
	Sub total	4,084,976
D.	Interest	60,000
E.	Other income	180,000
	Carry-over from previous fiscal year	790,747
F.	Total Income	5,115,723
2	**EXPENDITURES**	
A.	1. Permanent Salaries and Benefits	3,020,819
	2. Unfunded pension liability payments	325,704
	3. Temporary Salaries and Benefits	252,135
	4. Total Salaries and Benefits	3,598,658
B.	Travel	126,694
C.	Rents, Communications, Utilities	235,209
D.	Contractual Services	720,618
E.	Supplies and Materials	48,013
F.	Equipment	223,000
G.	Total Expenditures	4,952,192
3	BALANCE (DEFICIT)	163,531
Carry-over generated (expended) in the year		($627,216)

Appendix E
Pacific Salmon Commission Secretariat Staff as of March 31, 2020

EXECUTIVE OFFICE

John Field
Executive Secretary

Teri Tarita
Records Administrator/Librarian

Julie Ehrmantraut
Administrative Assistant

Kimberly Bartlett
Meeting Planner

John Son
Information Technology Manager

FINANCE & ADMINISTRATION

Ilinca Manisali
Director of Finance

Witty Lam
Senior Accountant

Koey Lu
Accountant

Tom Alpe
Fund Manager, Restoration & Enhancement Funds

Victor Keong
Fund Assistant, Restoration & Enhancement Funds

Christina Langlois
Administrative Assistant, Restoration & Enhancement Funds

FISHERY MANAGEMENT

Dr. Catherine Michielsens
Chief, Fisheries Management Science

Merran Hague
Quantitative Fisheries Biologist

Steve Latham
Manager, Stock Identification

Pasan Samarasin
Stock ID Biologist

Erica Jenkins
Director, Stock Monitoring

Eric Taylor
Test Fishing Biologist

Maxine Forrest
Manager, Scale Lab

Julie Sellars
Assistant Scale Analyst

Ms. Fiona Martens
Chief, Fisheries Management Programs

Catherine Ball
Scale Lab Technician

Yunbo Xie
Hydroacoustics Scientist

Jacqueline Nelitz
Hydroacoustic Technician

Mike Bartel-Sawatzky
Hydroacoustic Technician

Mark McMillan
Database Manager (term)

Angela Phung
Salmon Data Technician

Appendix F

Membership Lists for Standing Committees, Panels, Joint Technical Committees and other Appointments as of March 31, 2020

1. STANDING COMMITTEE ON FINANCE AND ADMINISTRATION

Mr. Andrew Thomson (Vice-Chair)
Mr. Fariz Ahmadov
Mr. Randy Atwal
Ms. Alison Chang
Ms. Sukhraj Sihota

Mr. W. Ron Allen (Chair)
Ms. Courtney Hann
Mr. William F. Auger
Ms. Staci MacCorkle
Ms. Christine Mallette
Mr. Mike Matylewich

Staff

Mr. John Field (ex. Officio)

Editorial Board

Ms. Alison Chang

Ms. Courtney Hann

2. FRASER PANEL

Ms. Jennifer Nener (Vice-Chair)
Mr. Chris Ashton
Mr. Mike Griswold
Mr. Ken Malloway
Mr. Rob Morley
Mr. John Murray

Mr. Kirt Hughes (Chair)
Ms. Lorraine Loomis
Mr. James Dixon
Mr. Robert F. Kehoe

FRASER RIVER PANEL - ALTERNATES

Mr. Shaun Hollingsworth
Mr. Darrel McEachern
Mr. Les Jantz
Mr. Tony Roberts Jr.
Mr. Marcel Shepert
Mr. Greg Witzky

Mr. Ronald G. Charles
Mr. Aaron Dufault
Mr. Jack R. Giard
Ms. Peggy Mundy

3. SOUTHERN PANEL

Dr. Laura Brown (Vice-Chair)
Mr. Larry George
Dr. Don Hall
Mr. Jeremy Maynard
Mr. Richard Michelson
Mr. Laurie Milligan
Mr. Joseph Oatman (Chair)
Ms. Laurie Peterson
Mr. Burnie Bohn
Mr. Jeromy Jording
Mr. Mark Newell
Mr. Terry R. Williams

SOUTHERN PANEL - ALTERNATES

Mr. Rod Cootes
Mr. Michael Baird
Ms. Marla Maxwell
Ms. Marilyn Murphy
Mr. Gordon Sterritt
Mr. Phil Young
Ms. Denise Hawkins
Mr. Vincent (Kyle) Adicks
Mr. Edward Johnstone
Mr. Chris Kern
Mr. Joseph C. Peters
Mr. Aldrich J. (Butch) Smith

4. NORTHERN PANEL

Ms. Sandra Davies (Vice-Chair)
Mr. Chris Cue
Mr. Tom Protheroe
Ms. Joy Thorkelson
Mr. Mike Wells
Mr. Glen Williams
Mr. Lowell Fair (Chair)
Mr. Clay Bezenek
Ms. Deborah Lyons
Mr. Robert D. Mecum
Mr. Tom Ohaus
Mr. Robert M. Thorstenson

NORTHERN PANEL - ALTERNATES

Mr. Stuart Barnes
Mr. Jeff Grout
Mr. Rick Haugan
Mr. Greg Knox
Chief Harry Nyce Sr.
Mr. Urs Thomas
Mr. John Carle
Mr. Mitchell Eide
Mr. Tom Fisher
Mr. Andrew K. Gray
Mr. Andrew Piston
Mr. Cole Wilburn

5. TRANSBOUNDARY PANEL

Mr. Steve Gotch (Vice-Chair)
Mr. Keith (Kerry) Carlick
Mr. Richard Erhardt
Ms. Cheri Frocklage
Ms. Jennifer Gould
Mr. Lawrence Joe
Mr. Chris Kendel
Mr. Wolf Reidl
Mr. John Ward
Mr. Troy Thynes (Chair)
Mr. Brennon Eagle
Mr. Arnold Enge
Dr. Peter Hagen
Mr. Brian Lynch
Mr. Patrick Robbins
Mr. Russell Thomas

6. STANDING COMMITTEE ON SCIENTIFIC COOPERATION

Dr. Carmel Lowe (Vice-Chair)
Mr. Lesley MacDougall
Mr. Scott McPherson

7. NORTHERN FUND COMMITTEE

Mr. Steve Gotch (Co-Chair)
Mr. John McCulloch
Dr. Carmel Lowe
Mr. William F. Auger (Co-Chair)
Mr. Robert D. Mecum
Mr. Douglas S. Vincent-Lang

8. SOUTHERN FUND COMMITTEE

Dr. Laura Brown (Co-Chair)
Mr. Mike Griswold
Dr. Don Hall
Mr. Larry Peck (Co-Chair)
Mr. Peter Dygert
Mr. Joseph Oatman

9. JOINT TECHNICAL COMMITTEE ON CHINOOK

Dr. Antonio Velez-Espino (Co-Chair)
Mr. Richard Bailey
Ms. Sabrina Crowley
Mr. Michael Folkes
Mr. Nicolas Komick
Ms. Elinor McGrath
Mr. Chuck Parken
Dr. Teresa Ryan
Mr. Bryan Rusch
Mr. Ivan Winther
Ms. Catarina Wor
Ms. Maxime Veilleux
Mr. John Carlile (Co-Chair)
Mr. Jonathan Carey
Dr. John H. Clark
Mr. Ethan Clemons
Mr. Tim Dalton
Dr. Derek Dapp
Mr. Brian Elliott
Ms. Danielle Evenson
Mr. Gary R. Freitag
Mr. Tommy Garrison
Mr. Steve Haeseker
Mr. Grant Hagerman
Mr. Oliver Miler
Mr. Galen Johnson
Mr. Edgar Jones
Mr. David Leonard
Ms. Marianne McClure
Dr. Gary S. Morishima
Mr. Jeff Nichols
Mr. Randy Peterson
Dr. Kristen Ryding
Mr. Martin Liermann
Mr. William Templin
Ms. Anne Reynolds
Dr. Charles Devans Waters

10. JOINT TECHNICAL COMMITTEE ON COHO

Dr. John Holmes (Co-Chair)
Mr. Michael Arbeider
Mr. Roger Dunlop
Mr. Peter Nicklin
Ms. Lynda Ritchie
Mr. Michael O'Brien
Mr. Joel Sawada

Dr. Gary S. Morishima (Co-Chair)
Ms. Carrie Cook-Tabor
Ms. Angelika Hagen-Breaux
Mr. Craig Foster
Ms. Angelika Hagen-Breaux
Mr. Jeff Haymes
Dr. Diego Holmgren
Dr. Marisa Litz
Mr. Andy Rankis
Dr. Laurie Weitkamp

(NORTHERN COHO)

Mr. Grant Hagerman
Ms. Michele Masuda
Mr. Justin Priest

11. JOINT TECHNICAL COMMITTEE ON CHUM

Mr. Pieter Van Will (Co-Chair)
Mr. John R. Candy
Ms. Kim Charlie
Ms. Brittany Jenewein
Mr. Joe Tadey

Mr. Bill Patton (Co-Chair)
Mr. Scott Bass
Ms. Maureen Small
Mr. Ben Starkhouse
Dr. Gary Winans

12. TECHNICAL COMMITTEE ON DATA SHARING

Ms. Kathryn Fraser (Co-Chair)
Mr. Nicholas Komick
Ms. Cheryl Lynch

Mr. George Nandor (Co-Chair)
Mr. P. Brodie Cox
Mr. Tim Frawley
Mr. Mike Matylewich
Dr. Gary S. Morishima
Ms. Amy Seiders

WORKING GROUP ON DATA STANDARDS

Mr. Nicholas Komick (acting Co-Chair)
Ms. Kathryn Fraser
Ms. Brenda Ridgway

Mr. George Nandor (Co-Chair)
Mr. Timothy Frawley
Mr. Gabriel T. Garza
Mr. Gilbert Lensegrav
Mr. Ken Phillipson

13. FRASER RIVER PANEL TECHNICAL COMMITTEE

Mr. Jamie Scroggie (Co-Chair)
Ms. Kelsey Campbell
Mr. Matt Mortimer
Mr. Mike Staley

Mr. Robert Conrad (Co-Chair)
Dr. Mickey Agha
Ms. Peggy Mundy

14. NORTHERN BOUNDARY TECHNICAL COMMITTEE

Mr. Steve Cox-Rogers (Co-Chair)
Ms. Charmaine Carr-Harris
Mr. Mike Cleveland
Mr. Peter Katinic
Mr. Jeffrey Radford

Mr. Bo Meredith (Co-Chair)
Ms. Malika Brunette
Mr. Bob Chadwick
Mr. Chuck Guthrie
Mr. Grant Hagerman
Ms. Michele Masuda
Ms. Sara Miller
Ms. Anne Reynolds
Mr. Kyle Shedd

15. SELECTIVE FISHERY EVALUATION COMMITTEE

Dr. Rob Houtman (Co-Chair)
Ms. Ann-Marie Huang
Ms. Cheryl Lynch
Ms. Catarina Wor

Dr. Kristen Ryding (Co-Chair)
Ms. Jill Cady
Mr. Robert Conrad
Mr. Trevor R. Clark
Ms. Carrie Cook-Tabor
Ms. Danielle Evenson
Ms. Lorraine Vercessi
Mr. Ryan Lothrop
Ms. Marianne McClure
Mr. Oliver Miler
Mr. Gary S. Morishima
Mr. George Nandor
Mr. Ron Olson
Dr. David Stormer
Ms. Michelle A. Varney

16. TRANSBOUNDARY TECHNICAL COMMITTEE

Mr. Bill Waugh (Co-Chair)
Mr. Ian Boyce
Mr. Mark Connor
Ms. Aaron Foos
Ms. Jody Mackenzie-Grieve
Mr. Johnny Sembsmoen
Mr. Sean Stark
Dr. Paul Vecsei

Mr. Edgar Jones (Co-Chair)
Ms. Julie Bednarski
Mr. Robert Clark
Ms. Sara Gilk-Baumer
Mr. Scott Forbes
Mr. David Harris
Mr. Rick Hoffman
Mr. Phil Richards
Mr. Paul Salomone
Mr. Jeffrey Williams

ENHANCEMENT SUB-COMMITTEE

Mr. Corino Salomi (Co-Chair)
Mr. Adam Brennan
Mr. Jason Calvert
Mr. Sean Collins
Mr. Mark Connor
Ms. Cheri Frocklage
Mr. Alex Parker

Mr. Garold Pryor (Co-Chair)
Mr. Eric Prestegard
Mr. Lorraine Vercessi
Mr. Scott Vulstek

17. JOINT CHINOOK INTERFACE GROUP

Chief Russ Jones
Mr. John McCulloch
Mr. Phil Anderson (Co-Chair)
Mr. McCoy Oatman
Mr. Douglas S. Vincent-Lang

18. NATIONAL CORRESPONDENTS

Ms. Alison Chang
Ms. Courtney Hann