Pacific Salmon Commission

2018/2019 Thirty-Fourth 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-Fourth Annual Report 2018/2019

Vancouver, B.C.
Canada

December 2019

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-Fourth Annual Report of the Commission.

This report summarizes the activities of the Commission for the fiscal year April 1, 2018 to March 31, 2019. It reports on the results of the 2018 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, 2018 to March 31, 2019.

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 2018/2019

Chair	Ms. Rebecca Reid
Vice-Chair	Mr. McCoy Oatman

COMMISSIONERS

Canada	**United States**
Mr. John McCulloch	Mr. Phil Anderson
Mr. Murray Ned	Mr. Robert Turner
Mr. Bob Rezansoff	Mr. Douglas Vincent-Lang
Ms. Susan Farlinger	Mr. W. Ron Allen
Dr. Brian E. Riddell	Mr. William F. Auger
Mr. Paul Sprout	Mr. Rick Klumph
Mr. Andrew Thomson	

SECRETARIAT STAFF

Executive Secretary	Mr. John Field
Administrative Officer	Ms. Ilinca Manisali
Chief Biologist	Mr. Mike Lapointe

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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.
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> Fraser River Panel: has special in-season regulatory responsibilities for stocks of sockeye and pink salmon originating from the Fraser River.
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> 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, 2018 to March 31, 2019, the Commission met on three occasions:

1. Fall Session
   October 15-18, 2018. Vancouver B.C.

2. Post-Season Meeting of the Commission and Panels
   January 14-18, 2019. Vancouver, B.C.

3. Thirty-Fourth Annual Meeting of the Commission
   February 11-15, 2019. Portland, OR.

This, the Thirty-Fourth Annual Report of the Pacific Salmon Commission, provides a synopsis of the activities of the Commission and its subsidiary bodies during its Thirty-fourth fiscal year of operation, April 1, 2018 to March 31, 2019.

Activities of the Commission

PART I
ACTIVITIES OF THE COMMISSION

A. FALL SESSION OF THE PACIFIC SALMON COMMISSION
October 2018, Vancouver, B.C.

The Commission met in three bilateral sittings during the week.

Mr. Field, Executive Secretary reported on the status of a two-year pilot database manager position launched in 2018, provided information about the International Year of the Salmon initiative, and reported on the 2018 Fraser River sockeye salmon season.

The Commission received an update about the approval of Annex IV amendments. The new agreement would be ratified by United States by January 2019. However, Canada's domestic ratification process included the requirement to table the agreement in the House of Commons for 21 sitting days so that members of Parliament could review and comment on the proposed amendments to Annex IV. The required 21 days would not be met before December 31, 2018. Therefore, the Canadian government and the United States supported the provisional application of the new agreement from January 1, 2019 until the PST was fully ratified through an exchange of diplomatic notes in spring 2020.

The Parties adopted the final 2017 post-season fishing reports.

The Commission received a report from the Chinook Interface Group (CIG) about: a) the CYER questionnaire that would be sent to the management entities; b) a proposal for an expanded CTC AWG meeting focused on model recalibration; c) the CTC work plan; and d) the establishment of a workgroup to consider the potential listing of Okanagan Chinook as an indicator stock.

The Commission received an update on coho status reference points and exploitation rate caps from members of the Southern Panel and Coho Technical Committee.

The Commission received an interim report from the Fraser Strategic Review Committee (FSRC).

The Commission discussed plans for the management entities meeting scheduled for February 2019 in Portland, Oregon and agreed to form a small bilateral group to organize the meeting.

The Commission received a report from the CTC Function and Operations Group (FOG), which included information about a memo to the CTC that specifically documented the various decisions and actions taken by the Commission due to the FOG's work. The Commission agreed that the FOG could be terminated because it had completed its tasks.

The Commission discussed and approved the work plans submitted by the Panels and Committees and upon doing so issued instructions to the Panels and Committees.

The Commission approved the PSC slate of officers for 2018/19.

B. MEETING OF THE COMMISSION AND PANELS
January 2019, Vancouver, B.C.

The Commission met in three bilateral sessions during the meeting.

The Commission received a report from Mr. Mark Saunders of the North Pacific Anadromous Fish Commission and Pacific Director of the International Year of the Salmon for the Pacific about the IYS initiative.

The Commission received reports on Treaty implementation plans from the Transboundary Panel, the Northern Panel, the Southern Panel, and the Chinook Technical Committee. The bilateral work plans set out activities necessary to implement the new agreement over the next ten years.

Mr. Field presented a table that summarized new tasks for the Parties or for the Commission that were identified in the amended chapters of Annex IV intended to complement the implementation plans prepared by the Panels and the CTC.

The Commission formed a small group directed to create an accountability chart that merged the implementation plans presented by the Panels and the CTC into a master reference for all amended Annex IV chapter tasks for subsidiary bodies. The group would make recommendations about how to proceed at the February Annual meeting.

The Commission received an update about the entry into force for Annex IV amendments. The Parties exchanged diplomatic notes and were applying the amended agreement as of January 1, 2019. Once both Parties' domestic ratification processes were complete, there would be a further exchange of diplomatic notes that would formally put the agreement into force.

Ms. Jennifer Nener and Ms. Lorraine Loomis, Chair and Vice Chair of the Fraser River Panel reported on the status of the Panel's renegotiation of the Fraser Chapter (Annex 4, Chapter 4).

The Chinook Interface Group reported on a number of issues including current methodologies for hatchery add-on and terminal area exclusion calculations and the Calendar Year Exploitation Rate questionnaire.

The Commission adopted the Chinook Interface Group's recommendation to establish the Okanagan Chinook Working Group

In conjunction with discussions about Okanagan Chinook and their interceptions, Mr. Rob Jones of NOAA Fisheries, Ms. Laurie Peterson of the Washington Department of Fish and Wildlife, Mr. Chris Kern of the Oregon Department of Fish and Wildlife, and Mr. Joseph Oatman of the Columbia River Inter-Tribal Fisheries Commission delivered a presentation about "Southern U.S. Chinook Management in 2018". Mr. Grant Hagerman and Mr. Ed Jones of the Alaska Department of Fish and Game delivered a presentation about "Southeast Alaska Chinook Salmon Fisheries and Escapements."

Mr. Jeff Grout of Fisheries and Oceans Canada presented an "Overview of the 2018 Canada Post Season Report.

C. PACIFIC SALMON COMMISSION ANNUAL MEETING
February 2019, Portland, Oregon

The Commission met bilaterally three times during the meeting.

The Commission discussed and approved the implementation plan for Annex IV tasks that would be used to guide bilateral planning and to set deadlines.

The Commission received a report from the Chinook Interface Group on a number of topics including the Chinook Technical Committee (CTC) work plan, the Chinook model base period recalibration, the Calendar Year Exploitation Rate (CYER) implementation, and the Okanagan Chinook Working Group Terms of Reference.

The Commission approved the terms of reference for the Okanagan Chinook Working group recommended by the CIG.

The Commission accepted the Finance and Administration Committee report, including the proposed budget for FY 2019/2020. The report also made recommendations on the data management pilot project for the CTC and Fraser River Panel, the PSC test-fishing program, and national dues and projected deficits.

The Commission received work plan progress reports from the Northern Panel, the Southern Panel, the Transboundary Panel, the Fraser River Panel, the Selective Fishery Evaluation Committee, the Chinook Technical Committee, and the Committee on Scientific Cooperation (CSC).

The CSC report included information about a mini-workshop on environmental variability and salmon production held during the meeting organized by the Committee.

The Fraser River Panel report included an outline of the Annex IV, Chapter 4 issues under negotiation and the key outcomes. The Panel reported that it had arrived at an agreement in principle.

Dr. Riddell presented the "Preliminary Report from the Fraser Strategic Review Committee (FSRC) on In-River Assessment of Fraser River Sockeye and Pink [Salmon]."

Mr. Angus MacKay, Endowment Fund Coordinator presented the "Annual Report of the Southern Boundary Restoration and Enhancement Fund and the Northern Boundary and Transboundary Rivers Restoration and Enhancement Fund for the year 2018."

The Commissioners congratulated PSC Chief Biologist Mr. Mike Lapointe on his retirement and thanked him for the significant role that he played in the Commission process.

Activities of the Standing Committees

ACTIVITIES OF THE STANDING COMMITTEES

A. MEETINGS OF THE STANDING COMMITTEE ON FINANCE AND ADMINISTRATION

The Standing Committee on Finance and Administration met by teleconference on June 8, June 27, and July 11, 2018, and in person on December 12, 2018, January 16, 2019, and February 11&13, 2019. The Committee addressed a number of issues and made recommendations for the Commission's consideration as noted below.

Data management pilot project for CTC and Fraser Panel

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) with their database needs, as well as provide in-season database support to the PSC Secretariat.

The Committee reviewed the interim report on the project's progress provided by the Secretariat, which highlighted the achievements to date, as well as the issues arising. Overall, the pilot project has been deemed successful, having received very positive feedback from the CTC and other stakeholders.

The Committee anticipates a recommendation from the CIG and Commission on the overall utility of the database manager role. The Committee will revisit the issue in December 2019 in conjunction with near-term budget planning.

Budget proposal for FY 2019/2020 and forecast through FY 2021/2022

The Committee reviewed the proposed budget for FY 2019/2020 and forecast budget for FY 2020/2021 and 2021/2022, as presented at the December 2018 F&A meeting.

It was agreed that the proposed budget for FY 2019/2020 and forecast budgets for FY 2020/2021 and 2021/2022 would incorporate the annual salary and benefits, as well as certain travel costs of the Database Manager position. The Committee understood that funding applications totaling over $300K were submitted by the Secretariat to the Northern and Southern Endowment Funds for these costs, with potential grant revenue not reflected in the proposed and forecast budgets.

Accordingly, the Committee recommends that the Commission adopt the proposed budget for FY2019/2020 as shown in Table I.

Test fishing

Test fishing finances have been a significant issue for the Parties in recent years, after extremely low returns of Fraser River sockeye and pink salmon in 2015, 2016, and 2017. The low returns precluded the capture and sale of adequate fish to recover test fishing costs in those years. Consequently, the Parties have made supplementary financial contributions to the Test Fishing Revolving Fund (TFRF) to help defray the test fishing costs in those years.

In 2018 (an Adams dominant year), the abundance of the sockeye return allowed the Secretariat to retain sufficient pay fish to cover the cost of the program and generate a surplus to build up the projected balance of the TFRF to approximately $2M as of March 31, 2019. The test fishing surplus generated in 2018 was primarily a result of better-than-projected price per pound for sockeye.

The Committee acknowledges that issues of test fishing administration and priority of pay fish are still unresolved and are currently being discussed by the Parties in parallel with Chapter 4 negotiations. The

Committee agreed that financial regulations and/or guidelines addressing the management of the Test Fishing Revolving Fund need to be developed.

National dues and projected deficits

The Committee acknowledges 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 eight years due to a combination of factors, which include:

- Poor fish return resulting in operational savings in budget line items such as DNA analysis (fewer samples) and temporary salaries (fewer port samplers, shorter fishing seasons);
- Prior to the establishment of the Capital Asset Replacement Reserve Fund (CARRF), equipment purchases such as ARIS sonars that would be normally paid for from the PSC core budget were financed by the Southern Endowment Fund; and
- Freeing up a portion of the carryover by changing the accounting policies related to pension reporting in 2015.

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, and would need scale back its services.

Based on the current budget projection, the Committee has identified the need for an increase in regular annual dues starting potentially as early as FY 2021/2022. Further work is required to identify the amount of an increase that will withstand inflationary pressures for several years and allow the Secretariat to provide adequate support to the Parties at the new dues level, with no further increases, for the subsequent eight years (two sockeye cycles).

B. MEETINGS OF THE STANDING COMMITTEE ON SCIENTIFIC COOPERATION

In 2018/2019, the Committee on Scientific Cooperation (CSC) primarily focused on the Commission directive to examine methods for informing the PSC community on annual variations in environmental conditions and their effects on salmon production. The CSC followed two courses of action for improved communication on these issues.

The Committee worked with Secretariat staff to design and implement a SharePoint site on the PSC Extranet that focuses on coastwide variation in environmental indicators and salmon production. The CSC received input from three expert reviewers on the alpha version of the site in April 2018. CSC members then revised the site and all members of the PSC community were provided password access in May 2018. The CSC hosted a Webinar in June 2018 to support the use of the site and encouraged additional feedback. CSC members continue to monitor use and add documents and information to this SharePoint site.

The CSC held a "mini-workshop" at the 2019 Annual Meeting on variability in environmental indicators and its implications for fisheries management under the Pacific Salmon Treaty. Presentations were given on the state of the ocean in relation to salmon and on examples of the use of environmental variation in fisheries management. Workshop participants were provided a questionnaire to provide further input regarding the mini-workshop, their themes, potential future themes, and how the information from the workshop may be utilized by the PSC.

The CSC summarized the outcome of the workshop and the responses to the questionnaires in a final report to the Southern Endowment Fund. The report included recommendations for monitoring environmental variability and long-term changes in productivity and survival driven by climate change as identified in the new Agreement.

In 2018/2019 the CSC also worked on two important activities germane to scientific collaboration and CSC function. The Committee tracked the International Year of the Salmon process and developed a Commission-sponsored SharePoint site archiving CSC activities, reports, and associated publications.

C. MEETINGS OF THE NORTHERN AND SOUTHERN FUND COMMITTEES

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 was appropriate to meet together as a Joint Fund Committee at least once a year, preferably twice, for Fund financial reviews and investment manager interviews. Thus, the Joint Fund Committees met in person three times during fiscal year 2018/19. On April 24th (p.m. only) and 25th (a.m. only), 2018 and again on November 27th and 28th, 2018 and finally on February 20th, 2019 for half an hour.

April 2018

The Spring meeting of the joint Northern and Southern Fund Committees was held in Vancouver on the afternoon of April 24th and the morning of April 25th. Ms. Michelle Richardson of Aon Hewitt presented the 2017 Q4 investment performance report that saw global equity markets ending the year on a high note with the 2018 outlook being positive for most markets, but potentially volatile. Of interest would be the performance of the new investment managers in the year ahead. A discussion on the Fund's tax position with respect to the new direct infrastructure manager IFM was discussed. Ms. Sidhu advised that IFM's anticipated formation of a Canadian pooled fund vehicle in which the Funds would be invested would eliminate the issue of US withholding taxes.

Ms. Sidhu then presented her final proposals for changes to the Northern and Southern Fund spending policies that had been a work in progress since November 2017. The Committees agreed to consider her final draft proposed changes overnight and make their decisions on the changes in separate Northern and Southern sessions the next day.

The Committee then gave consideration to a suggestion from Ms. Sidhu that at the November annual financial review meeting, it may not be essential to interview in-person all the Funds managers every year. Meeting with a sub-set of managers, for example new managers or managers "on watch", may be a better use of the Committees time. It was proposed that the suite of managers to be invited for interview in November 2018 would be new managers ACM (Canadian mortgages) and PH&N (Canadian core plus fixed income), and returning manager Morgan Stanley (global equities).

In the final presentation from Aon for the day, Ms. Sidhu provided an educational overview of recent investment trends. First, she mentioned "delegated investment management" whereby clients without the expertise or having limited resources to handle complex investments would outsource the investment management function to external companies (like Aon). Next, she discussed Environmental, Social and Governance Investing (ESG) a philosophy that had seen an exponential rise in popularity lately. She said that Aon would shortly be implementing a review of ESG considerations in their future manager ratings.

The last item of business for the day was to make a final review of the revised by-laws and a motion to approve was proposed by Carmel Lowe (Can) and Doug Mecum (U.S.) and seconded by Andrew Thomson (Can) and Bill Auger (U.S.).

Day 2

PSC Secretariat Director of Finance Ms. Ilinca Manisali led the Joint Fund Committees through a detailed review of the proposed administration budgets for the Northern and Southern Funds for 2018/19. Topics covered included administrative staff salaries, Committee member honoraria, professional and legal fees,

travel costs and the potential of and likely reasons for variance. It was noted that costs associated with fees for investment management charged by Aon had recently been higher than in prior years largely due to additional work that had resulted from the Asset Mix Optimization Study. An outcome of this discussion was an Action Item for the Director of Finance to review the consultant's fees over the last 5 years and take steps to compare the costs and services provided by Aon with those offered by potential alternative service providers. In addition to this work the administrative costs charged by the Fund's custodian, presently the Royal Bank of Canada (RBC) were also reviewed by the Director of Finance and found to be significant. Having become aware of this, the Joint Fund Committees instructed the Director of Finance to add a review of alternative custodians to the consultant's fees Action Item. To help guide the Director of Finance and assist with this task, a working group comprised of one Committee member from each Committee was struck. Mr. Doug Mecum (U.S. section) volunteered to represent the Northern Fund and Dr. Don Hall (Canadian section) the Southern Fund. The working group was instructed to report back to the Joint Fund Committee by November 2018.

Executive Secretary John Field gave a presentation on the timing of Treaty Chapter negotiations (and associated ratification) and outlined potential implications for project funding in 2019. He briefed the Committee on the status of the on-going negotiations; he gave an overview of Rule 33 and its implications for the Funds; he noted the contractual obligations that would exist with project proponents beyond December 31st; and, he said he would provide an update to the Fund Committees in November 2018 as to the status of the negotiations.

The Joint Committees have in the past approved funding (approx. $10K Can) to host an evening Fund seminar and networking opportunity during the week of the PSC's Post-season or Annual meeting – whichever of those two is held in Vancouver. The value of sponsoring such an event in January 2019 was discussed. While recognizing the communications and outreach value of these events and the successful outcomes achieved in previous years, it was agreed that Treaty renewal activities were likely to take precedence in 2019 and that reconsidering this idea in 2020 would be more appropriate at this time.

Lastly, the Committees set meeting dates for later in 2018 for their first round proposal reviews in September and for the annual financial review meeting in November.

November 2018

The joint Northern and Southern Fund Committees met together for the second time in 2018 in Vancouver on November 27th and November 28th. The meeting opened with a Third Quarter report presentation on Fund Performance in 2018 presented by Ms. Satinder Sidhu and Ms. Michelle Richardson, investment consultants from Aon. Following the presentation there was a short discussion on potential administrative cost savings that might be realized by providing quarterly performance "summaries" for three of the four quarters, and a full-length report for Q3 only ahead of each November's annual financial review meeting. The Committee agreed that Aon should provide a shortened Quarterly report format on Fund performance for Q4 2018 and Q1 2019. Further instructions from the Joint Fund Committee to Aon are to be provided for subsequent Quarters at a later date.

In addition, Ms. Sidhu provided an update on the last structural element of the 2017 asset mix optimization initiative namely the transfer of responsibility for management of the Fund's infrastructure portfolio from listed (RARE) to direct (IFM) anticipated in 2019.

She also discussed the Fund's (Europe, Asia & Far East/Non-North American) EAFE/NNA investments with LSV; their management fees; custodial fees charged by RBC on LSV trades; and, evaluating the merits of continuing to invest in a segregated mandate with LSV (based upon the revised fee schedule negotiated in 2017) versus other alternative investment vehicles where costs may be lower.

Given that the Northern and Southern Fund Spending Policies were revised in April 2018 and are being implemented for the first time in 2019 spending forecasts, Ms. Sidhu gave a brief refresher on inflation rates, consumer price indices and realistic future return-on-investment expectations.

Lastly, Ms. Sidhu gave an update on the educational item that she had presented in April on the topic of Responsible Investing and taking Environmental, Social and Governance (ESG) considerations into account in portfolio investments. She noted that Aon has now rated most of the PSC's investment managers with respect to ESG and also recently completed a survey of 200 institutional investors.

Next on the agenda Ms. Sidhu set the stage for the manager in-person interviews to follow. She revisited the decision to invite only three of the managers to Vancouver for in-person interviews and reminded the Committees that in November 2019 interviews are planned to be held with the Fund's other three active managers, Invesco (real estate), LSV (EAFE/NNA equities) and IFM (direct infrastructure). She reviewed the questions that had been directed in advance to the managers attending and provided her assessment of what to expect or listen for.

The Committee then received in-person presentations from the Fund managers: Morgan Stanley (global equity manager); ACM (Canadian mortgage manager); and, Philips, Hager and North (Canadian core plus fixed income). The Committee was generally satisfied with the managers' reports and were interested to hear in-person from their new Canadian core plus manager, local firm PH&N for the first time.

Day 2

PSC Secretariat Director of Finance Ms. Ilinca Manisali reported back to the Joint Fund Committee on developments concerning the Fund's custodian and investment consultant fees Action Item from the April 2018 Joint Fund Committee meeting. She reminded members that during the review and approval of the annual administration budget for the two Fund Committees, it was noted that the fees for custodial and consultant fees were high and that this should be further investigated with a view to reducing them if possible. Doug Mecum (N Fund) and Don Hall (S Fund) volunteered to assist staff with this task.

Regarding custodian fees, a report was commissioned with consulting firm George & Bell to review and examine custodian fees and to propose options for the Joint Fund Committees' consideration. A final report was delivered by Kamila Giesbrecht with George & Bell. The outcome of the report and Committee review and discussion with Ms. Giesbrecht was an instruction for staff to arrange meetings with two potential alternative custodians namely CIBC Mellon and Northern Trust by mid-February 2019. The purpose of the meetings would be to review each firm's operating procedures and meet client service personnel. Committee members Doug Mecum and Don Hall with Ilinca Manisali with other PSC staff as needed would attend. The outcome shall be a recommendation on the Fund custodian that will most closely achieve the Committee's interests going forward. The recommendation will be presented to the Joint Fund Committees for a final decision at the Feb 19-20, 2019 meeting.

Regarding investment consultant fees and services, Ms. Manisali reported that with help from the working group a Request for Proposals (RFP) had been developed as the next step in "going to market" for investment consultant services presently provided to the Funds by Aon. The Joint Committee having reviewed the document determined that the RFP was to be issued as soon as possible, with a deadline for applications to be received at the PSC office by mid–February 2019. The applications received will then be reviewed and discussed by the Joint Fund Committees at their February 19-20, 2019 meeting. All potential candidates will be invited for an in-person meeting and presentation to the full Joint Fund Committee members at the May 7-9, 2019 meeting.

The next item on the agenda was a routine review by Ms. Manisali of the Funds financial statements 6 months into the year and a check on administrative expenditures compared to the approved budget. The Committee were satisfied with the report.

The Northern Fund Committee took the opportunity to share with their Southern Fund colleagues their opinion that with the recent renegotiation of the Treaty for a 10 year period and with it the possibility of government agencies securing A-base financial support for their core functions – now would be a good time to consider the future strategic direction for the Funds. Although the two Funds have some differences in approach, there are some shared concerns such as agency core funding and on-going multi-year projects that they have in common. There was some discussion about possible strategic direction ideas for the Funds and if there are procedural and/or policy ideas that could shape developments.

During the first round project proposal reviews that had taken place in September, the Northern Fund Committee had determined that a number of projects (5), that had been submitted to the first round of the Northern Fund's proposal review for 2019, were of greater relevance in terms of their objectives and in their geographical location to the Southern Fund. Given the limited alignment of the identified project proposals with Northern Fund priorities, the Northern Fund invited the submission of detailed proposals, however deferred the consideration of funding in 2019 to the Southern Fund. Further, there were two additional projects submitted to the Northern Fund that the Northern Fund Committee felt should properly be shared between the two Funds. The Southern Fund Committee agreed to consider the Northern Fund's suggestions in their on-going deliberations on 2019 funding with the exception of one of the suggested projects to be shared. The Southern Fund Committee had previously considered one of those two projects at the first round conceptual stage and had decided that it was low priority and not to be considered further.

Lastly, the Committees confirmed meeting dates for February 2019 and selected dates for their Spring meeting in May 2019.

February 2019

In February 2019 the two Fund Committees met separately to select their projects for funding support in 2019. During these concurrent meetings the two Committees took the opportunity to meet briefly on the morning of February 20th, to discuss a small sub-set of proposals that the Northern Fund had earlier identified as being of greater relevance to the Southern Fund. The Committees agreed to share the funding of a Canadian chinook CWT project in 2019.

The Committees also received an update on progress towards the selection of a new Fund custodian and plans for the interviewing of a shortlist of potential investment consultants by the full Joint Fund Committee at the May 2019 meeting.

Northern Fund Committee Meetings

The Northern Fund Committee met in separate session on three occasions during 2018/19.

April 25th (p.m. only), 2018

- Potential for a Call for Proposals for 2019.
- Fund financial obligations in 2019.
- Timetable for Call for Proposals.
- Approved revisions to the spending policy effective immediately.

September 26th and 27th, 2018.

- First round selection of 2019 Northern Fund project concepts to be invited to proceed to Stage Two detailed proposals.
- Memo to Southern Fund regarding 5 project proposals having relevance either in large part or in total to the Southern Fund's Call for Proposals and being located within the Southern Fund's

geographical area of interest. Plus, identification of two proposals which offer the potential for shared funding arrangements with the Southern Fund.
- Memo to the Commissioners regarding persistent and incremental increases in the number and overall cost of agency "core" programs seeking financial support from the Northern Fund to deliver on the Parties obligations under the Treaty.
- Review and approval of annual audited financial statements.

February 18th (p.m. only), 19th and 20th (a.m. only) 2019
- Final selection of Northern Fund projects for funding in 2019.

Southern Fund Committee Meetings

The Southern Fund Committee met in separate session four times during 2018/19.

April 25th (p.m. only), 2018.
- Annual report on Year 4 (2017) of the Salish Sea Marine Survival Program from U.S. and Canadian partners Long Live the Kings & the Pacific Salmon Foundation.
- Potential for a Call for Proposals for 2019.
- Fund financial obligations in 2019.
- Timetable for the Call for Proposals.
- Approved revisions to the spending policy effective immediately.

September 18th, 2018.
- First round selection of 2019 Southern Fund project concepts to be invited to proceed to Stage Two detailed proposals.
- Review and approval of annual audited financial statements.

November 28th, 2018. (1 hour only).
- Briefing from Dr. Hall on custodian and consultant fees review.
- Consideration of the memo from the Northern Fund regarding 5 project proposals having in their opinion relevance either in large part or in total to the Southern Fund's Call for Proposals and being located within the Southern Fund's geographical area of interest. Plus, identification of two proposals which offer the potential for shared funding arrangements with the Southern Fund.

February 20th, 2019
- Final selection of Southern Fund projects for funding in 2018.

Activities of the Panels

PART III
ACTIVITIES OF THE PANELS

A. FRASER RIVER PANEL

At the January meeting the Panel received reports reviewing the 2018 fishing season, reports on experiments at Mission and Qualark hydroacoustic sites relating to the Fraser Strategic Review Committee (FSRC) review, addressed Total Allowable Catch (TAC) calculations, reviewed test fishing program expenses and revenues and received an overview on using data from ITQ fisheries collected in-season to augment abundance estimates obtained from purse seine fisheries. The Panel also discussed next steps for renewal of Annex IV, Chapter 4 which expires after the 2019 season. At the February meeting the Panel received reports from Canada on 2018 escapements, 2019 pre-season forecasts for Fraser River sockeye and pink salmon and finalized the TAC and allocation status dates for 2018. 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 2019 schedule and next steps for determining test fishery retention guidelines in 2019. At subsequent pre-season planning meetings the Panel reviewed escapement plan options for sockeye and pink salmon and planning model results and implications. They also reviewed run size assessment methods for pink salmon and received updates on the implementation of the new fishery planning model for the 2019 season.

B. NORTHERN PANEL

The bilateral Northern Panel met at the PSC Post Season meeting in Vancouver, B.C. from January 14–18, 2019. There were no bilateral Northern Panel meetings during the PSC Annual Meeting in February.

At the Vancouver meeting, fishery managers from both parties presented information to the Panel on Northern Boundary Area fisheries for 2018 and discussed compliance with provisions of the 2019 PST Agreement. A member of the CTC provided a summary of 2018 Chinook salmon management actions in the Northern Boundary Area.

The Panel reviewed and bilaterally agreed with the Northern Boundary Technical Committee's (NBTC) final 2017 sockeye salmon run reconstruction. The NBTC also presented the preliminary 2018 sockeye salmon run reconstruction as well as the current status of allowable and actual harvests and cumulative allowable harvest sharing agreements of sockeye salmon, as specified in Annex IV, Chapter 2.

The Panel received updates and recommendations moving forward from the NBTC about the requirement in the new annex to review the Northern Boundary sockeye run reconstruction (NBSRR) model regarding the creation of a simpler model. The panel also received updates and status on the Nass River sockeye salmon telemetry study and on the NBTC's 2017 assignment that will provide a state of knowledge on the status of northern coho salmon stocks, including information on productivity, harvest rates, assessment programs, and management actions.

Lastly, the Panel finalized (a) the Chapter 2 workplan with accompanying timeline for accomplishing tasks associated with the new annex; and (b) the Terms of Reference documents for the Nass and Skeena rivers escapement goal review and the pink salmon harvest analysis.

C. SOUTHERN PANEL

During the period from April 1, 2018 through March 31, 2019, the bilateral Southern Panel, Coho Technical Committee (CoTC) and Chum Technical Committee (ChumTC) met during the meetings described below to accomplish the objectives and tasks described in the Southern Panel work plan.

The bilateral Coho Working Group (a subset of CoTC and Southern Panel members) met via conference call on October 26, 2018 to discuss work planning and the latest updates on Canada's project to establish reference points for the Interior Fraser Coho management unit. Additionally, the CoTC met via conference call on November 13, 2018 to discuss workloads, review of stock and fishery assessment frameworks, updating and electronic hosting of periodic reports, approaches for addressing effects of environmental change on coho populations, and interactions with the Coho Working Group.

From January 14-18, 2019, the bilateral Southern Panel met at the PSC Post-Season meeting in Vancouver, BC. The Panel received the following presentations: 1) U.S. and Canadian postseason reports for the 2018 season; 2) updates on ocean indicators data and predicted effects on Pacific Northwest salmon, presented by Marisa Litz (from WDFW and the PSC Fraser Technical Committee). Additionally, during the January meeting the Parties made progress on developing workplans for implementing the new aspects of Chapters 5 and 6 of the PST.

The bilateral Southern Panel met again at the PSC Annual meeting in Portland, Oregon, from February 11-15, 2019. The bilateral Panel received Coho and Chum Technical Committee updates, including the Southern Endowment Fund priorities of those technical committees. In addition, the CoTC provided its report on exploitation rates on naturally spawning coho management units for 2016 to the Southern Panel. Also, at the February meeting, the bilateral Panel agreed upon processes for more effective Panel meetings, including appointing a recording secretary (the alternate Co-Chair of the current Chair), and drafting a set of Operating Guidelines for the Panel. The Panel received, with great interest, a presentation on the PSC portal from John Son of the PSC Secretariat. This presentation described the PSC website portal for sharing documents, maintaining records of meetings, etc. Also, the bilateral Panel continued to develop and refine the workplans for implementing the new Chapter 5 and 6 components. In addition, the Panel advanced plans for the mid-March information exchange.

Two new features of the February PSC meeting were: First, a series of Management Entities workshops were held, whereby Panel and Committee members and staff from various governments' regulatory and management organizations met to discuss common themes and challenges in planning for implementation of the amended 2019-28 Pacific Salmon Treaty. Members of the bilateral Panel attended. Second, two short workshops on Ocean Indicators were presented: one on the State of the Ocean in relation to salmon, the other on the use of environmental variation data in fisheries management. Bilateral panel members attended. On March 18, 2019 the U.S. and Canadian chairs, alternate chairs, as well as a subset of Coho Technical Committee representatives met for the annual manager-to-manager preseason information exchange meeting, at the Stillaguamish Tribe's Natural Resource Office in Arlington, WA. The Parties exchanged preseason stock forecasts with status designations, as well as preliminary fishery plans.

The Chum bilateral Technical Committee met on May 14-17, 2018 in La Conner, Washington. They worked to finalize their annual report, define and develop components of the Southern Chum Strategic Plan, and review status of all Southern Endowment Fund projects.

The joint meeting between the CoTC and the Selective Fishery Evaluation Committee has been postponed until the report on Coho Double Index Tagging becomes available.

D. TRANSBOUNDARY PANEL

The Transboundary Rivers Panel (Panel) held two series of bilateral sessions in conjunction with the Pacific Salmon Commissions meetings, the first being the 2018 Post-Season meeting in Vancouver (January 14-16, 2019) while the second was the 2019 Annual meeting in Portland (February 11-15, 2019).

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 2018 season. The Panel also received presentations on the result of 2017 Taku and Stikine Sockeye Salmon Enhancement Production Plans (2018 fry releases resulting from 2017 egg takes). On review, the Panel Co-Chairs approved the results of sockeye enhancement programs as presented. The Panel also received presentations on Chinook salmon conservation measures implemented by Alaska and Canada in 2018, results of sockeye salmon telemetry projects on the Taku River, completed the review of overage and underage considerations pertaining to the performance of 2018 fisheries and developed the Transboundary Panel 2019-2028 Chapter 1 bilateral implementation plan for submission to Commissioners.

The Annual meeting in February involved the review of pre-season outlooks for Alsek, Taku and Stikine River salmon stocks, 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 2019 and developed an approach for assessment and management of Taku River sockeye salmon stocks during the 2019 season which incorporates consideration for assessment program tag loss ("dropouts"). On review, the Co-Chairs approved bilateral acceptance of the results of the 2014 Stikine Enhancement Production Plan (consistent with the requirements set out within Chapter 1, the Panel reviewed the Parties performance relative to sockeye salmon enhancement program activities initiated 5 years earlier), approved the 2019 Taku River Enhancement Production Plan (including expansion of production (to support stock rebuilding) within the Tatsamenie Lake program staring in 2019) and approved the 2019 Stikine Enhancement Production plan. Finally, the Transboundary Panel approved revisions to the Transboundary Panel's Strategic Salmon Plan for the 2019-2028 Chapter period.

Review of 2018 Fisheries and Treaty-Related Performance

PART IV
REVIEW OF 2018 FISHERIES AND TREATY-RELATED PERFORMANCE

A. FRASER RIVER SOCKEYE SALMON

Pre-season Planning

1. Pre-season expectations were for a median run size (p50 level, Appendix B) of 13,981,000 Fraser River sockeye salmon and a one in two chance that the run size would be between 8,423,000 and 22,937,000.
2. Pre-season expectations of migration parameters included a 63% diversion rate for Fraser River sockeye through Johnstone Strait. The Area 20 50% migration dates adopted by the Fraser River Panel were July 2 for Early Stuart, August 8 for Early Summer, August 11 for Summer, and August 17 for Late-run sockeye salmon.
3. At median (p50) forecast abundance levels, pre-season spawning escapement targets were 84,000 Early Stuart, 862,000 Early Summer, 1,737,600 Summer and 2,959,200 Late-run sockeye for a total of 5,642,800 sockeye salmon (Table 1). These management group specific targets were derived by applying Canada's Spawning Escapement Plan (Appendix B) to the median forecasted run sizes.
4. Management Adjustments (MAs) of 58,000 Early Stuart, 198,300 Early Summer, 173,800 Summer-run and 1,272,500 Late-run sockeye were added to the spawning escapement targets to account for differences between estimates (Mission, catch and escapement) and en-route losses, to increase the likelihood of achieving the escapement targets.
5. The projected Total Allowable Catch (TAC) of Fraser River sockeye salmon based on the median forecasted abundances and agreed deductions was 6,197,900 sockeye salmon (Table 1), of which 16.5% (1,022,654 sockeye minus a small payback of 2,400 fish) were allocated to the United States (U.S.).
6. For Early Stuart, an MA was adopted despite the spawning escapement target (SET) exceeding the median run size forecast. This SET, coupled with the pre-season adopted proportional management adjustment (pMA) of 0.69, meant that pre-season expectations of reaching the spawning escapement targets for Early Stuart were very low, and that Early Stuart would likely be managed under a Low Abundance Exploitation Rate (LAER). In Canada, a moving window closure was implemented to ensure the protection of the Early Stuart Run.
7. Canada implemented a 20% exploitation rate constraint to Late-run catches seaward of the Chilliwack/Vedder confluence, due to Cultus Lake sockeye harvest constraints. This was consistent with the LAER applied to the Late-run aggregate at the forecasted p50 return abundance. As a result of these harvest constraints it was unlikely that Canada would be able to harvest its full TAC.
8. The Panel adopted the 2018 Management Plan Principles and Constraints, and Regulations, (Appendices C, D).

In-season Management Considerations

9. The in-season marine migration timing (Figure 3) was near expected pre-season values for all sockeye management groups: 2 days later for Early Stuart run, 2 days earlier for Early Summer run, 1 day earlier for Summer run and as expected for Late run.
10. The overall Johnstone Strait diversion rate (Figure 4) for Fraser River sockeye at the end of the season was 33% compared to the pre-season forecast of 63%. Initial post-season evaluations indicate that this post-season estimate might be an underestimation of the actual diversion rate due to lower catchabilities in the Johnstone Strait test fisheries.

11. Returns for Fraser River sockeye salmon were below median pre-season forecasts except for Early Stuart run (Early Stuart run: 49% above median forecast, Early Summer run: 16% below median forecast, Summer run: 6% below median forecast and Late run: 36% below median forecast). In context to the pre-season forecast range, the Early Stuart return was between the p50 and p75 forecast, the Early Summer and Summer run returns were slightly below the median forecast and the Late-run return was slightly below the p25 forecast level.
12. Fraser River discharge was below average and river temperatures were above average for the duration of the season (Figure 5). Due to the high temperatures, the in-season MA model predicted larger differences between estimates (DBEs, Table F3) than adopted pre-season.
13. The in-season run size for Early Stuart was slightly larger than its spawning escapement target (SET) but this group was still managed under a LAER due to the pre-season adopted pMA. For Early Summer and Summer run, the Fraser River Panel did not make any in-season updates to DBEs given the favorable observations of fish condition. The estimated delay in the upstream migration of Late-run sockeye was substantially longer than expected, resulting in a smaller DBE than predicted pre-season which led the Panel to reduce the Late-run MA to 75,200 sockeye (Table 6; pMA=0.04).

Run Size, Catch, Escapement and Migration patterns

14. Returns of adult Fraser River sockeye totaled 10,848,700 fish (Tables 8 and 9) which was 9.3 million fish less than the return of 20,148,100 adult sockeye in the brood year (2014). This return was one of the smallest on this cycle line in the last 40 years. Divided by management group, adult returns totaled 123,200 Early Stuart, 1,774,200 Early Summer-, 4,313,600 Summer- and 4,637,800 Late-run sockeye.
15. Catches of Fraser River sockeye salmon in all fisheries totaled 5,838,500 fish, including 4,732,000 fish caught by Canada, 993,500 fish caught by the U.S. and 113,000 fish caught by test fisheries (Table 8). Most of the Canadian catch occurred in commercial fisheries (3,699,600 including First Nations Economic Opportunity catch), followed by First Nations FSC fisheries (Food, Social and Ceremonial, 887,400 fish) and recreational fisheries (142,500). In Washington, commercial catches totaled 982,800 Fraser sockeye, mostly caught in Treaty Indian fisheries (589,600 fish). Fisheries in Alaska harvested 53,700 (preliminary number) Fraser sockeye. Excluding Alaska catches, the overall exploitation rate was 54% of the run, which is one of the larger ones in recent years (Figure7).
16. DFO's near-final estimates of spawning escapements to streams in the Fraser River watershed totaled 4,100,200 adult sockeye (Tables 8 and 9). This was 30% below the brood year escapement of 5,877,300 adults and the lowest escapement on this cycle since 1994. By management group and on this cycle line, spawning escapements in 2018 were above average for Early Stuart, Early Summer-, and Summer-run but below average for Late-run (Figure 9). There were 2,037,080 effective female spawners in the Fraser watershed, that achieved an overall spawning success of 93%.

Achievement of Objectives

17. 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.
18. Management decisions are based on spawning escapement targets, which are represented in-season by potential spawning escapement targets (i.e., spawning escapement targets plus MAs). In-season estimates of potential escapement (i.e., Mission escapement minus all catch above Mission) were respectively 4 and 8% below target for Early Stuart and Summer run, 11% above target for Early Summer run, and on target for Late run (Table 12).
19. Within the Fraser River, spawner abundances estimates totaled 4,100,200 adults, which is 2% below the post-season target. Spawner abundances were severely below target for Early Stuart sockeye (55% under), on target for Early Summer-run (1% over), above target for Summer-run

(16% over) and below target for Late-run sockeye (15% under) (Table 13). For Early Stuart, the spawning escapement target was slightly below the run size, making the escapement target impossible to be met given the anticipated large pMA, even with the rigorous management approach that was applied in 2018. The in-season management measures however ensured that the exploitation rate for Early Stuart (7%) did not exceed the 10% LAER (Table 9).

20. The process of calculating the TAC (Total Allowable Catch) was revised post-season based on an agreement reached on February 14, 2019. This agreement would be reflected in a revised Chapter 4, Annex IV of the Pacific Salmon Treaty and retroactively modify the TAC for 2018.
21. The International TAC of Fraser sockeye (Table 14) was 5,450,200 fish based on the revised calculation method. The Washington catch of 993,500 Fraser sockeye (excluding the Alaska catch of 53,700 Fraser sockeye) exceeded their 16.5% share by 96,600 sockeye. The total Canadian catch of 4,732,000 Fraser sockeye, was 221,200 fish less than the sum of the Canadian share of the TAC and the Aboriginal Fishery Exemption (AFE).
22. In terms of domestic U.S. allocation objectives for Fraser River sockeye, Treaty Indian fisheries and All Citizen fisheries exceeded their shares of the U.S. TAC by 37,200 and 124,500 fish, respectively (Table 15).
23. By-catches of non-Fraser sockeye and pink salmon in commercial net fisheries regulated by the Fraser River Panel totaled 3,630 sockeye and 200 pink salmon (Table 16). Catches of other Fraser and non-Fraser salmon species included 5,490 Chinook, 3,250 coho, and 270 chum.

Allocation Status

24. By Panel agreement there is no payback of Fraser River sockeye or pink salmon to be carried forward to 2019 (Table 17).

B. 2018 POST-SEASON REPORT UNITED STATES SALMON FISHERIES OF RELEVANCE TO THE PACIFIC SALMON TREATY

I. PRELIMINARY 2018 SOUTHEAST ALASKA FISHERIES

NORTHERN BOUNDARY AREA FISHERIES

District 104 Purse Seine Fishery

The 2009 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 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 (DFO) forecast runs of approximately 1.03 million 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 Week 29 and a 30-hour opening in 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 salmon 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 2018, a total of 789,552 pink salmon, 121,365 sockeye salmon, 114,796 chum salmon, 37,511 coho salmon, and 0 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 well below the 1985–2017 average (Figure 1 and 2). Purse seine fisheries were on non-retention for Chinook salmon throughout the season. Sockeye salmon harvests were below average until the final week of the season (Figure 4) and the treaty period (week 28–30) harvest of 19,743 was only 20% of the 1985–2017 average. The total sockeye salmon harvest of 121,365 was 26% of the 1985–2017 average of 468,000 fish. Harvests of coho salmon were also well below average throughout the season (Figures 5) and the overall harvest of 37,511 was only 33% of the long-term average. The overall pink salmon harvest of 789,552 was only 10% of the long-term average (Figure 6) and the chum salmon harvest of 114,796 was 39% 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 48%. 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, 2018.

Week/ Opening	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Hours
29	7/15	0	2,860	1,661	25,777	6,615	31	8
29B	7/19	0	4,698	2,047	31,085	6,272	10	10
30	7/22	0	6,833	2,253	74,338	11,411	22	15
30B	7/26	0	5,352	7,817	127,090	15,322	36	15
31	7/29	0	1,252	1,532	38,504	3,124	20	15
31B	8/2	0	2,506	2,887	96,272	9,634	33	15
32	8/5	0	7,119	5,344	137,126	14,931	27	15
32B	8/9	0	3,651	2,566	109,448	9,567	23	15
33	8/12	0	1,949	614	32,483	3,930	9	15
33B	8/16	0	8,608	1,744	43,340	8,864	12	15
34	8/19	0	43,329	4,868	47,303	12,187	27	15
34B	8/23	0	33,208	4,178	26,786	12,939	45	15
							Permits Fished	
Weeks 28-30		0	19,743	13,778	258,290	39,620	55	48
Weeks 31-36		0	101,622	23,733	531,262	75,176	68	120
Total		0	121,365	37,511	789,552	114,796	85	168

Table 2. –Fishing opportunity, effort, and sockeye salmon harvest prior to week 31 in the District 104 purse seine fishery, 1980–2018.

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	75	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	154	19,743	128
Avg. 80-84	139	225	9	1,487	187,647	136
Avg. 85-17	62	86	4	230	97,618	471
% Change	-56%	-62%	-56%	-85%	-48%	248%

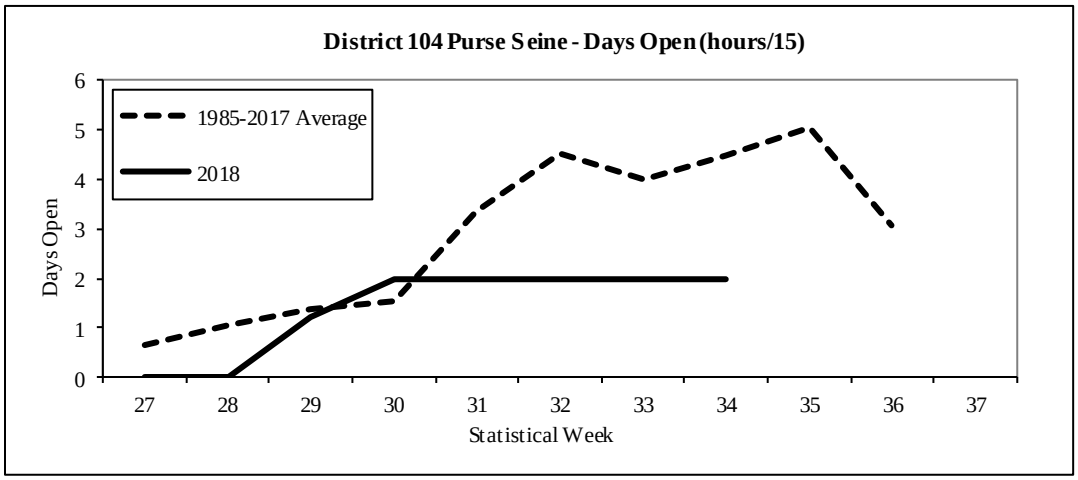


Figure 1. –Days open by week in the District 104 purse seine fishery, 2018.

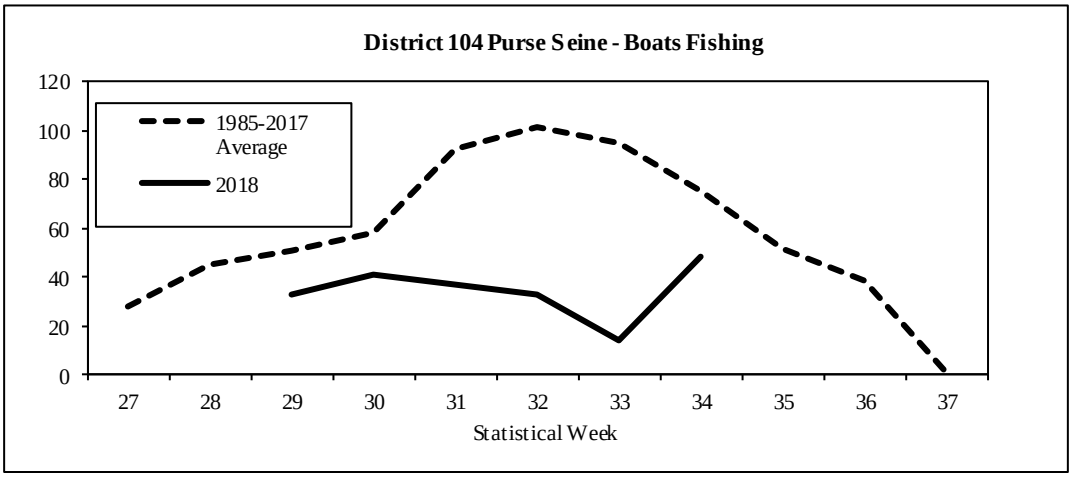


Figure 2. –Number of boats fishing by week in the District 104 purse seine fishery, 2018.

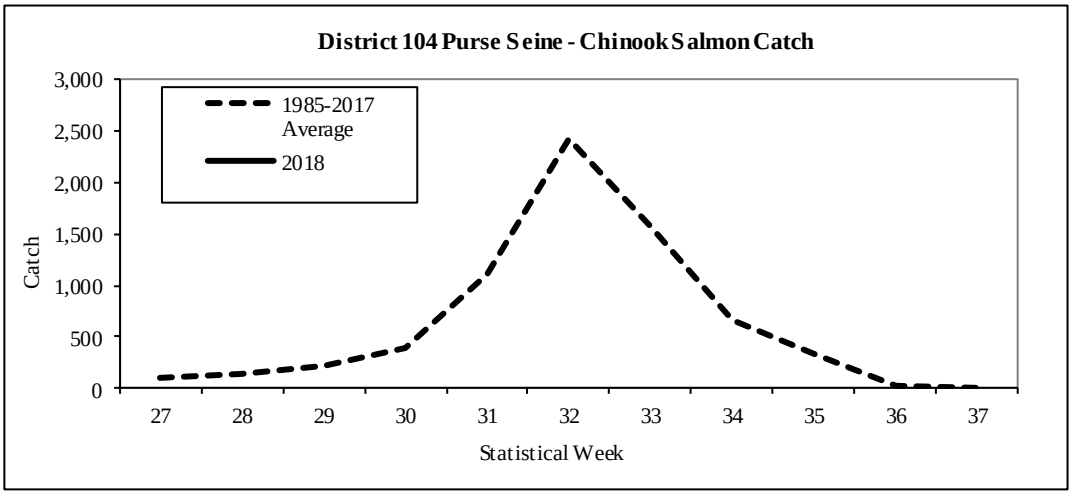


Figure 3. –Chinook salmon harvest by week in the District 104 purse seine fishery, 2018.

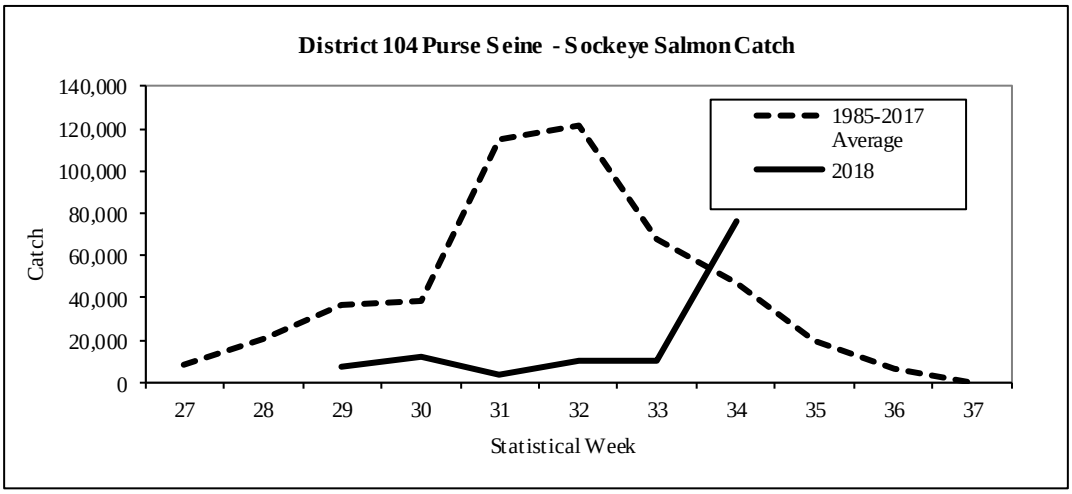


Figure 4. –Sockeye salmon harvest by week in the District 104 purse seine fishery, 2018.

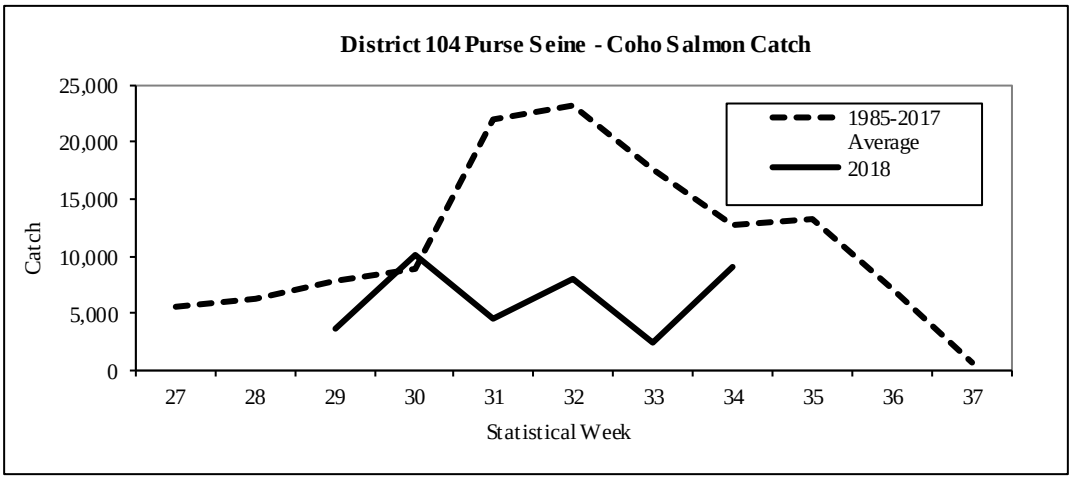


Figure 5. –Coho salmon harvest by week in the District 104 purse seine fishery, 2018.

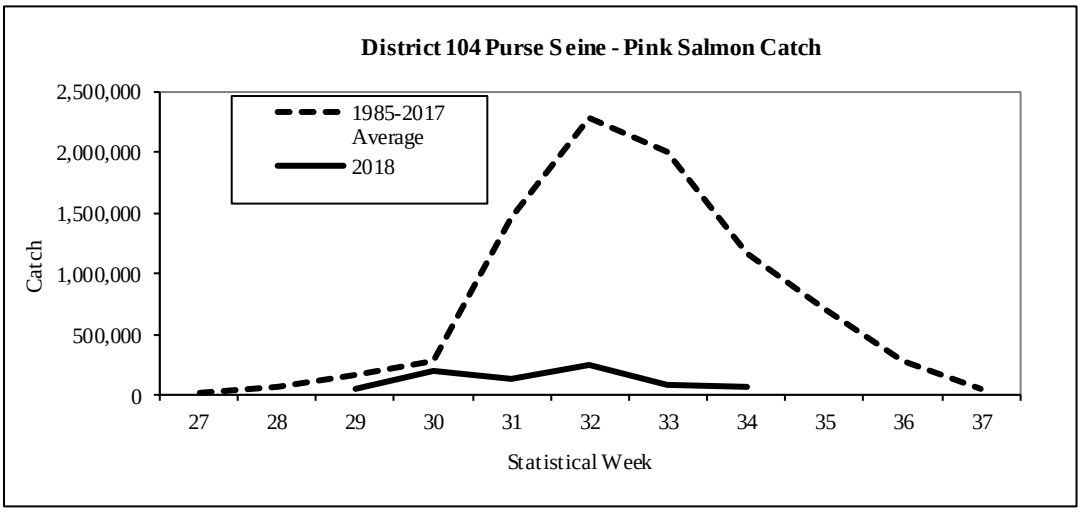


Figure 6. –Pink salmon harvest by week in the District 104 purse seine fishery, 2018.

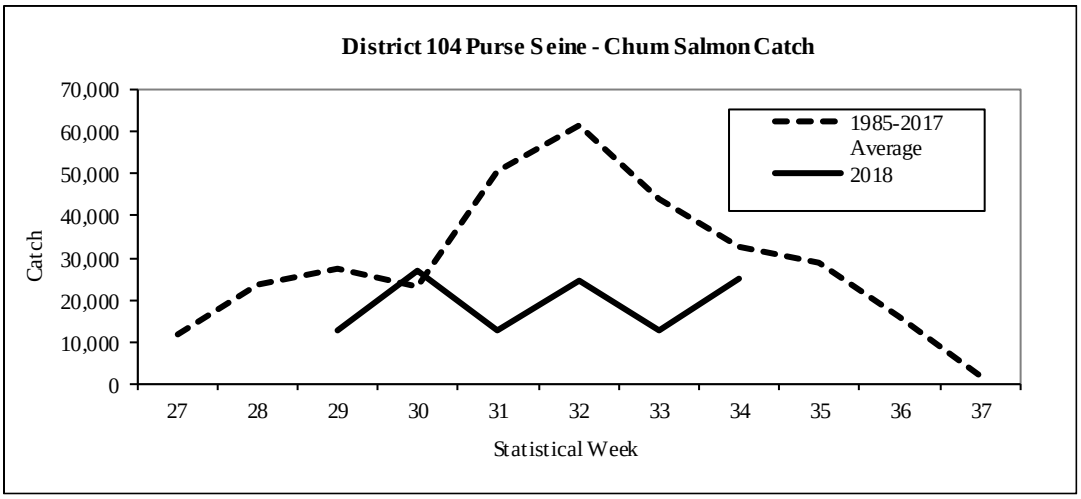


Figure 7. –Chum salmon harvest by week in the District 104 purse seine fishery, 2018.

District 101 Drift Gillnet Fishery

The 2009 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 377,000 in 2018 which, minus an escapement goal of 200,000, would result in an AAH of about 177,000. Using this forecast, the 2018 allowable harvest in the District 101 drift gillnet fishery was approximately 24,426 Nass River sockeye salmon.

The District 101 drift gillnet fishery opens by regulation on the third Sunday in June, which was June 17 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 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 3) management was based on the strength of wild stock fall chum and coho salmon.

The District 101 drift gillnet fishery opened Sunday June 17 (week 25) in 2018. 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 64, which was approximately 60% of the 1985-2017 average of 106 boats. A total of 19,920 sockeye salmon were harvested, which was only 17% of the 1985–2018 average of 114,656 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 18,540 fish, or about 93% 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 2018 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 12,948 Nass River sockeye salmon may have been harvested in the District 101 gillnet fishery in 2018.

Coho salmon harvests were below average for most weeks of the season and the total harvest of 35,457 fish was 72% of the treaty period average (Figure 11). Pink salmon harvests were well below average all season and the total harvest of 113,346 fish was 23% of average (Figure 12) and was the lowest harvest since the

inception of the PST. Chum salmon harvests were near or below average in most weeks of the fishery and the total harvest of 187,661 fish was 62% 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, 2018.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Hours
25	6/17	493	915	49	21	5,876	40	96
26	6/24	422	1,185	63	66	16,234	33	96
27	7/1	297	2,163	141	3,069	26,822	37	96
28	7/8	211	1,443	216	11,892	18,617	36	96
29	7/15	32	585	90	11,133	13,505	30	48
30	7/22	59	1,966	504	25,439	31,665	43	96
31	7/29	30	2,523	698	23,082	19,509	44	96
32	8/5	47	5,197	1,189	10,188	13,220	40	96
33	8/12	14	1,888	1,803	16,155	11,362	31	96
34	8/19	1	446	1,524	6,949	5,746	25	48
35	8/26	5	1,144	6,746	4,899	11,602	31	96
36	9/2	4	316	10,232	416	9,949	38	96
37	9/9	2	109	7,918	27	2,711	35	96
38	9/16	1	36	3,864	9	739	28	96
39	9/23	1	4	420	1	104	7	48
Total		1,619	19,920	35,457	113,346	187,661	64	1,296
1985-2017 Avg.		1,480	114,656	49,007	501,436	301,552	74	1,371

Table 4. –Sockeye salmon harvest in the Alaska District 101 gillnet fishery, 1985 to 2018, 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	64	1,296	30,960
Average 1985-2017	114,657	107,201	107	988	63,470

[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.

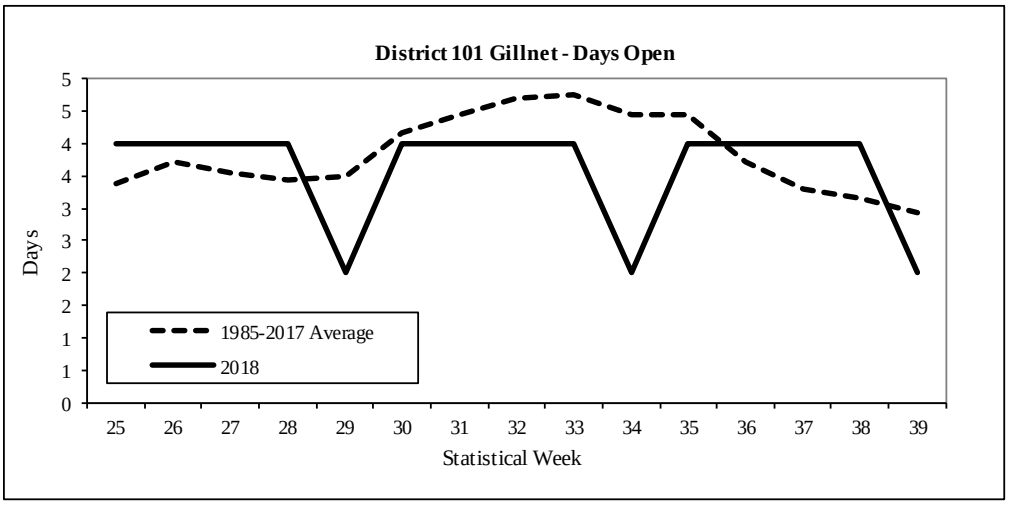


Figure 8. –Days open by week in the District 101 drift gillnet fishery, 2018.

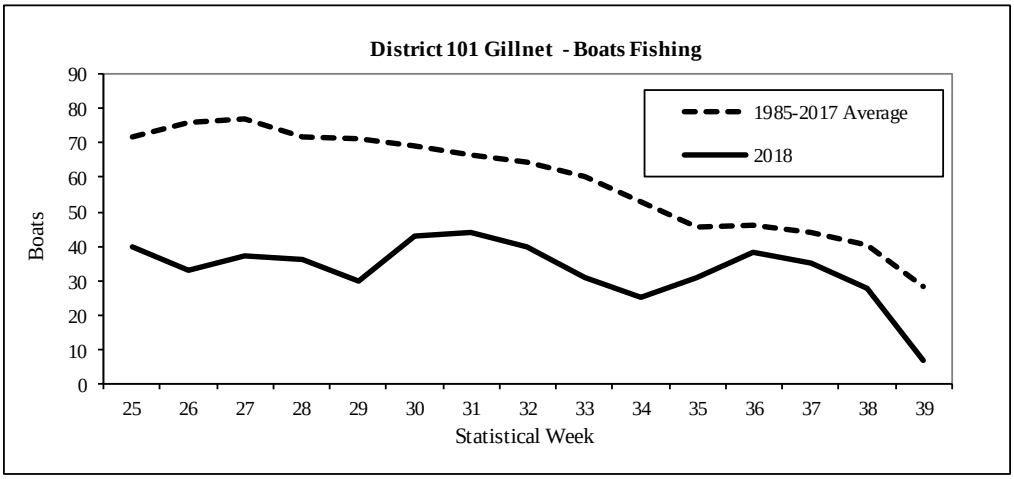


Figure 9. –Number of boats fishing by week in the District 101 drift gillnet fishery, 2018.

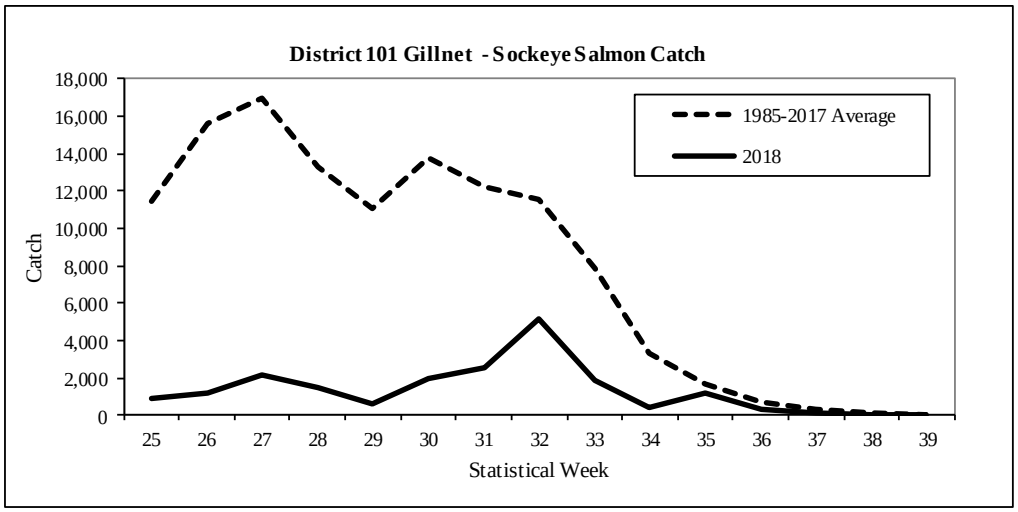


Figure 10. –Sockeye salmon harvest by week in the District 101 drift gillnet fishery, 2018.

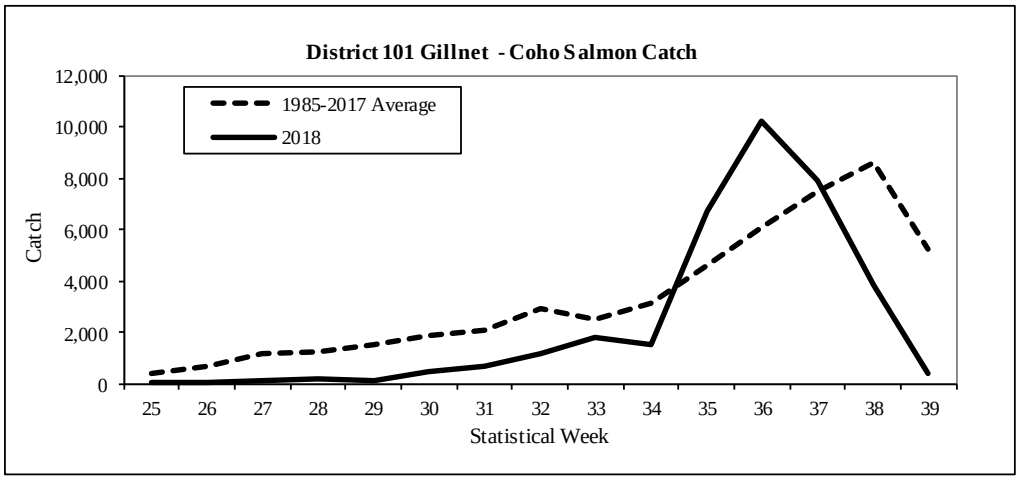


Figure 11. –Coho salmon harvest by week in the District 101 drift gillnet fishery, 2018.

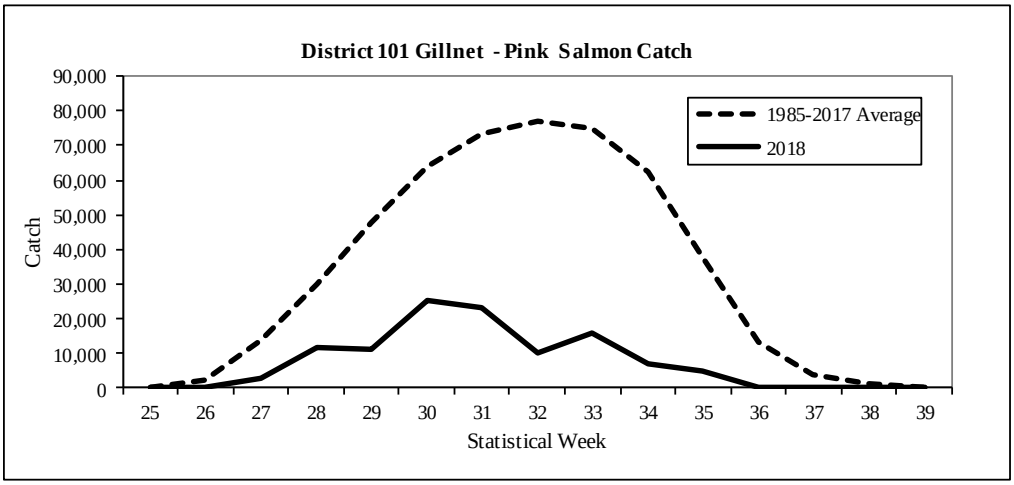


Figure 12. –Pink salmon harvest by week in the District 101 drift gillnet fishery, 2018.

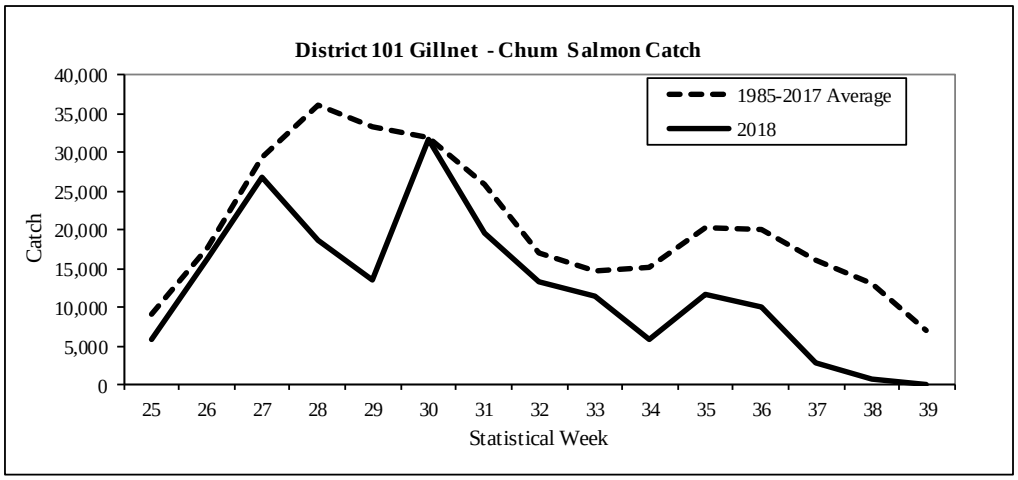


Figure 13. –Chum salmon harvest by week in the District 101 drift gillnet fishery, 2018.

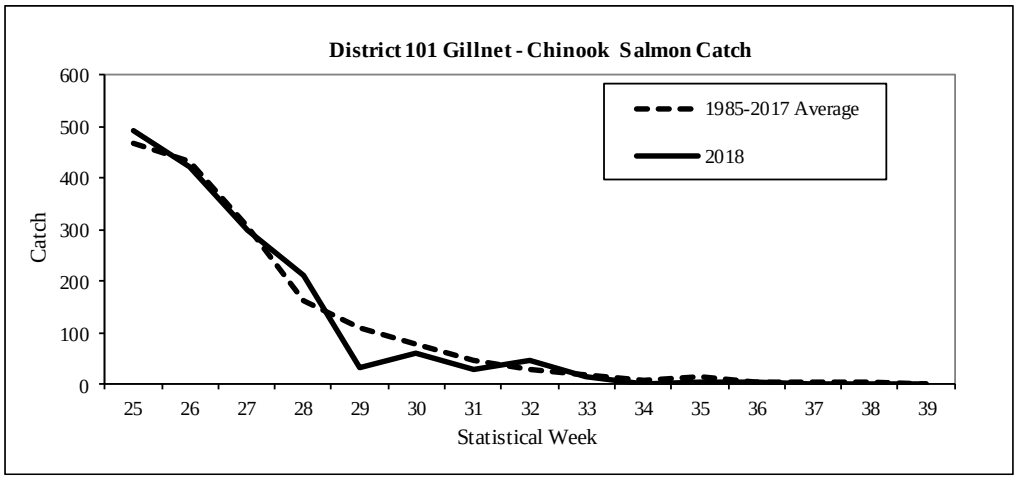


Figure 14. –Chinook salmon harvest by week in the District 101 drift gillnet fishery, 2018.

Pink, Sockeye, and Chum Salmon Escapements

Escapements of pink salmon were generally poor to average throughout Southeast Alaska. The total 2018 Southeast Alaska pink salmon escapement index of 8.15 million index fish ranked 35th 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 2018 (Table 5). 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. The pink salmon harvest of 5.4 million in the Southern Southeast Subregion was only 26% of the recent 10-year average. The overall Southeast Alaska pink salmon harvest of 8.1 million fish was approximately 21% of the 2008–2017 average of 37.8 million.

Table 5. –Southeast Alaska 2018 pink salmon escapement indices and biological escapement goals by subregion (in millions).

Subregion	2018 Pink Salmon Index	Biological Escapement Goal Lower Bound	Biological Escapement Goal Upper Bound
Southern Southeast	4.87	3.0	8.0
Northern Southeast Inside	1.37	2.5	6.0
Northern Southeast Outside	1.90	0.75	2.50
Total	8.15		

Sockeye salmon runs throughout Southeast Alaska were mixed in 2018, and escapement targets were met for at least 6 of the 12 sockeye salmon systems with formal escapement goals (escapement estimates not yet available for Stikine River mainstem and Tahltan-Stikine). 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 only 11,000 fish, which was far 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 two of the 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 127,000 in 2018 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 70,000 was well above the upper 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).

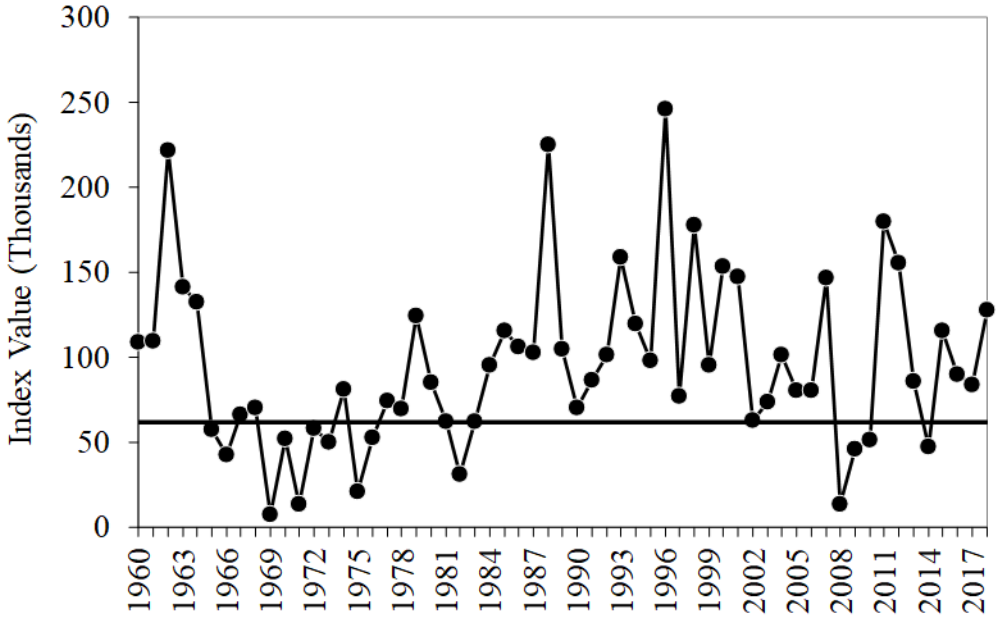


Figure 15. –Observed escapement index value by year (solid circles) and the sustainable escapement goal threshold of 62,000 index spawners (horizontal line) for wild summer-run chum salmon in the Southern Southeast Subregion, 1960–2018.

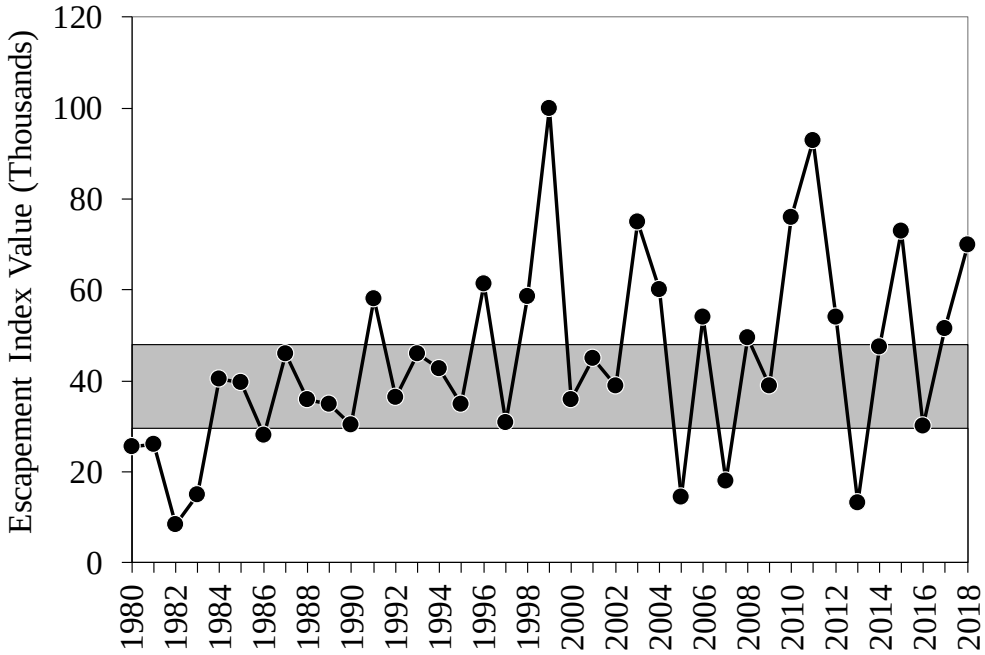


Figure 16. –Observed escapement index value by year (solid circles) and the sustainable escapement goal range of 30,000 to 48,000 index spawners (shaded area) for Cholmondeley Sound fall-run chum salmon, 1980–2018.

TRANSBOUNDARY AREA FISHERIES

Stikine River Area Fisheries

The 2018 preseason forecast for large Chinook salmon returning to the Stikine River was approximately 6,900 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 a run size less than 10,000 fish initially and less than 8,000 fish later in the season. More exact estimates of run size were not available due to low numbers of fish caught, thus creating very low confidence in model estimates. The post-season SCMM projected a terminal run of less than 8,000 fish and an escapement of well below the escapement goal range of 14,000 to 28,000 fish. The final run size estimate was not available by the time of publication.

The 2018 preseason forecast for sockeye salmon returning to the Stikine River was 161,000 fish, which was near the recent 10-year average of 159,000 fish. The 2018 forecast included approximately 46,000 wild Tahltan (29%), 66,000 enhanced Tahltan (41%), 13,000 enhanced Tuya (8%), and 36,000 mainstem (22%) sockeye salmon. Due to the near identical run timing of the Tahltan Lake and Tuya Lake stocks, any open 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. Typically, the Tahltan Lake and Tuya Lake sockeye salmon run timing peaks in statistical week 26 (June 24–June 30) through the Districts 106 and 108 fisheries. 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 2018 runs of local area sockeye salmon stocks were expected to be 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, in addition to a three-week delay of the initial opening; time, area, and mesh restrictions were also implemented through statistical week 29 (July 15–July 21). 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 5 fish based on GSI. The District 108 Spring Troll hatchery access fishery was closed for 2018. Commercial trolling remained closed in District 108 until the opening of the Summer Troll fishery on July 1st. U.S. harvest of large Stikine River Chinook salmon in all District 108 fisheries was estimated to be 23 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 17 (week 25) and the District 108 drift gillnet fishery opened Sunday, July 1 (week 27). The initial openings in District 106 were limited to two days in week 25 and three days in week 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. Fishing time peaked with three days in District 106 and four days in District 108 during this period to harvest the surplus Stikine River sockeye salmon. By week 29, it became apparent that sockeye salmon returning to the Stikine River were coming in below expectations and open time in District 108 was reduced by one day each week through week 31. Open time in District 106 also experienced weekly reductions and were 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 89,600 fish and included 20,200 wild Tahltan (23%), 21,400 enhanced Tahltan (24%), 11,100 Tuya (12%), and 36,900 Mainstem (41%) fish.

Districts 106 and 108 were managed based on pink salmon abundance during the month of August and three-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 near or above average in most weeks (Figure 18), and the seasonal number of permits fished was 101% of average (Table 6). The number of boats participating in the District 108 fishery was below average during the first weeks of the sockeye salmon fishery and increased to above average from mid-to-late July; the 103 permits fished was 75% of the average of 137 permits (Figure 25; Table 7).

During the 2018 season, 348,277 pink salmon, 25,203 sockeye salmon, 176,392 chum salmon, 112,000 coho salmon, and 3,247 Chinook salmon were harvested in the District 106 drift gillnet fishery (Table 6). Chinook salmon harvests were generally above average from late June through late August (Figure 19) and were comprised of 47% Alaska hatchery origin fish. Sockeye salmon harvests were below average all season (Figure 20), and the total sockeye salmon harvest of 25,203 fish was 30% of the recent 10-year average; 3,000 were estimated to be of Stikine River origin. Harvests of coho salmon were also below average early in the season but increased to above average from early August to early September. The overall harvest of 112,000 coho salmon was 77% of the recent 10-year average of 145,700 fish (Figure 21). Pink salmon harvests were above average from late July through through August (Figure 22), and the overall harvest of 348,277 fish was 125% of the recent 10-year average. Chum salmon harvests were near or above average throughout the season. The overall harvest of 176,392 fish was 114% of average (Figure 23).

During the 2018 season, 15,643 pink salmon, 5,731 sockeye salmon, 133,812 chum salmon, 8,823 coho salmon, and 2,649 Chinook salmon were harvested in the District 108 drift gillnet fishery (Table 7). The harvest of Chinook salmon was near average in all but the first week of the fishery and was comprised of 73% Alaska hatchery origin fish for the season (Figure 26). An estimated 23 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 5,731 fish was only 18% of the recent 10-year average. An estimated 4,200 fish, or 73% of the harvest, were estimated to be Stikine River sockeye salmon. The overall coho salmon harvest of 8,823 fish was also well below the recent 10-year average of 29,000 fish (Table 7, Figure 28). Pink salmon harvests

were below average throughout the season and the overall harvest was 34% of the recent 10-year average (Figure 29). The overall harvest of 133,812 chum salmon was 93% of the recent 10-year average (Figure 30).

Table 6. –Weekly salmon harvest in the Alaskan District 106 commercial drift gillnet fisheries, 2018.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
25	17-Jun	206	447	280	65	714	52	2	104
26	24-Jun	573	1,946	1,907	705	10,420	44	3	132
27	1-Jul	422	2,097	2,382	1,932	9,327	37	3	111
28	8-Jul	308	2,937	3,632	6,182	19,220	38	3	114
29	15-Jul	178	2,647	2,035	12,576	14,987	42	2	84
30	22-Jul	266	3,817	2,519	42,214	29,176	68	2	136
31	29-Jul	511	3,569	5,110	60,986	13,721	87	2	174
32	5-Aug	89	3,002	9,440	85,749	11,890	74	3	222
33	12-Aug	142	2,367	8,790	57,553	11,684	72	3	216
34	19-Aug	111	1,423	8,782	43,907	15,856	72	3	216
35	26-Aug	311	733	13,598	29,207	16,033	81	3	243
36	2-Sep	82	152	26,459	6,883	13,078	95	3	285
37	9-Sep	38	56	20,360	310	7,694	99	4	396
38	16-Sep	4	5	5,800	6	2,099	63	3	189
39	23-Sep	6	5	906	2	493	18	2	36
Total		3,247	25,203	112,000	348,277	176,392	151	41	2,657
2008-2017 Average		2,172	82,773	145,700	278,552	154,801	150	48	2,753
2018 as % of Average		149%	30%	77%	125%	114%	101%	85%	97%

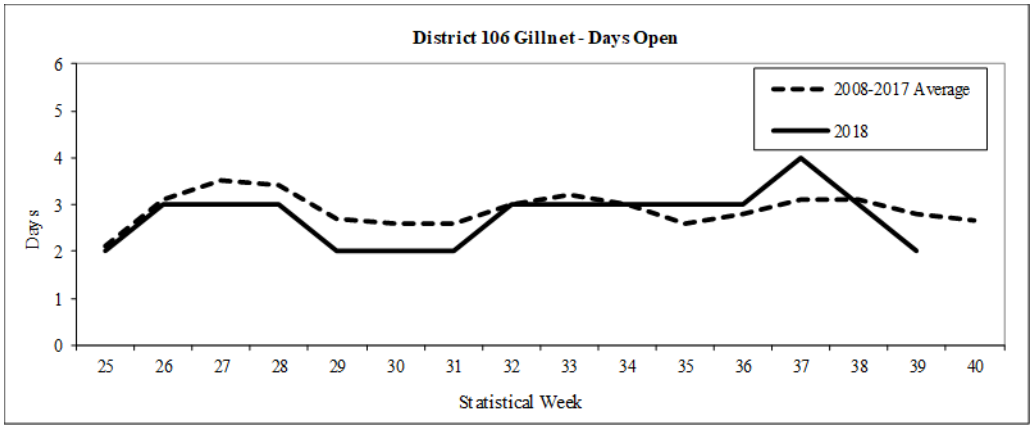


Figure 17. – Days open by week in the District 106 drift gillnet fishery, 2018.

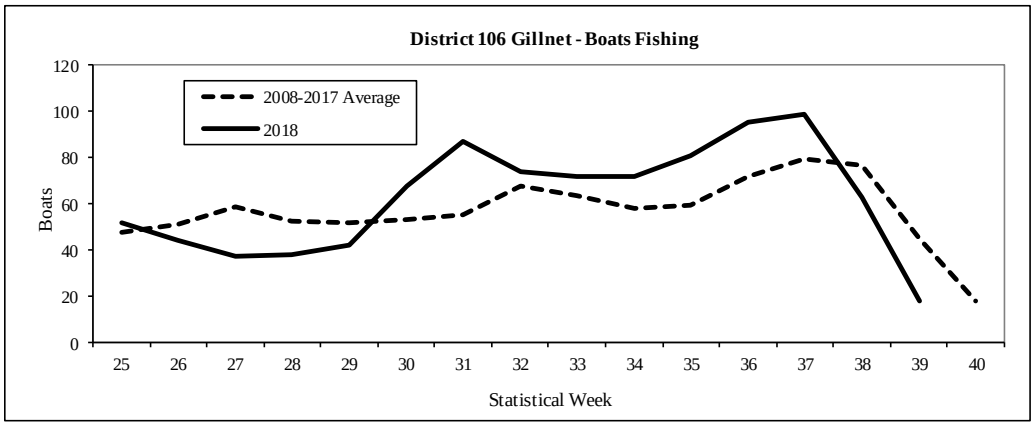


Figure 18.–Number of boats fishing by week in the District 106 drift gillnet fishery, 2018.

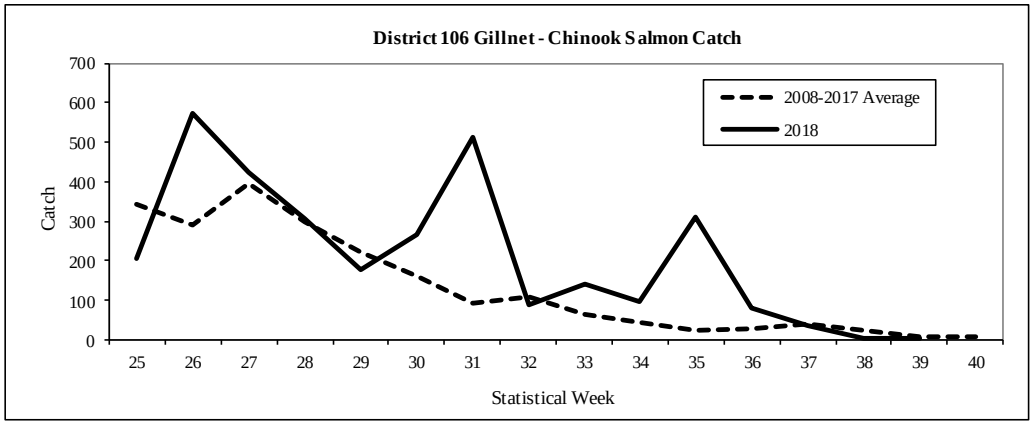


Figure 19. –Chinook salmon harvest by week in the District 106 drift gillnet fishery, 2018.

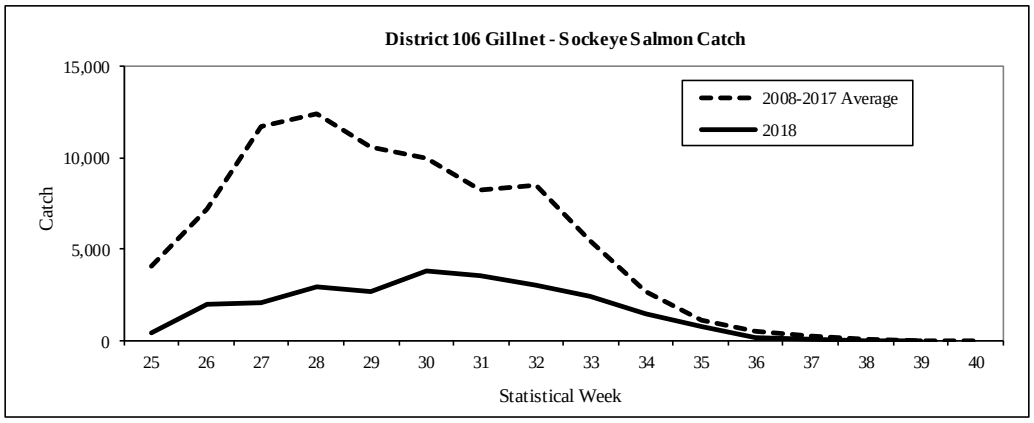


Figure 20. –Sockeye salmon harvest by week in the District 106 drift gillnet fishery, 2018.

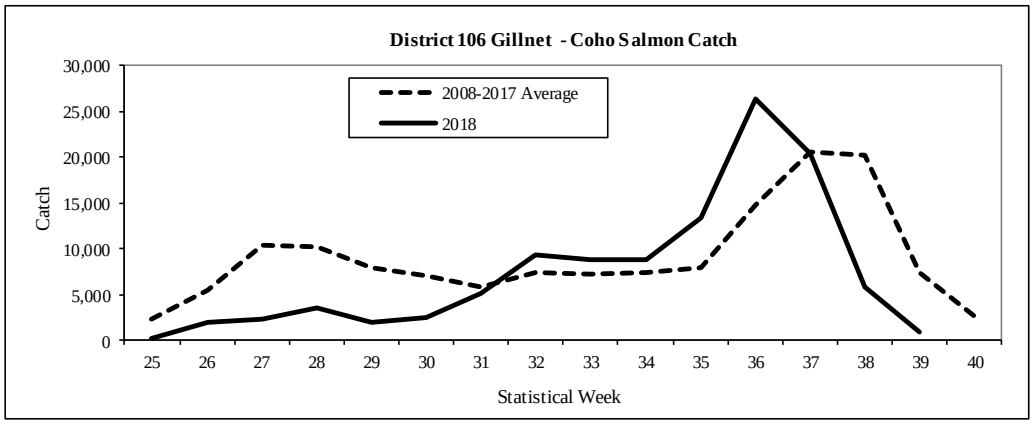


Figure 21. –Coho salmon harvest by week in the District 106 drift gillnet fishery, 2018.

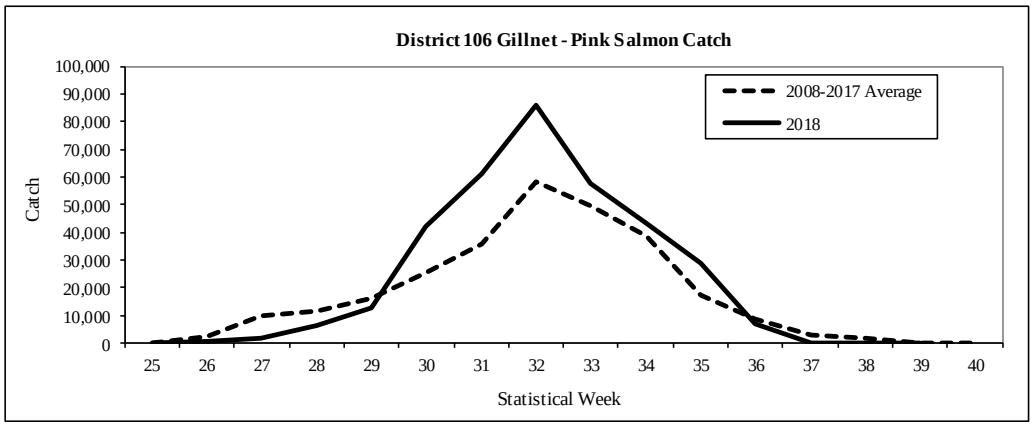


Figure 22. –Pink salmon harvest by week in the District 106 drift gillnet fishery, 2018.

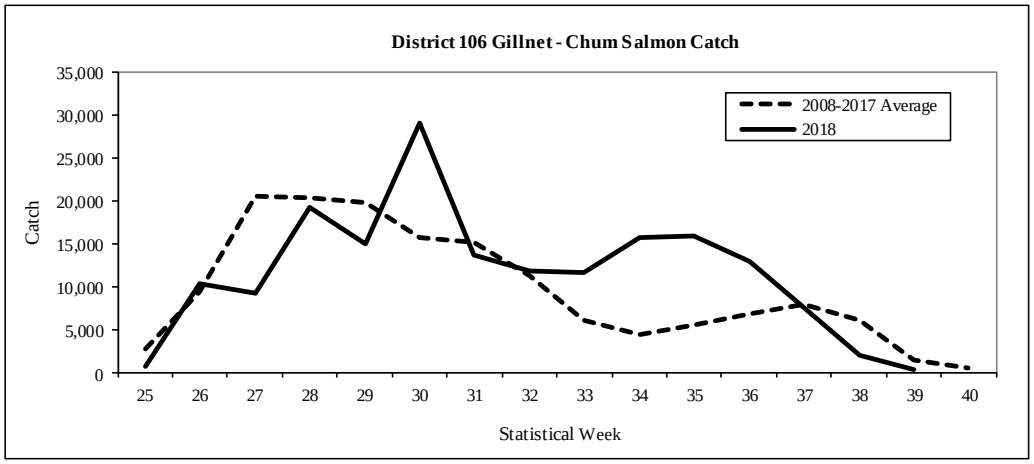


Figure 23. –Chum salmon harvest by week in the District 106 drift gillnet fishery, 2018.

Table 7. –Weekly salmon harvest and effort in the Alaskan District 108 traditional commercial drift gillnet fishery, 2018.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
27	1-Jul	226	1,276	64	37	4,050	16	3	48
28	8-Jul	1,423	1,404	260	359	10,251	35	4	111
29	15-Jul	516	1,184	158	1,547	46,690	58	4	158
30	22-Jul	284	1,125	171	4,448	27,417	78	3	174
31	29-Jul	116	404	308	3,337	10,605	48	2	96
32	5-Aug	41	212	1,220	4,089	19,449	54	3	162
33	12-Aug	15	63	816	1,447	12,491	38	3	114
34	19-Aug	6	17	937	186	1,771	16	3	48
35	26-Aug	10	30	999	124	416	11	3	33
36	2-Sep	4	9	1,632	58	300	13	3	39
37	9-Sep	4	6	1,697	11	348	12	4	44
38-39	16-Sep	4	1	561	0	24	13	5	37
Total		2,649	5,731	8,823	15,643	133,812	103	40	1,064
2008-2017 Average		7,966	32,631	28,858	45,518	143,837	137	51	2,107
2018 as % of Average		33%	18%	31%	34%	93%	75%	78%	50%

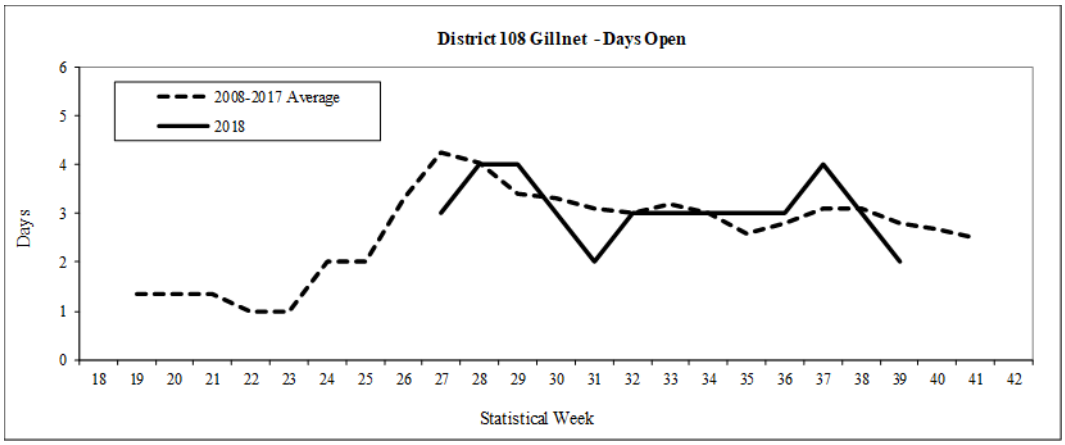


Figure 24. –Days open by week in the District 108 drift gillnet fishery, 2018.

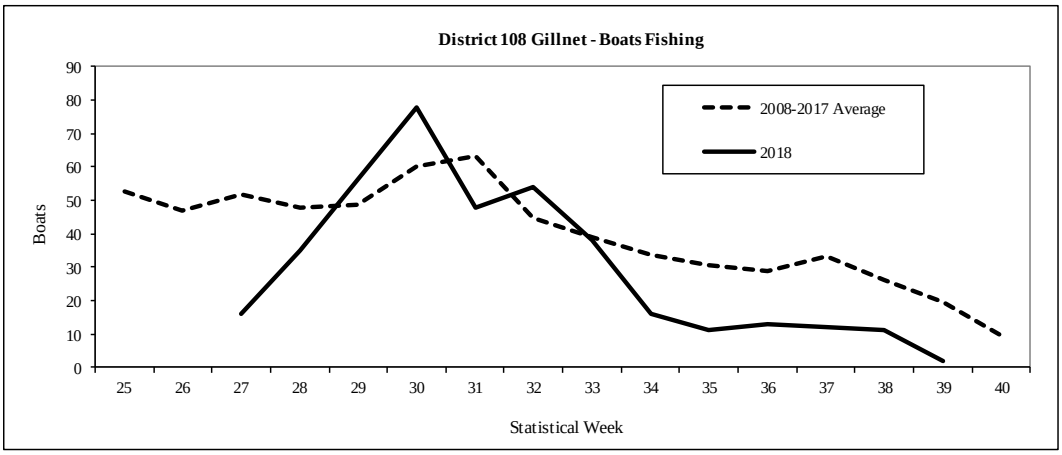


Figure 25. –Number of boats fishing by week in the District 108 drift gillnet fishery, 2018.

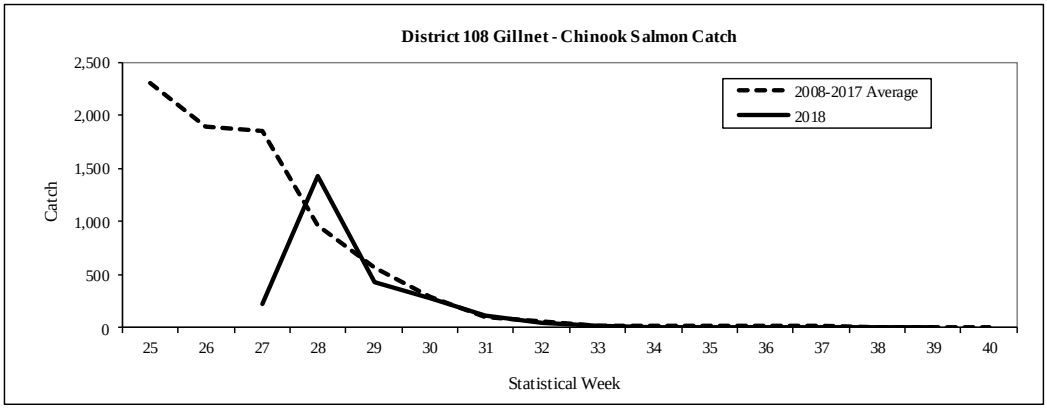


Figure 26. –Chinook salmon harvest by week in the District 108 drift gillnet fishery, 2018.

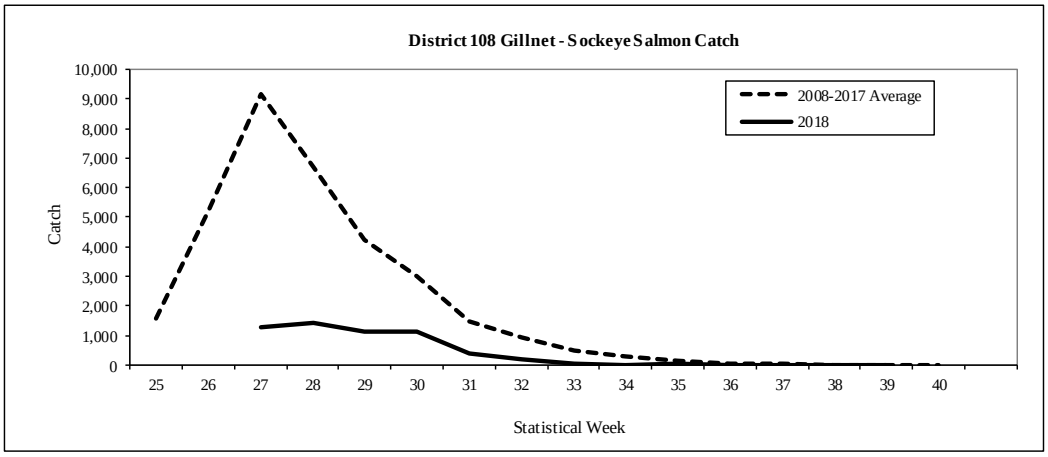


Figure 27. –Sockeye salmon harvest by week in the District 108 drift gillnet fishery, 2018.

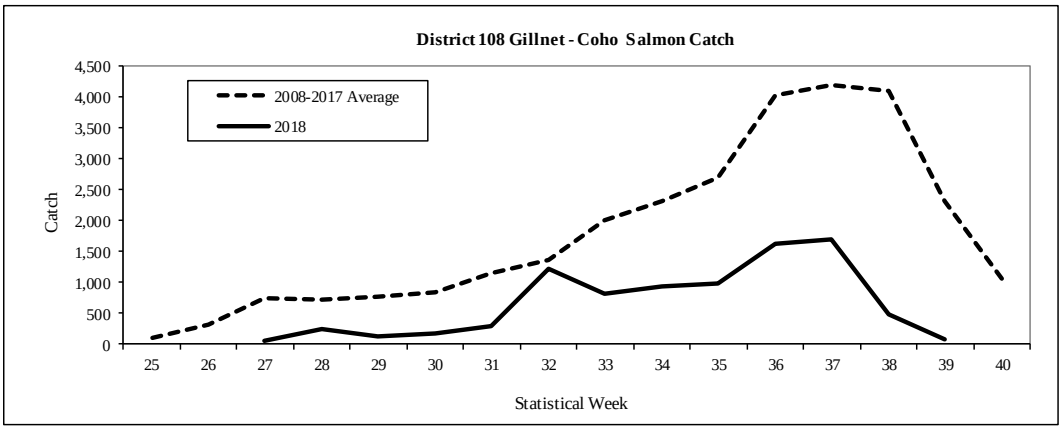


Figure 28. –Coho salmon harvest by week in the District 108 drift gillnet fishery, 2018.

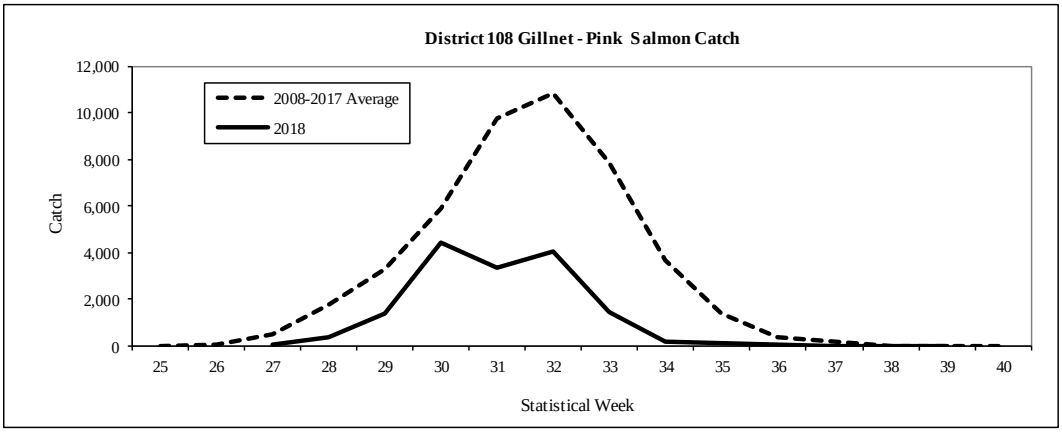


Figure 29. –Pink salmon harvest by week in the District 108 drift gillnet fishery, 2018.

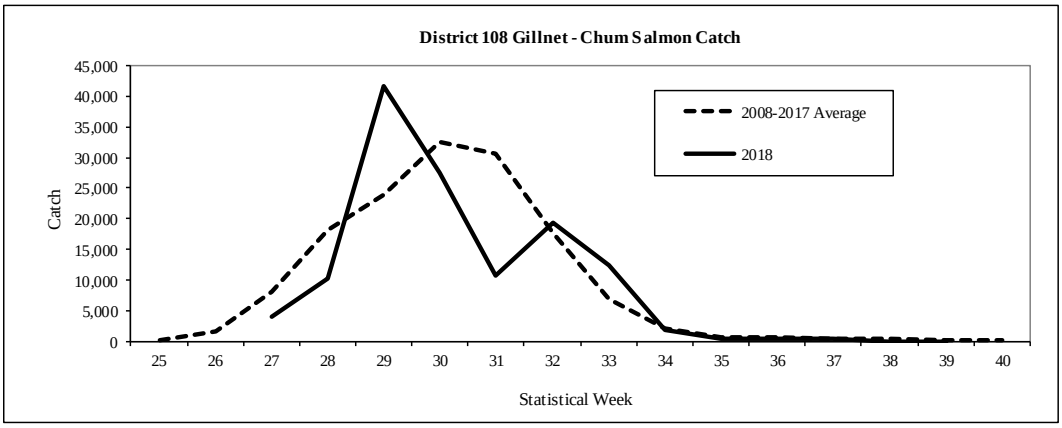


Figure 30. –Chum salmon harvest by week in the District 108 drift gillnet fishery, 2018.

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 runs in excess of escapement needs. The 2018 preseason terminal run forecast for the Taku River of 4,700 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 spawning objective range for Taku River sockeye salmon is 71,000 to 80,000 fish, with a point goal of 75,000 fish. The 2018 Taku River sockeye salmon forecast was below the average of 160,000 wild fish, based on the average of Canadian stock-recruit and sibling forecasts. DIPAC forecasted 243,000 enhanced sockeye salmon returning through District 111 waters to Port Snettisham.

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. The U.S. management intent in 2018 was to pass a minimum of 75,000 coho salmon above the border, providing for escapement and a 5,000 fish Canadian assessment fishery. The preseason Taku River forecast was for a below average terminal run of 81,000 coho salmon in the Taku River, and DIPAC forecast a run of 37,000 enhanced coho salmon from releases in Gastineau Channel. For 2018, DIPAC forecasted runs totaling 1,090,000 enhanced chum salmon to Gastineau Channel and Limestone Inlet, which was below the recent average.

The traditional drift gillnet fishery in District 111 began on Sunday, June 17, 2018 (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 28 boats, which was near the ten-year average of 31 boats. Only 244 sockeye salmon were harvested during the opening, but the chum salmon harvest of 16,777 fish was by far the largest week 25 harvest ever for the district (Figures 34 and 37). A total of 66 Chinook salmon were harvested, which was well below average for week 25 (Figure 33).

From late June through early August (weeks 26–29) effort in the District 111 drift gillnet fishery was generally above average, with a peak of 154 boats fishing in week 28 (Figure 32). Harvests of sockeye salmon were below average through mid-July, but then improved to near average in late July before dropping to well below average for the rest of the season (Figure 34). Weekly chum salmon catches were well above average and approximately 516,000 fish were harvested from late 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. Chinook salmon harvests were below average and the total harvest of 739 fish was approximately half the average (Figure 33). Pink salmon harvests were well below average throughout the season and the harvest of 23,183 fish was only 15% of average (Figure 36). From late August through late September (weeks 34–39), overall effort in the fishery was near or below average in most weeks (Figure 31 and 32). The overall coho salmon harvest of 35,608 fish was near average and the peak weekly harvest of 12,252 fish occurred in week 36 (Figure 35). Fall chum salmon harvests were below the recent ten-year average from week 34 through 39 (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 final, GSI-based District 111 harvest estimates of Taku River large Chinook salmon during the accounting period was 31 fish in the drift gillnet fishery, 9 in the sport fishery, and an estimated 10 in the personal use fishery, for a total of 50 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 7,271 fish, which was well below the escapement goal range.

The 2018 traditional District 111 sockeye salmon harvest of 68,122 fish was 66% of the recent ten-year average. Peak catches of sockeye salmon occurred in weeks 29 and 30 (mid-to-late July; Figure 34). The Speel Arm SHA was opened from week 32 to 37 and 24,767 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 4,244 fish counted through the weir through September 18. DIPAC sockeye salmon returning to the Snettisham Hatchery contributed a minimum of 41,000 fish to the traditional District 111 harvest. The preliminary escapement estimate of Taku River sockeye salmon is 108,000 fish, which was above the escapement goal range.

The 2018 traditional District 111 coho salmon harvest of 35,608 fish was near the recent ten-year average (Figure 35). Approximately 90% of the coho salmon were harvested in Taku Inlet, which was above the ten-year average of 80%, and 10% 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 fourth year of full production for DIPAC's revitalized enhanced coho salmon program. Alaska hatchery (nearly entirely DIPAC) enhanced coho salmon first appeared in the District 111 harvest in week 33, and comprised substantial proportions of the harvest each remaining week of the fishery. Alaska hatchery enhanced coho salmon contributed 39% of the 2018 District 111 traditional drift gillnet harvest. The final escapement estimate of Taku River coho salmon is 51,600 fish, which was just inside the escapement goal range of 50,000 to 90,000 fish.

The 2018 District 111 traditional pink salmon harvest of 23,183 fish was 15% of the ten-year 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 25% of the lower end of the management target range. The 2018 District 111 traditional fishery chum salmon harvest of 517,104 fish was 83% of the recent ten-year 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 comprised mostly 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 57% of the District 111 chum harvest was taken in Taku Inlet, and 43% in Stephens Passage. The harvest of 1,507 fall-run chum salmon (i.e. chum salmon caught after week 33) was 47% of the recent ten-year 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, 2018a.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
25	17-Jun	66	244	6	0	16,777	28	2	56
26	24-Jun	89	1,100	8	0	39,971	64	2	128
27	1-Jul	96	1,721	19	9	115,954	119	2	238
28	8-Jul	133	6,208	53	404	160,306	154	3	462
29	15-Jul	96	17,058	376	2,121	104,783	150	4	600
30	22-Jul	108	18,588	1,724	6,113	48,844	123	4	492
31	29-Jul	96	9,934	1,775	9,802	20,668	75	4	300
32	5-Aug	31	8,199	1,565	4,383	7,340	68	4	272
33	13-Aug	4	2,172	727	319	954	25	3	75
34	20-Aug	6	1,789	3,098	32	752	28	3	84
35	26-Aug	5	889	4,471	0	304	24	3	72
36	2-Sep	4	185	12,252	0	339	34	4	136
37	9-Sep	5	31	6,633	0	79	34	3	102
38	16-Sep	0	3	2,736	0	33	28	2	56
39	23-Sep	0	1	165	0	0	7	1	7
Total		739	68,122	35,608	23,183	517,104	218	44	3,080
2008–2017 Average		1,434	103,184	36,592	152,604	624,011	191	52	2,947
2018 as % of Average		52%	66%	97%	15%	83%	114%	85%	104%

[a] The 2018 District 111 drift gillnet harvest and effort, as well as the 2008-2017 averages, are for the directed sockeye and coho salmon portions of the fishery only. There was no directed fishery for Chinook salmon in District 111 in 2018 due to a low Taku River preseason abundance forecast.

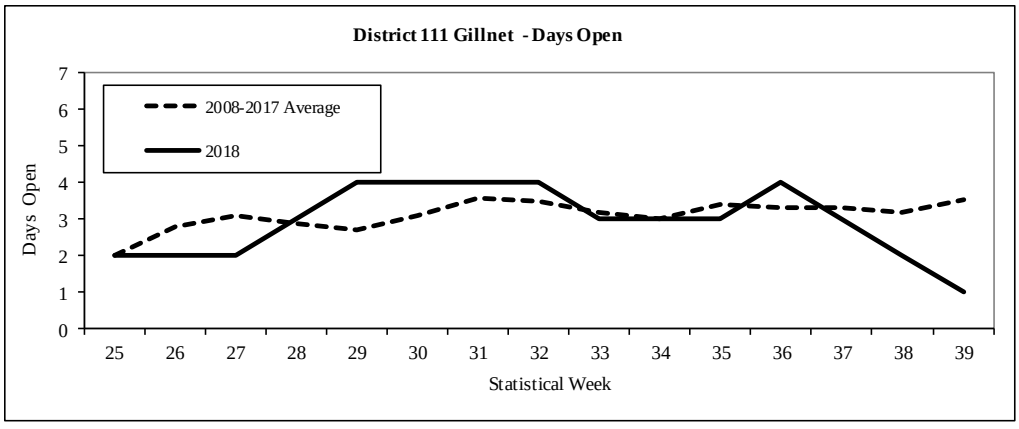


Figure 31. –Days open by week in the District 111 drift gillnet fishery, 2018.

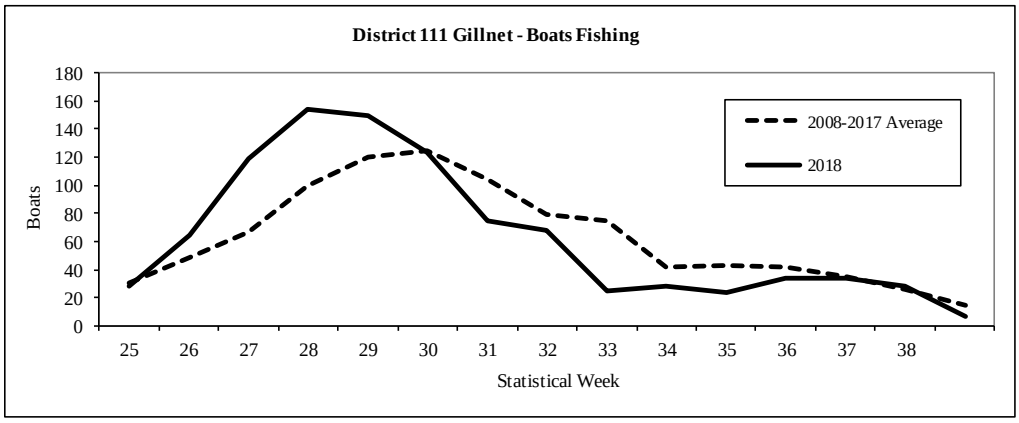


Figure 32. –Number of boats fishing by week in the District 111 drift gillnet fishery, 2018.

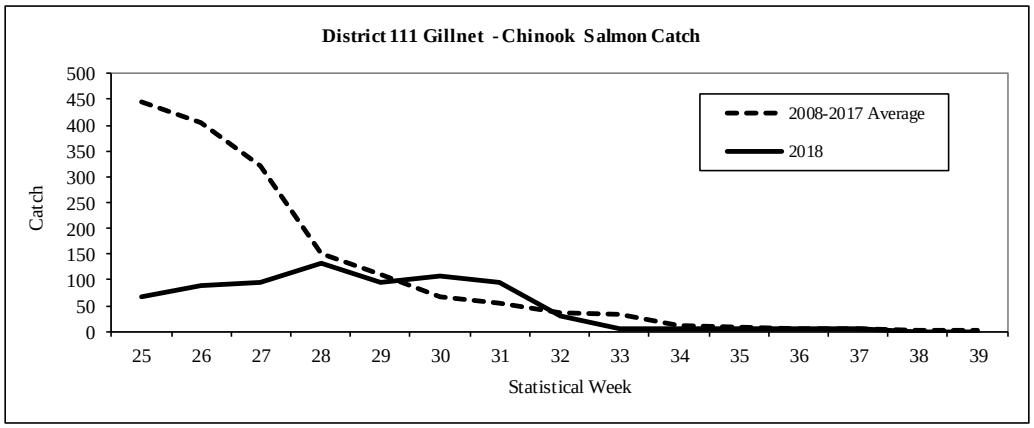


Figure 33. –Chinook salmon harvest by week in the District 111 drift gillnet fishery, 2018.

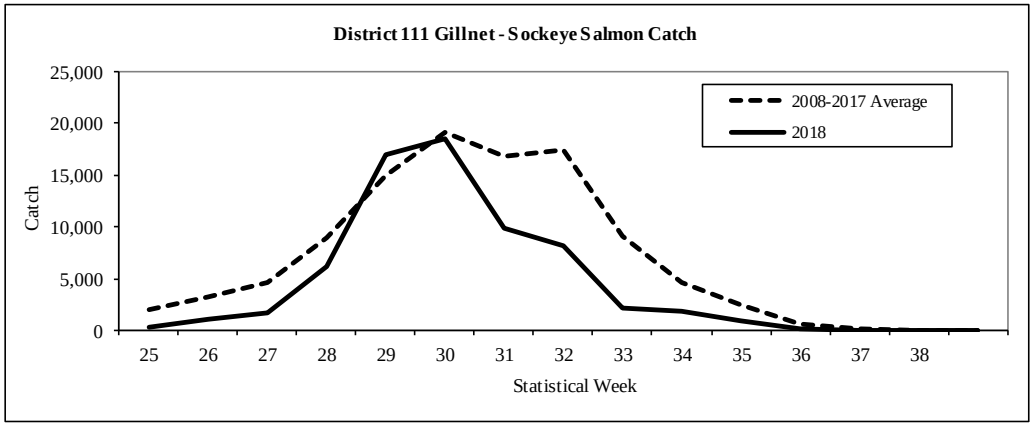


Figure 34. –Sockeye salmon harvest by week in the District 111 drift gillnet fishery, 2018.

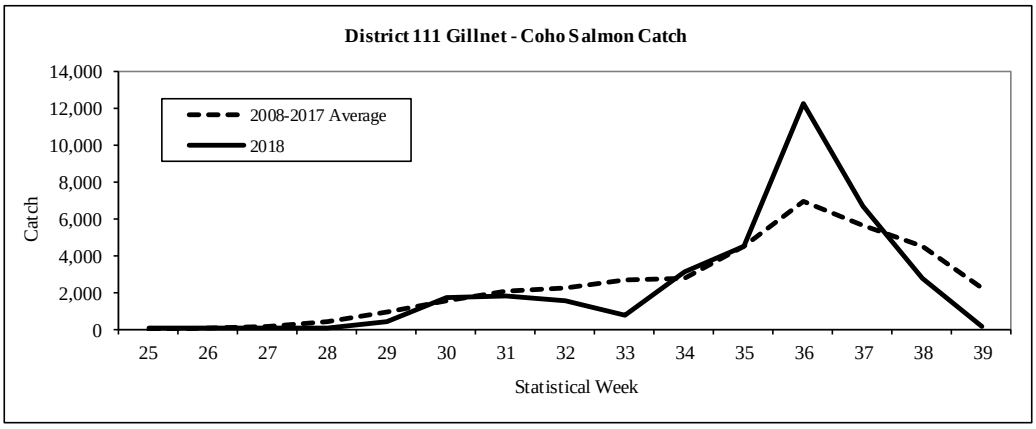


Figure 35. –Coho salmon harvest by week in the District 111 drift gillnet fishery, 2018.

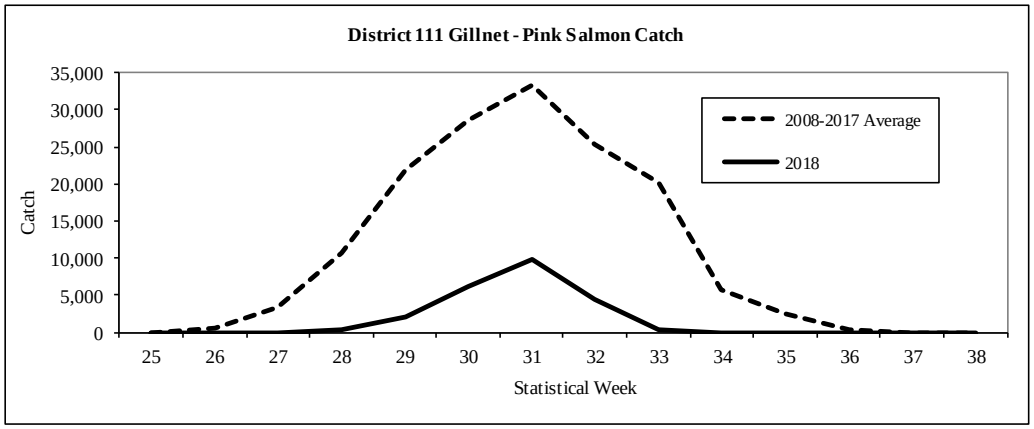


Figure 36. –Pink salmon harvest by week in the District 111 drift gillnet fishery, 2018.

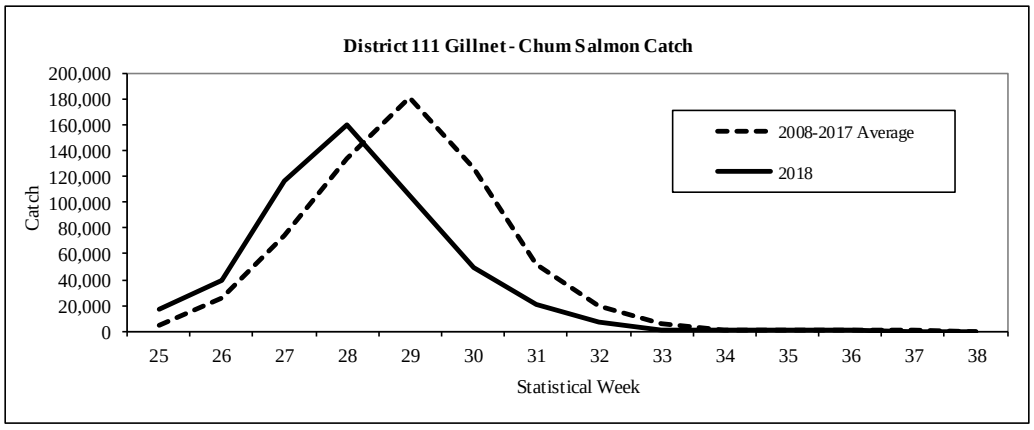


Figure 37. –Chum salmon harvest by week in the District 111 drift gillnet fishery, 2018.

Transboundary River Joint Enhancement

The transport of sockeye salmon fry from the Snettisham Hatchery facility back to the Canadian lakes was complete on June 5, 2018. Approximately 4.30 million fry were released in Tahltan, Tatsamenie, and Trapper lakes in Canada. The overall green egg to fry survival for brood year (BY) 2016 releases was 71% (Table 9). After transporting BY17 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 BY18 egg-takes.

Brood year 2018 egg-takes began on September 12th at Tahltan Lake and September 19th at Tatsamenie Lake. An estimated total of 5.0 million green eggs were collected from the two donor lakes. Tahltan Lake egg-takes were completed on September 24th after collecting an estimated 2.5 million eggs in 7 egg lots. Tatsamenie Lake egg-takes were completed on October 8th after collecting 2.5 million eggs in 5 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 2017 sockeye salmon fry released May and June 2018. 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	6	79.2%	68.4%	2,634,200
Tatsamenie	Upper Tats Lk	3	81.4%	74.3%	1,263,500
Tatsamenie	Upper Tats Lk, Extended Rearing	2	85.1%	83.2%	214,300
Trapper	Trapper Lk	1	75.1%	67.0%	187,700
	Average/Totals	12	79.8%	70.6%	4,299,700

During the 2018 season, the ADF&G Thermal Mark Lab processed 12,985 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 73 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 2018 and a 6-inch maximum mesh restriction was in effect through July 1 as a Chinook salmon conservation measure.

Preseason expectations were for below average Chinook and sockeye salmon runs in 2018. The overall Alsek drainage sockeye salmon run was expected to be approximately 28,200 fish; well below the recent 10-year average run size of approximately 61,000 sockeye salmon. The preseason outlook for 2018 was based on a predicted run of 6,500 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 2018 run were 2013 and 2014. The Klukshu River escapements in 2013 and 2014 were 3,800 and 12,100 sockeye salmon respectfully; both below the 10-year average of 14,000 fish.

The 2018 Alsek River set gillnet fishery opened Sunday June 17 (week 25). The total number of individual permits fished during the season was 10, which was below the 2008–2017 average of 17 permits. The commercial fishery was opened for a total of 32.5 days which was well below the ten-year average of 44 days. The overall effort in boat-days was 23% 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 below average in all weeks of the fishery and the total harvest of 1,363 fish was only 10% of the 2008–2017 average of 13,966 fish (Table 10). There was little effort after early August. 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 2018, only 2 coho salmon were harvested (Table 10).

The Klukshu River weir count of 7,035 sockeye salmon was below the lower bound of the 7,500 to 11,000 fish escapement goal range. The count of 91 early run sockeye salmon (count through August 15) and the late run count of 6,944 were both below average. The Klukshu River weir count of 1,078 Chinook salmon met the escapement goal range of 800 to 1,200 fish.

Table 10. –Weekly fishing effort and salmon harvest for Alsek River, 2018.

							Effort		
Statistical	Start	Catch							Boat
Week	Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Days
25	17-Jun	15	59	0	0	0	9	1	9
26	24-Jun	70	322	0	0	0	9	1	9
27									
28	8-Jul	3	397	0	0	0	8	0.5	4
29									
30	22-Jul	0	471	0	0	0	10	1	10
31-39[ab]	29-Jul	0	114	2	0	0	5	29	7
Total		88	1,363	2	0	0	10	32.5	39
2008-2017 Avg.		410	13,966	1,096	0	6	17	44	170
2018 as % of Avg.		21%	10%	0%		0%	59%	74%	23%

[a] Includes weeks with fewer than three permits, confidential information so data combined in catch table.
[b] Weeks 33-34, 36-39 opened to fishing but not fished.

SOUTHEAST ALASKA CHINOOK SALMON FISHERY

All Gear Harvest

The SEAK (Southeast Alaska/Yakutat) Chinook salmon fishery is managed to achieve the annual all-gear PST allowable catch associated with the preseason abundance index, which is generated by the PSC Chinook model each spring. The 2018 SEAK Chinook salmon management programs were configured around an abundance index (AI) of 1.07 for the 2018 fishing season. This equates to an all-gear PST allowable harvest limit of 144,500 Treaty Chinook salmon, which reflects a 15% reduction in allowable catch (AC) from that allowed under the 1999 PST Agreement. However, owing to conservation concerns for SEAK, Transboundary River, and Northern British Columbia Chinook salmon stocks, extraordinary measures were taken, and Alaska targeted 10% below the harvest limit of the preseason AI (130,000).

The preliminary total Chinook salmon harvest by all SEAK commercial fisheries was 138,650 fish, and the preliminary sport fish harvest was 26,400, for an all-gear harvest of 165,050 (Table 11). The preliminary all-gear PST harvest was 128,623 fish (Table 12).

Table 11. –Preliminary estimated all-gear Chinook salmon harvests in 2018.

Gear	Total Harvest	AK Hatchery Harvest	Wild Terminal Exclusion	Alaska Hatchery Addon	Treaty Harvest
Troll	107,565	9,203	0	5,935	101,630
Sport	26,400	6,859	0	5,073	21,327
Drift Gillnet	14,128	11,198	0	10,005	4,123
Purse Seine	16,871	15,613	0	15,413	1,458
Set Gillnet	86	0	0	0	86
Total Net	31,085	26,812	0	25,418	5,667
Total All Gear	***165,050***	***42,873***	***0***	***36,427***	***128,623***

Note: Annette Island and terminal area harvests are included.
**Not available until 2019 model calibration is complete and postseason AI is generated.*

Table 12. –Chinook all-gear harvests in Southeast Alaska and deviation from the harvest ceiling limit (1987-1998) and postseason allowable catch (1999-2018). Harvests are in thousands.

Year	Total Harvest	Add-on and Exclusion Harvest	Postseason Target Treaty Harvest	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	72.6		155.0		
1997	343.0	46.5		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	176.0	228.0	52.0	29.5%
2010	284.8	54.1	215.8	230.6	14.8	6.9%
2011	357.4	66.2	283.3	291.2	7.9	2.8%
2012	295.3	52.5	205.1	242.8	37.7	18.4%
2013	257.3	65.9	284.9	191.4	-93.5	-32.8%
2014	492.5	57.3	378.6	435.2	56.6	14.9%
2015	403.3	68.3	337.5	335.0	-2.5	-0.7%
2016	387.0	36.3	288.2	350.7	62.5	21.7%
2017	207.1	31.6	215.8	175.4	-40.4	-18.7%
2018[1]	165.1	36.4		128.6		

[1] Preliminary.

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 2017–2018 winter troll fishery was open from October 11, 2017 through March 15, 2018. To help reduce encounters of wild SEAK and TBR Chinook during the winter season the fishery was closed from March 16 through April 30, prior to reaching the GHL. A total of 11,967 Chinook salmon were harvested. Of these, 744 (6%) were of Alaska hatchery origin, of which 459 counted toward the Alaska hatchery add-on, resulting in a PST harvest of 11,508 (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 PST 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 PST harvest limit of Chinook salmon, while most of the Alaska hatchery fish are not.

In 2018, 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 migration corridors did not open. A total of eight spring areas and seven terminal area fisheries opened in 2018. The combined harvest for spring and terminal troll fisheries was 8,395 Chinook salmon, of which 4,130 (49%) were of Alaska hatchery origin and 2,807 counted toward the Alaska hatchery add-on, resulting in a PST harvest of 5,588.

The 2018 summer troll fishery included two Chinook salmon retention periods, from July 1–14 and August 15–19. A total of 6,734 Chinook salmon were harvested, of which 4,329 (5%) were of Alaskan hatchery origin and 2,670 counted toward the Alaska hatchery add-on. The resulting PST harvest was 84,064 fish.

The total harvest for all troll fisheries in the 2018 accounting year was 107,565 Chinook salmon, of which 101,630 counted as PST harvest.

Table 13. –Preliminary 2018 troll fishery Chinook salmon harvest by season.

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	11,967	744	459	0	459	11,508
Spring Troll[a]	8,395	4,130	2,807	0	2,807	5,588
Summer Troll						
First Period[b]	58,992	3,322	2,049	0	2,049	56,943
Second Period	27,742	1,007	621	0	621	27,121
Total Summer	86,734	4,329	2,670	0	2,670	84,064
Total Traditional Troll	107,106	9,203	5,935	0	5,935	101,171
Annette Is. Troll	459	0	0	0	0	459
Total Troll Harvest	**107,565**	**9,203**	**5,935**	**0**	**5,935**	**101,630**

[a] Spring troll harvest includes all terminal and Wild Terminal Exclusion harvests for year.
[b] Total summer harvest includes confiscated harvest for year.

Net Fisheries

A total of 14,128 Chinook salmon were harvested in the drift gillnet fisheries in 2018, of which 11,198 (79%) were of Alaska hatchery origin and 10,005 counted toward the Alaska hatchery add-on, resulting in a PST harvest of 4,123 fish (Table 11). A total of 16,871 Chinook salmon were harvested in the purse seine fisheries, of which 15,613 (93%) were of Alaska hatchery origin and 15,413 counted toward the Alaska hatchery add-on, resulting in a PST harvest of 1,458 fish. A total of 86 Chinook salmon were harvested in the set gillnet fisheries, none of which were of Alaska hatchery origin, resulting in a PST harvest of 86 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 agreement (Chapter 1), harvests of Chinook salmon in the net fisheries are primarily incidental to the harvest of other species and only constituted a small fraction (<1.0%) of the total net harvest of all species.

Recreational Fisheries

The Southeast Alaska king salmon sport fishery is managed under provisions of the Southeast Alaska King Salmon Management Plan (5 AAC 47.055). This plan prescribes management measures based upon the preseason abundance index determined by the Chinook Technical Committee of the Pacific Salmon

Commission. The preseason abundance index generated for the SEAK AABM fishery in 2018 was 1.07, resulting in a preseason sport allocation of 23,900 treaty Chinook salmon under the harvest management plan adopted by Alaska Board of Fisheries. Based on this preseason AI, the SEAK King Salmon Management Plan, and additional conservation measures to further reduce harvest by 10%, a resident sport fish angler was allowed to use two rods from October through March, and the bag and possession limit was one king salmon 28 inches or greater in length. The nonresident annual harvest limit was three king salmon 28 inches or greater in length from January 1 through June 30, with a daily bag and possession limit of one king salmon 28 inches or greater in length applying to the whole season. From July 1 through December 31, the annual limit is one king salmon, 28 inches or greater in length, and king salmon harvested from January 1 through June 30 will apply toward the one fish annual limit. The 2018 recreational fishery had an estimated preliminary total harvest of 26,400 Chinook salmon, of which 21,327 counted as treaty harvest. The final total and treaty harvest in the sport fishery for 2018 will be available in late fall of 2019.

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 2018, troll CPUE in Area 6 in the early weeks of the fishery averaged 28 coho/day, which was above the highest boundary area conservation trigger of 22 coho/day. The mid-July projection of region-wide total commercial harvest of 1.81 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 2018 region-wide summer troll coho fishery began by regulation on June 1 and continued through the normal September 20. All waters of SEAK, apart from a portion of southern boundary area waters, extended to trolling through September 30. The 2018 all-gear catch of coho salmon totaled 1.65 million fish, of which 1.47 million (89%) were taken in commercial fisheries (Table 14). The troll catch of 942,400 fish was 42% below the 10-year average of 1.62 million fish and accounted for 64% of the commercial catch. Power troll wild coho CPUEs were below the 20-year average for the duration of the summer season. The overall wild stock abundance (wild troll catch divided by an index of the troll exploitation rate) was estimated at 3.21 million fish and was 22% below the 20-year average. With pink salmon abundance down throughout much of SEAK in 2018, purse seine opportunities were reduced. Consequently, the purse seine coho salmon harvest of 156,800 fish was 50% below the 10-year average, while the drift gillnet harvest of 273,000 fish was 27% below the 10-year average. The set gillnet harvest of 95,600 fish in the Yakutat area was 32% below the 10-year average, with 89% 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 1.04 million fish (71%) in the commercial catch compared with a recent 10-year average of 1.88 million fish (77% wild). The hatchery percentage of the commercial catch of 29%. Of the estimated hatchery contribution of 426,100 fish, over 99% originated from facilities in Southeast Alaska, with facilities on or near the outer coast accounting for an estimated 58% of the return while inside hatchery returns contributed to the remaining 42%.

Escapement counts and estimates were within or above goal in most cases, with a few exceptions. The total escapement of 619 coho salmon to Hugh Smith Lake was within the biological escapement goal (500-1,600 spawners) for the fourth consecutive year, after consistently exceeding the goal during the prior seven years. Despite a 2017 smolt migration that was 49% above the long-term average, the estimated total run size of 1,318 adults was 68% below average and the lowest return on record since 1982. The cause of the poor return was a record low marine survival rate of 2.7% that was down by one-third from the previous low of 4.1% for the 1988 return and was 78% below the long-term average (12.5%). Escapements were within respective goal ranges for four northern Southeast inside stocks (Chilkat River, Taku River, Montana Creek, and Peterson Creek) while falling under goal for two streams (Auke Creek and Berners River). The combined peak count of 13,764 coho salmon in the 14 surveyed streams in the Ketchikan area was well-above the 1987–2017 average of 8,913 spawners, and the goal of 4,250–8,500 spawners. The combined peak count of spawners in

five streams in the Sitka area (1,502 spawners) was above both the long-term average of 1,372 spawners and the escapement goal of 400–800 spawners.

In addition to the record low smolt-to-adult survival rate of 2.7% for Hugh Smith Lake, marine survival also remained low for northern inside stocks. Smolt-to-adult survival rates of 6.8% for the Berners River and 7.1% for Auke Creek represented a slight improvement over rates of 4.1–6.4% for these stocks in 2016 and 4.9–5.0% in 2017. However, they were far below historical average estimates of 16.1% for the Berners River (1990–2015) and 19.1% for Auke Creek (1980–2015). A low jack return to Auke Creek as a proportion of the 2018 smolt migration suggests that low smolt-to-adult survival similar to the past 3 years will persist in northern inside waters in 2019. Coho salmon returns have appeared proportionately stronger in outer coastal systems from southern Southeast to Yakutat for a third consecutive year, compared with inside area streams.

Preliminary all-fishery exploitation rate estimates were low to moderate for wild indicator stocks, at 44% for Auke Creek, 49% for Berners River, and 53% for Hugh Smith Lake. The all-fishery exploitation rate for the Hugh Smith Lake stock was well below the long-term average of 61%. The Alaska troll fishery exploitation rate on the Hugh Smith Lake stock (17%) was below the 25-year (1993–2017) average of 31%. Alaska troll fishery exploitation rates on northern inside stocks were estimated at only 19% for Auke Creek and 13% for the Berners River compared with 25-year averages of 26% and 27%, respectively. However, while Alaska purse seine exploitation rates were below average for all three of the wild coho salmon indicator stocks, drift gillnet exploitation rates were well above average. Compared with 25-year averages, Alaska drift gillnet fisheries accounted for an estimated 31% of the Auke Creek return (average 7%), 35% of the Berners River return (average 23%), and 21% of the Hugh Smith Lake return (average 14%).

Table 14. –Coho salmon harvest in Southeast Alaska in 2018 by gear type (preliminary).

Gear Type	Harvest
Troll	942,400
Purse Seine	156,800
Drift Gillnet	273,000
Set Gillnet	95,600
Sport (marine and freshwater)	185,400
Total	1,653,200

II. PRELIMINARY 2018 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 2018 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 2008) 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 2018 pre-season planning process in this region is provided in the following section. The conduct of major fisheries is 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 2013 are also presented. Where available, preliminary estimates of the number of Chinook or Coho salmon released by anglers in 2018 mark-selective fisheries are also presented (Table 17). All estimates for the 2018 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.

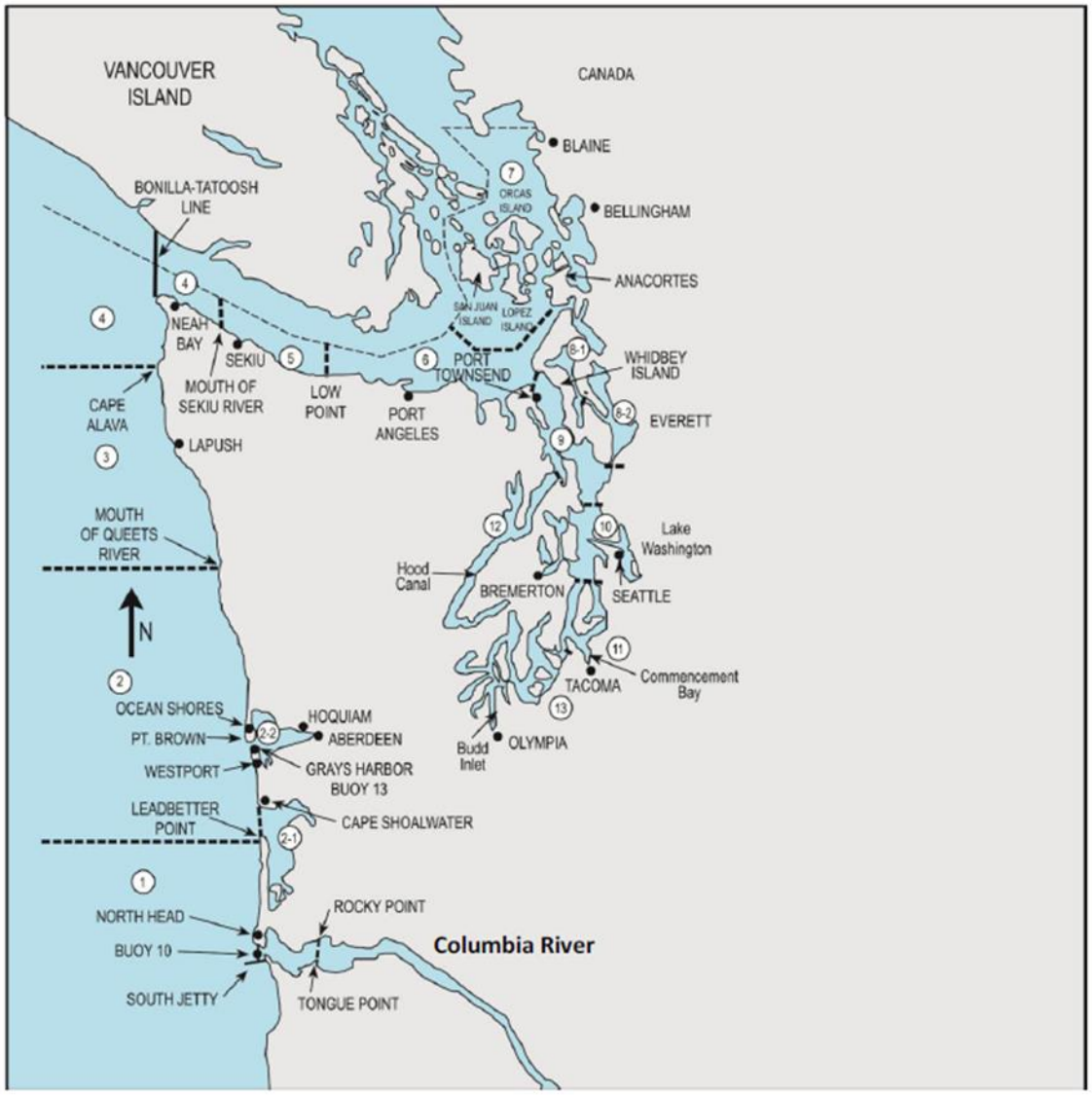


Figure 38. Map of Western Washington marine catch areas of the Washington coast (Areas 1 through 4) and Puget Sound (Areas 5 through 13) (WAC 220-22-030). Inside (Columbia River) fisheries reported in this document extend beyond the scope of this map.

Chinook Salmon Management

Under the 2008 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 the non-ceiling index for aggregated Southern U.S. fisheries on Chinook stocks not achieving their management objectives to be no greater than 60% of the levels estimated for the 1979 – 1982 base period.

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 2018 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 2018, 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, Queets, and Grays Harbor Coho MUs were forecasted to be in low abundance status. The Skagit, Stillaguamish, and Snohomish Coho MUs were predicted to be in moderate status, while the Hood Canal, Quillayute, and Hoh 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 7.0% 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 2018.
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 2018 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 27,500 Chinook and 5,600 Coho with a clipped adipose fin, hereinafter referred to as marked. The preliminary estimate of non-Tribal harvest in the 2018 North of Falcon troll fishery is 24,000 Chinook (87% of the pre-season coast-wide quota; a transfer of 1,876 Chinook from the sport to the troll fishery occurred in-season, resulting in a final troll Chinook quota of 29,376) and 1,400 Coho (25% of the pre-season coast-wide non-Tribal troll quota; a transfer of 1,000 Coho from the troll to the sport fishery occurred in-season, resulting in a final troll Coho quota of 4,600). Trollers harvested 16,200 Chinook in the May 1 – June 30 fishery, and the remaining 7,800 Chinook were harvested in the summer all-species fishery between July 1 and September 19. 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 2018 quotas were set at 40,000 Chinook and 12,500 coho. The Chinook quota was split into two sub-quotas—a 16,000 sub-quota during May-June and a 24,000 sub-quota during July-September. The 12,500 coho quota could be harvested during the July-September all-species fishery.

The May-June Treaty troll Chinook-directed fishery harvested 81% of the 16,000 Chinook sub-quota. Chinook effort was highest in June, which accounted for 73% of the Chinook landings during this time period. There were 324 landings during May and June. The all-species portion of the fishery ran from July 1 until September 15. The fishery harvested 45% of the 24,000 Chinook sub-quota and 90% of the 12,500 coho quota. Coho landings were highest in August accounting for 46% of the overall catch, followed by September at 40%. Chinook effort was highest in July, which accounted for approximately 78% of the Chinook landings during this time period. There were 485 landings during the all-species portion of the fishery.

Overall the Treaty troll fishery harvested 59% of the 40,000 Chinook quota and 90% of the 12,500 coho quota. The total ocean salmon harvest for the 2018 Treaty troll fishery was 23,680 Chinook and 11,301 coho.

Ocean Sport Fisheries

Pre-season quotas for the Washington coastal sport fishery (Ocean Areas 1 through 4) were 27,500 Chinook and 42,000 marked Coho. Preliminary total catch estimates for the ocean sport fisheries north of Cape Falcon were 10,600 Chinook (39% of the pre-season coast-wide quota; a transfer of 1,876 Chinook from the sport to the troll fishery occurred in-season, resulting in a final sport Chinook quota of 25,624) and 41,800 Coho (100% of the pre-season coast-wide sport quota; a transfer of 1,000 Coho from the troll to the sport fishery occurred in-season, resulting in a final sport Coho quota of 43,000). 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 23 with a pre-season quota of 21,000 marked Coho and a guideline of 8,000 Chinook. The fishery closed upon projected attainment of the Coho quota on August 12, and reopened for two days on September 2 and 3. The catch estimates for Area 1 were 2,200 Chinook (28% of the guideline) and 20,500 Coho (98% 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.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 1 Coho mark-selective sport fishery, June 23 – September 3, 2018.

Coho retained	Coho released	Total encounters	Mark %
20,500	14,600	35,100	58%

Westport, Washington

Ocean Area 2 (Westport, WA) opened for all-species salmon sport fishing on July 1 with a pre-season quota of 15,540 marked Coho and a guideline of 13,100 Chinook. The fishery closed on its automatic closure date, September 3. The catch estimates for Area 2 were 4,900 Chinook (37% of the guideline) and 15,400 Coho

(99% 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 13.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 2 Coho non-retention sport fishery, July 1 – September 3, 2018.			
Coho retained	Coho released	Total encounters	Mark %
15,400	16,900	32,300	48%

La Push, Washington

Ocean Area 3 (La Push, WA) opened for all-species salmon sport fishing on June 23 with a pre-season quota of 1,090 marked Coho and a guideline of 1,500 Chinook. The fishery closed on its automatic closure date, September 3. The catch estimates for Area 3 were 400 Chinook (27% of the guideline) and 1,000 Coho (92% of the quota). The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 3 Coho non-retention sport fishery, June 23 – September 3, 2018.			
Coho retained	Coho released	Total encounters	Mark %
1,000	1,600	2,600	38%

Neah Bay, Washington

Ocean Area 4 (Neah Bay, WA) opened for all-species salmon sport fishing on June 23 with a pre-season quota of 4,370 marked Coho and a guideline of 4,900 Chinook. Following an in-season transfer from the non-Tribal troll fishery to modify the area Coho quota to 5,370 and a transfer to the troll fishery to modify the area Chinook guideline to 3,024, the fishery closed upon attainment of the Coho quota on August 12. The catch estimates for Area 4 were 3,000 Chinook (100% of the guideline) and 4,900 Coho (91% of the modified quota). The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches.

Preliminary estimates of Coho encounters (retained and released), in the Area 4 Coho non-retention sport fishery, June 23 – September 3, 2018.			
Coho retained	Coho released	Total encounters	Mark %
4,900	7,900	12,800	38%

NORTH OF CAPE FALCON INSIDE FISHERIES

WASHINGTON COASTAL RIVER FISHERIES

North Washington Coastal Rivers

Net and sport fisheries targeting salmon in northern Washington coastal rivers were implemented based upon pre-season, Tribal-State agreements. The 2018 north coastal rivers net harvest (all by Tribal fisheries that are non-selective) includes catch from the Sooes, Quillayute system, Hoh, Queets, and Quinault Rivers. The 2018 commercial Tribal net fisheries in north coastal rivers harvested an estimated 11,000 Chinook salmon and 21,800 Coho salmon through November 15, 2018.

Recreational fisheries conducted during 2018 in the Quillayute, Hoh and Queets River systems included mark-selective fisheries targeting hatchery Chinook in the Quillayute and Hoh systems as well as hatchery summer and fall Coho in the Quillayute system. The Queets system had a hatchery coho sport fishery in

September, but was closed to sport fishing during October and November when the wild fall coho and Chinook returned. 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, 2018. The non-selective Tribal net fisheries in Grays Harbor, and including fisheries in the Humptulips and Chehalis Rivers, harvested an estimated 2,600 Chinook salmon and 8,300 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 2018 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 and Snake River spring/summer Chinook. Summer season fisheries were constrained by impacts to ESA listed sockeye and summer steelhead. Fall fisheries were mainly constrained by impacts to ESA listed Snake River fall Chinook. Additionally, careful in-season management to limit the fishery impacts on upriver summer steelhead, wild lower Columbia tule fall Chinook, and wild lower Columbia River Coho further constrained Columbia River fall fisheries during 2018.

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 2018 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 recent 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 2018, the area below Bonneville Dam was open from January 1 – April 7, April 14, and May 25 through June 15 for hatchery Chinook retention. Catch estimates for this area totaled 7,509 hatchery adult spring Chinook kept and 1,530 non-adipose fin clipped Chinook released. From Bonneville Dam to the Washington-Oregon state line, there were 613 hatchery adult spring Chinook kept and 100 non-adipose fin clipped Chinook released. The Snake River fishery structure included three specific catch areas open on a days-per-week rotation as was open April 20 –

June 12. Catch in the Snake River fishery totaled 740 hatchery adult spring Chinook and 302 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 2017 Winter/Spring Columbia River mark-selective sport fishery.					
System	Area	Chinook Kept	Chinook Released	Total Encounters	% Kept
Columbia River	Below BON (LCR)	7,509	1,530	9,039	83%
Columbia River	BON to WA-OR S/L	613	100	713	86%
Snake River	Washington Waters	740	302	731,072	69%

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 2018, 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 4 days to assess catches. Commercial sales did not occur in 2018 Tribal fisheries during the spring management period. Harvest estimates from the combined ceremonial and subsistence fisheries totaled approximately 10,870 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, non-Tribal commercial fisheries did not occur in the 2018 summer management timeframe. Non-Tribal commercial fisheries are now restricted to non-gillnet gear and did not occur since a suitable alternative has not been identified.

Sport

Summer season recreational fisheries occurred from June 22-30 from the Astoria-Megler Bridge near the mouth of the Columbia River upstream to Bonneville Dam. The fishery was mark-selective the entire season. Catch estimates below Bonneville Dam (BON) totaled 1,027 adult Chinook kept (750 non-adipose fin clipped released). The season upstream of Bonneville Dam was open June 16-July 6. Catch estimates from Bonneville Dam upstream to McNary Dam totaled 12 adult Chinook kept (0 non-adipose fin clipped released). The majority of harvest occurred in fisheries upstream of Priest Rapids Dam and in tributaries, which are not reported in this document.

Adult Summer Chinook Salmon Handle in the 2018 Sport Mark-Selective Fishery.					
System	Area	Chinook Kept	Chinook Released	Total Handle	% Kept
Columbia River	Below BON (LCR)	1,027	750	1,777	58%
Columbia River	BON to PRD	12	0	12	100% [1]

[1] *The high mark rate may be an artifact of small sample size in the creel.*

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. Seven weekly commercial gillnet fishing periods were conducted from June 16 – July 29. 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 approximately 9,498 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 seining or Coho tangle net fisheries occurred in 2018 due to ESA constraints. In 2018, the early fall season consisted of four fishing periods during August 21-30 in commercial Zones 4-5 (Warrior Rock to Beacon Rock). There were insufficient ESA impacts to open the late fall season. Harvest estimates are estimated to include 8,320 Chinook and 380 Coho Salmon.

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 2018 and closed to salmon fishing September 12 through the remainder of the fall season due insufficient ESA impacts remaining. The Buoy 10 fishery opened August 1 and continued through September 12; Chinook retention was allowed August 1 through August 24. Additional regulations for the Buoy 10 fishery included minimum size limits for Chinook (24-inches) and Coho (16-inches), and in 2018, steelhead retention was prohibited beginning August 18. 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 11,608 Chinook and 6,734 hatchery Coho Salmon kept. Released fish included 4,700 Chinook and 6,242 Coho Salmon. The lower Columbia River (LCR) mainstem sport fishery from the Rocky Point – Tongue Point line upstream to Bonneville Dam opened August 1 and continued September 12. In the area from the Rocky Point – Tongue Point line upstream to the Lewis River, Chinook retention was open August 1 through September 2. Chinook retention was allowed August 1-September 12 from the Lewis River upstream to Bonneville Dam. The kept catch estimate for the LCR sport fishery was 9,802 adult Chinook through September 12; an additional 877 adult Chinook were released. The mainstem sport fishery

from Bonneville Dam to the Highway 395 Bridge (near Pasco, Washington) was open August 1 – September 12. Adult catch estimates for the Bonneville to McNary area totaled 958 fall Chinook and 12 Coho Salmon. 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 2018 Columbia River Fall Sport Fisheries					
System	Area	Chinook Kept	Chinook Released	Total Handle	% Kept
Columbia River	Buoy 10	11,608	4,700	16,308	71%
Columbia River	LCR Sport	9,802	877	10,679	92%
Columbia River	Bonneville-McNary	958	97	1,055	91%
System	Area	Coho Kept	Coho Released	Total Handle	% Kept
Columbia River	Buoy 10	6,734	6,242	12,976	52%
Columbia River	LCR Sport [1]	650	417	1,067	61%
Columbia River	Bonneville-McNary [2]	12	6	18	66%

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 seven weekly fishing periods from August 21 through October 5. Preliminary harvest estimates for all fall season fisheries total 53,343 adult fall Chinook and 3,705 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 2018 pre-season planning included Mid-Hood Canal, Snohomish, and Nooksack Chinook. Strait of Juan de Fuca, Snohomish, and Stillaguamish 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.

Strait of Juan de Fuca Sport

Marked Chinook retention was allowed for sport fishing in salmon management Area 5 from March 16, 2018 through April 30, 2018 and in Area 6 from March 1, 2018 through April 8, 2018. 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, 2018.

Chinook retained	Chinook released	Total encounters	Mark % (legal size)
3,838	18,069	21,907	62.3%

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, 2017 – April 15, 2018), 800 Chinook and zero Coho were caught. In the summer Tribal troll fishery in Areas 5 and 6C only (June 1 – September 30, 2018), 200 Chinook and 500 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 2018 catch in the Strait of Juan de Fuca Tribal net fisheries (no non-Tribal net fisheries in the Strait of Juan de Fuca) are 2,200 Chinook and 4,400 Coho salmon.

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

Preliminary estimates of the 2018 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 4,000 Chinook and 2,900 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, 2018 through April 30, 2018. 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 30, 2018.

Chinook retained	Chinook released	Total encounters	Mark % (legal size)
2,227	4,383	6,610	72%

During the summer season in Area 7, recreational anglers were allowed to retain Chinook from July 1 through September 3. Mark-selective regulations (release of unmarked Chinook required) were implemented during

the month of July only. 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 2018-19 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, 2018.

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, 2018.

Chinook retained	Chinook released	Total encounters	Mark % (legal size)
2,349	6,744	9,093	62%

Catch estimates and sampling information for this area during the period from August 1 through September 3, 2018 are not available at this time.

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 2017 – April 2018) period, and in Areas 9, 10, 11, 12, and 13 during the summer (May – September 2018) period. Additionally, marked and unmarked Chinook retention was permitted in the Tulalip Bay (Area 8-2) from May 26 through September 25(Fridays through noon Mondays), and from September 8 through September 30 (Saturdays and Sundays).

Puget Sound Chinook mark-selective sport fisheries conducted in marine areas during 2017-2018.

Areas	Season
8.1 & 8.2	Winter: November 1, 2017 – November 12, 2017; February 16, 2018 - April 30, 2018.
9	Winter: November 1 – November 12, 2017; February 16, 2017 – April 15, 2018. Summer: July 16 – July 22, 2018; July 26 – July 29, 2018.
10	Winter: November 1, 2017 – February 28, 2018. Summer: July 16 – August 16, 2018; Sinclair Inlet: July 1 – September 30, 2018.
11	Winter: October 1, 2017 – April 30, 2018. Summer: June 1 – August 25, 2018 (only Fridays – Mondays from July 17 – July 30).
12	Winter: October 1, 2017 – April 30, 2018. Summer: July 1 – September 30 (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 2018 directed at marked Coho were conducted in the following marine catch areas: Area 9 from July 16 – September 30 and in Area 13 from January 1 – December 31. Marked and unmarked Coho retention was permitted in Tulalip Bay from May 25 – September 3 (on Fridays through noon, Mondays only) as well as from September 8 – September 30 (Saturdays, Sundays); in Area 11 from June 1 – December 31; and in Area 12 from January 1 – April 30, 2018 in the whole area, as well as from September 1 – December 31, 2018 in the areas North of Ayock Point and from July 1 – December 31, 2018 in 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 2018. Chinook and Coho were also intercepted in fisheries directed at Pink and Chum salmon. A total of 56,700 Chinook and 116,300 Coho were landed in the Tribal marine net fisheries in Puget Sound (Areas 8-13 & 7B-D) during 2018. 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 40,500 Chinook and 112,000 Coho during 2018.

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 2018.	
River	Season
Nooksack River	September 1 - 30
Cascade River	June 1 – July 15
Skagit River	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 – September 30
Chinook non-selective sport fisheries conducted in Puget Sound rivers during 2018.	
River	Season
Samish River	August 1 – October 31
Green River	September 1 – December 31

During the 2018 season there were no 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. However, recreational non-selective Coho fisheries were conducted on the Skykomish River, Green River, Carbon River, Puyallup 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 2018 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/]

	2018			Landed					
	Preseason [5/]								
Fisheries	Total Mortality [1/]	Landed [2/]	Preliminary Landed	2017	2016	2015	2014	2013	2012
OCEAN FISHERIES									
Commercial Troll									
Neah Bay and La Push (areas 3,4,4B) [3/]	54,600	48,100	33,700	35,200	28,100	73,600	77,100	63,700	79,400
Columbia Ocean Area and Westport (area 1,2) [4/]	30,600	19,400	13,900	24,700	14,200	50,900	39,100	28,300	20,600
Sport (see text for quota information)									
Neah Bay (area 4)	5,500	4,900	3,000	7,300	3,300	8,500	5,900	6,200	5,600
La Push (area 3)	1,700	1,500	400	500	300	2,400	1,600	2,400	1,300
Westport (area 2)	14,600	13,100	4,900	6,600	8,400	19,100	23,500	13,700	19,500
Columbia Ocean Area (area 1)[13/]	10,300	8,000	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)	16,300	10,300	na	9,810	15,000	11,800	11,100	14,900	13,900
San Juan Islands (area 7)	11,000	7,600	na	7,000	5,900	8,600	9,200	9,500	5,800
Puget Sound Marine (area 8-13)	36,500	29,500	na	21,600	16,700	9,000	12,100	16,600	22,000
Puget Sound Rivers [12/]	12,500	12,000	na	23,700	9,600	11,100	11,800	19,600	23,200
North WA Coastal Rivers	-	-	na	1,600	600	2,200	1,200	2,700	1,600

Grays Harbor [7/]	1,700	1,500	na	2,200	2,800	3,800	1,200	3,800	4,600
Columbia River (Spring) [6/]	-	-	8,200	9,100	14,100	23,100	21,400	8,400	17,000
Columbia River (Summer) [6/]	2,800	2,600	1,000	3,800	6,800	6,700	2,300	2,100	3,200
Columbia River (Fall) (incl. Buoy 10) [6/]	25,900	24,800	21,900	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)	7,200	4,500	3,200	1,900	700	5,900	6,100	4,000	3,900
San Juan Islands (area 6,7, 7A)	8,000	7,900	4,000	2,600	100	4,800	6,900	3,800	400
Puget Sound Marine (8-13,7B-D)	45,500	44,700	70,400	90,600	55,800	33,100	28,400	70,100	75,700
Puget Sound Rivers[12/]	35,900	35,900	40,500	53,900	23,300	21,200	19,900	26,800	39,500
North WA Coastal Rivers	-	-	11,000	14,200	9,400	17,300	20,200	14,400	12,800
Grays Harbor (area 2A-2D) [7/]	1,000	1,000	2,600	3,700	2,100	10,500	5,100	2,900	4,000
Columbia River Net (Winter/Spring) [8/]	-	-	8,700	8,100	20,400	37,600	28,200	11,200	23,800
Columbia River Net (Summer) [8/]	-	-	10,600	16,300	23,400	41,700	22,200	15,300	9,500
Columbia River Net (Fall) [8/]	-	-	61,700	140,600	188,900	343,900	365,900	312,500	119,800

Table 15 Footnotes:

[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. http://wdfw.wa.gov/fishing/crc/staff_reports.html.

[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 2018 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/]

	2018			Landed					
	Preseason [9/]								
Fisheries	Total Mortality [1/]	Landed [2/]	Preliminary Landed	2017	2016	2015	2014	2013	2012
OCEAN FISHERIES									
Commercial Troll									
Neah Bay and La Push (area 3,4,4B) [3/]	15,000	13,600	11,300	13,300	-	4,100	60,100	48,500	38,600
Columbia Ocean Area and Westport (area 1,2) [10/]	8,000	4,500	1,200	1,800	-	4,800	19,000	5,400	2,800
Sport (see text for quota information)									
Neah Bay (area 4)	5,300	4,400	4,900	3,500	100	7,800	5,600	6,500	7,500
La Push (area 3)	1,300	1,100	1,000	1,750	-	600	4,600	2,800	2,200
Westport (area 2)	18,100	15,500	15,400	15,750	-	30,700	54,500	20,400	11,900
Columbia Ocean Area (area 1)[12/]	23,900	21,000	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)	23,400	19,600	na	5,450	200	62,900	63,000	41,300	76,200
San Juan Islands (area 7)	1,400	1,300	na	100	100	3,700	2,000	2,600	2,200
Puget Sound Marine (area 8-13)	45,900	40,900	na	35,200	5,200	77,200	59,200	72,100	91,300
Puget Sound Rivers	21,200	20,200	na	9,000	11,300	18,600	17,900	70,000	43,500
North WA Coastal Rivers	2,500	2,300	na	4,900	1,600	3,600	8,800	7,200	2,700

Grays Harbor [5/]	5,700	5,400	na	7,400	4,300	8,200	27,300	21,200	18,300
Columbia River Buoy 10 [4/,11/]	29,300	25,000	6,700	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)	1,600	1,600	4,900	1,200	700	1,700	2,300	2,700	3,500
San Juan Islands (area 6,7,7A)	13,000	9,800	3,800	3,400	4,100	3,900	19,800	19,400	10,500
Puget Sound Marine (area 8-13,7B-D)	125,900	123,000	125,100	134,400	210,900	28,800	108,400	168,500	236,300
Puget Sound Rivers	62,300	61,100	112,000	63,200	65,400	17,800	73,400	136,000	132,400
North WA Coastal Rivers	50,200	49,200	21,800	63,400	57,200	18,400	101,500	44,800	39,700
Grays Harbor (area 2A-2D) [5/]	13,100	12,800	8,300	22,800	3,200	12,600	67,200	22,000	30,700

Table 16 Footnotes:

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 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 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 after March 2013 are preliminary. For Buoy 10, see tables 25 in the annual fall report.

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

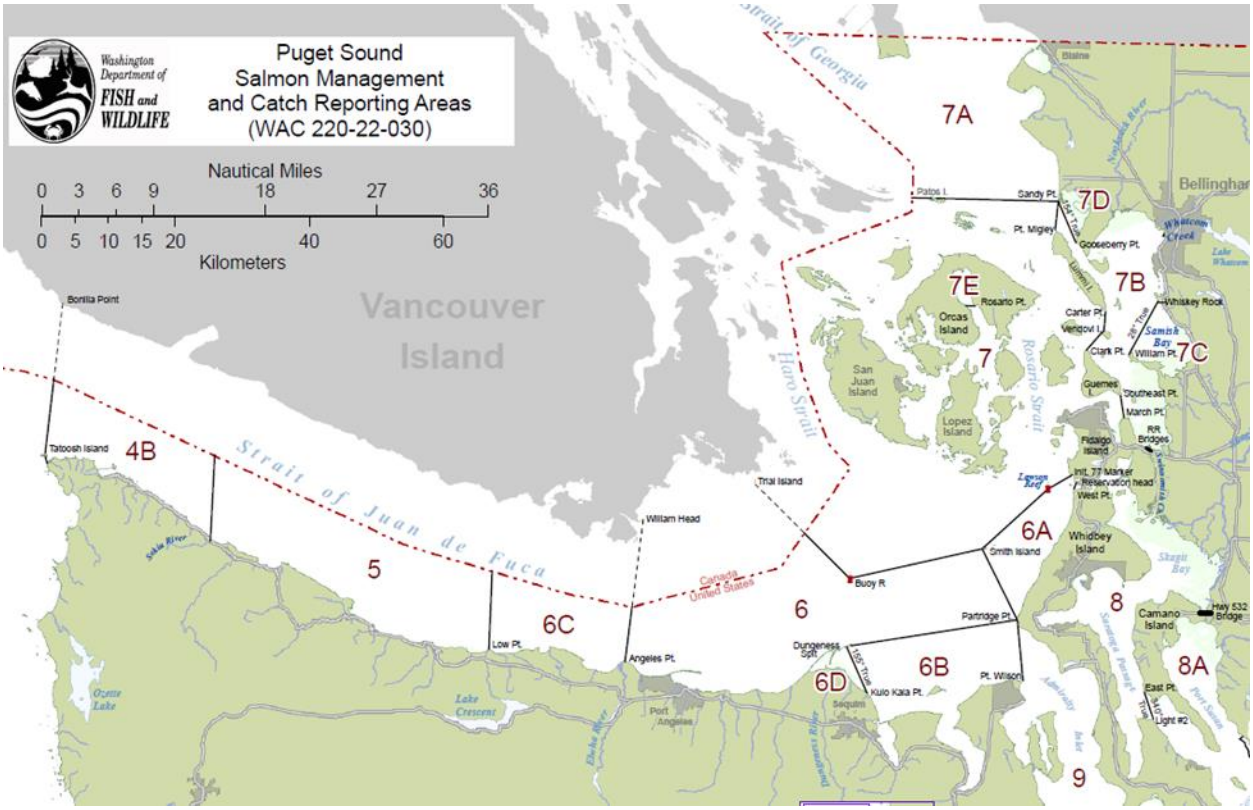
Table 17. Mark-Selective Chinook and Coho Fisheries by Area and Year. "Yes" denotes that a mark selective fishery occurred, even if it only occurred in a subset of the fishing area, season, gear type, or user group.

Selective Coho	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Ocean Troll										
Cape Flattery & Quillayute (Areas 3/4)	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Columbia R & Grays Harbor (Areas 1 & 2)	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Ocean Sport										
Neah Bay (Area 4)	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
LaPush (Area 3)	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Grays Harbor (Area 2)	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
Inside Fisheries										
Sport										
Juan de Fuca (Areas 5 & 6)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
San Juan Islands (7)	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
Puget Sound Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
North WA Coastal Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Grays Harbor (Areas 2-2)	yes	yes	yes	yes	yes	yes	yes	no	yes	yes
Willapa Bay (Area 2-1)	no	yes	no	yes	no	no	no	no	yes	no
Columbia River Buoy 10	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
Grays Harbor (Areas 2A-2D)	yes	yes	yes	yes	yes	no	no	yes	yes	yes
Willapa Bay (Area 2-1)	no	no	no	no	no	no	no	no	yes	no
Columbia River Net/ - Fall	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
San Juan Islands (Areas 6, 7 & 7A)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Marine (Areas 8 - 13)	no	no	yes	no	no	no	no	no	no	no
Puget Sound Rivers	no	no	no	no	no	no	no	no	no	no

III. PRELIMINARY REVIEW OF THE 2018 WASHINGTON CHUM SALMON FISHERIES OF INTEREST TO THE PACIFIC SALMON COMMISSION

This summary report provides a preliminary review of the 2018 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 2008). The harvest and abundance information provided are based on preliminary data reported through November 20, 2018. 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

Areas 4B, 5 and 6C

As in previous years, the Chum salmon fishery in Areas 4B, 5 and 6C was restricted to Tribal fishers using gillnets. The fall Chum-directed salmon fishery opened the week of October 14, with a schedule of six days per week and continued through November 10. A total of 4,519 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 656 Coho, 23 Chinook, and zero Steelhead.

Table 18. Preliminary 2018 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 9/22	224
9/23-9/29	9
9/30-10/6	0
10/7-10/13	161
10/14-10/20	289
10/21-10/27	33
10/28-11/3	1,550
11/4-11/10	2,253
11/11-11/17	0
Total	4,519

Areas 7 and 7A

Chum salmon fisheries in Areas 7 and 7A are regulated to comply with a base harvest ceiling of 130,000 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 2008). 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 10 (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 8, 2018 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 13. On October 10, 2018 Canada notified the U.S. that the Inside Southern Chum aggregate abundance was now estimated to exceed the 1.0 million critical threshold that allowed the U.S. to target the 130,000 chum ceiling in Area 7 and 7A fisheries. Following notification from Canada that the U.S. fishery could now open, the Tribal fishery first opened October 12; the non-Tribal purse seine and gillnet fisheries first opened October 13; and the non-Tribal reef net fishery resumed chum retention on October 11.

Paragraph 10 (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 900,000, then the U.S. will limit its fishery to not exceed a catch of 20,000 additional Chum salmon from the day following notification. On October 19, 2018, Canada notified the U.S. that the Fraser River chum run size was estimated to be below the 900,000 fish threshold. Therefore, the U.S. was expected to limit chum harvest to not exceed 20,000 from the day following this notification. The U.S. closed Area 7 and 7A commercial chum fisheries on October 20. The Tribal fishery opened on October 12 and ran continuously through October 20. Non-Tribal purse seine and gillnet fisheries were open daily October 13, 14, 16. Non-Tribal reef net fisheries resumed retention of chum on October 11 and was open daily through October 20.

Non-Tribal reef net fisheries targeting Coho salmon were conducted from the end of Fraser Panel control in Area 7 (September 17) until October 9 with chum salmon and unmarked coho retention prohibited prior to October 1. Chum salmon by-catch in this fishery was 1,661. Following the initial prohibition of chum salmon retention on October 10, reef net effort was minimal with most reef net gears being removed from the water during this chum closure. An additional 307 chum were caught by reef nets after October 10.

The total 2018 Chum salmon catch by all gears in Areas 6, 7, and 7A (reported through November 20) was 66,445 (Table 19). Catch distribution, between Areas 7 and 7A, was 69% and 31% respectively. It should be noted that these catch reports may be incomplete as of the date of this report. Multiple notices regarding Inside Southern Chum abundance estimates delayed the start of chum directed fisheries and reduced purse seine and gill net effort during the first days of the fishery, which historically are the most productive. During the fall Chum salmon-directed fisheries in Areas 6, 7, and 7A, there was a reported by-catch of 2,496 Coho, 23 Chinook, and zero Steelhead (Table 19).

Table 19. Preliminary 2018 Chum salmon harvest report for Washington Salmon Catch Reporting Areas 6, 7 and 7A.

	Area 6	Area 7				Area 7A			Areas 6,7,7A
Time Periods	GN	PS	GN	RN	Area Total	PS	GN	Area Total	Total
Through 9/22	1	5	2		7	17	1	18	26
9/23-9/29									0
9/30-10/6				1,522	1,522			0	1,522
10/7-10/13		3,823	143	139	4,105	756	1,903	2,659	6,764
10/14-10/20		38,440	1,791	307	40,538	6,013	11,574	17,587	58,125
10/21-10/27	8				0			0	8
10/28-11/3					0			0	0
11/4-11/10					0			0	0
11/11-11/17									0
Total	9	42,268	1,936	1,968	46,172	6,786	13,478	20,264	66,445
Gear Type Abbreviations: GN=Gill Net; PS=Purse Seine; RN=Reef Net									
10/10- 10/20 By-catch	Coho: 2,496		Chinook: 23		Steelhead: 0				

PUGET SOUND TERMINAL AREA FISHERIES AND RUN STRENGTH

Pre-season forecasts for Chum salmon returns to Puget Sound predicted a fall Chum run size totaling approximately 1,214,900 fish, with 497,400 Chum predicted to return to Hood Canal and 543,600 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 at or above forecast with some exceptions. In-season run size estimates from the 2018 fall Chum fisheries in Hood Canal and South Puget Sound indicate that South Sound is near forecast and Hood Canal is slightly above. Some Puget Sound Chum fisheries are still underway and additional in-season estimates of abundance may occur. 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 do, however, suggest that nearly all stocks will meet escapement goals; although, some central Puget Sound fall Chum stocks appear to be below escapement (as forecasted) again this year.

REFERENCES

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

IV. PRELIMINARY REVIEW OF 2018 UNITED STATES FRASER RIVER SOCKEYE FISHERIES

INTRODUCTION

The 2018 Fraser River Panel fishing season was implemented under Annex IV of the Pacific Salmon Treaty (PST), 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 1). In partial fulfillment of Article IV, paragraph 1 of the PST, this document provides a season review of the 2018 U.S. Fraser River salmon fisheries as authorized by the Panel. Catch and abundance information presented is considered preliminary.

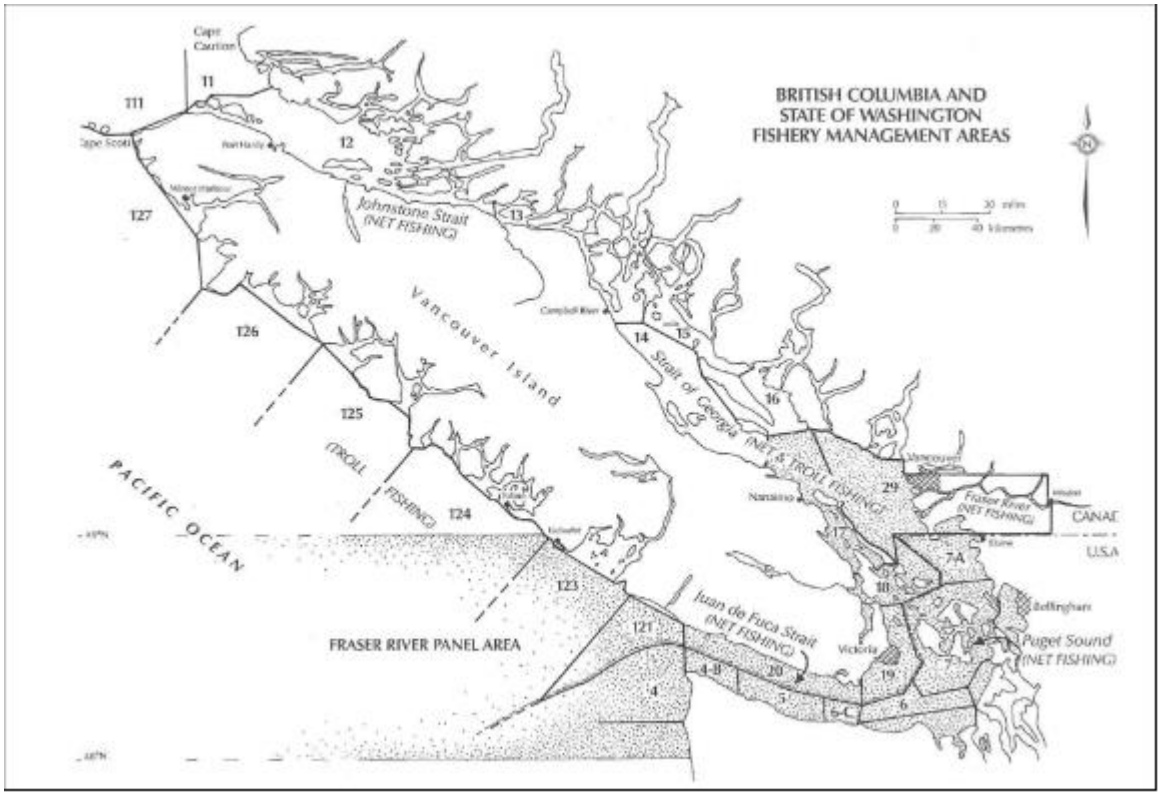


Figure 40. British Columbia and State of Washington Fishery Management Areas, 2018. The shaded area in the figure represents the marine waters managed by the Fraser River Panel.

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 2018 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.

Table 20. 2018 pre-season Fraser River sockeye forecasts and escapement goals by run-timing group.

	Early Stuart	Early Summer	Summer	Late	Total
Forecast of Abundance	84,000	2,155,000	4,344,000	7,398,000	13,981,000
Escapement Goal	84,000	862,000	1,737,600	2,959,200	5,642,800

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 56% which is less than the 1990-2017 median diversion of 63%.

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 that were used for planning fisheries in 2018. 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. 2018 pre-season proportional management adjustment (pMA) and corresponding proportional difference between estimates (pDBE1) for each run-timing group.

Early Stuart		Early Summer		Summer		Late	
pMA	pDBE	pMA	pDBE	pMA	pDBE	pMA	pDBE
0.69	-41%	0.23	-19%	0.10	-9%	0.43	-30%

1 Early Stuart pDBE = "all years" historical median; Early Summer pDBE = "dominant cycle" historical median; Summer pDBE = "all years" historical median; Late pDBE = "dominant cycle" historical median if timing is September 15 or earlier and the all years "run-timing" model if timing later than September 15.

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. 2018 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)
Early Stuart	July 4	July 2
Early Summer	August 7	August 8
Summer	August 11	August 11
Late	August 16	August 17

U.S. Total Allowable Catch (TAC)

Pre-season, the U.S. TAC was established at 1,020,300 sockeye. The TAC available by sockeye run-timing group is shown in Table 23.

Table 23. 2018 total U.S. total allowable catch (TAC) by run-timing group.

Run Timing Group	Pre-season U.S. TAC
Early Stuart	0
Early Summer	164,600
Summer	369,000
Late	486,700
Total	1,020,300

[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 2018, the pre-season forecast of ~14 million sockeye resulted in available U.S. TAC in the Early Summer, Summer, and Late run-timing groups (Table 23) with the majority of TAC (~48%) in the Late-run group. Although the Late run was the largest component of the TAC, the U.S. planned to begin fishing relatively early because of concerns about the diversion rate and the extremely high diversion rate that occurred with this cycle in 2014. U.S. fisheries were planned to commence in late July in areas 4B/5/6C and in early August in areas 6/7/7A and target the peak of the summer run while also harvesting co-migrating components of the Early Summer and Late run-timing groups.

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 2018 (Table 24) was 10,725,000, which was 77% of the pre-season forecast. This represents the lowest sockeye return to the Fraser River for this four-year cycle (the Adam's dominant cycle) since 1998. Only the Early Stuart run returned above the pre-season forecast in 2018. The other run-timing groups returned below their pre-season forecasts. The return of Late-run sockeye, the group with the largest pre-season forecast, was 64% of the pre-season forecast. In 2018, the length of delay by the Late run (sockeye holding off the mouth of the Fraser River before migrating upstream) was unusually long and relatively large numbers of Late-run sockeye were migrating upstream through September and into October. This pattern of delayed migration had not been seen since the 1990s.

The 2018 Fraser sockeye run timing was very similar to the pre-season forecasts. The Early Stuart run was two days later than the pre-season forecast, while the Early Summer and Summer runs were two and one days earlier than forecast, respectively. The Late run timing date was the same as the pre-season forecast.

Table 24. Comparison of 2018 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 Size Estimate[1]	Comparison: In-Season / 0Pre-Season
Early Stuart	84,000	125,000	149%
Early Summer	2,155,000	1,800,000	84%
Summer	4,344,000	4,100,000	94%
Late	7,398,000	4,700,000	64%
Total Sockeye	13,981,000	10,725,000	77%

[1] As of October 12, 2018.

Table 25. Comparison of 2018 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 2	July 4
Early Summer	August 8	August 6
Summer	August 11	August 10
Late	August 17	August 17

Season Description

The Fraser Panel held regular meetings either in-person or by conference call between July 6 and September 28 (usually on Tuesdays and Fridays) to receive updates on the abundance and timing of the sockeye return from PSC staff and to review migration conditions in the Fraser River watershed. In-river environmental conditions were not a major factor affecting management decisions in 2018. The last Fraser Panel in-season meeting was held on October 12. Table 26 summarizes changes to run sizes made by the Fraser Panel during the 2018 season and the effect on U.S. TAC. The following summarizes the major decisions related to U.S. fishing during the 2018 season.

Week ending July 27, 2018

The first Panel approved U.S. commercial fishery was conducted from July 27 to July 31 for Treaty fishers in areas 4B/5/6C. Estimated Early Summer run abundances were tracking ahead of model expectations based on the pre-season forecast. Estimated Summer run abundances were also tracking slightly above expectations. There was not sufficient information to update either the Early Summer or Summer run sizes.

The Panel extended the Treaty fishery in areas 4B/5/6C through August 1 on July 27.

The All Citizens fishery remained closed.

Week ending August 3, 2018

The Treaty fishery in areas 4B/5/6C was extended through August 4. The Panel approved Treaty fisheries in areas 6/7/7A for August 2-3, August 4-5, and August 7-9. All Citizens purse seine and gillnet fisheries were scheduled for August 3 and 6; the reef net fishery was scheduled for August 6 and 8. The estimated diversion rate remained low at 37%.

Week ending August 10, 2018
Early Summer and Summer run in-season abundance assessments were close to pre-season model expectations. The Treaty fishery in areas 4B/5/6C was extended through August 11. The Panel approved All Citizens purse seine, gillnet, and reefnet fisheries for August 9. The estimated diversion rate remained low at 30%.

Week ending August 17, 2018
Early Summer and Summer run in-season abundance assessments continued to follow pre-season model expectations. The Treaty fishery in areas 4B/5/6C was extended through August 18. The Panel approved Treaty fisheries in areas 6/7/7A for August 15-17. All Citizens purse seine and gillnet fisheries were scheduled for August 17; the reef net fishery was scheduled for August 18. The estimated diversion rate remained low at 29%.

Week ending August 24, 2018
Early Summer run abundance expected at Mission did not materialize and the run appeared to be returning below forecast. The Summer run in-season abundance assessment continued to follow pre-season model expectations. Late run abundance was not building as expected given its pre-season forecast. The Treaty fishery in areas 4B/5/6C was extended through midnight August 24. The Panel approved Treaty fisheries in areas 6/7/7A for August 22-24. The estimated diversion rate remained low at 29%.

Week ending August 31, 2018
On August 28, the Fraser Panel decreased the Early Summer run size to 1.8 million and adopted a provisional run size for the Late run of 6,000,000 sockeye. This effectively removed any remaining U.S. TAC. U.S. fisheries remained closed for the remainder of the season. The estimated diversion rate increased to 58%. On August 31, the Fraser Panel decreased the Early Summer run size further to 1.7 million.

Week ending September 7, 2018
Estimated Late-run abundance continued to be considerably below expectations. There was considerable uncertainty about the number of Late-run sockeye holding in the Gulf of Georgia.

Week ending September 14, 2018
The Fraser Panel increased the Early Summer run size to 1.8 million and formally adopted a run size of 6 million for the Late run. There was still considerable uncertainty about the number of Late-run sockeye holding in the Gulf of Georgia and the timing of the Late run.

Week ending September 21, 2018
The Fraser Panel decreased the Summer run size to 4.1 million and provisionally adopted a run size of 5 million for the Late run with marine timing of August 18. There was still considerable uncertainty about the number of Late-run sockeye holding in the Gulf of Georgia and the timing of the Late run.

Weeks ending September 28 and October 5, 2018
No changes were made to run sizes during this period. The Panel continued to monitor the number of Late-run sockeye migrating past the Mission hydro-acoustic site and the estimates of the number of Late-run sockeye holding in the Gulf of Georgia and in the river below Mission.

Week ending October 12, 2018
As its final in-season action the Fraser Panel adopted a run size of 4.7 million sockeye for the Late run.

Table 26. Summary of changes to Fraser River sockeye run sizes adopted by the Fraser Panel during the 2018 season.

Meeting Date	Run-Timing Group	Change Made[1]	U.S. TAC
Pre-season			1,023,200
July 17, 2018	Early Stuart	increased to106,000	1,023,200
July 20, 2018	Early Stuart	increased to120,000	1,023,200
July 27, 2018	Early Stuart	increased to135,000	1,023,200
August 7, 2018	Early Stuart	decreased to125,000	1,023,200
August 28, 2018	Early Summer Summer Late	decreased to 1,800,000 adopted 4,344,000 decreased to 6,000,000 (p)	891,700
August 31, 2018	Early Summer Late	decreased to 1,700,000 decreased to 5,800,000 (p)	869,300
September 11, 2018	Early Summer Late	increased to 1,800,000 adopted 6,000,000	962,100
September 19, 2018	Summer Late	decreased to 4,100,000 decreased to 5,000,000 (p)	926,100
October 12, 2018	Late	adopted 4,700,000	899,600

[1] (p) indicates a run size that was provisionally adopted for management purposes.

HARVEST

U.S. harvest opportunities in 2018 were expected to be the greatest since 2014 (the last return on the Adam's-dominant cycle) with a pre-season U.S. TAC of approximately one million sockeye. U.S. fisheries were conducted similar to pre-season planning expectations through late August. On August 28, 2018, the in-season assessment of abundance decreased the Early Summer run size from 2.2 million to 1.8 million and the Late run size from 7.4 million to 6.0 million which eliminated any remaining U.S. TAC. There were no additional U.S. fisheries conducted after the Tribal fisheries conducted on August 24, 2018. A total of 989,459 Fraser sockeye were harvested in U.S. fisheries in 2018 (Table 27). Of this total, 596,318 sockeye (60%) were harvested by Treaty fishers and 393,141 sockeye (40%) in the All Citizens fishery. Treaty commercial fisheries were open on 29 days in areas 4B/5/6C and 11 days in areas 6/7/7A. All Citizens purse seine, gillnet, and reef net fisheries were open on four days in areas 7/7A.

Although the total U.S. sockeye catch (989,459 sockeye) exceeded the final U.S. TAC (899,600, see Table 26), the U.S. does not owe Canada any payback because the total U.S. catch did not exceed the U.S. TAC available when the last U.S. fishery was scheduled on August 23, 2018.

Table 27. Preliminary summary of 2018 U.S. catches of Fraser River sockeye salmon in Panel area waters.

	Treaty Indian	All Citizens
Ceremonial and Subsistence (all areas)	9,290	0
Commercial Catch in Areas 4B/5/6C	54,164	0
Commercial Catch in Areas 6/7/7A	532,864	393,141
Total Catch	596,318	393,141
% of U.S. Catch	60.3%	39.7

C. 2018 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. On December 23, 2008, Canada and the U.S. ratified new provisions for five chapters under Annex IV of the Pacific Salmon Treaty. These chapters came into effect on January 1, 2009 and remain in force until 2018. Chapter 4, which covers Fraser River Sockeye and Pink salmon, was revised in July 2014 and these revisions cover fisheries in 2014 through 2019. All management regimes under Annex IV continue to be implemented by Fisheries and Oceans Canada (DFO) for the 2018 season.

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). Appendix 1 summarizes 1997-2018 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 the tables at the end of each section.

TRANSBOUNDARY RIVERS

STIKINE RIVER

Following the 2018 pre-season meeting of the Transboundary Panel, Canada developed its 2018 domestic fishing strategy for Stikine River salmon fisheries based on the catch sharing and management arrangements outlined in Annex IV, Chapter 1, and Paragraph 3 of the Pacific Salmon Treaty (PST). The 2018 Canadian Stikine River salmon fishery management approach was designed to achieve the spawning escapement targets and the following harvest objectives: 1) to harvest 50% of the total allowable catch (TAC) of Stikine River Sockeye salmon in existing fisheries; 2) to allow additional harvesting opportunities in terminal areas for enhanced Sockeye that were surplus to spawning requirements; and 3) to harvest up to 5,000 Coho salmon in a directed Coho fishery. A pre-season forecast of 6,900 Chinook was below the PST threshold run size of 28,100 which did not allow for a directed Chinook fishery in 2018. Due to concerns over run abundance and escapement, the Chinook assessment fishery was not prosecuted in 2018.

The 2018 Canadian Stikine River commercial fishing season opened on June 26 (statistical week 26) and ended September 13 (statistical week 37). From statistical weeks 26 through 34 a directed Sockeye fishery was prosecuted followed by a directed Coho fishery which ended in statistical week 37.

Fishing gear employed within the 2018 season was limited to one 135-metre (443 ft.) gill net per licence holder. The maximum mesh size allowed was 140 mm (5.5”) through August 25, after which time the

maximum mesh size was increased to 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 extended upstream to the mouth of the Tuya River. This action was taken in order to provide for a terminal fishing opportunity on Tuya River bound enhanced Sockeye salmon, specifically at sites located upstream of the Tahltan River. For the tenth consecutive year, no commercial fishing activity occurred at this site. The Tuya run, which consists entirely of Sockeye salmon produced from the Canada-U.S. Stikine enhancement program, has no spawning escapement requirement since these fish are unable to return to Tuya Lake due to several velocity barriers located in the lower reach of the Tuya River. Tuya Sockeye were released into Tuya Lake as young of the year juveniles.

The Canadian First Nation Food, Social, and Ceremonial (FSC) fishery located near the community of Telegraph Creek, British Columbia (BC) was active from the last week in May to the last week of July (the fishing season was shortened due to the forest fire evacuation of Telegraph Creek), with no time or gear restrictions imposed in 2018. Bilateral meetings with the Tahltan/Iskut First Nations and DFO were held which highlighted the need to conserve Chinook salmon. FSC fishery community buy-in was significant and efforts were implemented to minimize Chinook salmon harvest.

Canadian Recreational fishery effort was effectively non-existent in 2018 as area, retention, and size restrictions were in place for the entire Chinook season to prohibit the harvest of PST-defined “Treaty” Stikine River Chinook salmon >659 mm in 2018.

CHINOOK SALMON

The pre-season forecast of 6,900 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. Technical Committee for the Transboundary Rivers (TCTR) did not allow for a directed Chinook fishery in 2018. A pre-season forecast run size of <28,100 precludes Canada or the U.S. from scheduling a directed fishery, whereas an in-season run size of >24,500 large Chinook is required to permit a targeted Chinook fishery. Specific management provisions were implemented within all Canadian fisheries to minimize the likelihood of interception of Chinook salmon in 2018.

The 2018 total gill net catch (First Nation only for 2018) of Chinook salmon was 165 large Chinook salmon and 456 jacks. This was well below the 10-year average of 3,000 large Chinook salmon and 1,050 jacks, while the Sockeye test fishery resulted in the interception (fish released) of 21 large Chinook and 37 jack Chinook salmon compared to the 10-year average harvests of 20 large Chinook salmon and 21 jack Chinook salmon. No Chinook salmon were harvested within the 2018 recreational (sport) fishery as retention was prohibited. The 10-year average harvest of Chinook salmon in the Canadian Stikine River sport fishery is 41 large and 10 jack Chinook salmon.

The preliminary post-season estimate of the terminal run was approximately 8,800 large Chinook salmon, including an in river run size based on mark-recapture data of approximately 8,765 large Chinook salmon and a total U.S. catch estimate of approximately 35 large Chinook salmon. Accounting for the total Canadian catch of Chinook salmon (includes First Nation and test catches), the total system-wide spawning escapement was estimated at approximately 8,600 large Chinook salmon. The adult salmon migration barrier resulting from the 2014 Tahltan River rockslide is not believed to have had a detrimental effect on Chinook salmon escapement. The Chinook salmon escapement estimate of 8,600 is 51 % below the target SMSY escapement goal of 17,400 large Chinook salmon and did not achieve the escapement goal range of 14,000 to 28,000

large Chinook salmon. The preliminary post-season run size of approximately 8,800 fish did not result in any allowable harvest allocations to Canadian or U.S. directed fisheries.

The 2018 Chinook salmon escapement enumerated at the Little Tahltan weir was 453 large and 413 jack Chinook salmon. The escapement of large Chinook salmon in the Little Tahltan River was well below both the SMSY estimate of 3,300 fish and the lower end of the Canadian management escapement goal range of 2,700-5,300 large Chinook salmon. The contribution of the Little Tahltan Chinook salmon was only 5% of the total Stikine River escapement in 2018. Historically the contribution of this stock was approximately 14% of the total terminal abundance. 2018 is the twelfth consecutive year that the lower end of the Canadian management escapement objective was not achieved for Little Tahltan Chinook salmon.

In addition to the mark-recapture study, the Little Tahltan weir project and aerial surveys, genetic samples were collected on a weekly basis from Chinook salmon incidentally caught in U.S. marine fisheries. These data were used to determine the total U.S. interception of Canadian-origin Stikine River Chinook salmon.

SOCKEYE SALMON

The forecast for Stikine River Sockeye salmon, as developed by TCTR, was for a terminal run size of 160,900 fish including: 112,400 Tahltan Lake origin Sockeye salmon (46,300 wild and 66,100 enhanced); 12,900 enhanced Tuya Lake Sockeye; and 35,000 non-Tahltan wild Sockeye salmon, which constituted an average forecast. For comparison, the previous 10-year average terminal run size was approximately 159,000 fish.

The combined harvest of 2018 Stikine River Sockeye salmon in Canadian commercial and First Nation gill net fisheries was 22,737, which is below the 10-year average of 48,000 fish. The lower Stikine River commercial fishery harvested 16,915 Sockeye, while the upper Stikine River commercial and First Nation fisheries harvested a total of 407 and 5,415 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 9,889 fish (or 44 % of the total harvest). In addition, 1,312 Sockeye salmon were harvested in the stock assessment test fishery located near the U.S/ Canada border.

A count of 9,854 Sockeye salmon was made at the Tahltan Lake weir in 2018, this represents only a partial enumeration as the crew was evacuated from the site for much of August. During this time, the weir was left open to allow the passage of fish into the lake. The 10-year average count is 25,933 and the escapement goal range is 18,000 to 30,000 fish. An estimated 5,223 of the fish counted (53%) originated from the bilateral Stikine Sockeye enhancement program, which was near the 55% contribution observed in smolts leaving the lake in 2015, the principal smolt year contributing to the 2018 return. A total of 1,878 Sockeye salmon were collected for broodstock to support the Stikine Sockeye enhancement program while no fish were removed for stock identification purposes (ESSR). Overall, it is not known how many Sockeye salmon successfully migrated into Tahltan Lake to spawn in 2018 but it is estimated that approximately 19,000 fish may have made it into the lake based on historical run timing.

The preliminary total estimated run size of 43,004 Tahltan Lake Sockeye was approximately 62% below the pre-season expectation of 112,400 fish.

The spawning escapements for the non-Tahltan and the Tuya stock groups are calculated using stock identification, test fishery and in-river commercial catch and effort data. The average of the test fishery and the commercial fishery catch-per-unit of effort (CPUE), which operated over the full duration of the run, were used as the principal tool in assessing the spawning ground escapements of non-Tahltan Lake and the Tuya Sockeye stock groupings. Based on the run reconstructions generated using stock identification, test fishery, and inriver commercial harvest data, the preliminary escapement estimates for 2018 were 10,231 non-Tahltan and 1,123 Tuya Sockeye salmon. The non-Tahltan spawning escapement estimate was below the escapement goal range of 20,000 to 40,000 and was 57% below the 10 year average of 24,000 fish. The estimated return of Tuya Lake Sockeye salmon was below the recent 10 year average of 12,000 fish. These fish do not

contribute to the natural production of Stikine River Sockeye salmon due to migration barriers that obstruct entry to Tuya Lake.

Based on the preliminary in-river run reconstruction of the Tahltan Lake run expanded by run timing and stock identification data in the lower river and estimated harvests of Stikine River Sockeye salmon in U.S. terminal gill net fisheries, the preliminary post-season estimate of the terminal Sockeye salmon run size is approximately 63,649 fish. This estimate includes 43,004 Tahltan Lake origin fish, 2,154 Tuya Lake origin fish, and 18,491 Sockeye salmon of the non-Tahltan stock aggregate. The 2018 Stikine River Sockeye salmon run was below the 10-year average terminal run size of ~159,000 Sockeye salmon and is approximately 60% below the preseason forecast of 160,900 fish.

Based on the preliminary post-season run size estimate, Canada was allocated an allowable catch of 9,531 Stikine River Sockeye salmon. The total Canadian fishery harvest of Stikine River Sockeye salmon in 2018 was 22,737.

COHO SALMON

The total Canadian fishery harvest of Coho salmon in 2018 was 3,685. 3,324 Coho salmon were harvested during the directed Coho salmon fishery in statistical weeks 35-37. The total Canadian fishery harvest was below the recent 10 year average of 5,420 fish.

A Coho salmon test fishery was not conducted in 2018. Incidental catches and CPUE taken in the Sockeye salmon test and commercial fisheries were near average. The CPUE observed in the targeted Coho salmon fishery was below average for statistical weeks 35 - 37. Aerial surveys of six index spawning sites yielded above average counts observed under excellent viewing conditions.

JOINT SOCKEYE SALMON ENHANCEMENT PROGRAM

Joint Canada/U.S. enhancement activities continued from 2017 through 2018 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 30th to June 5th, 2018 approximately 2.6 million fry were out-planted into Tahltan Lake. No fry were released into Tuya Lake. The fry originated from the 2017 egg-take and were mass-marked at the Snettisham hatchery with thermally induced otolith marks. Green egg to released fry survival was approximately 68%. 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.

In the fall of 2018, approximately 2.3 million Sockeye salmon eggs, near the target of 2.5 million, were collected at Tahltan Lake and transported to Snettisham Hatchery in Alaska. Canada determined the egg take target based on escapement evaluation results in season. As in previous years additional efforts beyond beach seining were employed to acquire brood stock including angling and temporarily holding female brood stock to mature in floating net pens in the lake.

TAKU RIVER

Following the 2018 pre-season meeting of the Transboundary Panel, Canada developed its 2018 domestic fishing strategy for Taku River salmon fisheries based on the catch sharing and management arrangements outlined in Annex IV, Chapter 1, and Paragraph 3 of the Pacific Salmon Treaty (PST). Accordingly, the Canadian strategy incorporated specific conservation considerations and contained the following harvest objectives: 1) harvest 21% of the TAC of Taku River Sockeye salmon (adjusted as necessary according to

projections of the number of enhanced Sockeye), plus the projected wild Sockeye in-river escapement in excess of 1.6 times the spawning escapement goal; 2) to harvest enhanced Taku River Sockeye salmon incidentally to wild Sockeye salmon; 3) to harvest 5,000, plus any excess over the escapement target of 70,000 Coho salmon in a directed Coho salmon fishery, dependent on in-river run size projections; and 4) to consider a directed Chinook salmon fishery, dependent on in-river run size projections.

The 2018 commercial fishing season on the Taku River opened on June 26 (statistical week 26) and closed on September 17 (statistical week 38). 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 grounds in Canada consist of the mainstem of the river from the international border upstream approximately 18 km (11 miles), to a geological feature known locally as Yellow Bluff. Almost all fishing activity takes place in the lower half of this area, downstream of the Tulsequah River.

The First Nation 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. There were no time or gear restrictions imposed on the First Nation fishery in 2018.

Canadian Recreational fishery effort was effectively non-existent in 2018 as area, retention, and size restrictions were in place for the entire Chinook season to prohibit the harvest of PST-defined "Treaty" Taku River Chinook salmon >659 mm in 2018.

CHINOOK SALMON

The bilateral pre-season forecast was for a terminal run of 4,700 large Chinook salmon, approximately 82% below the previous 10-year average of 26,000 fish. The forecast generated by the Taku River Chinook salmon model was 7,100 fish. However, due to persistent overestimation in recent years coupled with a pattern of decline in Chinook salmon stocks in the North Pacific, the forecast was reduced by 34%. A run size of 4,700 fish was well below the SMSY escapement goal of 25,500 fish (below the lower end of the escapement goal range of 19,000 – 36,000), and as a result, there was no allowable catch (AC) for either the U.S. or Canada and therefore, neither country prosecuted a directed Chinook salmon fishery. Additionally, significant efforts were made in all other fisheries to avoid the incidental harvest of Chinook salmon. For 2018, the Chinook assessment fishery, which has an allocation of 1,400 large Chinook, 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 in the test/assessment fishery; 0 large Chinook salmon were harvested in the directed commercial Sockeye and Coho salmon fisheries; 7 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 7 large Chinook salmon was well below the allowance of 2,900 fish.

The preliminary Taku River large Chinook spawning escapement estimate for 2018 was approximately 7,300 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 22,000 large Chinook (which was associated with a higher target until 2009). During aerial surveys of five index areas, a total of 1,719 large Chinook salmon were observed; this was 47% below the average of 3,241.

The Canadian catch of large Chinook was 100% below the 10-year average of approximately 2,200 fish (excluding test/assessment fisheries). The 2018 harvest of small Chinook was 19 fish (First Nation FSC), 96% below the 10-year average of 511 fish.

SOCKEYE SALMON

The Canadian pre-season run outlook for wild Sockeye salmon was 160,000 fish, approximately 11% below the previous 10-year average total run size of 180,000 fish. In addition, approximately 5,400 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 46% above the average return of 10,000 fish.

The Canadian Sockeye salmon catch was 17,988 fish, of which 17,974 were taken in the commercial fishery, 14 in the First Nation FSC fishery, and 0 in assessment/test fisheries. This harvest was 24% below the 10-year average total of 23,700 fish, with the contribution of Sockeye salmon from the bilateral enhancement program estimated at 951 fish (5% of the total Canadian catch).

To reduce incidental harvest of Chinook salmon, the directed Sockeye salmon fishery commenced 10 days late on June 26 (SW 26). 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 fishery. The maximum permissible mesh size in the first four weeks of the directed Sockeye salmon fishery was 140 mm (5.5") which was intended to reduce the gilling of large Chinook 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. Projections in 2018 ranged from 83,000 in statistical week 27 (July 1-7) to 166,000 in statistical week 31 (July 29-August 4). The preliminary post-season estimate of run size is 164,400 fish (comprising 159,600 wild Sockeye and 4,800 enhanced Sockeye). Subtracting the escapement target of 75,000 from the wild run of 160,000 fish resulted in a TAC of approximately 85,000 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 16,900 wild fish; the actual catch was 17,038, representing 20% of the TAC.

The estimated spawning escapement of wild Sockeye salmon in the Canadian section of the Taku River was 116,700 fish which was above the target range of 71,000 to 80,000 fish. The escapement is 13% above the 10-year average of 103,000 fish. Based on weir counts, escapements to the Kuthai, Little Trapper, Tatsamenie and King Salmon lakes were 13, 8,249, 4,936, and 3,180 Sockeye salmon, respectively. Escapements to Kuthai and Tatsamenie lakes were below average in 2018 while Little Trapper and King Salmon lakes were above average. It is felt that the return to Kuthai Lake was impeded by partial barriers to migration that were exacerbated by extremely low water levels in 2018.

COHO SALMON

The catch of 9,505 Coho salmon (9,503 commercial and 2 First Nation FSC) was 6% above the 10-year average of 9,000 fish. The catch during the directed commercial/assessment Coho salmon fishery, i.e. after statistical week 33, was 7,245 fish. A live-release assessment fishery was implemented in 2018 after Canada's AC (5,000) was exhausted, catching and releasing a total of 244 Coho salmon. Based on mark-recapture data, the bilateral estimate of the run into the Canadian section of the drainage is 60,678 fish. In accordance with PST harvest arrangements for the 2018 Taku River Coho salmon season, at a run size of this magnitude, 5,000 Coho salmon were harvested for assessment purposes starting in statistical week 34. The post-season spawning escapement estimate is 51,173 fish, 41% below the previous 10-year average of 86,600 fish. The 2018 escapement was below the target of 70,000 but within the goal range of 50,000 to 90,000 fish.

JOINT SOCKEYE ENHANCEMENT

Joint Canada/U.S. enhancement activities continued from 2017 through 2018 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 2017). Between May 29-31, 2018, approximately 1.5 million emergent

Sockeye salmon fry were out-planted into Tatsamenie Lake from the 2.0 million eggs collected in 2017. No losses were experienced from Infectious Hematopoietic Necrosis virus (IHNv) for the eggs collected in 2017. In addition, as part of an extended rearing project, approximately 214,000 fed fry were released into net pens for rearing. Net pen reared fry were released at 2.1 grams on June 28. Smolt production for 2018 was above average with an estimate of 1.3 million coming off a strong brood year. A breakdown of the origin of the smolts to evaluate annual release strategies is underway pending otolith results.

No eggs were collected from King Salmon Lake in 2018 for enhancement purposes.

For 2018, the agreed bilateral Taku River enhancement production plan (TEPP) identified collection of up to 2.5 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. Eggs were not collected from Little Trapper due to a shortage of females in the escapement. The resulting fry were intended to be released to Trapper Lake, upstream of a barrier, to establish a small escapement of salmon (approximated at 500 adults) for barrier passage evaluation beginning in 2020. Barrier removal project plans were established in 2016 and are ongoing in support of a potential Sockeye 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 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. 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 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-Aishihik First Nation (CAFN).

Total drainage abundance 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 are appropriate and achievable. At this time, there are no programs in place to estimate the drainage-wide Coho salmon escapement. A large and variable proportion of the escapement of each species is enumerated at the Klukshu River using video enumeration techniques. Current escapement monitoring programs include the Klukshu River, Village Creek Sockeye 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.

The harvest estimate for the 2018 Canadian First Nation FSC fishery was 0 Chinook, 0 Sockeye and 0 Coho salmon. In July of 2018, the Champagne and Aishihik First Nations passed a resolution that prohibited any salmon fishing 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 is 61 Chinook, 1,034 Sockeye, and 18 Coho salmon. Catch estimates for the Alsek River recreational fishery were 0 Chinook salmon retained, and 0 Sockeye salmon retained. Retention of Chinook and Sockeye salmon was not permitted in 2018 in light of the forecasts and in-season run abundance information. Approximately 20 Coho salmon were harvested in the recreational fishery.

The 2018 count and escapement estimate for Klukshu River Sockeye salmon was 7,035 fish (no harvest in the Klukshu River). The count and escapement estimate were both below the 10-year average of 10,600 and 10,300, respectively. The total escapement was below the lower end of the escapement goal range of 7,500 to 11,000 fish. The Sockeye salmon count at Village Creek was 97 fish; the average is 1,800 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 2018 was 1,078 fish, near the average of 1,140 fish. The 2018 escapement estimate was within the escapement goal range of 800 to 1,200 Klukshu Chinook salmon.

The Klukshu River Coho salmon count was 870. The 2018 count, as in past years, is not considered a complete indicator of run strength as the project is finished prior to the end of the Coho salmon return to the Klukshu River.

Table 28. Transboundary Rivers Fisheries (Treaty Harvest)

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
First Nations FSC											
	Stikine River	165		5,415				-			
	Taku River	7		14				2			
	Alsek River	-		-				-			
Total First Nations FSC Catch		172	-	5,429	-	-	-	2	-	-	-
First Nations Commercial											
	Stikine River										
	Taku River										
	Alsek River										
Total First Nations Commercial Catch		-	-	-	-	-	-	-	-	-	-
Commercial											
	Stikine River	-		16,915				3,685			
	Taku River	-		17,948				9,503			
	Alsek River										
Total Commercial Catch		-	-	34,863	-	-	-	13,188	-	-	-
Recreational											
	Stikine River	-						-			
	Taku River	-						-			
	Alsek River	-		-	-			20			
Total Recreational Catch		-		-	-	-	-	20	-	-	-
TOTALS		**172**	**-**	**40,292**	**-**	**-**	**-**	**13,210**	**-**	**-**	**-**

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

OBJECTIVES AND OVERVIEW

Escapement of northern Chinook salmon has declined dramatically in recent years. Reduced survival rates, and productivity, have been observed across British Columbia and South East Alaska. This has led to unprecedented declines of northern Chinook and the need for conservation measures to be to be implemented in 2018 salmon fisheries. The Department developed management measures to achieve 25% to 35% reductions on specific stocks of concern after consultations with First Nations and stakeholders. Chinook salmon fisheries implemented under the PST AABM management regime include three mixed-stock fisheries:

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

These fisheries are managed to an annual total allowable catch (TAC) based on the forecast abundance of the aggregate of stocks that contribute to each fishery. 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 abundance index for North Coast BC troll and Haida Gwaii sport fisheries in 2018 was 1.01, which permitted a total allowable catch of 131,300 Chinook salmon in these fisheries. The total Chinook catch in the Area F Troll fishery and recreational fishery can be found in Table 29.

RECREATIONAL FISHERIES

Estimates for 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. Concerns for northern British Columbia Chinook stocks resulted in management actions across northern fisheries to reduce overall harvest rates by 25% to 35%. For recreational fisheries, the daily limit was reduced from two Chinook per day to one per day and the possession limit was reduced from four to two in possession from June 1st to July 9th. Limits returned to two Chinook per day with four in possession on July 10th, after the majority of northern Chinook had migrated out of the area. 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.

COMMERCIAL FISHERIES

The North Coast BC troll fishery was opened for Chinook fishing from July 10 to August 6 and from August 20 to September 30. The entire 2018 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 2018.

Table 29. North Coast AABM Chinook Directed Fisheries

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
Commercial											
	Haida Gwaii	70,276	22,601	0	11,248	30,896	8,613	176,914	150	3,175	5,026
Total Commercial Catch		70,276	22,601	0	11,248	30,896	8,613	176,914	150	3,175	5,026
Recreational											
	Haida Gwaii	36,700	40,564	170		1,950		34,200	7,795	950	
Total Recreational Catch		36,700	40,564	170	0	1,950	0	34,200	7,795	950	0
TOTALS		**106,976**	**63,165**	**170**	**11,248**	**32,846**	**8,613**	**211,114**	**7,945**	**4,125**	**5,026**

Notes:

1. Released Catch for Recreational is estimated for Areas 1 and 2W based on Creel data.
2. FSC in Area 1,2 is not part of the AABM fisheries

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

OBJECTIVES AND OVERVIEW

Fisheries included in this category are commercial net fisheries throughout north and central BC, marine sport fisheries along the mainland coast and freshwater sport, and First Nations FSC fisheries in both 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 2018 returns is provided. Chinook escapements to the upper Nass River are 13,262 (based on mark-recapture data). Skeena River Chinook escapements were greater than 2017 at approximately 33,802. The Bella Coola/Atnarko River Chinook escapements were up from 2017, with an estimated total of 15,000.

Expectations for 2019 are for an average or above average return if ocean conditions are favourable.
The total Chinook catch in the Test fishery on the Skeena River was 677. Since 1984, the lowest Chinook catches at the Tyee Test Fishery have been in 1995 and 2017. ISBM catch data can be found in table 30.

FIRST NATIONS FSC FISHERIES

Catches by First Nations in Areas 6, 7 and 8 are presented as a combined total in this report. No Chinook catches were reported by First Nations in Rivers Inlet or Smith Inlet (Areas 9 and 10).

RECREATIONAL FISHERIES

RECREATIONAL – TIDAL

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 2018. Due to predicted low returns of Northern Chinook salmon, the Department implemented Northern Chinook salmon conservation measures which reduced the Chinook daily limits in Areas 3 to 5 as follows:

June 1, 2018 to June 15, 2018 – Daily limit of one (1) Chinook per day.
June 16, 2018 to July 9, 2018 – Zero (0) retention of Chinook.
July 10, 2018 to July 31, 2018 – Daily limit of one (1) Chinook per day.

Area 6 also had the daily limit reduced to one per day June 1st to July 31st, 2018.

The 2018 catches in the mainland sport fishery in Areas 5 and 6 were not available at the time of writing.
Tidal sport catch from lodges operating in the Smiths Inlet, Rivers Inlet, Hakai Pass and Bella Bella areas were estimated using log books.

RECREATIONAL- NON-TIDAL

Non-tidal management actions included zero Chinook retention for recreational fisheries in all north coast watersheds on May 9, 2018. Additional restrictions were implemented in the Skeena River that included full recreational closure of all salmon species from May 9, 2018 to Aug 6, 2018 due to predicted low returns of Skeena River Chinook salmon in 2018.

Recreational fishing for Skeena River Coho and Pink reopened on Aug 7, 2018 while recreational fishing for Chinook and Chum remained closed in the entire Skeena River watershed, including tributaries and lakes. Additional management measures were implemented for North Coast Chinook which included:

1. The Skeena River mainstem upstream of the Sustut River and at the Kitsumkalum, Kitwanga and Kispiox River mouths was closed to fishing for salmon.
2. Kispiox River and Babine River remained no fishing for salmon during the 2018 season.
3. Gitnadoix River upstream of confluence with Magar Creek remained no fishing for salmon during the 2018 season.
4. Morice River upstream of confluence with Lamprey Creek remained no fishing for salmon during the 2018 season.
5. There was non-retention of Chinook salmon in all rivers draining into PFMAs 1 to 6, excluding the Kitimat River which opened to Chinook retention (1 per day under 80cm) on July 1, 2018.
6. On July 5, 2018 Chinook salmon fishing was closed in the waters of the Kitlope Lake, and tributaries, including the waters flowing from Kitlope Lake to the confluence with the Kitlope River.
7. The Nass River was closed to recreational fishing for Chinook during the 2018 season.

COMMERCIAL FISHERIES

North and Central Coast commercial catches includes gill net catches from Areas 3 to 8 (from hailed catch data). Estimates of gill net catches include Chinook less than 5 pounds (graded as jacks and small red fleshed Chinook) not normally included for PSC accounting. Small Chinook typically make up less than 5% of commercial gill net catches. Hail catch data tend to underestimate catch reported in fish slips by 25 to 30%.

Chinook commercial fisheries were closed in the North Coast (Areas 3-10), except for Area 8. In this area, the gillnet fishery opened on June 4, 2018. Opportunities were generally limited to one fishing day a week until August, where the final two weeks were open two days each week. During July average gill net fleet size was 166 vessels, which were distributed almost evenly between the Bella Coola Gill Net Area and Fisher/Fitz Hugh Net Area. The last commercial opening occurred on August 18. Refer to table 30 for chinook catch totals.

Table 30. North Coast ISBM Chinook Fisheries

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
First Nations FSC											
	Skeena River (Area 4)	4,735		46,615		1,002		2,691		89	
	Nass River (Area 3)	5,888		74,726		2,785		2,754		745	
	Area 6,7,8	1,628		1,381		117		580		794	
Total First Nations FSC Catch		12,251		122,722		3,904		6,025		1,628	
Commercial											
	Area 8	5,162	0	3,563	243	5,464	0	0	1,218	263,850	0
Total Commercial Catch		5,162	0	3,563	243	5,464	0	0	1,218	263,850	0
Recreational											
	Area 5	Not yet available									
	Area 6	Not yet available									
	Area 7	3,484		0		39		3,639		62	
	Area 8	869		0		119		1,225		6	
	Area 9	2,438		0		171		7,535		35	
	Area 10	218		0		1		73		1	
Total Recreational Catch		7,009	0	0	0	330	0	12,472	0	104	0
TOTALS		**24,386**	**0**	**126,285**	**243**	**9,698**	**0**	**18,497**	**1,218**	**265,582**	**0**

Notes:

3. No released catch data available.
4. Limited Chinook retention in Area 3, 4 recreational fisheries. Catch information for these areas can be found in table 31.

NORTHERN BC PINK SALMON FISHERIES

OBJECTIVES AND OVERVIEW

In 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 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.

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 10, 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 July 10 to August 6 and again 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 31.

Table 31. Northern BC Pink Directed Fisheries

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
First Nations FSC											
	Area 1										
	Area 3										
	Area 4										
Total First Nations FSC Catch*											
First Nations Commercial											
	Area 1										
	Area 3										
	Area 4										
Total First Nations Commercial Catch*											
Commercial											
	Haida Gwaii*										
	Area 1	0	146	0	4	266	0	714	6	0	14
	Area 3	0	694	159	4,125	101,267	0	635	17	38,368	0
	Area 4,5	0	343	103,595	0	16,857	257	0	1,503	0	1,605
Total Commercial Catch		0	1,183	103,754	4,129	118,390	257	1,349	1,526	38,368	1,619
Recreational											
	Area 1										
	Area 3,4	5,822		32		1,391		10,438		176	
Total Recreational Catch		5,822	0	32	0	1,391	0	10,438	0	176	0
TOTALS		**5,822**	**1,183**	**103,786**	**4,129**	**119,781**	**257**	**11,787**	**1,526**	**38,544**	**1,619**

*Note: All available First Nations catch reported in Tables 29 and 30.

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 2017 through September 2018, the forecast Chinook abundance index was 0.59 of the PST base period. Therefore, under Treaty provisions, the maximum allowable catch was 88,300 Chinook for WCVI AABM fisheries; which includes a 30% reduction consistent with the treaty provisions that came into effect in January 2009.

Further 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), Fraser River Chinook, and Interior Fraser Coho populations.

Several ocean fisheries in Canada intercept WCVI origin Chinook, including northern troll, Haida Gwaii recreational, WCVI troll and WCVI recreational. Ocean fisheries in Canada are limited to a 10% exploitation rate, even if PST provisions allow for a higher catch. Management measures are in place to reduce the impact of fisheries on WCVI origin Chinook while still providing harvest opportunities.

Continued efforts were made in 2018 to limit the impact of the troll fishery on low status Chinook populations, including time and area constraints, and limits on effort (boat-days) to protect stocks of concern.

The pre-season planning distribution of the total WCVI AABM TAC amongst fisheries is shown in Table 32 below.

AABM Chinook catch and release information from all fisheries can be found in Table 33.

Table 32. Pre-Season Total Allowable Catch Estimate for October 2017-September 2018 WCVI AABM Chinook

	Pre-Season
WCVI AABM Abundance Index	0.59
WCVI AABM Chinook TAC*	88,300
AABM Recreational Harvest Projection	50,000
First Nations Harvest Projection (FSC)	5,000
Maa-nulth First Nations Domestic Allocation (FSC)	3,447
T'aaq-wiihak Allocation	9,721
Area G Troll Allocation	20,132
Total AABM	88,300

RECREATIONAL FISHERIES

The WCVI AABM recreational Chinook fishery primarily takes place in offshore Areas 121-127 from June to September. Chinook catch from inshore Areas 21-27 in June and Areas 21-24 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.

Chinook management measures are in place in the near-shore AABM areas to protect migrating WCVI origin Chinook. In 2018, management measures included increasing the finfish closures in several areas, increasing terminal Chinook non-retention areas, and focussing recreational opportunities in areas where DNA samples indicate that WCVI Chinook presence is lower.

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 total Chinook recreational catch in the 2018 WCVI AABM fishery is provided in Table 33.

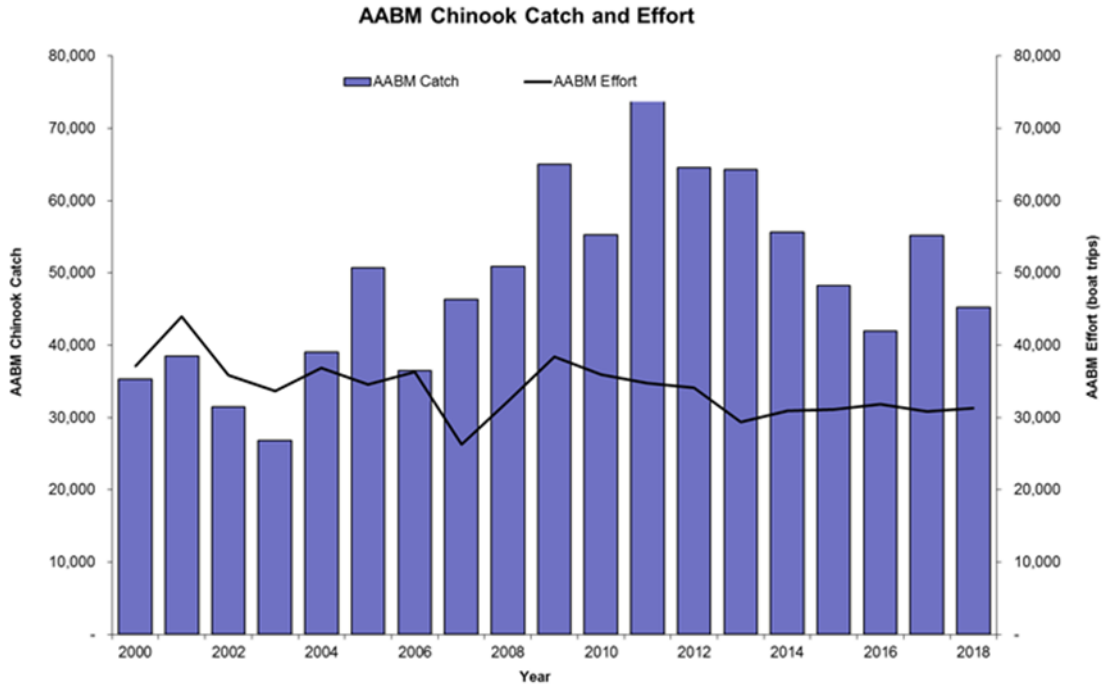


Figure 41. WCVI Recreational AABM Catch and Effort- Chinook, 2000-2018

COMMERCIAL FISHERIES

For the 2017/2018 Chinook year (October 1, 2017 to September 30, 2018), fisheries continued to be shaped by conservation concerns for the following domestic stocks: Fraser River Chinook, Interior Fraser River Coho, WCVI origin Chinook salmon, and LGS Chinook.

The distribution of the WCVI AABM TAC between fisheries is shown above in Table 32. Two commercial fisheries occurred during the 2017/2018 chinook year which were the Area G troll fishery and the T'aaq-wiihak First Nations Demonstration fishery.

AREA G TROLL SUMMARY

The Area G Troll annual management plan is designed to maintain exploitation rates on stocks of concern within established limits through the use of fishing time and area closures in conjunction with fishing effort limits. The management plan distributes catch and effort throughout the fishing year.

The management plan is subject to change when required to address specific conservation concerns. For the 2018 fishing season, the following changes to annual fishing plan were implemented:

- Additional conservation to address to further protect low returns of Fraser River Spring 42, Spring 52, and Summer 52 Chinook were implemented. For Area G troll this includes a fishery closure for June and July and the use of additional time/area closures.
- To avoid exceeding the overall WCVI AABM TAC, 5,000 Chinook of the Area G TAC was allocated to September fisheries. If AABM catch estimates indicate the overall WCVI AABM TAC may be exceeded, the Area G TAC for September would be used to assist Canada with staying within its overall WCVI Chinook TAC.
- The retention of hatchery marked Coho was not permitted in fisheries after September 15 which has been permitted in recent years

Area G Troll Fishing Periods Generalized Fishing Plan

October to March:

During the period from October 1 to March 15, a harvest level of approximately 20% of the Area G annual TAC was recommended, based on the PST Chinook model calibration and assigned harvest levels for the outer WCVI area.

March 16 to April 18:

A full time-area closure was maintained from March 16 to April 18 annually to avoid interception of Fraser River Spring 42 and Fraser Spring & Summer 52 Chinook.

Late April/ mid-June:

During the period from April 19 to June 15, a harvest of approximately 40% of the Area G annual TAC is permitted, based on the PST Chinook model calibration and assigned harvest levels for the outer WCVI area. In addition, total effort (boat-days) was limited and areas of southwest Vancouver Island were closed until May 7 (partial openings from May 2 to 7), in order to avoid interception of Fraser River Spring 42, Spring 52, and Summer 52 Chinook.

June 16 to July 23:

A full time-area closure was maintained from June 15 to July 23 in Management Areas 125 to 127, and from June 16 to July 31 in Management Areas 123 to 124, to avoid interception of Fraser River Spring 42, Spring 52, and Summer 52 Chinook.

July 24 through early August:

During this period, a harvest of approximately 20% of the Area G annual TAC is permitted, based on the PST Chinook model calibration and assigned harvest levels for the outer WCVI area. In addition, the fishery is managed to minimize mortality on wild Coho through: a) a maximum interception of Coho; and b) the mandatory use of large (minimum 6") plugs. As well, the fishery is managed to minimize mortality of WCVI origin Chinook through the use of time-area closures of near shore areas where WCVI Chinook stocks are prevalent.

September:

During the September period, a harvest of approximately 20% of the Area G annual TAC is permitted based on the PST Chinook model calibration and assigned harvest levels for the WCVI AABM area. The Area G harvest level in September has the potential to increase if there is available remaining WCVI AABM TAC after accounting for First Nation FSC and recreational fisheries. However, if First Nations or the recreational sectors catches are larger than projected, the available commercial TAC is reduced. During harvest opportunities between September 15 and December 31 retention of marked Coho bycatch may be permitted.

For all troll fisheries, selective fishing practices were mandatory, including single barbless hooks and revival tanks for resuscitating non-retention species prior to release.

Since 1999, a major objective for the management of the WCVI troll fishery has been to distribute the catch throughout the fall-winter-spring-summer periods. This objective was continued in 2017/2018.

FIRST NATIONS COMMERCIAL HARVEST

In 2018, the Department authorized an AABM Chinook salmon demonstration fishery for the T'aaq-wiihak 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) with a TAC of 9,721 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 two openings: May 14 – 31, and June 12 – August 28. A 100% independent dockside monitoring program was in place for the entire season. Sale of Chum and Pink were permitted during these openings. In the second opening hatchery-marked Coho could be retained for sale, and sale of Sockeye was also permitted from August 3 – 28. Several groundfish species were could be retained for sale, and additional salmon and groundfish were retained for FSC under dual fishing provisions. Total catch reported to date for the AABM Chinook salmon demonstration fishery can be found in Table 33.

<u>FIRST NATIONS DOMESTIC AND FSC FISHERIES</u>

The 2018 WCVI AABM FSC Chinook reported catch (to date) can be found in table 33 (this includes fish retained for food, social and ceremonial purposes from the T'aaq-wiihak salmon demonstration fishery); catch from Maa-nulth Nations Domestic fisheries can be found in Table 33. Total AABM Chinook reported to date for First Nations FSC and domestic fisheries can be found in Table 33.

Table 33. Southern BC - AABM Chinook Directed Fisheries

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Fraser Sockeye Kept	Non-Fraser Sockeye Kept	Unknown Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
First Nations FSC													
	West Coast Vancouver Island	1,133	100	445						5,033		2	
Total First Nations FSC Catch		1,133	100	445	0	0	0	0	0	5,033	0	2	0
First Nations Commercial													
T'aaq-wiihak	WCVI AABM (24-26, 124-126)	9,667	499	15,493	43		9			899	2,145	2	0
T'aaq-wiihak[2]	Fraser River Sockeye (124-126)	17	41	14,185	43					1	49	1	0
Total First Nations Commercial Catch		9,684	540	29,678	86	0	9	0	0	900	2,194	3	0
Treaty													
Maa-nulth Treaty	WCVI Areas 123-1 to 8, and Portions of Areas 21, 121-1, 123-9, 124-1, 124-3, 126-1 to 4	1,752											
Total Treaty Catch		1,752	0	0	0	0	0	0	0	0	0	0	0
Commercial													
Area G Troll	WCVI	19,156	2,209	0	0	0	50	0	0	0	3,739	31	7
Total Commercial Catch		19,156	2,209	0	0	0	50	0	0	0	3,739	31	7
Recreational													
	WCVI - Inshore (20W-27)	17,197	39,450						2				
	WCVI - Offshore (121-127)	31,241	15,860					19	77				
Total Recreational Catch		48,438	55,310	0	0	0	0	19	79	0	0	0	0
TOTALS		**80,163**	**58,159**	**30,123**	**86**	**0**	**59**	**19**	**79**	**5,933**	**5,933**	**36**	**7**

Notes:

5. West Coast Vancouver Island FSC catch includes catch from all FSC fisheries reported in those areas. FSC fisheries in these areas do not generally 'target' one species. 'Target' and 'non-target' catch retained for FSC are included for T'aaq-wiihak fisheries where appropriate.
6. Catch from the T'aaq-wiihak Fraser Sockeye directed fishery

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 2018 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. FSC management actions included time and area closures and reduced fishing times. Recreational measures included barbless hooks, time and area closures, reductions to daily/possession limits, size restrictions and mark-selective fisheries. Commercial measures included barbless hooks, time and area closures, gear restrictions, mandatory use of revival tanks, daily catch reporting and mandatory logbooks.

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 recreational, commercial and First Nations FSC fisheries.

LGS Chinook stocks are improving from historic lows seen in 2009 and are 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.

Fraser River Spring 42, Spring 52, and Summer 52 Chinook stocks have had specific management measures in place to reduce exploitation in FSC, recreational and commercial fisheries.

For 2018, the Department also implemented a precautionary 25% to 35% reduction in exploitation rates for all Fraser River Chinook populations to support conservation and promote rebuilding.

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.

ISBM Chinook catch and release information from all fisheries can be found in the individual tables.
In 2018, commercial fisheries in Barkley and Nootka sounds targeted ISBM Chinook. Chinook non-retention was in place for other southern BC commercial fisheries (excluding AABM Chinook).

STOCK STATUS

WEST COAST VANCOUVER ISLAND CHINOOK

Wild 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 Nation 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 2018 in order to improve the precision and accuracy of annual WCVI Chinook return estimates. The sample size was approximately 1,000 Chinook.

STRAIT OF GEORGIA CHINOOK

Fall Season

Returns of fall Chinook to SEP facilities south of Campbell River were average to above average in 2018. Puntledge River had another strong showing with an estimate of over 10,600 fish compared to the 12 year average of 7,170. Further south, the Big Qualicum River escapement was closer to the 4 year average of 6,700 at 6,336. Counts in the Little Qualicum River were also average at 4,411 based on swim results.

Chinook escapement to mid-island streams was variable. The peak count in the Englishman River (411) was less than half of 2017 and below the average of 860. Nanaimo River counts were at the four year average with 4,074 fish.

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 80-90% in the early 1990s but declined to an average of 56% for the period 2006-2012 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 7 to October 26th, 2018 following significant repairs in 2017 and further modifications in 2018. Over this time, a total of 9,949 Chinook were enumerated before the fence was removed due to a large number of fish still holding downstream. The final escapement into the system was estimated at 22,482 Chinook including 16,037 adults and 6,445 jacks using PIT tags. Hatchery contributions based on adipose clips were estimated at 10.5% for jacks and 9.1% for adults. The escapement target of 6,500 naturally spawning adults was met for a third consecutive year.

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. 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:

The Puntledge, Nanaimo and more recently the Cowichan system have identified early runs of Chinook in the Strait of Georgia. Cowichan summer run Chinook were monitored again this year with a DIDSON and

results show approximately 100 targets moving upstream in the mid-river. Efforts to recover Puntledge summers to viable levels have resulted in improved returns to the river since 1999. The estimate for 2018 escapement to Puntledge is approximately 820 adults which is close to the four year average of 860. Monitoring of Nanaimo spring and summer Chinook escapement was confined to one swim survey in 2018. Although no spring run surveys were conducted, a count of 288 summer run Chinook was achieved which is below the 4 year average of 810. Two swim surveys of the Chemainus River revealed a peak count of just five summer Chinook. Recent counts in this system have been very low and a rock slide in the lower canyon now limits 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). The Phillips program has been in development over the past few years with the plan to eventually establish it as a Chinook indicator for the mainland inlet area. Other systems are covered using intermittent visual surveys.

Nimpkish River

In 2018, the general observations of Chinook were down relative to recent years and below brood. Low water conditions during October constrained fish migration and Chinook staged and spawned in atypical locations. At the time of this report Hatchery staff were in the process of trying to secure brood stock, but low Chinook abundance and water conditions had impacted those efforts to date. Many of the fish that have been encountered for brood collection have been post spawn. Preliminary estimate of 857 (peak count 518) Chinook is 54% of the last 4 year average of 1,600 and is approximately 35% of the 2014 brood year.

Campbell/Quinsam System

The 2018 program has the combined system preliminary Chinook estimate at approximately 7,300 adults; down from the 2017 estimate of 9,500 adults but similar to the 7,500 that returned in 2016. The 2014 parental brood year for returning age-4s was approximately 2,600. In 2018, program precision for each river was below 9%. The Quinsam Hatchery attained their Chinook brood target.

Phillips River

Preliminary results for the Phillips River program indicate the Chinook escapement is in the range of 1,200, a marked decrease in the consistent trend of the past few years; the 5-year historic average is approximately 2,400.

FRASER RIVER CHINOOK

Escapements of spring and summer stream type stocks have been at low levels during the 2009 Agreement, and in 2018 fisheries were restricted further in the Canadian marine fisheries and Fraser River to address concerns about poor status for all Fraser Chinook stock groups. Relative to the parental brood escapements, the 2018 escapement decreased approximately as follows to the Spring 42 (-88%), Spring 52 (-50%) and Summer -52 (-60%) stock groups.

Status has declined for the Summer 41 stock group. In 2018, the escapement of the Summer 41 aggregate declined by approximately 50% from the brood escapement levels.

Annual Fraser River fall-run Chinook stock group escapements are, on average, large (~100,000 during the 2009 Agreement). Historically, the major contributor and principal focus of assessment of this stock group is

Chinook returning to the Harrison River, and Harrison River transplants to the Chilliwack River Hatchery. Harrison River escapements have been below the escapement goal for the last three years.

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 by catch during other salmon fisheries in Area 23. Catch reports for Maa-nulth domestic harvest, the WCVI NTC non-treaty First Nations harvest, the remaining non-NTC First Nations harvest, and the total combined catch for WCVI First Nations can be found in Table 34.

Strait of Georgia FSC Fisheries and Treaty Domestic Fisheries

First Nations catches in the Strait of Georgia can be found in Table 34.

Johnstone Strait FSC Fisheries

First Nations catches in Johnstone Strait can be found in Table 34.

Fraser River FSC Fisheries

FSC fisheries took place in the Lower Fraser River between the mouth and Sawmill Creek from April through November 2018. A total number of Chinook harvested, including from Chinook-directed fisheries, and the remaining Chinook harvested as bycatch in Sockeye and Chum-directed FSC openings or limited participation openings, can be found in Tables 34,41,43, and 45. Sockeye, Coho, and Chum bycatch that occurred during Chinook-targeted FSC openings is also listed in those Tables.

Chinook directed FSC fisheries took place in the Fraser River and some tributaries above Sawmill Creek from May through October 2018. A preliminary total of Chinook harvested, as well as bycatch estimates can be found in Tables 34, 41, 43, and 145.

COMMERCIAL FISHERIES

Area B Seine

Due to a relatively large forecast of 83,000 Chinook for Robertson Creek Hatchery, Area B Seine fisheries were initiated in Area 23. The fisheries occurred in Subarea 23-1, 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 on September 4-7. The Area B in-season TAC was 4,877 Chinook. There was also additional quota reallocated to Area B from uncaught catch in the recreational sector. The fisheries were very successful, and a total Chinook catch and Coho bycatch can be found in Table 34.

Area D Gill Net

Area D gill net fisheries were initiated in Area 23. The fisheries occurred in Subarea 23-1, upper Alberni Inlet, targeting Chinook with a bycatch of Coho allowed. The fisheries were opened one day a week for night-time only fisheries in late August. After Labour Day there were multiple openings nightly in early and mid-September. The fisheries occurred on August 22, 26 and September 3,4,5,7,8,10,11,12,13. The Area D in season TAC was 9,768 Chinook. There was also additional quota reallocated to Area D from uncaught catch in the recreational sector. The fisheries were successful and a total Chinook catch and Coho bycatch can be found in Table 34.

In 2018, gill net fisheries occurred in Tlupana Inlet targeting Chinook returns to the Conuma River hatchery. Fisheries occurred discontinuously from Aug 12 to September 12. The total estimated catch during the Chinook directed fishery can be found in Table 34.

Area E Gill Net

There were no Area E gill net fisheries for ISBM Chinook in 2018.

There were no chinook directed Area E gill net commercial openings in the Fraser River (Area 29) during the 2018 season and retention of chinook in sockeye directed fisheries was not permitted as part of the 25% to 35% coast wide reductions for Fraser chinook stocks.

FIRST NATIONS COMMERCIAL HARVEST

In 2018, an agreement was reached with the Hupacasath and Tseshaht First Nations for an Economic Opportunity fishery. The fisheries occurred in Subarea 23-1 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 24, 28, September 6th, 9th, and 20th. The in-season Economic Opportunity TAC for Chinook was 14,645. There was also additional quota reallocated to the Somass Economic Opportunity fishery from uncaught catch in the recreational sector. There was also a small amount of Chinook bycatch in an October 15 Economic Opportunity Coho fishery. The fisheries were successful and a total Chinook and Coho bycatch can be found in Table 34.

The Department authorized an ISBM Chinook commercial salmon demonstration fishery in Area 25 for the T'aaq-wiihak Nations in 2018. This fishery targeted both the Conuma River and Burman River enhanced Chinook returns using troll and gill net. Fishery openings occurred between July 12 and September 4. The total Chinook catch from the Conuma-targeted fishery and the Burman-targeted fishery can be found in Table 34. Chum bycatch was also permitted to be sold. Dual fishing was permitted and catch reported retained for FSC purposes can be found in Table 34.

Fraser River Economic Opportunity and Inland Demonstration Fisheries

Economic opportunity or inland demonstration fisheries did not occur in 2018 for ISBM Chinook in either the upper or lower reaches of the Fraser River as part of the 25% to 35% coast wide reductions for Fraser Chinook Stocks.

In 2018, Fraser Sockeye economic opportunity and demonstration fisheries took place in the lower Fraser River with the Musqueam First Nation, Harrison Fisheries Authority, and 18 communities from Port Mann Bridge to Sawmill Creek; retention of Chinook was not permitted.

In 2018, no economic opportunity fisheries for Fraser Chum occurred in the Lower Fraser River Area due to poor in-season chum escapement. There is currently one Inland Commercial Fishing Enterprises (CFE) operating in the Lower Fraser: Harrison Fisheries Authority was authorized a demonstration fishery on sockeye using gill nets in the Harrison River; however, no fishing occurred as the group was concerned the Harrison River Sockeye return was not sufficient to sustain a fishery. Therefore, there were no incidental impacts on Chinook from these fisheries.

There are currently three Inland Commercial Fishing Enterprises (CFE) operating 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 4-1 chinook). In 2018, Riverfresh did not retain Chinook for sale during the sockeye directed purse

seine fishery as part of the 25% to 35% coast wide reductions for Fraser chinook stocks. Dual Fishing was in place for any non-target species that could not be released alive in vigorous condition or were dead.

The total Chinook harvested in sockeye economic opportunity/demonstration fisheries can be found in Tables 34, 41, 43, 45.

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 at the Robertson Creek Hatchery facility.

The Ditidaht First Nation was issued an ESSR Licence for Chinook at Nitinat Lake and the 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, and the Burman River. Due to challenging environmental conditions and no surplus of salmon available, no ESSR fishery occurred in 2018.

The Ucluelet First Nation was issued an ESSR licence to harvest Chinook at the Thornton Creek hatchery.

An ESSR for the Qualicum First Nation for chum, coho and chinook was issued October 3, 2018 UFN at the Big Qualicum hatchery. See Table 34 for catch.

There were ESSR fisheries at the Capilano hatchery in 2018 that included Chinook salmon.

There were ESSR fisheries at the Chilliwack hatchery in 2018 that included Chinook salmon.

There were ESSR fisheries permitted at the Inch Creek and Chehalis hatcheries in 2018

There were no Johnstone Strait ESSR opportunities on Chinook in 2018

There were no Interior ESSR opportunities on Chinook in 2018

All ESSR harvest information can be found in the individual tables.

RECREATIONAL FISHERIES

ISBM Chinook catch and release information from all fisheries can be found in Table 34.

West Coast Vancouver Island

In 2018, a good return of 4 year old Chinook was expected to the WCVI. Actual returns were slightly above forecast and provided good recreational fishing opportunities in many areas.

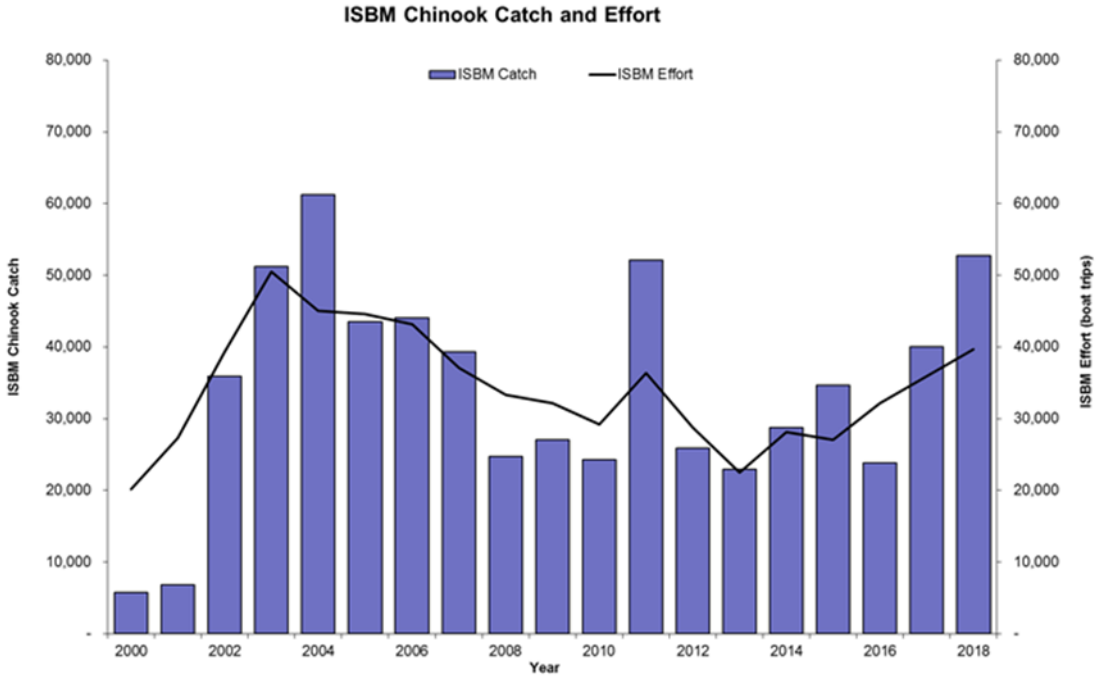


Figure 42. Recreational WCVI Chinook ISBM Catch and Effort, 2000 to 2018

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

The 2018 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 mark selective fisheries, size limits in specific areas/times, reductions in daily limits in portions of the Strait of Georgia. Closures were also implemented in portions of the Fraser approach waters, Southern Gulf Islands and Juan de Fuca Strait to support recovery of Southern Resident Killer Whales.

Areas 13 to 18, 28 and 29 and Subareas 19-1 to 19-6 (except those portions listed below):

> June 1, 2018 until September 30, 2018, the daily limit for Chinook Salmon was reduced from two (2) per day to one (1) per day in in Areas 13 to 17, 28 and 29 with the exception of those areas listed below where additional actions were in place for Southern Resident Killer Whales (SRKW).
>
> October 1, 2018 until further notice, the daily limit for Chinook Salmon was two (2) per day in in Areas 13 to 19, 28 and 29.

Exceptions:

Strait of Georgia:

> May 7, 2018 until June 28, 2018 the daily limit for Chinook salmon was two (2) per day, of which only one may be greater than 67 cm in Subareas 18-1, 18-3, 18-6, 18-11, and 19-5.
>
> June 29, 2018 to July 31, 2018 the daily limit was two (2) Chinook salmon per day between both of which must be less than 85 cm in Subareas 18-1, 18-3, 18-6, 18-11, and 19-5.
>
> Chinook salmon retained in these waters must have a fork length of at least 62 cm.

Juan de Fuca (Subareas 19-1 to 19-4 and Area 20):

> June 1, 2018 until June 28, 2018 the daily limit for Chinook salmon was two (2) per day which may be wild or hatchery marked between 45 and 67 cm fork length or hatchery marked greater than 67 cm in Subareas 19-1 to 19-4 and 20-6 and 20-7 and that portion of Subarea 20-5 that lies east of 123 degrees
> 49.30 minutes west longitude (Otter Point).
>
> June 29, 2018 until July 31, 2018, the daily limit for Chinook salmon was two (2) Chinook per day which may be wild or hatchery marked between 45 and 85 cm or hatchery marked greater than 85 cm in Subareas 19-1 to 19-4 and 20-6 and 20-7 and that portion of Subarea 20-5 that lies east of 123 degrees 49.30 minutes west longitude (Otter Point).

Fraser River tidal and non-tidal sport fisheries had delayed starting dates, implemented to protect Fraser Chinook stocks.

Finfish Closures were also implemented from June 1- September 30 in the following portions of the Southern Gulf Islands and Juan de Fuca to support SRKW:

- Subareas 18-2, 18-4, 18-5 and 18-9.
- Subareas 20-3, 20-4 and that portion of Subarea 20-5 that lies west of 123 degrees 49.30 minutes west longitude (Otter Point)
- Subareas 29-7, 29-9, 29-10
- Subarea 29-6 was closed to salmon fishing from June 1 – July 31 and was a chinook non-retention area from August 1 – September 30.

For the Johnstone Strait and the other areas of the Strait of Georgia not described above, Chinook management measures included an annual limit of 15 Chinook, a daily limit of two Chinook and a minimum size limit of 62 cm. For the Canadian portion of Juan de Fuca Strait south of Cadboro Point, regulations include an annual limit of 20 Chinook, a daily limit of two Chinook and a minimum size limit of 45 cm.

In 2018, 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 Subareas 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 Victoria Areas in 2018. 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 June to October. Areas 15 and 16 did not have a creel survey in 2018. Creel surveys were conducted in Areas 17 and 18 from May to July. Creel surveys were conducted for Areas 19 and the SOG portion of Area 20 from March to October.

Effort, catch and release information from marine fisheries are summarized in Table 34.

Region 1 Vancouver Island Tributaries

River conditions in most tributaries on Vancouver Island were improved in 2018 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 2018. The Qualicum Nitinat, Somass and Conuma Rivers provided some recreational opportunities to harvest enhanced Chinook stocks during this time period.

Qualicum River

Qualicum River opened for Chinook on August 1 for four per day less than 62 cm. On October 16 the regulation changed to four Chinook per day of which 2 could be greater than 62 cm. The Qualicum River was not monitored by creel survey during 2018.

Somass/ Stamp

During 2018 there was a non-tidal opening on the Somass/Stamp River (Area 23) with Chinook retention. The fishery opened from August 25th until December 31, 2018, and the daily limit was one Chinook salmon greater than 77cm and one less than 77 cm. The Somass/Stamp Rivers were not monitored by creel survey during 2018.

Nitinat

During 2018 there was a non-tidal opening for the Nitinat River (Area 22) from August 25, 2018 to September 30, 2018. The daily limit was two with only one greater than 77 cm. The salmon fishery was closed for retention of Chinook from October 1 until October 14 to protect Chinook salmon during the peak spawning period. The salmon fishery re-opened from October 16 until December 31 with non-retention of Chinook salmon. The Nitinat River was not monitored by creel survey during 2018.

Conuma

During 2018 there was a non-tidal opening for the Conuma River from August 25, 2018 to December 31, 2018. The daily limit was two with only one greater than 77 cm.

Fraser River and Tributaries

Fraser River Chinook stocks required additional management measures again in 2018 due to continued concerns about poor stock status.

In Subareas 29-6, 29-7, 29-9 and 29-10, the 2018 fishing regulations were as follows:

- January to May 31, 2018, fishing for chinook was not permitted.
- June 1 to October 24, 2018, fishing for salmon was not permitted in Subareas 29-7, 29-9 and 29-10.
- June 1 to July 31, 2018, fishing for salmon was not permitted in Subarea 29-6.
- August 1 to September 27, 2018, the daily limit for chinook salmon was zero per day in Subarea 29-.6
- September 28 to October 24, 2018, fishing for salmon was not permitted in Subarea 29-6.
- October 25 to December 31, 2018, the daily limit for Chinook salmon was two (wild or hatchery marked) with a minimum size limit of 62 cm in Subareas 29-6, 29-7, 29-9 and 29-10.

Tidal Fraser and Region 2 Fraser River:

In the tidal waters of the Fraser River and in that portion of the Fraser River in Region 2 the following regulations were in place for 2018:

- January 1 to August 6, no fishing for salmon.
- August 7 to September 3, the daily limit for chinook was four (wild or hatchery marked) with only one over 50 cm allowed to be retained.
- September 4 to September 27, the daily limit for chinook was four (wild or hatchery marked) with only one over 62 cm allowed to be retained.
- September 28 to October 24, fishing for salmon was not permitted.
- October 25 to December 31 the daily limit for chinook was four (wild or hatchery marked) with only one over 62 cm allowed to be retained.

Fraser River Tributaries:

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, there was no Chinook fishery on the Harrison River in 2018 due to a low forecast of terminal abundance.

Tributaries to the Fraser River above Sawmill Creek in which Chinook retention was authorized included:

Region 3 - Fraser River Tributaries

Kamloops Lake and Thompson River from the outlet of Kamloops Lake, downstream to fishing boundary signs located just downstream of Gold Pan Provincial Park:

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

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.

Region 5 – Fraser Watershed

There were no recreational Chinook fisheries in 2018.

Region 7

There were no recreational Chinook fisheries in 2018.

Region 8

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

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 chinooks, only two over 50 cm.

Middle Shuswap River: No fishing for salmon.

Lower Shuswap River upstream from white triangular fishing boundary signs upstream of the Mara Bridge to Mable Lake

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

Table 34. Southern BC - ISBM Chinook Directed Fisheries*

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Fraser Sockeye Kept	Non-Fraser Sockeye Kept	Unknown Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
First Nations FSC													
	Johnstone Strait	529	0										
	Strait of Georgia	1,033	0										
	WCVI	2,118	120										
	Fraser River*	17,819	494										
Total First Nations FSC Catch		21,499	614										
First Nations Commercial													
T'aaq-wiihak	WCVI ISBM (25)	2,850											
Maa-nulth HA	Henderson (23)	430											
Harvest Agreement	Fraser River*	22	8										
EO	WCVI	19,899	0							783			
EO	Fraser River*	556	1,452										
Demo	Fraser River*	0	3,449										
Total First Nations Commercial Catch		23,327	4,909							783			
Commercial													
Area B Seine	Nitinat (21, 121)	0	0										
Area B Seine	Somass (23)	6,403	235				66		58	2,606			5
Area D Gillnet	Tlupana (25)	3,307	0								2	36	
Total Commercial Catch		9,710	235				66		58	2,606	2	36	5
Recreational													
	Juan de Fuca (19,20)	23,587	41,434					207	0				
	Strait of Georgia (13-19,28,29)	67,797	65,510					2,646	2,243				
	Johnstone Strait (11-12)	13,995	15,222					1,897	1,945				
	WCVI - Inshore (20-27)	40,593	24,395					76	79				
	Fraser River*	12,833	3,115										
Total Recreational Catch		158,805	149,676					4,826	4,267				

ESSR													
	Johnstone Strait												
	Strait of Georgia	3,336											
	WCVI	28,762											
	Fraser River*	13,652	0										
Total ESSR Catch		45,750	0										
TOTALS		**259,091**	**155,434**	**0**	**0**	**0**	**66**	**4,826**	**4,430**	**3,389**	**2**	**36**	**5**

Notes:

*Fraser River Data includes Chinook CATCH from all fisheries, not just "directed" Chinook fisheries. Some Fraser River catch estimates are preliminary and are subject to change.

Johnstone Strait, West Coast Vancouver Island and Strait of Georgia FSC catch includes catch from all FSC fisheries reported in those areas. FSC fisheries in these areas do not generally 'target' one species. 'Target' and 'non-target' catch retained for FSC are included for T'aaq-wiihak and Somass fisheries where appropriate.

FRASER RIVER SOCKEYE

OBJECTIVES AND OVERVIEW

In 2018 the Fraser River Panel (FRP) adopted the p50 probability run size forecast for all run timing groups (13.9M 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 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 2018 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. If the Late Run reached the p75 level abundance in-season the LAER for this group increases to 30%;

- The allowable harvest in a LAER situation is not a target and, in most circumstances, would be considered incidental harvest or bycatch only; however, in some circumstances limited directed harvest in terminal areas may be considered;
- In 2018, 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 rolling window closure based on run timing of the Early Stuart Sockeye migration through various fishery areas; and
- Conservation concerns for other Sockeye stocks and species continued to impact the planning of Sockeye fisheries. The stocks and species of concern in 2018 were: Cultus Lake Sockeye, Nimpkish River Sockeye, Sakinaw Lake Sockeye, Interior Fraser River Coho, Southern B.C Chinook including Fraser River Chinook, and Interior Fraser River Steelhead.

STOCK STATUS

Please Note: With the exceptions of Tables 35, 37 and 39, all tables and figures 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 13,981,000 Fraser River Sockeye salmon with a one in two chance that the run size would be between 8,423,000 (p25 level) and 22,937,000 (p75 level).

Table 35. Pre-season run size abundance forecast range by management group for Fraser Sockeye

	Probability that the Return will be at or below specified Run Size				
Management Group	**p10**	**p25**	**p50**	**p75**	**p90**
Early Stuart	37,000	54,000	84,000	133,000	199,000
Early Summer	584,000	1,102,000	2,155,000	3,765,000	6,587,000
Summer	1,470,000	2,473,000	4,344,000	7,669,000	13,173,000
Late	3,174,000	4,794,000	7,398,000	11,370,000	16,934,000
Total	5,265,000	8,423,000	13,981,000	22,937,000	36,893,000

The pre-season diversion rate forecast for Fraser River Sockeye through Johnstone Strait was 56%. Given the recent high diversion rates on this cycle line through Johnstone Strait the Panel chose to adopt the 1990-2017 median diversion rate of 63% for pre-season planning purposes. Expected Area 20 50% migration timing dates were July 2 for Early Stuart, August 8 for Early Summer, August 11 for Summer, and August 17 for Late-run Sockeye.

Pre-season spawning escapement goals at the p50 run size forecasts were 84,000 Early Stuart, 862,000 Early Summer, 1,737,600 Summer and 2,959,200 Late-run Sockeye for a total of 5,642,800 Sockeye spawners (Table 36).

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

Date	Management Group	Total Abundance	TAC* Spawning Escapement Target	TAM	pMA	Management Adjust.	Test Fishing	Aboriginal Fishery Exemption	Total Deductions	Total Allowable Catch (includes AFE)**	50% Migration Date (A20)	JS Diversion Rate
June Pre-season	Early Stuart	84,000	84,000	0.00	0.69	58,000	800	7,500	84,000	7,500***	2-Jul	
	Early Summer	2,155,000	862,000	0.60	0.23	198,300	19,700	74,900	1,154,900	1,075,000	8-Aug	
	Summer	4,344,000	1,737,600	0.60	0.10	173,800	37,800	153,200	2,102,400	2,394,800	11-Aug	
	Late	7,398,000	2,959,200	0.60	0.43	1,272,500	45,700	164,400	4,441,800	3,120,600	17-Aug	
	Sockeye	**13,981,000**	**5,642,800**			**1,702,600**	**104,000**	**400,000**	**7,783,100**	**6,597,900**		**63%**
October 12 In-season	Early Stuart	125,000	108,000	0.14	0.69	74,500	1,070	6,850	125,000	6,850***	4-Jul	
	Early Summer	1,800,000	720,000	0.60	0.23	165,600	24,000	75,077	984,677	890,400	6-Aug	
	Summer	4,100,000	1,640,000	0.60	0.10	164,000	51,600	153,442	2,009,042	2,244,400	10-Aug	
	Late	4,700,000	1,880,000	0.60	0.04	75,200	34,330	164,631	2,154,161	2,710,500	17-Aug	
	Sockeye	**10,725,000**	**4,348,000**			**479,300**	**111,000**	**400,000**	**5,272,880**	**5,852,150**		**33%**

* The TAC is determined by the run sizes and TAC deductions (spawning escapement targets, management adjustments, projected test fishing catches and AF Exemptions) that were in effect when the 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 The allowable harvest (LAER) is not a target and is usually by-catch in fisheries directed at other stocks or species with some limited directed terminal harvest.

*** The expected allowable Early Stuart Catch.

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 to10%, while the Early Summer and Summer run Sockeye LAER limit was up to 20%, and the Late run Sockeye LAER limit was 20-30%. Harvest rules were further constrained by a 60% Total Allowable Mortality (TAM) rate for all management groups (Table 37).

Table 37. Fraser River Sockeye Salmon 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%	180,000	450,000
Summer (w/o misc)	20%	60%	1,020,000	2,550,000
Late (w/o misc)	20-30%	60%	1,100,000	2,750,000

Management Unit		Pre-season Forecast Return p10	p25	p50	p75	p90
Early Stuart	forecast	37,000	54,000	84,000	133,000	199,000
	TAM Rule (%)	0%	0%	0%	19%	46%
	Escapement Target	37,000	54,000	84,000	108,000	108,000
	MA	25,500	37,300	58,000	74,500	74,500
	Esc. Target + MA	62,500	91,300	142,000	182,500	182,500
	LAER	10%	10%	10%	10%	10%
	Available ER at Return	0%	0%	0%	0%	6%
	Allowable ER	10%	10%	10%	10%	10%
	Allowable Harvest	3,700	5,400	8,400	13,300	19,900
	2018 Performance					
	Projected S (after MA)	19,600	28,700	44,600	70,600	105,700
	BY Spawners	68,613	68,613	68,613	68,613	68,613
	Proj. S as % BY S	29%	42%	65%	103%	154%
	cycle avg S	33,275	33,275	33,275	33,275	33,275
	Proj. S as % cycle S	59%	86%	134%	212%	318%

Management Unit		Pre-season Forecast Return				
		p10	p25	p50	p75	p90
Early Summer (w/o RNT)	*lower ref. pt. (w misc)*	267,500	294,300	**330,100**	312,600	316,200
	upper ref. pt. (w misc)	668,700	735,800	**825,300**	781,500	790,400
	forecast (incl. misc)	584,000	1,102,000	**2,155,000**	3,765,000	6,587,000
	TAM Rule (%)	54%	60%	**60%**	60%	60%
	Escapement Target	267,500	440,800	**862,000**	1,506,000	2,634,800
	MA	61,500	101,400	**198,300**	346,400	606,000
	Esc. Target + MA	329,000	542,200	**1,060,300**	1,852,400	3,240,800
	LAER	20%	20%	**20%**	20%	20%
	Available ER at Return	44%	51%	**51%**	51%	51%
	Allowable ER	44%	51%	**51%**	51%	51%
	Allowable Harvest	255,000	559,800	**1,094,700**	1,912,600	3,346,200
	2018 Performance					
	Projected S (after MA)	266,500	439,200	**858,800**	1,500,400	2,625,000
	BY Spawners	647,784	647,784	**647,784**	647,784	647,784
	Proj. S as % BY S	41%	68%	**133%**	232%	405%
	cycle avg S	330,355	330,355	**330,355**	330,355	330,355
	Proj. S as % cycle S	81%	133%	**260%**	454%	795%
Management Unit		**Pre-season Forecast Return**				
		p10	p25	p50	p75	p90
Summer (w. RNT & Har)	*lower ref. pt. (w misc)*	1,064,300	1,064,300	**1,064,300**	1,064,300	1,064,300
	upper ref. pt. (w misc)	2,660,900	2,660,900	**2,660,900**	2,660,900	2,660,900
	forecast	1,470,000	2,473,000	**4,344,000**	7,669,000	13,173,000
	TAM Rule (%)	28%	57%	**60%**	60%	60%
	Escapement Target	1,064,300	1,064,300	**1,737,600**	3,067,600	5,269,200
	MA	106,400	106,400	**173,800**	306,800	526,900
	Esc. Target + MA	1,170,700	1,170,700	**1,911,400**	3,374,400	5,796,100
	LAER	20%	20%	**20%**	20%	20%
	Available ER at Return	20%	53%	**56%**	56%	56%
	Allowable ER	20%	53%	**56%**	56%	56%
	Allowable Harvest	299,300	1,302,300	**2,432,600**	4,294,600	7,376,900
	2018 Performance					
	Projected S (after MA)	1,065,300	1,065,300	**1,739,400**	3,070,700	5,274,500
	BY Spawners	2,837,275	2,837,275	**2,837,275**	2,837,275	2,837,275
	Proj. S as % BY S	38%	38%	**61%**	108%	186%
	cycle avg S	815,485	815,485	**815,485**	815,485	815,485
	Proj. S as % cycle S	131%	131%	**213%**	377%	647%
Management Unit		**Pre-season Forecast Return**				
		p10	p25	p50	p75	p90
Late (w/o Har)	*lower ref. pt. (w misc)*	1,105,200	1,105,200	**1,105,200**	1,105,200	1,105,200
	upper ref. pt. (w misc)	2,763,100	2,763,100	**2,763,100**	2,763,100	2,763,100
	forecast	3,174,000	4,794,000	**7,398,000**	11,370,000	16,934,000
	TAM Rule (%)	60%	60%	**60%**	60%	60%
	Escapement Target	1,269,600	1,917,600	**2,959,200**	4,548,000	6,773,600
	MA	545,900	824,600	**1,272,500**	1,955,600	2,912,600
	Esc. Target + MA	1,815,500	2,742,200	**4,231,700**	6,503,600	9,686,200
	LAER	20%	20%	**20%**	30%	30%
	Available ER at Return	43%	43%	**43%**	43%	43%
	Allowable ER	43%	43%	**43%**	43%	43%
	Allowable Harvest	1,358,500	2,051,800	**3,166,300**	4,866,400	7,247,800
	2018 Performance					
	Projected S (after MA)	1,270,900	1,919,500	**2,962,200**	4,552,500	6,780,300
	BY Spawners	2,303,384	2,303,384	**2,303,384**	2,303,384	2,303,384
	Proj. S as % BY S	55%	83%	**129%**	198%	294%
	cycle avg S	2,652,186	2,652,186	**2,652,186**	2,652,186	2,652,186
	Proj. S as % cycle S	48%	72%	**112%**	172%	256%
Allowable Harvest (TF, US, CDN)		1,916,500	3,919,300	**6,702,000**	11,086,900	17,990,800
Total projected spawners		2,622,300	3,452,700	**5,605,000**	9,194,200	14,785,500

Management Adjustments (MAs) of 58,000 Early Stuart, 198,300 Early Summer, 173,800 Summer-run and 1,272,500 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 2018 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. For Summer run Sockeye, a return abundance at the lower level of the forecast range (p10) would necessitate LAER management.

The preseason MAs were derived from historical proportional differences between estimates (pDBEs). For the Early Stuart and Summer run aggregates the pre-season pDBEs were historical medians from all cycle years and for Early Summers from the dominant cycle only. For Late run the Panel agreed to use the historical

median from the dominant cycle if the upstream timing was earlier than September 15th or the all years timing model estimate if the timing was after September 15th.

The projected Total Allowable Catch (TAC) of Fraser River Sockeye for international sharing based on the median forecasted abundances and bilaterally agreed deductions was 6,197,900 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 p10 forecast there would be some international TAC. In Canada, commercial and recreational fisheries directed on Sockeye were unlikely at the p10 forecast and limited harvest opportunities would be available for First Nations FSC fisheries due to constraints (e.g. Cultus) required to achieve spawning escapement targets. Pre-season model runs also indicated it was unlikely the Early Summer run TAC could be fully harvested due to the overlap in timing and predicted larger abundances of Summer run and Late run stocks (Figure 43).

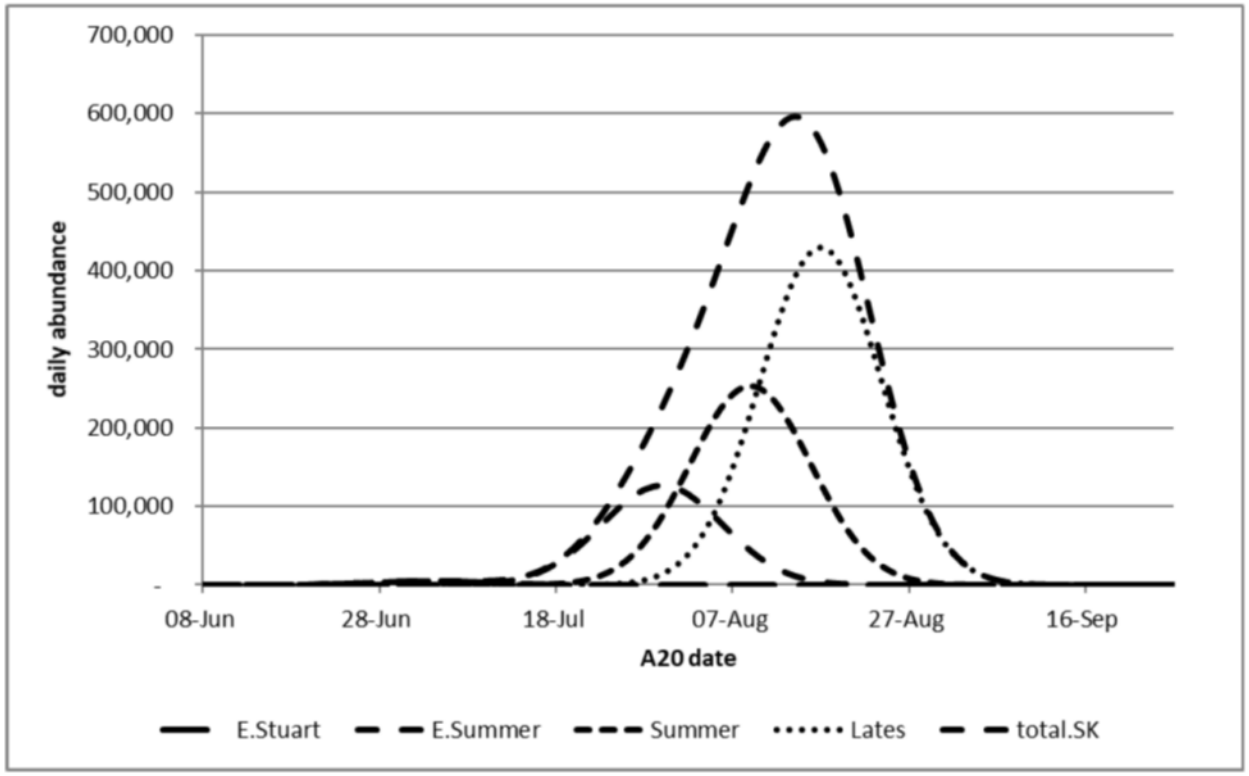


Figure 43 Pre-Season Projections of Daily Fraser River Sockeye Salmon Abundance by Management Group

IN-SEASON ASSESSMENT

Overall the marine migration timing was similar to pre-season expectations for all management groups: 2 days later for Early Stuart, 2 days earlier for Early Summer, 1 day earlier for Summer and no difference to the preseason timing for Late run Sockeye. Although the Late run timing through Area 20 was close to expectations the delay off the mouth of the Fraser River was one of the longest observed since pre-1995 (~23 days).

The Johnstone Strait diversion rate was 33% compared to a pre-season adopted value of 63%.

Returns for all but the Early Stuart management group were below median pre-season forecast levels (Early Stuart run: 125,000, 49% above median forecast; Early Summer run: 1,800,000, 16% below median forecast; Summer-run: 4,100,000, 6% below median forecast; and Late-run: 4,700,000, 36% below median forecast)

(Table 36). In context to the pre-season forecast range, the Early Stuart return was similar to the p75 forecast and the Early Summer and Summer returns were slightly below the p50 forecast and the Late run return was similar to the p25 forecast.

Fraser River discharge was slightly above the mean discharge at the beginning of the season, but apart from one early season increase back to the mean, remained at or near one standard deviation below the mean for the entire season. After beginning the season around the mean, the Fraser River daily water temperatures fluctuated a few degrees above the historical mean reaching historical maximum observations at the mid-point of the season, and slowly dropped to around the mean for the latter half of the season. In-season 19 day model estimates of DBEs that take into account environmental conditions in the Fraser River were larger than pre-season medians adopted by the Panel with the exception of the Early Stuart sockeye model estimate which was smaller. The timing based model DBE estimate for Late Runs was lower than the pre-season DBE but higher than the adopted provisional DBE used for management purposes. The low in-season run size of Early Stuart sockeye resulted in LAER management and did not require changes to the pre-season proportional management adjustment (no management implications). The Panel did not make any adjustments to the preseason DBEs for the Early Summer and Summer run sockeye given the uncertainty in the modelled estimates and there were no indications or reports of significant migration issues, disease or mortalities observed in the river.

POST-SEASON ASSESSMENT

The preliminary post season return of adult Fraser Sockeye was estimated to be 10,725,000, 23% below the pre-season median forecast (Table 38). The run size was 46% below the brood year run size (20M) and 18% below the cycle line average (13M).

There was 5,452,150 Fraser Sockeye Total Allowable Catch (TAC) for international sharing, based on the calculation method set out in Annex IV, Chapter 4 of the Pacific Salmon Treaty. The U.S. share (16.5%) of the TAC, including payback (-2,400) was 897,200 sockeye (Table 38). The Canadian share of the TAC, including AFE, was 4,954, 950 sockeye (Table 38).

Table 38. Preliminary Post- Season Total Allowable Catch

		Fraser Sockeye				
		Early Stuart	Early Summer	Summer	Lates	Total
RUN STATUS, ESCAPEMENT NEEDS & AVAILABLE SURPLUS						
Pre-season or Adopted In-season Run Size		**125,000**	**1,800,000**	**4,100,000**	**4,700,000**	**10,725,000**
Adult Spawning Escapement Target (SET)		**108,000**	**720,000**	**1,640,000**	**1,880,000**	**4,348,000**
Management Adjustment (MA)*		**74,500**	**165,600**	**164,000**	**75,200**	**479,300**
Test Fishing (TF)		**1,100**	**24,000**	**51,600**	**34,300**	**111,000**
DEDUCTIONS & TAC FOR INTERNATIONAL SHARING						
Aboriginal Fishery Exemption (AFE)		**6,850**	**75,077**	**153,442**	**164,631**	**400,000**
Available TAC for International Sharing		**0**	**815,323**	**2,090,958**	**2,545,869**	**5,452,150**
UNITED STATES (Washington) TAC						
Proportionally Distributed TAC ***	16.5%	0	134,500	345,000	420,100	899,600
U.S. Payback ***	0.0%	0	-400	-900	-1,100	-2,400
Proportionally Distributed TAC + Payback		**0**	**134,100**	**344,100**	**419,000**	**897,200**
Treaty Indian Share **	67.7%	0	90,700	232,700	283,300	606,700
All Citizen Share	32.3%	0	43,400	111,400	135,700	290,500
CANADA TAC						
Proportionally Distributed TAC	83.5%	0	681,223	1,746,858	2,126,869	4,554,950
Aboriginal Fishery Exemption (AFE)		6,850	75,077	153,442	164,631	400,000
Canadian TAC + AFE		**6,850**	**756,300**	**1,900,300**	**2,291,500**	**4,954,950**
First Nations Catch (including AFE)		0	0	0	0	0
Planned Charter & Recreational		0	0	0	0	0
Total Commercial (including FN EO/Demo****)		6,850	756,300	1,900,300	2,291,500	4,954,950

Fraser sockeye were caught in U.S. and Canadian fisheries. In Washington, harvest occurred in both Treaty Indian and All Citizens fisheries. In Canada, Fraser sockeye were harvested in First Nations Food, Social and Ceremonial fisheries, as well as commercial (including First Nations demonstration and economic opportunity) fisheries, and recreational fisheries. The total Fraser sockeye catch (either directed or bycatch) can be found in Table 34, Table 41, Table 43, and Table 45, as well as Appendix 1 and Appendix 2. Note that current estimates exclude anticipated bycatch of Fraser Sockeye in Alaskan fisheries directed at other species. A small amount of Fraser Sockeye bycatch in fisheries directed at other species has yet to be included as the stock of origin is uncertain. The preliminary post season exploitation rate is estimated to be 54.4%. See Table 39 for preliminary post season exploitation rates relative to allowable exploitation rates.

Table 39. Preliminary Post-Season Exploitation Rate Estimates for All Catch by Management Group

	Early Stuart	Early Summer	Summer	Late	Total
Run Size	125,000	1,800,000	4,100,000	4,700,000	10,725,000
Projected Exploitation Rate	6.8%	44.4%	56.8%	57.3%	54.4%
Allowable Exploitation Rate	**10.0%**	**50.8%**	**56.0%**	**58.4%**	55.6%

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

Table 40: Near-final Sockeye Salmon Escapement Summary by Management Unit.

Management Unit	Spawning Escapement	Spawning Success	% high precision
Early Stuart	48,489	82%	0%
Early Summer	787,091	80%	88%
Summer	1,671,777	92%	93%
Late	1,584,850	99%	84%
Total	4,092,207	92%	87%

FIRST NATIONS FSC AND TREATY DOMESTIC FISHERIES

There were directed Fraser Sockeye FSC harvest opportunities for Treaty and non-Treaty First Nations in 2018. Sockeye retention remained closed for portions of the Johnstone Straits North of Lewis Point until the end of July to conserve Nimpkish bound sockeye. The remainder of marine area FSC fisheries opened to Fraser Sockeye retention on July 19, with fisheries restricted to gill net, troll and hook and line gear. This opening date was 4 days later than the opening anticipated based on the pre-season Early Stuart rolling window closure date of July 15. The delay was a result of uncertainty in the Early Summer run size at the time and an additional concern for some early timed Early Summer stocks. The use of purse seine gear in marine FSC fisheries targeting Fraser Sockeye was not permitted until July 25 in the Johnstone Straits and August 15 in the northern Strait of Georgia to provide additional protection to Sakinaw sockeye. In the Fraser River, sockeye directed FSC fisheries began on July 25 in the lower river with openings in the mid and upper river as the Early Stuart window closure dates were lifted. Similar to the marine area, the lower and mid-river sockeye directed fisheries were delayed slightly from the anticipated pre-season opening dates.

RECREATIONAL FISHERIES

Recreational fisheries directed on Fraser River Sockeye occurred in 2018. The marine recreational fishery was opened to Fraser Sockeye retention in South Coast marine waters from August 1 until December 31 with a daily limit of four. In the tidal portion of the Fraser River downstream of the Mission Bridge retention of sockeye in recreational fisheries took place from August 7 to September 3 with a daily limit of four.
Non-tidal sockeye directed fisheries also took place in the following areas:

- Fraser River from Mission Bridge to Sawmill Creek from August 7 to September 5. Daily limit of two.
- Fraser River near Lillooet from August 15 to September 15. Daily limit of two

- Horsefly Bay on Quesnel Lake from August 23 to September 15. Daily limit of two.
- Nechako River downstream of the Foothills Bridge from August 27 to September 15. Daily limit of two.
- Kamloops Lake and Thompson River downstream of Kamloops Lake from August 22 to September 30. Daily limit of two.

COMMERCIAL FISHERIES

There were directed commercial fisheries on Fraser River Sockeye in Canada and the United States in 2018. In Canada, commercial fisheries targeting Fraser River Sockeye began in early August (Area D gill net) and continued until mid-October (Kamloops Lake Demonstration fishery). The commercial harvest of Fraser Sockeye occurred in Area D gill net, Area B seine, Area H troll, Area G troll, Area E gill net fisheries as well as First Nations economic opportunity, Treaty and demonstration fisheries.

EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

There were no ESSR opportunities directed on Fraser River Sockeye in 2018.

Table 41. Fraser River Sockeye Catch and Directed Fisheries*

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Fraser Sockeye Kept	Non-Fraser Sockeye Kept	Unknown Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
First Nations FSC													
	Johnstone Strait (FSC and Domestic Harvest)			193,658	3,359	9,359	-						
	Strait of Georgia (FSC)			55,988	2	681	-	3,819	54				
	WCVI (FSC and Domestic Harvest)	174		14,757	14,719	523	-			109		1	
	Fraser River*			603,350			4,383						
Total First Nations FSC and Domestic Catch		174	0	867,753	18,080	10,563	4,383	3,819	54	109	0	1	0
First Nations Commercial													
T'aaq-wiihak	Fraser River Sockeye (124-126)	17	41	14,185	43	-	-	0	0	1	49	1	0
T'aaq-wiihak[3]	WCVI AABM (24-26, 124-126)	9,667	499	15,493	43		9	0	0	899	2,145	2	0
Harvest Agreement	Fraser River*			37,374			-						
EO	Fraser River*			215,369			31						
Demo	Fraser River*			228,744			-						
Total First Nations Commercial Catch		9,684	540	511,165	86	0	40	0	0	900	2,194	3	0
Commercial													
Area G Troll	WCVI (11, 12, 111, 123 to 127)	0	643	29,400	-	-	4	107	37	0	587	6	9
Area H Troll	Johnstone Strait (12, 13)	0	609	63,219	115	-	36	771	444	0	299	49	56
Area H Troll	Fraser (29)	1	655	118,705	1	-	-	7	18	1	321	5	11
Area H Troll	MVI (14-19)	0	0	-	-	-	-	0	0	0	0	0	0
Area B Seine	Johnstone Strait (12, 13)	244	2,949	1,271,844	7,631	-	8,557	56,369	9	702	4,494	13,279	43
Area B Seine	Fraser (29)	15	76	627,492	11	-	1	17	0	108	158	601	2
Area D Gillnet	Johnstone Strait (11,12,13,14)	6	1,069	475,287	3,719	0	308	34,046	326	0	5,668	10,307	56
Area E Gillnet	Fraser (29)	24	2,402	600,942			0	20	12	0	62	2	4
Total Commercial Catch		290	8,403	3,186,889	11,477	0	8,906	91,337	846	811	11,589	24,249	181
Recreational													

	Juan de Fuca (19,20)			5,314			389						
	Strait of Georgia (13-19,28,29)			46,596			468						
	Johnstone Strait (11-12)			3,700			315						
	WCVI - Inshore (20W-27)				5,691[2]	4,755	505						
	WCVI - Offshore (121-127)					860	16						
	Fraser River[1]			95,910			6,296						
Total Recreational Catch		0	0	151,520	5,691	5,615	7,989						
ESSR													
	Fraser River[1]												
Total ESSR Catch													
TOTALS		**10,148**	**8,943**	**4,717,327**	**35,334**	**16,178**	**21,318**	**95,156**	**900**	**1,820**	**13,783**	**24,253**	**181**

7. Fraser River Data includes Fraser River Sockeye catch from all fisheries, not just "directed" fisheries. Some Fraser River catch estimates are preliminary and subject to change.
8. Somass Sockeye Recreational Catch
9. Catch of Fraser sockeye during T'aaq-wiihak AABM Chinook Fishery

- Johnstone Strait, West Coast Vancouver Island and Strait of Georgia FSC catch includes catch from all FSC fisheries reported to date in those areas. FSC fisheries in these areas do not generally 'target' one species. Pink salmon is included here as it is typically non-targeted catch in sockeye directed fisheries. 'Target' and 'non-target' catch retained for FSC are included for T'aaq-wiihak and Somass fisheries where appropriate.

FRASER RIVER PINK SALMON

Pink salmon return to the Fraser River in significant numbers on odd years only; negligible numbers of pink salmon returned to the Fraser River in 2018.

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).

In 2018 an exploitation rate of up to 10% was permitted in Canadian fisheries with an additional 10% permitted in U.S. fisheries as per the Pacific Salmon Treaty management regime. Coho management measures varied in Southern BC in 2018, depending on the area of harvest and impact on specific Coho stocks.

The Canadian objective for Interior Fraser River (IFR) Coho (including Thompson River Coho) was to manage Canadian fisheries in a highly precautionary manner with fisheries management measures similar to those in place prior to 2014. This approach 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, with more severe measures being implemented beginning in 1998. In most years since that time, Canadian fisheries impacting these stocks have been curtailed to limit the exploitation rate to 3% or less, with an additional 10% permitted in U.S. fisheries (as per the Pacific Salmon Treaty management regime).

Currently, there is no evidence that IFR Coho has departed from the 'low' productivity regime that has persisted since the 1994 return year. Current productivity is still well below that of the relatively high productivity period of 1978-1993. 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 2018 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 were not found.

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 the individual tables.

STOCK STATUS

STOCK STATUS- UPPER FRASER RIVER

Interior Fraser

Escapement surveys to estimate returns of Coho to the Interior Fraser are currently underway, and preliminary escapement estimates will not be available until mid-January 2019 at the earliest.

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 are currently underway, however, preliminary survival information for the 2015 brood is not expected to be available until March 2019.

Coho salmon production within the Strait of Georgia has declined dramatically since the early 1990s. Marine survivals have been fluctuating near replacement levels with recent estimates in the 1-4% range. 2018 escapement estimates were higher than pre-season expectations based on recent returns and poor ocean conditions throughout the SOG, but still below target in some systems.

Hatchery stocks

Coho returns to facilities north of Nanaimo were above average in 2018. Escapement to the Puntledge River was 35% higher than the 12 year average at 8,619 and up from 2017 (2,756). The Big Qualicum River had another strong return in 2018 of over 10,000 fish which is near the 12 year average of 9,914. Swim surveys of the Little Qualicum River suggest abundance for this system was above average at 5,200 fish. Nanaimo River returns were about 1K above the long term average with close to 4,500.

Escapements to southern Strait of Georgia stocks were variable with 136 estimated in the Goldstream River (20% of the 4 year average). 2,128 fish were counted in Shawnigan Creek which was above the four year average of 1,559.

Wild stocks

In the past, both Black Creek and Myrtle Creek have served as indicators of Strait of Georgia Coho. Myrtle Creek was discontinued as an indicator in 2014. Counts on the Englishman River were near the 4 year average in 2018 and higher than the previous two years. Camera operations in the Millstone River bypass channel yielded a total of 37 fish which was well below expectations of 100-200. Returns to the Colquitz River (near Victoria) were reported to be 25% of the 4 year average at 210 fish.

Black Creek (DFO Wild Indicator for SOG)

2018 Black Creek adult assessments are complete, but estimates are still considered preliminary. Limited fall rains allowed crews to operate the counting fence continuously through the coho migration window without the fence being topped. It is estimated that 2,702 adult coho and 1,873 jacks returned to Black Creek in the fall of 2018.

The smolt production contributing to 2018 brood year was 34,473. This is below the 23 year average smolt production of 51,300 smolts. The parental brood year estimate was 2,623 (2015) adults. The 2018 return

was better than expected based on poor marine evaluations during the 2017-2018 marine residence for Strait of Georgia Coho salmon. The outlook for 2018-2019 is for continued poor marine conditions, and the 2019 adult return is uncertain, with low expectations.

STOCK STATUS- WEST COAST VANCOUVER ISLAND

In most recent years, spawning abundances for wild WCVI Coho populations are near historic levels. However, the overall production of WCVI Coho is likely much lower than historic levels – i.e. less fish are caught in fisheries because of low fishery impacts maintain spawning levels. Hatchery production has also been reduced. Results suggest escapement near or slightly above recent year averages.

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. The declining trend observed since 2015 appears to have reversed with a preliminary estimate for 2018 of 1,240 adult Coho, a doubling of the brood year return (650 Coho adults in 2015). Juvenile recruitment in 2018 of 62,213 smolts is close to the long term average but showing a reduction compared to the strong freshwater productivity observed 2011-2017 (average 62,323 smolts (1977-2010) to average 94,152 smolts (2011-2017)). 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/spawner, brood years 1998-2015). Expectations in 2019 are for below average returns but with the hope that marine conditions improve resulting in a positive trend in Coho returns.

The marine survival indicator for Area 13 is the Quinsam River Hatchery. The 2018 Quinsam Coho return of ~6,000 (preliminary) is similar to the 4 and 12 year averages of escapement. The 2018 adult return was higher than expected based on anticipated low marine survival. 2019 expectations are for below average returns with low survival conditions continuing.

Village Bay Creek on Quadra Island continued with video monitoring of Coho. A total of 744 adults and 24 jacks were counted through the fence, which is nearly double the 2014 escapement. This escapement was also higher than expected, and exceeds the 4 and 12 year escapement averages.

Extensive escapement reports for Coho in many systems are indicating average, to slightly above average escapements in 2018. It appears Coho marine survivals over the past year were better than anticipated, but poor marine survivals are expected to continue through 2019. The trend of low abundance is anticipated to continue through 2019.

FIRST NATIONS

WCVI FSC and Treaty Fisheries

FSC gill net and hook and line had openings during the summer and fall seasons. The Somass First Nations harvest was 587 Coho. The Maa-nulth domestic harvest was 1,219 Coho. The WCVI NTC non-treaty First Nations' reported catch was 5,392 Coho. The remaining non-NTC First Nations harvest reported 1,907 Coho. The total combined harvest was 8,489 Coho.

Lower Fraser

There were no Coho-directed fisheries in the Lower Fraser in 2018. Both hatchery-marked and wild Coho were authorized to be retained in FSC fisheries before and after the Interior Fraser Coho window closure. The total hatchery-marked and wild Coho harvested and released during Sockeye and Chum FSC fisheries can be found in Tables 34, 41, 43, 45.

In 2018, Fraser Sockeye economic opportunity and demonstration fisheries took place in the Fraser River with the Musqueam First Nation, Harrison Fisheries Authority, and 18 communities from Port Mann Bridge to Sawmill Creek; retention of hatchery-marked and wild Coho was not permitted in these fisheries. The total hatchery-marked and wild Coho encountered and released in sockeye economic opportunity/demonstration fisheries can be found in Tables 34, 41, 43, and 45.

BC Interior

There were no Economic Opportunity (EO), demonstration or ESSR fisheries in the BC Interior (Fraser River above Sawmill Creek) targeting Coho in 2018.

FSC fisheries in the area target Sockeye, Chinook or Pink salmon. This year, First Nations harvesters were requested to release unharmed any Coho incidentally caught. Directed opportunities were permitted subject to abundance, at the fence on McKinley Creek, a tributary of the Quesnel River; The total Coho catch (either directed or bycatch) in First Nations fisheries can be found in Table 34, Table 41, Table 43, and Table 45.
Strait of Georgia FSC Fisheries and Treaty Domestic Fisheries

First Nations Coho catch reports are preliminary at this time; estimates for the Strait of Georgia are found in Table 43.

Johnstone Strait

First Nations Coho catch reports are preliminary; estimates for the Johnstone Strait are found in Table 43.

RECREATIONAL

TIDAL RECREATIONAL FISHERIES

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. The table below outlines the areas in Southern BC and the general Coho regulations pertaining to them.

Table 42. Southern BC Coho Fishery Regulations in 2018

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 43.

NON-TIDAL RECREATIONAL FISHERIES

Region 1 Vancouver Island Tributaries

Fresh water conditions were improved in 2018 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:

- Cayeghle River (including the Colonial River) from April 1 to March 31 for one per day;
- Campbell/Quinsam River from October 1 to December 31 for four per day, two of which could be marked over 35 cm;
- 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 fresh water fisheries.

Strait of Georgia

Due to increased coho returns in 2018 coho openings were provided on:

- Cowichan River from November 1 – December 31 for one coho per day, min. size limit of 25 cm.
- Nanaimo River from November 1 – December 31 for 2 hatchery-marked only coho per day, min. size limit of 25 cm.
- Puntledge River from September 24-December 31 for 1 hatchery-marked only coho per day, min. size limit of 25 cm.

Typical Non-tidal openings for Coho are available on:

- Qualicum River from October 16 to December 31 for four per day, two of which could be over 35 cm;
- Chemainus River from October 15 to March 31 for one per day, maximum size limit of 35 cm;
- Nanaimo River from October 15 to March 31 for one per day, maximum size limit of 35 cm; and
- Catch is not estimated in these fresh water 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, marked or unmarked. A single, barbless hook restriction is in effect all year and there is a bait restriction in the Upper Somass and Stamp from May 1 to October 31.
- Nitinat River from October 15 to December 31 the daily limit for Coho was two, marked or unmarked. The 2 week closure between October 1 and October 14 provides protection to Chinook salmon during the peak spawning period. The area above Parker Creek is closed to fishing. A single barbless hook restriction is in effect all year and there is also a bait restriction in effect.
- Conuma River opened August 25 with a daily limit of two Coho, marked or unmarked and was reduced to one per day from September 26 to December 31 in response to observations of a lower than expected abundance in-river.
- Washlawlis River and Waukwass River and other west coast rivers are open year-round with a daily limit of one Coho, marked or unmarked. Barbless hooks are required. No creel survey information is collected. Other rivers receiving some directed 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 fresh water fisheries.

Fraser River and Tributaries

During 2018, 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. The dates by area were as follows:

- From the CPR Bridge at Mission, BC upstream to the Highway #1 Bridge at Hope - October 26 to December 31.
- There are no directed Coho openings in the Fraser River or tributaries upstream of the Highway #1 Bridge at Hope, BC.

The following tributaries to the Fraser River were open during the dates stated below:

- Alouette River and De Boville Slough from October 1 to December 31 for one per day.
- Coquitlam River from September 1 to December 31 for one per day.
- Kanaka Creek from November 1 to November 30 for one per day.

- Chilliwack River/Vedder for four 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 per day.
- Harrison River for four 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 per day from January 1 to December 31 with only two over 35 cm.

During 2018, 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 per day from September 1 to December 31.

COMMERCIAL

In 2018, Southern BC commercial fisheries were regulated so that impacts on Coho, in particular Interior Fraser Coho stocks, were minimized. Retention of Coho bycatch in most of these fisheries was not permitted, including the Fraser River, with the exception of a few terminal seine and gill net fisheries targeting Chinook and Sockeye where Interior Fraser River Coho were not prevalent.

There was no Area G fishery directed on Coho in 2018. During harvest opportunities between September 15 and December 31 non-retention of all Coho bycatch was in place and no coho was landed in the Area G fishery in the 2017/2018 (October 1, 2017 to September 30, 2018) AABM Chinook fishing year.

WCVI Terminal Area Coho

In 2018, in Area 23 there was one targeted Area D Coho commercial net fishery, this fishery was planned in mid-October and no vessels participated. There were also commercial gill net and Seine fisheries in Alberni Inlet targeting Chinook, which permitted Coho bycatch retention. Retention of both hatchery and wild Coho were permitted. The by catch fisheries were the most successful and a total Coho bycatch can be found in Table 43.

Coho retention in other terminal WCVI commercial fisheries was not permitted in 2018. The total WCVI Coho bycatch in commercial terminal fisheries can be found in Table 43.

COMMERCIAL

FIRST NATIONS COMMERCIAL HARVEST

WCVI Economic Opportunity (EO)

In 2018, DFO with Hupacasath and Tseshaht First Nations reached an agreement for an Economic Opportunity fishery targeting Coho in Subarea 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 TAC for Coho was 3,000 pieces. Most of the Coho catch was retained as bycatch in EO-directed Chinook fisheries in late August and September. There were two directed Coho EO fisheries on Sept 20 and October 13-14. The catch in these fisheries were poor. The total Coho catch in these fisheries can be found in Table 43.

T'aaq-wiihak Salmon Demonstration Fishery

In addition to fishing opportunities for FSC purposes, DFO provided commercial demonstration fishery opportunities for five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht.

There was no directed Coho T'aaq-wiihak salmon demonstration fishery in 2018; however, hatchery-marked Coho retention for sale was permitted in the AABM Chinook fishery, Fraser River Sockeye fishery, and ISBM Chinook fisheries. Total Coho catch in these fisheries can be found in Table 43.

Lower Fraser

There were no directed Coho fisheries authorized in the Lower Fraser in 2018.

EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

WCVI ESSR Fisheries

There were ESSR fisheries at the Robertson Creek Hatchery in 2018 that included Coho salmon.

There were ESSR fisheries in Nitinat in 2018 that included Coho salmon.

There were ESSR fisheries at the Canuma Hatchery in 2018 that included Coho salmon.

All ESSR harvest information can be found in Tables 34, 41, 43, and 45.

Lower Fraser ESSR Fisheries

There were ESSR fisheries at the Capilano hatchery in 2018 that included Coho salmon.

There were ESSR fisheries at the Chilliwack hatchery in 2018 that included Coho salmon.

There were ESSR fisheries permitted at the Inch Creek and Chehalis hatcheries in 2018 that included Coho salmon.

All ESSR harvest information can be found in Tables 34, 41, 43, and 45.

Strait of Georgia ESSR Fisheries

An ESSR for Chum, Coho and Chinook salmon was issued to the Qualicum First Nation on October 3, 2018 UFN at the Big Qualicum Hatchery. See Table 43 for preliminary catch numbers.

Johnstone Strait ESSR Fisheries

For 2018, there were no ESSR opportunities on Coho in Johnstone Strait.

Table 43. Southern BC - Coho Directed Fisheries*

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Fraser Sockeye Kept	Non-Fraser Sockeye Kept	Unknown Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
First Nations FSC													
	Johnstone Strait									226	1		
	Strait of Georgia									498	3		
	WCVI									5,244	803	225	0
	Fraser River*									734	1,242		
Total First Nations FSC Catch										6,702	2,049	225	0
First Nations Commercial													
Harvest Agreement	Fraser River*									0	0		
EO	WCVI									12	0	0	0
EO	Fraser River*									14	1,295		
Demo	Fraser River*									0	2,655		
Total First Nations Commercial Catch										26	3,950	0	0
Commercial													
Area G Troll	WCVI												
Area B Seine	Barkley (23)												
Area D Gillnet	Somass (23)												
Area E Gillnet	Nitinat (21, 121)												
Total Commercial Catch													
Recreational													
	Juan de Fuca (19,20)									8,281	18,881		
	Strait of Georgia (13-19,28,29)									19,028	82,466		
	Johnstone Strait (11-12)									4,065	4,960		
	WCVI ISBM - Inshore (20W-27)									23,270	10,835		

	WCVI AABM - Inshore (20W-27)									3,754	4,271		
	WCVI AABM-Offshore (121-127)									22,059	36,528		
	Fraser River *									10,138	6,379		
Total Recreational Catch										90,595	164,320	0	0
ESSR													
	Johnstone Strait**												
	Strait of Georgia**									10,390			
	WCVI									5,160			
	Fraser River*									47,397	0		
Total ESSR Catch										62,947	0	0	0
TOTALS										**160,270**	**170,319**	**225**	**0**

Notes:

*Fraser River Data includes Coho CATCH from all fisheries, not just "directed" Coho fisheries. Some Fraser River catch estimates are preliminary and subject to change.
** Johnstone Strait, West Coast Vancouver Island and Strait of Georgia FSC/domestic catch includes catch from all FSC fisheries reported in those areas. FSC fisheries in these areas do not generally 'target' one species. 'Target' and 'non-target' catch retained for FSC are included for T'aaq-wiihak and Somass fisheries where appropriate.

JOHNSTONE STRAIT CHUM SALMON

OBJECTIVES AND OVERVIEW

The Johnstone Strait Chum salmon fisheries primarily target Chum that spawn in Johnstone Strait, the Strait of Georgia, and the Fraser River areas. In order to improve the management of Johnstone Strait Chum fisheries and to ensure adequate escapement, a 20% fixed exploitation rate strategy was implemented in 2002. Of the 20% exploitation rate, 15% is allocated to the 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.

The pre-season commercial fishing plan was developed based on expectation of effort, exploitation levels by gear group, and historical run timing (peak was modelled at October 8). The fishing plan was developed to achieve the commercial allocation sharing guidelines of 77% for seine, 17% for gill net and 6% for troll. Adjustments to the fishing plan are made in-season, if warranted, and are typically based on effort and weather.

As outlined in Chapter 6 of the Pacific Salmon Treaty, commercial Chum fisheries in Johnstone Strait are suspended when an abundance estimate of less than 1 million Chum salmon migrating through Johnstone Strait is expected. Early indications from the test fishery were that Inner South Coast Chum abundance was tracking at or below the 1 million critical threshold. Troll fisheries had been initiated as per the preseason plan but on September 30th those fisheries and the other planned fisheries were suspended and the US was notified as per the treaty language. On October 10th, with an improvement to the test fishery CPUE indicating that the abundance would be over 1.0 million, the US was notified and a modified fishing plan was initiated. This year, the Area B (seine) and Area D (gill net) were competitive (derby style) fisheries, and the Area H (troll) fleet was managed using an effort-based individual transferable effort (ITE) demonstration fishery.

Chum catch and release information from all fisheries can be found in Table 44.

STOCK STATUS

Mixed Stocks

The main components of the Inside South Coast (ISC) Chum return were expected to be both Fraser and non-Fraser stocks. These stocks are typically dominated by four year old fish which were from an average 2014 brood return that out-migrated in 2015. Other salmon species that out-migrated in 2015 encountered poor survival conditions (i.e. local Pink and Coho returns in 2016 were poor). The pre-season expectation for ISC Chum suggested below to near target returns to the area but was highly uncertain.

The Johnstone Strait test fishery, which ran from September 12th through October 27th, provided timing and abundance information for the 2018 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). Initially, Chum catch per unit effort (CPUE) in the test fishery was at or below what was encountered in the low 2010 return and it was determined on October 1st that the ISC index of abundance was likely below the 1.0 million critical level (Figure 44). As the season progressed, test fishery CPUE improved and on October 10th, indicated abundance was now at or above the 1.0 million threshold for ISC Chum and timing appeared to be slightly later. The test fishery CPUE demonstrated that the front end of the return in 2018 was similar to that in 2010 but the back end of the run was stronger than 2010 (Figure 44). 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 2014 brood.

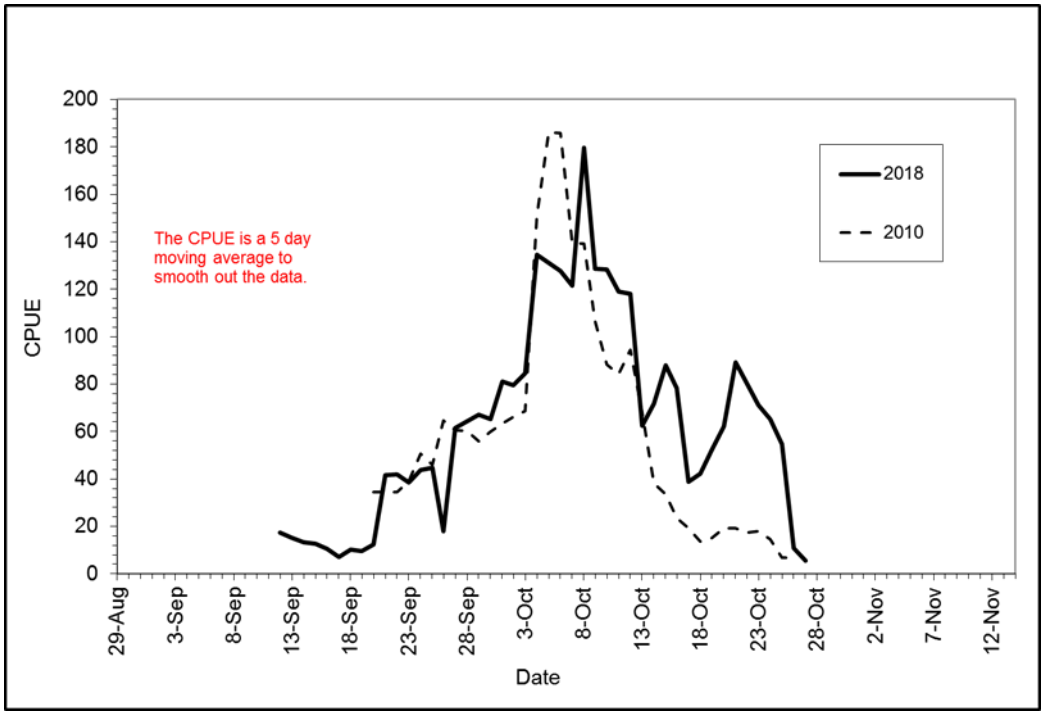


Figure 44. 2018 Johnstone Strait Chum Test Fishery Catch per Unit Effort (CPUE) compared to 2010, the lowest Chum return in recent years.

Terminal returns

Although escapement monitoring is limited, Summer Chum catch per unit effort (CPUE) in the 2018 Fraser Sockeye directed test fisheries was down from the previous historic high observed in 2017 through July and August. Status of summer run Chum in the Johnstone Strait area is unknown but the test fishing CPUE and some terminal assessments indicated low returns. Assessments of terminal fall Chum, such as the Nimpkish, are ongoing but information suggests another poor return to that system.

Information on escapements and catches suggest ISC Chum aggregate returns (Johnstone Strait, Strait of Georgia and Fraser combined) were below average but highly variable with some populations well below goal and others well above goal throughout the ISC area (see next Sections 12 and 13).

FIRST NATIONS FSC FISHERIES

First Nations fisheries for Chum were not restricted. The total Chum salmon catch in the Johnstone Strait FSC fishery can be found in Table 44.

RECREATIONAL FISHERIES

TIDAL RECREATIONAL FISHERIES

The marine recreational daily limits for Chum are four (4) with a possession limit of eight salmon (8). 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 June to October. Recreational catches were reported as fair, but lower than recent years due to the lower abundance of Chum available in these areas in 2018. The majority of the sport Chum salmon fishing effort occurs in Area 13 which is included in the Strait of Georgia catch estimate.

NON-TIDAL RECREATIONAL FISHERIES

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.

COMMERCIAL FISHERIES

Commercial Chum fisheries in 2018 were planned as per the Pacific Salmon Treaty. Fisheries were scheduled to not exceed a 20% fixed harvest rate on Inner South Coast (ISC) Chum stocks passing through Johnstone Strait with 15% exploitation rate for Commercial and 5% exploitation rate for Test, FSC, Recreational and a commercial buffer. Shares of the 15% commercial exploitation rate were to be share among the Area B seine (11.55%), Area D gill net (2.55%), and Area H troll fleets (0.9%). The total commercial Chum catch from Johnstone Strait during Chum directed fisheries can be found in Table 44. Area and gear restrictions, including the mandatory use of revival tanks, were in place for commercial Chum fisheries. Catch monitoring included requirements for catch reporting and mandatory logbooks. Time and area closures were also implemented in 2018 to protect co-migrating Interior Fraser Steelhead.

COMMERCIAL

Area B Seine

In 2018 the pre-season plan was to have two commercial seine openings for Chum salmon in portions of Areas 12 and 13. The two openings were scheduled pre-season to occur October 1 and October 15, for 12 hours and 10 hours respectively. The first opening that was scheduled to take place on October 1 did not occur since the Southern Chum return was tracking below the 1.0 million threshold identified in the Pacific Salmon Treaty. By mid-October the Southern Chum return was tracking above the 1.0 Million threshold, and an Area B seine opening was scheduled on October 15 for 10 hours, and extended by 1 hours due to lower than expected effort.

The estimated catches from the 2018 Area B Seine Johnstone Strait chum directed fisheries can be found in Table 44. The peak effort on the October 15 opening was 65 vessels.

Area D Gill net

Pre-season, three (3) Area D gill net openings were planned for 41 hours in duration each but these openings were subject to change based on in-season assessment information, weather constraints, and effort information. The first gill net opening, that was planned pre-season to occur October 9 to 11, did not occur since the Southern Chum return was tracking below the 1.0 million threshold identified in the Pacific Salmon Treaty. In 2018, a new window closure to provide protection for migrating Interior Fraser River Steelhead was implemented in Areas 12 and 13. Details on the management approach for Interior Fraser River Steelhead in South Coast fisheries can be found in the 2018-19 South Coast Salmon IFMP. The window closure restricted gill net fisheries from September 12 to October 8 in Area 12 and from September 17 to October 13 in Area 13. Gill net fisheries were planned pre-season to occur outside these window closure dates. The first gill net fishery planned pre-season (as mentioned above) was to only occur in Area 12.

By mid-October the Southern Chum return was tracking above the 1.0 Million thresholds, and two commercial gill net openings for Chum salmon in portions of Areas 12 and 13 were planned. The first opening was for 41 hours from 16:00 hours on October 18 to 09:00 hours on October 20. The second opening was initially scheduled for 41 hours from 16:00 hours on October 26 to 09:00 hours on October 28, but due to poor weather conditions that hampered fishing on October 27, the opening was extended to 09:00 on October 29.

The estimated catches from the 2018 Area D gill net Johnstone Strait chum directed fisheries can be found in Table 44. The peak effort on the October 18 to 20 opening was 110 vessels and 58 vessels on the October 26 to 29 opening.

Area H Troll

In 2018 the pre-season plan for Area H troll Individual Transferable Effort (ITE) demonstration fishery was divided into two fishing periods: September 28 to October 14 (Period 1) and October 16 to October 31 (Period 2); with a one day closure during the Area B Seine which aligned to be between the two periods on October 15, and a closures during the Area B seine fishery on October 1 (except a portion of Subarea 13-3). Each licence was initially allocated three boat days during the first fishing period and two boat days during the second fishing period. Boat days could be transferred between vessels within each fishing period but not between fishing periods. The first period was initially opened on September 28, however it closed shortly after on September 30 since Southern Chum return was tracking below the 1.0 million threshold identified in the Pacific Salmon Treaty. No fishing effort occurred during this period.

By mid-October the Southern Chum return was tracking above the 1.0 Million threshold, and the fishing plan was altered. The fishery was divided into two fishing periods. Period One (October 12, 2018 to October 14, 2018) and Period Two (October 16, 2018 to October 31, 2018). Each licence was assigned an allocation of one boat day in fishing Period One and two boat days in fishing Period Two. There was a one day closure between fishing periods during the Area B seine fishery on October 15, 2018. Boat-days could be fished at any time within each fishing period. Boat-days in each fishing period could be transferred between eligible licence holders within each fishing period but not between fishing periods. Total effort for the Johnstone strait fishery was 57 boat days, 22 in Period One, and 35 in Period Two. The estimated catches from the 2018 Area H troll (ITE) Johnstone Strait chum directed fisheries can be found in Table 44.

FIRST NATIONS COMMERCIAL HARVEST

There was no First Nations commercial harvest of Johnstone Strait Chum in 2018

EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

For 2018, there were no ESSR opportunities on Chum salmon in Johnstone Strait.

Table 44. Johnstone Strait - Chum Directed Fisheries

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Fraser Sockeye Kept	Non-Fraser Sockeye Kept	Unknown Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
First Nations FSC													
	Johnstone Strait											2,390	117
Total First Nations FSC Catch												2,390	117
Commercial													
Area H Troll	JST (12,13)		4			0	3	0	1	0	14	1,976	0
Area B Seine	JST (12,13)		6			1	12	2	0	3	58	37,773	12
Area D Gillnet	JST (12,13)		2			0	0	0	0	0	44	12,390	4
Total Commercial Catch			12			1	15	2	1	3	116	52,139	16
Recreational													
	Johnstone Strait (11-12)*											66	45
Total Recreational Catch												66	45
ESSR													
	Johnstone Strait												
Total ESSR Catch													
TOTALS		**0**	**12**	**0**	**0**	**1**	**15**	**2**	**1**	**3**	**116**	**54,595**	**178**

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 three years; escapement to spawning grounds in 2009, 2010, and 2017 did not meet the escapement goal, with approximately 460,000, 590,000, and 660,000 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, DFO implemented management measures for 2018 to reduce the incidental impacts of Chum fisheries on co-migrating IFR Steelhead. In the marine approach areas, a rolling window closure of nearly 4 weeks duration was in place in for commercial gillnet fisheries in Areas 12, 13 and 29. Modifications were also applied to the boundaries of the Nitinat Chum gillnet fishery to avoid areas of Steelhead interception. Within the Fraser River, the window closure applied to all commercial, recreational, and FSC salmon fisheries within the window closure period. Limited Chum FSC harvests using gillnets and beach seine gear were permitted in lower Fraser River during the closure.

Catch data from all Chum fisheries can be found in Table 34, Table 41, Table 43, and Table 45.

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 16, the Chum net fished every day, and then every other day from November 17 until November 23. Total Chum catch for the Albion test fishery can be found in Appendix 2.

For fishery planning purposes, DFO provided a provisional in-season terminal return estimate on October 17 of 793,000 Chum Salmon. This estimate assumed that the 50% migration date of the run was no later than October 17.

A subsequent estimate of Fraser River Chum terminal return was provided on October 22. The estimated terminal return on that date was 769,000 (80% probability interval of 659,000 to 894,000), with a 50% migration date through the lower river of October 18. This peak date is consistent with timing in recent years (average peak date from 1997-2017 is October 17).

Additional in-season terminal return estimates were not provided, as subsequent test fishing information was consistent with a run size of 769,000.

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).

The preliminary estimate of escapement for 2018 is 690,000 Chum Salmon. This estimate is similar to the preliminary estimate of escapement of 660,000 for 2017 and below the escapement goal of 800,000 for Fraser Chum.

FIRST NATIONS FISHERIES

First Nations Food, Social and Ceremonial (FSC) gillnet fisheries commenced October 10 (below Port Mann Bridge) and October 13 (above Port Mann Bridge), following closures to protect co-migrating Interior Fraser River Coho (IFR Coho). Chum directed FSC fisheries were also further reduced due to the Interior Fraser River Steelhead window closure that overlapped with the end of the IFR Coho window closure but was extended through to 23:59 October 24 below Mission and 23:59 October 25 above Mission Bridge.
The total Chum catch (either directed or bycatch) in First Nations FSC fisheries can be found in Table 34, Table 41, Table 43, and Table 45.

RECREATIONAL FISHERIES

In 2018 two of the major Fraser River watershed recreational salmon fisheries impacting Chum salmon were assessed, these were the lower Fraser River mainstem sport fishery and a significant salmon fishery occurring in the Chilliwack River (a tributary to the Fraser River in the lower Fraser Valley).

The lower Fraser River mainstem recreational fishery was open to the retention of Chum salmon from September 4 to September 27 downstream of Mission Bridge with a daily limit of four and from September 5 to September 28 upstream of Mission Bridge with a daily limit of two. In 2018 the Fraser mainstem was closed to fishing for salmon during the Interior Fraser River Steelhead window closure (downstream of Mission Bridge from September 28 to October 24 and upstream of Mission Bridge from September 29 to October 25). Following the IFR Steelhead window closure period, chum non-retention was in place in the Fraser mainstem downstream of Mission Bridge from October 25 to December 31 and upstream of Mission Bridge from October 26 to December 31. In 2018, this mainstem fishery was assessed in the period opened to the retention of Chum. Estimates of kept and released Chum salmon are not yet available. The Chilliwack River sport fishery was open to the retention of Chum salmon from July 1 to December 31 (with a daily limit of one). Similar to past years, this Chilliwack River fishery was assessed from September 15 to November 15 in 2018. Estimates of kept and released Chum salmon are not yet available.

The Harrison River, Stave River and Nicomen Slough/Norrish Creek sport fisheries were open to the retention of Chum salmon year round (daily limit of two) until October 28 and closed to retention of chum from October 29 to December 31 this year. In 2018, no assessment was conducted on the Harrison River or Stave River fisheries; however, the Nicomen Slough/Norrish Creek fishery was assessed from October 6 to November 30. Estimates of kept and released Chum salmon are not yet available.

COMMERCIAL FISHERIES

COMMERCIAL

Area B

Area B seine fisheries in Area 29 (Fraser River) for Fraser Sockeye took place from September 12 to 17 and September 21 to 27. There were no Area B fisheries in Area 29 for Chum in 2018 and therefore no catch of Chum salmon to report.

Area E

There were four Area E gillnet openings in the Fraser River (Area 29) during the 2018 Fraser Sockeye season, consisting of a 24 hour fishery on August 8, a 16 hour fishery on August 15, a 16 hour fishery on August 16, and an 8 hour fishery on August 21.

Commercial salmon fisheries in the lower Fraser River (below Mission) remained closed during the 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 2018 and therefore no catch of Chum salmon to report.

Area H

Area H troll was provided an opportunity in Area 29 that took place from October 25 to November 3.
The total Chum catch (either directed or bycatch) in Commercial A-H Fisheries can be found in Table 34, Table 41, Table 43, and Table 45.

FIRST NATIONS COMMERCIAL HARVEST

In 2018, there were no Chum directed economic opportunity or demonstration fisheries in the Lower Fraser due to a poor in-season chum escapement estimate. However, during the Sockeye economic opportunity beach seine fishery for the Harrison Fisheries Authority and the 18 signatory communities on September 23-28, retention and sale of chum was permitted.

Musqueam and Tsawwassen First Nations Sockeye directed economic opportunities concluded August 25, 2018 prior to chum entering the Fraser river and therefore no chum were permitted for retention or sale.
The total Fraser River Chum catch (either directed or bycatch) in First Nations Commercial fisheries can be found in Table 34, Table 41, Table 43, and Table 45.

EXCESS-TO-SPAWNING REQUIREMENT (ESSR) FISHERIES

There were ESSR fisheries at the Chilliwack hatchery in 2018 that included Chum salmon.
There were ESSR fisheries permitted at the Inch Creek and Chehalis hatcheries in 2018 that included Chum salmon.

All ESSR harvest information can be found in Table 34, Table 41, Table 43, and Table 45.

Table 45. Fraser River - Chum Catch and Directed Fisheries*

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Fraser Sockeye Kept	Non-Fraser Sockeye Kept	Unknown Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
First Nations FSC													
	Fraser River											62,847	434
Total First Nations FSC Catch												62,847	434
First Nations Commercial													
Harvest Agreement	Fraser River											2	0
EO	Fraser River											1,379	95
Demo	Fraser River											0	0
Total First Nations Commercial Catch												1,381	95
Commercial													
Area H Troll	Fraser (29)											0	0
Area B Seine	Fraser (29)											94	2
Area E Gillnet	Fraser (29)											2	4
Total Commercial Catch												96	6
Recreational													
	Fraser River											5,115	7,346
Total Recreational Catch												5,115	7,346
ESSR													
	Fraser River											29,352	0
Total ESSR Catch												29,352	0
TOTALS												**98,791**	**7,881**

*Fraser River Data includes Fraser River Chum catch from all fisheries, not just "directed" fisheries. Some Fraser River catch estimates are preliminary and subject to change.

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 2018, 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 above the target level,
- Nanaimo was forecasted to be well above target levels,
- Cowichan was forecasted to be slightly below to well above target level,
- And 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 will be conducted in the near future.

Conditions for returning Chum migration and spawning in October began with an early bump of rain followed by a three week stretch with little to no precipitation. Rains arrived in late October during the peak of migration and spawning providing suitable conditions in most systems. In late November, water levels increased significantly signaling an end to enumeration programs. By this time it is believed that the majority of spawning had occurred.

Returns for the Jervis/Narrows Inlet aggregate (which includes Brittain River, Skwawka River, Deserted River, Vancouver River and Tzoonie River) were particularly poor with several record-low counts. Returns came in at or below forecast for mid-Vancouver Island systems and escapement targets were not met. Puntledge River counts were modest while the Big and Little Qualicum escapements were very poor. South Island systems fared better with Nanaimo River and Cowichan River at or above the expected range and reached escapement targets (Table 46). Goldstream River escapement also tracked the forecast with spawning targets met early into the run.

Table 46 Strait of Georgia Chum Spawning Escapements

System	Target Escapement	2018 Forecast Range	2018 Final Escapement	% of Target
Jervis Inlet	110 K	37K-55K	3K	3%
Mid Island	230K	95K-142K	64K	28%
Puntledge	60K		40K	67%
Little Qualicum	85K		13K	15%
Big Qualicum	85K		11K	13%
Nanaimo	40K	60K-90K	103K	258%
Cowichan	160K	170K-255K	181K	113%
Goldstream	15K	31K-47K	61K	407%

FIRST NATIONS FSC FISHERIES

The total FSC Chum salmon catch by First Nations in the Strait of Georgia can be found in Table 47.

RECREATIONAL FISHERIES

TIDAL RECREATIONAL FISHERIES

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 13-14 is usually the most active Chum recreational fishery in the area. Catches in the derby were reported to be modest, likely based on the lower abundances of Chum observed in 2018. There was no creel survey during the months of October and November in the Strait of Georgia.

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. Catch estimates for chum in the marine recreational fisheries can be found in Table 47.

NON-TIDAL RECREATIONAL FISHERIES

Chum retention fisheries in Region 1 took place in 2018 in the Courtenay, Cowichan, Nanaimo, Puntledge and Qualicum Rivers on Vancouver Island. 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.

Catch is not estimated in these freshwater fisheries.

COMMERCIAL FISHERIES

Strait of Georgia commercial Chum fisheries for troll, gill net and seine were conducted in Areas 17, 18 and 19 between October 24 and November 21. Escapement to Area 14 streams was insufficient to permit

commercial fisheries in that area. Commercial Chum catch from the Strait of Georgia can be found in Table 47.

COMMERCIAL

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 pre-season forecast is greater than 340,000 early Chum openings would 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 MVI aggregate abundance.

In 2018 the Mid-Vancouver Island aggregate was managed based on the pre-season forecast of less than 340,000 Chum. This was considered to be too low to sustain an assessment fishery because it was less than the 240,000 escapement target. No commercial chum fisheries occurred in Area 14 for 2018. Escapement targets were not met, total returns to the Puntledge, Qualicum, and little Qualicum, as of November 28, was 57,902.

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. These terminal fisheries occur when the individual or combined escapement goals have been assured. Fishing opportunities do not occur on a regular basis. There were no fisheries in Area 16 in 2018.

Area 17

This fishery is a terminal fishery targeting Nanaimo River stocks. The Nanaimo River Chum stocks are supplemented by the Nanaimo River hatchery (supplementation 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 4.

In 2018 there were Area E Gill Net and Area B Seine openings for Nanaimo River Chum. The Area E Gill Net fishery opened October 24 and the Area B Seine fishery opened on October 30. The escapement target of 40,000 chums was reached on Oct 30 and the Area E gill net and Area B Seine fishery opened daily from

November 1 until the fisheries closed for the season on November 15. The catches in the fisheries can be found in Table 47.

Area 18

This fishery is directed primarily at Cowichan River stocks; however incidental catches of Goldstream bound Chum are also harvested. Fishery openings in mid to late November are limited to Satellite Channel, in order to minimize impacts on Goldstream stocks. Chemainus River stocks could also be impacted if the fisheries are 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 2018, the Cowichan Tribes demonstration fishery was triggered on October 24 when the Didson Chum count was approximately 40,000 chums. The Cowichan Tribes demonstration fishery was licenced to fish for 5,000 chum on October 24 daily until December 31 but was not active after November 6. An Area H Troll fished was triggered when the Didson Chum count was approximately 60,000 Chum. The Area 18 troll fishery was to fish for 3000 Chum on November 1 daily until the TAC was caught. No Area H vessels participated in the fishery. Area E and Area B fished in Area 18 daily from October 24 until November 21.

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 (or bi-weekly in 2018) stream walks are conducted on Goldstream River by Goldstream Hatchery staff to estimate Chum escapement. In 2018, enumerations began on October 10.

In 2018, the Saanich Tribes demonstration fishery was triggered on November 5 when the Goldstream escapement estimate count was approximately 10,000 Chum. The Saanich Tribes demonstration fishery was licenced to fish for 5,000 Chum on November 6 daily until December 31 but was not active after November 7. Area E and Area B commercial fisheries began on November 9 and continued until November 19. Chum catch and release information from all fisheries can be found in Table 47.

FIRST NATIONS COMMERCIAL HARVEST

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 2018, a commercial opportunity was triggered on October 23 when the Didson Chum count was near 40,000 of the escapement target of 160,000 Chum. The Cowichan Tribes commercial demonstration fishery began October 24 and was licensed to fish from October 24 daily until December 31. The Cowichan Tribes Commercial Demonstration catch is approximately 5,644 Chum. No other species were reported to be encountered in the fishery.

Area 19

At pre-season meetings with Saanich Tribes potential triggers and fishing plans were made to harvest surplus Goldstream Chum. In 2018, a commercial opportunity was triggered in Area 19 on November 5 when the in-river chum estimate to Goldstream River was near 10,000 of the escapement target of 15,000 Chum. The Saanich Tribes demonstration fishery began on November 6 and was licensed to fish from November 6 daily until December 31. The Saanich Tribes Commercial Demonstration catch is approximately 1,500 chums. No other species were reported to be encountered in the fishery.

EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERY

The Cowichan Tribes First Nation had an ESSR harvest of chum from the Cowichan River. The license was issued on Nov 6 and harvest took place between November 7th and 12th. Total catch is reported in Table 47. The Qualicum First Nation was issued an ESSR Licence for chum, coho and chinook on October 3, 2018 at the Big Qualicum Hatchery. No chum ESSR was executed.

The Snuneymuxw First Nation was issued an ESSR licence in portions of the Nanaimo River for chum. The license was issued on October 26 until further notice.

The K'ómoks First Nation was issued an ESSR licence for chinook and chum salmon for the Puntledge River, the non-tidal portion of the Courtenay River, and PFMA 14-14 valid Oct 3, 2018 until further notice. No harvest to-date.

There were ESSR fisheries at the Capilano hatchery in 2018 that included Chum salmon.

Table 47. Strait of Georgia - Chum Directed Fisheries

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Fraser Sockeye Kept	Non-Fraser Sockeye Kept	Unknown Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
First Nations FSC													
	Strait of Georgia											92	0
Total First Nations FSC Catch												92	0
First Nations Commercial													
EO	Strait of Georgia											0	0
Demo	Strait of Georgia											7,144	0
Total First Nations Commercial Catch												7,144	0
Commercial													
Area H Troll	MVI (14-19)											0	0
Area B Seine	MVI (14-19)										28	17,128	0
Area D Gillnet	MVI (14)										0	0	0
Area E Gillnet	MVI (Area 17-19)		3						1		94	100,645	0
Total Commercial Catch			3						1		122	117,773	0
Recreational													
	Strait of Georgia (13-19,28,29)											623	131
Total Recreational Catch												623	131
ESSR													
ESSR	Strait of Georgia		1							37	15	4,793	0
Total ESSR Catch			1							37	15	4,793	0
TOTALS			**4**						**1**	**37**	**137**	**130,425**	**131**

WEST COAST VANCOUVER ISLAND CHUM

OBJECTIVES AND OVERVIEW

Commercial Chum salmon fisheries normally occur on the 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 Nootka Sound and Tlupana Inlets (Area 25). In some years there have been limited-fleet 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 controlling removals; 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 10-20% is implemented. The maximum harvest rate is set at a precautionary level relative to stock-recruit derived optimal exploitation rates for WCVI Chum; which are in the order of 30-40%. This approach allows limited harvest while protecting the biodiversity of Chum stocks and permitting rebuilding when the population is low. In areas of low quality data or only naturally spawning stocks, including Barkley (Area 23), Clayoquot 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 stock 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 is forecasted in-season to be 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 many 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 were again low.

EXCESS SALMON TO SPAWNING REQUIREMENTS (ESSR) FISHERIES

The Ditidaht First Nation was issued an ESSR Licence for Chum at Nitinat Lake and Nitinat hatchery. There was gill net and seine broodstock capture in the lake. The total Chum catch can be found in Table 48.
The Mowachaht/Muchalaht First Nation was issued an ESSR licence to harvest Chinook, hatchery-marked Coho, and Chum from the Conuma River and hatchery, and the Burman River. Due to challenging environmental conditions and no surplus of salmon available, no ESSR fishery occurred in 2018.

There were no other Chum ESSR fisheries on the WCVI in 2018.

FIRST NATIONS FSC FISHERIES

The 2018 WCVI FSC chum reported catch (to date) can be found in Table 48, (this includes fish retained for food, social and ceremonial purposes from Tsu-ma-uss (Somass) First Nations economic opportunity fisheries and T'aaq-wiihak salmon demonstration fishery); catch from Maa-nulth Nations Domestic harvest can be found in Table 48. Total chum reported to date for First Nations FSC and domestic fisheries can be found in Table 48.

RECREATIONAL FISHERIES

TIDAL RECREATIONAL

The WCVI recreational fishery is open year-round with a daily limit of four (4) and possession of eight (8) Chums. 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, sport catch of Chum is very low (estimated at less than 200 for all areas combined).

NON-TIDAL RECREATIONAL

Chum retention fisheries took place in the Nitinat River on Vancouver Island from October 15-Dec 31, with a limit of two (2) /day and four (4) in possession. 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 low to moderate in most systems in 2018. Daily and possession limits are typically half of those provided in marine waters, with daily limits on most rivers being 2/day and 4 in possession. Catch is not estimated in these freshwater fisheries. Chum catch and effort from this fishery is expected to be marginal.

COMMERCIAL FISHERIES

Commercial fisheries on the WCVI targeted three Chum stocks in 2018: Nitinat (Area 21/121), Esperanza (Area 25) and Kyuquot (Area 26).

Nitinat (Area 21/121)

In 2018, the preseason forecast of 178,000 precluded regular commercial fisheries for both gill net and seine fisheries.

A one day Area E gillnet fishery occurred on October 1st. The catch per unit effort (CPUE) was used to predict an in season run size reforecast. The fishery was poor and the low CPUE precluded any further fishery for two weeks. On October 19 and 20th, because the weekly escapement targets for the Nitinat System were met, a regular gillnet fishery occurred. This fishery also had low catches. No further fisheries occurred and the run size ended up at approximately 160,000. The fisheries were poor and the total Chum catch can be found in Table 48.

Esperanza Inlet (Area 25)

Based on pre-season forecasts, a limited effort gill net Chum fishery opened in Esperanza Inlet on September 25, 2018. Effort was limited to a maximum of 5 vessels fishing, of which 4 were for Area D vessels and 1 was for a local First Nation with an Area D licence. Four Area D vessels participated in the 2018 fishery. 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 48.

Kyuquot Sound (Area 26)

Based on pre-season forecasts, a limited effort gill net Chum fishery opened in Kyuquot Sound on September 25, 2018. Effort was limited to a maximum of 4 vessels fishing, of which 3 were for Area D vessels and 1 was for a local First Nation with an Area D licence. Three Area D vessels and 1 Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations Area D vessel participated in the 2018 fishery. The fishery was open for 2 days per week during daylight hours for 4 weeks. The total catch for the Kyuquot Sound Area D gill nets can be found in Table 48.

FIRST NATIONS COMMERCIAL HARVEST

In 2018, an agreement was reached with the Hupacasath and Tseshaht First Nations (Somass First Nations) for an Economic Opportunity fishery targeting Chum (Area 23). The pre-season forecast was 14,000, 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 2018.

There were no Chum directed fisheries during the 2018 T’aaq-wiihak salmon demonstration fishery.

Table 48. West Coast Vancouver Island - Chum Directed Fisheries*

Licence Group	Fishing Area	Chinook Kept	Chinook Released	Fraser Sockeye Kept	Non-Fraser Sockeye Kept	Unknown Sockeye Kept	Sockeye Released	Pink Kept	Pink Released	Coho Kept	Coho Released	Chum Kept	Chum Released
First Nations FSC													
	WCVI											2,584	0
Total First Nations FSC Catch												2,584	0
First Nations Commercial													
T'aaq-wiihak	WCVI ISBM (25)												
Maa-nulth HA	Henderson (23)											17	
EO	WCVI												
Demo	WCVI												
Total First Nations Commercial Catch												17	
Commercial													
Area B Seine	Nitinat (21, 121)											0	0
Area D Gillnet	Esperanza (25)		12							0	82	7,670	0
Area D Gillnet	Kyuquot (26)		5							0	83	8,278	0
Area E Gillnet	Nitinat (21, 121)		1							0	20	11,467	1
Total Commercial Catch			18							0	185	27,415	1
Recreational													
	Juan de Fuca (19,20)											47	23
	WCVI - Inshore (20W-27)											25	0
Total Recreational Catch												72	23
ESSR													
	WCVI											40,359	
Total ESSR Catch												40,359	0
TOTALS			**18**								**185**	**70,447**	**24**

Note:

*FSC catch includes catch from all FSC fisheries reported in those areas. FSC fisheries in these areas do not generally 'target' one species.

15 APPENDICES

Table 49: CATCHES IN CANADIAN TREATY LIMIT FISHERIES, 1997 TO 2018

Fisheries/Stocks	Species	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
	Sockeye	17,322	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	17,294	25,600	27,468	38,055	43,803	65,559	74,281
	Coho	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	82	233	301	181	726	401	1,404
Stikine River	Chinook-lg	-	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	1,362	1,480	3,086	2,916	2,164	4,483	2,471
(all gears)	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	578	103	628	1,264	423	286	421
	Sockeye	17,974	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	31,053	47,660	28,009	20,681	19,038	24,003	41,665
Taku River	Coho	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	3,082	2,568	4,395	4,416	5,090	2,594	5,028
(commercial gill	Chinook-lg	-	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	1,561	1,458	1,576	908	1,107	2,731	3,331
net)	Chinook-jk	-	88	205	-	657	N/A	478	514	697	1,183	330	337	198	821	334	547	291	118	87	257	227	84	144
	Sockeye	-	644	815	1,084	1,140	508	1,786	2,110	1,716	717	-	1,340	1,327	594	2,122	2,795	2,255	1,177	745	554	585	520	1,361
Alsek River (all	Coho	-	-	-	-	-	29	N/A	29	7	3	34	1	-	71	127	192	289	99	52	28	112	5	65
gear)	Chinook	-	74	10	87	39	73	85	214	294	125	7	41	19	114	185	228	2,194	277	142	412	346	530	1,098
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	876,631	473,318	127,000	2,162,280	61,000	329,000	987,000
Area 1 (commercial troll)****	Pink	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	41,418	175,000	28,295	25,000	-	261,000	732,000
	Chinook	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	150,137	43,500	32,048	70,701	144,650	145,568	26,900
North Coast** (troll + sport)		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	103,037 + 47,100						
West Coast	Chinook	77,017	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	165,824	102,266	89,139	28,540	10,855	59,796	3,677
Vancouver Island (troll + sport + FN)		28,840 + 45,233 + 2,944	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	134,308 + 31516	78,302 + 23964	64,216 + 24923	6,906 + 21634	6,678 + 4177	53,396 + 6400	4 + 3673
	Sockeye	3,683,351	-	-	-	7,945,474	2,124	-	443,000	9,305,104	-	16,942	-	4,633,623	137,000	1,993,800	1,042,986	2,182,700	295,000	953,000	54,000	1,295,000	8,737,000	1,019,000
Fraser River Canadian Commercial Catch	Pink	90,982	-	-	452	-	2,855,441	-	4,751,800	-	1,442,840	-	333,300	68,325	338,000	-	1,149,189	-	579,000	-	3,000	-	3,660,000	-
	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	434,600	240,000	494,000	41,000	707,000	1,578,000	257,000
Fraser River U.S. Commercial Catch	Pink	-	105,930	-	334,700	-	3,057,222	-	2,893,400	-	2,726,230	-	377,600	-	-	-	773,000	-	427,000		3,000	-	1,565,000	-
West Coast Vancouver Island (commercial troll)	Coho	-	331	774	18,126	32,992	5,499	1,988	-	458	-	369	1,424	2,399	5,989	-	-	-	-	-	-	-	-	761,000
Johnstone Strait (commercial catch)***	Chum	53,166	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	700,000	236,000	161,000	41,411	1,820,000	104,593	101,971

*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 A

*** 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 50. 2018 SOUTH COAST TEST FISHERY CATCHES

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	Steelhead kept	Steelhead released	GRAND TOTAL
Albion Chinook Gillnet	22-Apr-18	20-Oct-18	153	1,679	0	15	0	0	0	1,346	0	636	0	0	1	**3,673**
Albion Chum Gillnet	1-Sep-18	23-Nov-18	56	798	0	98	0	0	0	5,374	0	187	0	0	5	**6,462**
Mquqwin / Brooks Chinook Troll	12-Jul-18	5-Aug-18	17	0	11	251	113	0	0	0	0	473	17	0	0	**865**
Juan De Fuca Chum Seine	24-Sep-18	9-Nov-18	24	0	0	0	71	0	0	1,940	6,740	0	69	0	0	**8,820**
Area 12 Chum Seine	12-Sep-18	27-Oct-18	69	137	517	0	547	252	51	20,517	2,999	0	26	0	3	**25,049**
Area 13 Sockeye Seine	26-Sep-18	31-Aug-18	37	8,921	19,458	0	89	391	2,585	13	286	0	146	0	0	**31,889**
Area 23 Sockeye Seine	11-Jun-18	17-Jul-18	14	4,951	171	0	1	0	0	0	0	0	381	0	25	**5,529**
Blinkhorn Sockeye Seine	24-Jul-18	11-Sep-18	48	31,243	37,527	0	410	5,036	2,832	836	630	0	412	0	11	**78,937**
Round Island Sockeye Gillnet	12-Jul-18	14-Aug-18	34	1,691	11	47	22	296	2	19	0	21	26	0	3	**2,138**
San Juan Sockeye Seine	25-Sep-18	4-Sep-18	42	37,822	51,795	0	1,500	0	2	0	14	0	1,067	0	1	**92,201**
San Juan Sockeye Gillnet	10-Jul-18	16-Aug-18	75	9,845	1	32	169	3	0	42	0	70	69	0	11	**10,242**
Whonnock Gillnet	22-Jun-18	12-Oct-18	109	5,716	0	160	0	0	0	923	0	406	0	0	3	**7,208**
Cottonwood Gillnet	12-Jul-18	26-Sep-18	73	7,945	0	0	291	0	0	81	0	349	0	0	2	**8,668**
Gulf Sockeye Troll	21-Aug-18	6-Oct-18	42	3,288	2,229	62	62	0	0	19	16	0	21	0	0	**5,697**
Qualark Gillnet	2-Jul-18	10-Oct-18	100	4,318	2	6	28	0	0	0	3	289	7	0	0	**4,653**
Grand Total				**118,354**	**111,722**	**671**	**3,303**	**5,978**	**5,472**	**31,110**	**10,688**	**2,431**	**2,241**	**0**	**65**	**292,035**

All test fish catches include assessment and non-assessment sets
Note: Jacks included in the above test fishing catches if encountered

Table 51. 2018 SOUTHERN BC COMMERCIAL CATCH TOTALS BY GEAR AND AREA

License Group	Fishing Area	Adult Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
Area G Troll*	WCVI AABM Chinook (23-27,123-127)	0	50	0	3,739	0	0	31	7	19,156	2,209
Area G Troll	WCVI Sockeye (11,12,111,123 to 127)	29,400	4	0	587	107	37	6	9	0	643
Area H Troll	Fraser Sockeye (12,13)	63,334	36	0	299	771	444	49	56	0	609
Area H Troll	Fraser Sockeye (29)	118,706	0	1	321	7	18	5	11	1	655
Area H Troll	Fraser Pink (12, 13, 29)										
Area H Troll	JST Chum (12,13)	0	3	0	14	0	1	1,976	0	0	4
Area H Troll	Fraser Chum (29)										
Area H Troll	MVI Chum (14)										
Area B Seine	Barkley Sockeye (23)										
Area B Seine	Fraser Sockeye (12,13)	1,279,475	8,557	702	4,494	56,369	9	13,279	43	244	2,949
Area B Seine	Fraser Sockeye (16)	0	0	0	0	0	0	0	0	0	0
Area B Seine	Fraser Sockeye (29)	627,503	1	108	158	17	0	601	2	15	76
Area B Seine	Mainland Pinks (12, 13, 16)										
Area B Seine	Howe Sound Pink (28)										
Area B Seine	Fraser Pink (12, 13, 29)										

License Group	Fishing Area	Adult Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
Area B Seine	Nitinat Chum (21, 121)										
Area B Seine	JST Chum (12,13)	1	12	3	58	2	0	37,773	12	0	6
Area B Seine	Fraser Chum (29)							94	2		
Area B Seine	MVI Chum (14-19)				28			17,128	0		
Area B Seine	Somass Chinook (23)	0	66	2,606	0	0	58	0	5	6,403	235
Area D Gillnet	Barkley Sockeye (23)										
Area D Gillnet	Barkley Chum (23)										
Area D Gillnet	Somass Chinook (23)										
Area D Gillnet	Clayoquot Chum (24)										
Area D Gillnet	Esperanza (25)	0	0	0	82	0	0	7,670	0	0	12
Area D Gillnet	Tlupana Chinook (25)	0	0	0	2	0	0	36	0	3,307	0
Area D Gillnet	Nootka Chum (25)										
Area D Gillnet	Kyuquot Chum (26)	0	0	0	83	0	0	8,278	0	0	5
Area D Gillnet	Fraser Sockeye (11,12,13,14)	479,006	308	0	5,668	34,046	326	10,307	56	6	1,069
Area D Gillnet	JST Chum (12,13)	0	0	0	44	0	0	12,390	4	0	2
Area D Gillnet	MVI Chum (14)										
Area E Gillnet	Fraser Sockeye (29)	600,942	0	0	62	20	12	2	4	24	2,402
Area E Gillnet	Fraser Chum (29)							2	4		

License Group	Fishing Area	Adult Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
Area E Gillnet	Nitinat Chum (21, 121)	0	0	0	20	0	0	11,467	1	0	1
Area E Gillnet	MVI Chum (Area 14-19)	0	0	0	94	0	1	100,645	0	0	3
T'aaq-wiihak	WCVI AABM Chinook (24-26,124-126)	15,536	9	899	2,145	0	0	2	0	9,667	499
T'aaq-wiihak	WCVI ISBM Chinook (25)	0	0	0	0	0	0	0	0	2,850	0
T'aaq-wiihak	Fraser River Sockeye (124-126)	14,228	0	1	49	0	0	1	0	17	41
Maa-nulth HA	Henderson Sockeye (23)										
Harvest Agreement	Fraser	37,374	0	0	0	0	0	2	0	22	8
EO	Johnstone Strait										
EO	Strait of Georgia										
EO	WCVI	0	0	795	0	0	0	0	0	19,899	0
EO	Fraser River	215,369	31	14	1,295	0	1	1,379	95	556	1,452
Demo	Johnstone Strait										
Demo	Strait of Georgia	0	0	0	0	0	0	7,144	0	0	0
Demo	WCVI										
Demo	Fraser River	228,744	0	0	2,655	0	0	0	0	0	3,449
TOTALS		**3,709,618**	**9,077**	**5,129**	**21,897**	**91,339**	**907**	**230,267**	**311**	**62,167**	**16,329**

Table 52. 2018 SOUTHERN BC RECREATIONAL CATCH TOTALS BY AREA

Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
Juan de Fuca (19,20)	5,314	389	8,281	18,881	207	0	47	23	23,587	41,434
Strait of Georgia (13-19,28,29)	46,596	468	19,028	82,466	2,646	2,243	623	131	67,797	65,510
Johnstone Strait (11-12)	3,700	315	4,065	4,960	1,897	1,945	66	45	13,995	15,222
WCVI ISBM - Inshore (20W-27)	5,691**	321	23,270	10,835	76	79	25	0	40,593	24,395
WCVI AABM - Inshore (20W-27)	4,755	184	3,754	4,271	0	2	0	0	17,197	39,450
WCVI AABM - Offshore (121-127)	860	16	22,059	36,528	19	77	0	0	31,241	15,860
Fraser River *	95,910	6,296	10,138	6,379	-	-	5,115	7,346	12,833	3,115
TOTAL	**162,826**	**7,989**	**90,595**	**164,320**	**4,845**	**4,346**	**5,876**	**7,545**	**207,243**	**204,986**

**Reported Somass Sockeye Recreational catch

Table 53. 2018 SOUTHERN BC FIRST NATIONS (FSC AND TREATY) AND ESSR CATCH ESTIMATES BY AREA

Fishery type	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook ISBM Kept	Chinook ISBM Released	Chinook AABM Kept	Chinook AABM Released
First Nations FSC and Treaty	Johnstone Strait	206,376		226	1			2,390	117	529	0		
	Strait of Georgia	56,671		498	3	3,819	54	92	0	1,033	0		
	WCVI	30,444		10,386	803			2,584	0	2,118	120	1,133	100
	Fraser River	603,350	4,383	734	1,242			62,847	434	14,819	494		
TOTAL		**896,841**	**4,383**	**11,844**	**2,049**	**3,819**	**54**	**67,913**	**551**	**18,499**	**614**	**1,133**	**100**

Fishery type	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook ISBM Kept	Chinook ISBM Released	Chinook AABM Kept	Chinook AABM Released
ESSR	Johnstone Strait												
	Strait of Georgia			10,427	15			4,793		3,336			
	WCVI			5,160				40,359		28,762			
	Fraser River			47,397				29,352		13,652			
TOTAL				**62,984**	**15**			**74,504**		**45,750**			

D. 2018 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, 2019.

2005 ANNUAL REPORT ON THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2006 ANNUAL REPORT ON THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2007 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2008 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2009 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2010 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2011 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2012 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2013 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

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2014 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

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2015 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2016 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2017 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2018 ANNUAL REPORT OF THE SALMONID ENHANCEMENT ACTIVITIES OF THE UNITED STATES

This report had not been received by March 31, 2019.

2006 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2019.

2007 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2019.

2008 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2019.

2009 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

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2016 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2019.

2017 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2019.

2018 REPORT ON THE SALMONID ENHANCEMENT PROGRAM IN BRITISH COLUMBIA

This report had not been received by March 31, 2019.

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, 2018 to March 31, 2019 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

2017 EXPLOITATION RATE ANALYSIS AND MODEL CALIBRATION TCCHINOOK (18)-1 – May 2018

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). Additionally, this report contains the results of the annual exploitation rate assessment of CWT data through 2015 (US stocks) and 2016 (Canadian stocks), the preseason PSC Chinook Model calibration results for 2017 (CLB 1702), and postseason PSC Chinook Model calibration results through 2016 (CLB 1702). Results include the abundance indices (AIs) for the aggregate abundance-based management (AABM) fisheries and individual stock based management (ISBM) indices for each country.

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 2009–2017 for the SEAK, NBC, and WCVI AABM fisheries. Postseason values 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		1.15		0.77	

[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 and year and the observed treaty catches (total catch minus any hatchery add-on and exclusion catch) are shown for AABM fisheries for 2009–2016 in Table 2.

Table 2 Preseason allowable catches (2009–2017), and postseason allowable catches and observed catches (2009–2016) 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			149,500			115,300		

[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 2016, actual landed catch was less than preseason allowable catch by 1,896 (SEAK), 57,819 (NBC), and 33,650 (WCVI) Chinook salmon in these AABMs. In terms of the postseason allowable catches for evaluation of the provisions of the PST (subparagraph 11(a)(i)), 2016 actual catches were greater than the postseason allowable catches by 65,504 (22.7%) in SEAK and 6,281 (3.4%) in NBC, and less than the postseason allowable catch by 5,150 (4.9%) in WCVI.

From 2009–2016, the SEAK AABM observed catch was greater than postseason allowable catch in 6 of 8 years, whereas in NBC observed catch was greater than postseason allowable catch in 1 of 8 years and WCVI observed catch was less than postseason allowable catch in 3 of 8 years (Table 3). In 2016, SEAK observed catch exceeded allowable catch by 23%, NBC observed catch exceeded allowable catch by 3%, and WCVI observed catch was less than allowable catch by 5%.

Table 3 Summary of AABM fishery performance and deviations between pre- and postseason allowable catches and observed catches, 2009–2016.

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 [1]	-4,234	-1%	60,800	16%	56,566	15%
2015 [1]	98,029	41%	-100,500	-30%	-2,471	-1%
2016	-1,896	-1%	67,400	23%	65,504	23%
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 [1]	-73,399	-25%	27,700	11%	-45,699	-17%
2015 [1]	-1,497	-1%	-86,200	-35%	-87,697	-36%
2016	-57,819	-23%	64,100	35%	6,281	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 [1]	-17,026	-8%	13,700	7%	-3,326	-2%
2015 [1]	-10,563	-8%	-52,400	-29%	-62,963	-35%
2016	-33,650	-25%	28,500	27%	-5,150	-5%

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 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 2015, 4 of the 7 Canadian ISBM indices that could be calculated from CWT data were reduced more than required under the Agreement (Table 4). The CWT-based ISBM index exceeded the general-obligation rate of 0.635 for the Canadian stock group WCVI and for the Stillaguamish River and Green River stocks in the U.S. Since there is no CTC-agreed escapement goal for these stocks, the general obligation applies. For 2016, the computation of CWT-based ISBM indices was possible for 4 Canadian stocks, and all 4 were reduced more than required under the 2009 PST Agreement (Table 4).

Table 4 Review of performance in the Canadian ISBM fisheries, 2009–2016.

Stock Group	Stock (CTC agreed goal year)	2009	2010	2011	2012	2013	2014	2015	2016
North/ Central B.C.	Yakoun, Nass, Skeena, Atnarko, Dean (no goal)	NA	NA	NA	NA	NA	NA	NA	NA
WCVI Falls	Artlish, Burman, Kauok, Tahsis, Tashish, Marble, Gold (no goal)	0.489	0.207	0.635	0.619	0.328	0.290	0.653	0.392
L. Georgia Strait	Cowichan (2005)	0.461	0.372	0.182	0.412	0.375	0.436	0.269	0.319
	Nanaimo (no goal)	NA	NA	NA	NA	NA	NA	NA	NA
U. Georgia Strait	Klinaklini, Kakweikan, Wakeman, Kingcome, Nimpkish (no goal)	0.202	0.372	0.092	0.142	0.070	0.047	0.190	0.209
Fraser Late	Harrison (2001)	0.06	0.107	0.091	0.132	0.149	0.274	0.168	0.167
Fraser Early (spring & summers)	Upper Fraser, Mid-Fraser, Thompson	NA	NA	NA	NA	NA	NA	NA	NA
Puget Sound Spring	Nooksack (no goal)	0.148	0.029	0.135	0.057	0.059	0.084	0.059	NC
	Skagit (no goal)	NA	NA	NA	NA	NA	NA	NA	NA
Puget Sound Falls	Skagit (no goal)	NA	NA	NA	NA	NA	NA	NA	NA
	Stillaguamish (no goal)	0.22	0.147	0.21	0.257	0.2	0.588	0.682	NC
	Snohomish (no goal)	NA	NA	NA	NA	NA	NA	NA	NA
	Lake Wash. (no goal)	NA	NA	NA	NA	NA	NA	NA	NA
	Green River (no goal)[2]	0.270	0.130	0.261	0.300	0.277	0.406	0.970	NC

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 2015, 14 of the 15 US stocks for which CWT-based ISBM indices could be calculated either met their escapement goals (11 stocks) or had ISBM index below 0.600 (Table 5). Additionally, the US ISBM index for the Harrison stock (Fraser Late) was well below the general obligation (0.255). Only the Stillaguamish US ISBM index exceeded the general obligation (0.765) and does not have a CTC-agreed escapement goal. For 2016, only the US ISBM index could be calculated at this time for the Harrison River stock; this ISBM index (0.212) was well below the general obligation.

Table 5 Review of performance in the US ISBM fisheries, 2009–2016.

Stock Group	Stock (CTC agreed goal in year)	2009	2010	2011	2012	2013	2014	2015	2016
Fraser Late	Harrison (2001)	0.134	0.295	0.285	0.351	0.441	0.379	0.255	0.212
Puget Sound Spring	Nooksack (no goal)	0.585	0.758	0.890	1.866	0.872	1.298	0.547	NC
	Skagit (no goal)	NA	NA	NA	NA	NA	NA	NA	NA
Puget Sound Fall	Skagit (no goal)	NA	NA	NA	NA	NA	NA	NA	NA
	Stillaguamish (no goal)	0.219	0.198	0.218	0.170	0.299	1.211	0.765	NC
	Snohomish (no goal)	NA	NA	NA	NA	NA	NA	NA	NA
	Lake Wash. (no goal)	NA	NA	NA	NA	NA	NA	NA	NA
	Green (no goal)	0.483	0.285	0.408	0.514	0.299	0.400	0.598	NC
WA Coast Falls	Hoko (no goal)	NA	NA	NA	NA	NA	NA	NA	NA
	Grays (2014)	0.692	0.619	0.740	0.939	0.771	0.760	0.895	NC
	Queets (2004)	0.545	0.522	0.530	0.801	0.706	0.437	0.427	NC
	Hoh (2004)	1.011	0.828	1.754	1.590	2.598	1.254	1.359	NC
	Quillayute (2004)	1.835	1.361	1.692	1.957	1.762	2.597	2.094	NC
Columbia Fall	Brights (2002)	2.668	1.669	2.616	2.713	2.227	1.931	1.541	NC
	Deschutes (2010)	0.821	0.696	0.768	0.775	0.796	0.758	0.685	NC
	Lewis (1999)	0.217	0.554	1.374	0.870	1.106	0.793	0.472	NC
Columbia Summers	Summers (1999)	5.230	6.958	12.439	7.888	8.717	13.993	10.374	NC
N. Oregon Coast	Nehalem (1999)	0.234	1.950	1.861	1.690	2.525	3.668	3.759	NC
	Siletz (1999)	0.871	0.372	1.719	1.178	2.076	1.570	2.681	NC
	Siuslaw (1999)	1.869	1.773	2.646	1.830	2.831	2.132	3.099	NC

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.

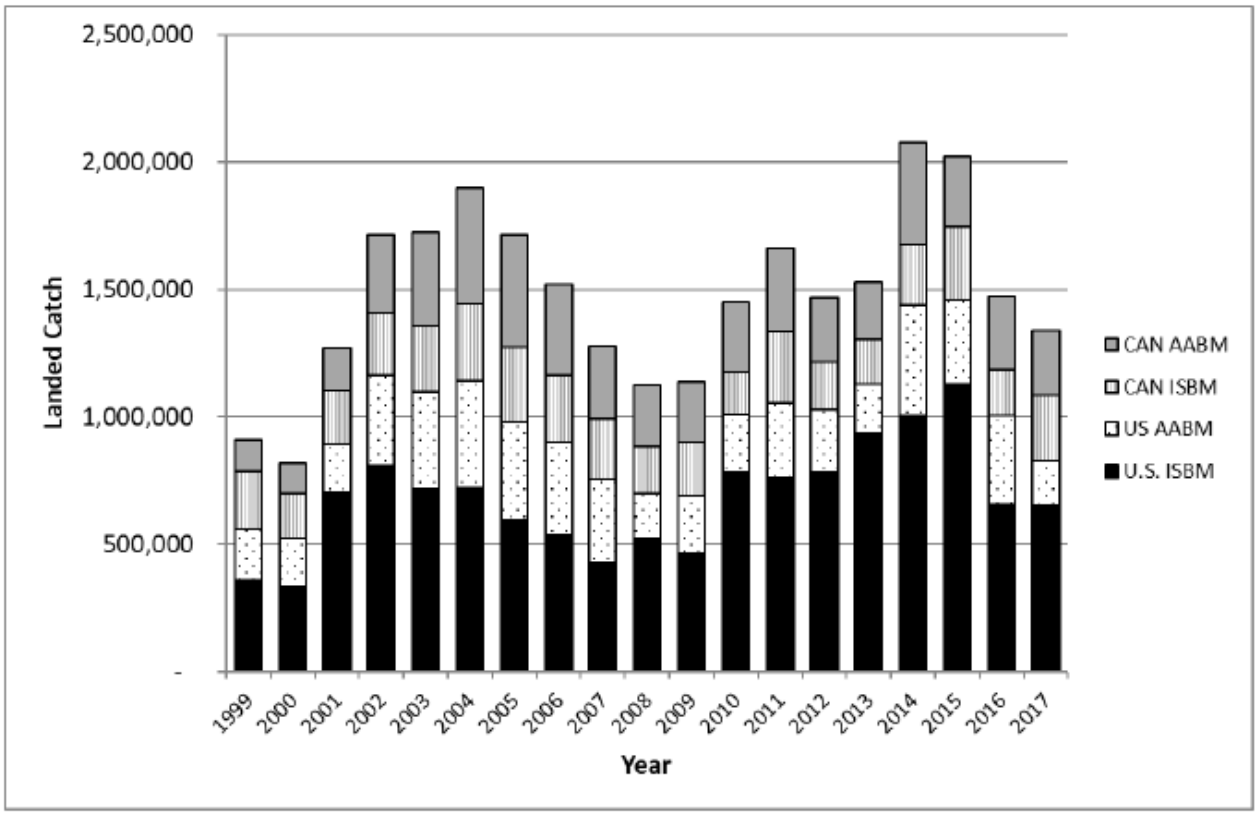
Mark Selective Fisheries

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 2016. 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., Canada and Alaska 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 and presented herein. Three SIT stocks from the Fraser River (Nicola, Lower Shuswap, and Middle Shuswap) were examined to review the methodology and identify potential enhancements.

ANNUAL REPORT OF CATCH AND ESCAPEMENT FOR 2017
TCCHINOOK (18)-2 – July 2018

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 2017: Chinook salmon catches, escapements, and stock status.

Section 1 summarizes, for 2017, 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 2017, 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.

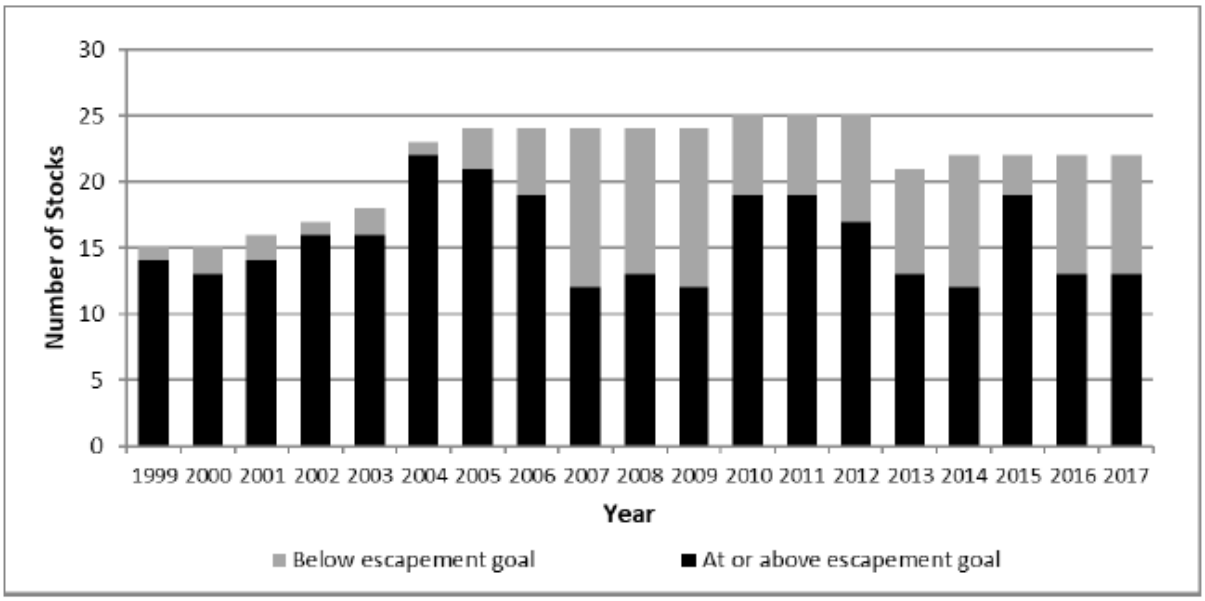


Estimates of landed catch for US and Canada AABM and ISBM fisheries, 1999–2017.

The preliminary estimate of Treaty LC of Chinook salmon for all PST fisheries in 2017 is 1,337,301, of which 827,211 were taken in US fisheries and 510,090 were taken in Canadian fisheries. Total estimated IM associated with this harvest is 194,264 nominal Chinook salmon. The TM for all PST fisheries in nominal fish was 1,531,565 Chinook salmon, of which 936,495 were taken in US fisheries and 595,070 occurred in Canadian fisheries. For US fisheries, 78% of the LC and 61% of IM occurred in ISBM fisheries; in Canada, 50% of the LC and 62% of IM occurred in ISBM fisheries. For some sport fisheries, 2017 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 2017, the percentage of stocks that met or exceeded escapement goals or goal ranges has varied from 50% to 96% (see figure below). In 2017, 13 of 22 stocks (59%) met or exceeded escapement objectives. Of the nine stocks below goal, three stocks (Unuk, Nehalem, and Siuslaw) were within 15% of the target goal. Six stocks were more than 15% below goal: Chilkat, Chickamin, Alsek, Taku, Stikine, and Harrison.

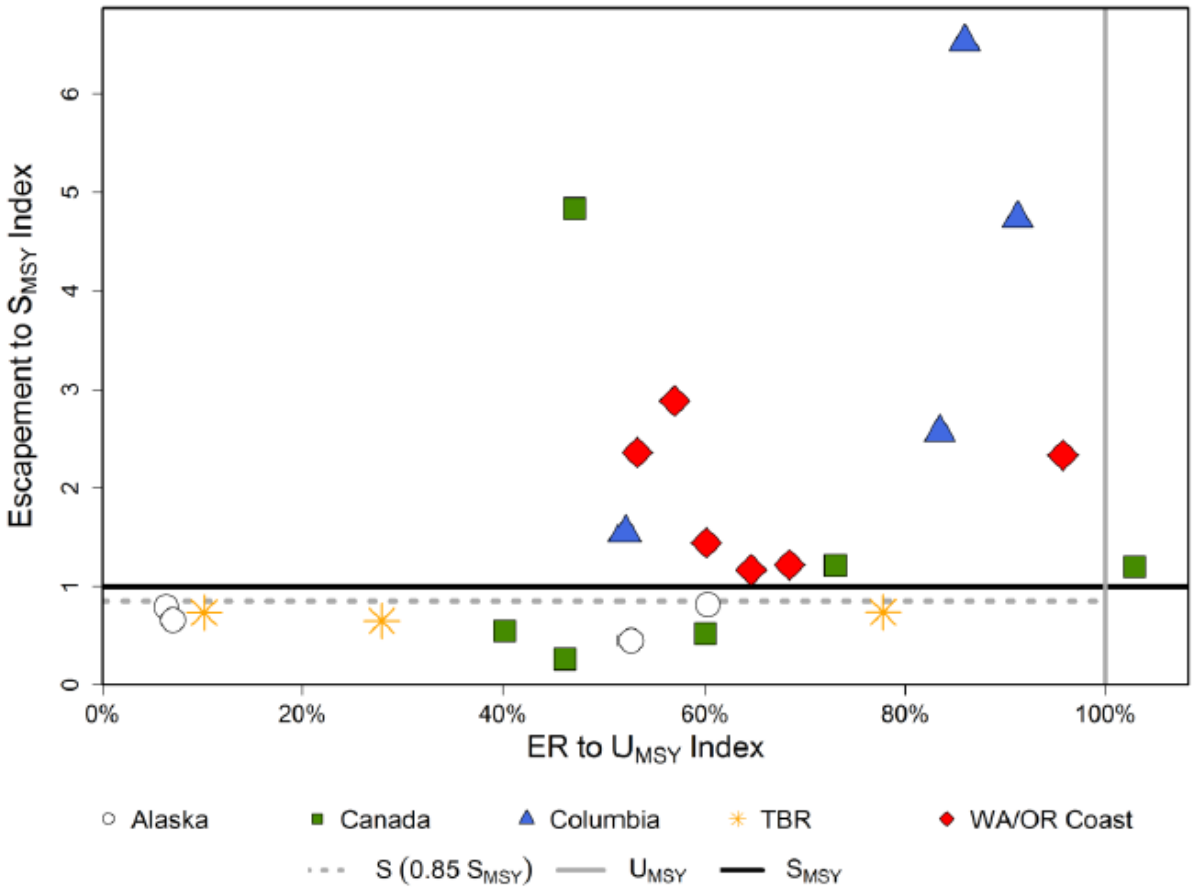


Number and status of stocks with PSC-agreed escapement goals, 1999–2017.

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 2016 data shows that the majority of stocks were in the safe zone (exploitation below UMSY and escapement above SMSY). No stocks were in the high-risk zone and no stocks were in the buffer zone. One stock, Cowichan, experienced exploitation above UMSY and still the escapement

exceeded SMSY. Ten stocks were in the low escapement and low exploitation zone: Alsek, Chickamin, Chilkat, Nicola, Shuswap, Harrison, Situk, Stikine, Taku and Unuk. In general, Columbia River and WA/OR Coast 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 2016 (escapement and exploitation rate data for each stock was standardized to the stock-specific escapement goal and U_{MSY} reference points).

B. JOINT CHUM TECHNICAL COMMITTEE

2015 POST SEASON SUMMARY REPORT
TCCHUM (18)-2 – May 2018

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 2015 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 2015 were below 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 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 and run reconstruction model development.

C. JOINT COHO TECHNICAL COMMITTEE

No reports were finalized for publication during this reporting period.

D. JOINT NORTHERN BOUNDARY TECHNICAL COMMITTEE

No reports were finalized for publication during this reporting period.

E. JOINT TRANSBOUNDARY TECHNICAL COMMITTEE

SALMON MANAGEMENT AND ENHANCEMENT PLANS FOR THE STIKINE, TAKU AND ALSEK RIVERS, 2018
TCTR (18)-1– May 2018

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 on transboundary stocks of the Stikine, Taku, and Alsek rivers conducted by DFO, TFN, TRTFN, CAFN, and ADF&G.

This report contains, by river system and species, the 2018 salmon run outlooks, spawning escapement goals, a summary of harvest sharing objectives, and an outline of management procedures to be used during the 2018 fisheries. Numerical forecasts are presented for: Stikine River sockeye and large (MEF > 659 mm; typically age 5–7) Chinook salmon and Taku River large Chinook salmon as required by the PST; Taku River sockeye and coho salmon; and Alsek River sockeye and Chinook 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 2018, identifying agency responsibility and contacts for the various functions within the projects. Information shown for 2017 and 2018 is preliminary. Unless otherwise define the 10-year average is 2008–2017 and the 5-year average is 2013–2017.

FINAL ESTIMATES OF TRANSBOUNDARY RIVER SALMON PRODUCTION, HARVEST AND ESCAPEMENT AND A REVIEW OF JOINT ENHANCEMENT ACTIVITIES IN 2016
TCTR (19)-1– January 2019

Final estimates of harvests and escapements of Pacific salmon returning to the transboundary Stikine, Taku, and Alsek rivers for 2016 are presented and compared with historical patterns. Average, unless defined otherwise, refers to the most recent 10-year average (2006–2015). Relevant information pertaining to the

management of appropriate U.S. and Canadian fisheries is presented and the use of inseason management models is discussed. Final results from TBR sockeye salmon Oncorhynchus nerka enhancement projects are also reviewed.

Stikine River

The final postseason estimate of the 2016 Stikine River sockeye salmon terminal run was 247,900 fish, of which approximately 171,900 fish were harvested in various fisheries including assessment/test fisheries. An estimated 75,800 Stikine River fish escaped to spawn; 4,300 fish were removed for brood stock, and an estimated 8,700 fish migrated to the barrier in the Tuya River and were not harvested. The terminal run was above average and the harvest was above average. The Tahltan Lake sockeye salmon total weir count was 38,600 fish was above the goal range of 18,000 to 30,000 fish. The estimated spawning escapement of 28,700 mainstem Stikine River sockeye salmon was within 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 83,500 fish. The sockeye salmon harvest in the Canadian inriver commercial was 75,700 fish and the AF harvest was 10,600 fish. The inriver test fisheries harvested 1,800 sockeye salmon. Weekly inseason run projections from the SMM ranged from 153,500 to 242,500 sockeye salmon. The final inseason model prediction was 242,500 fish, with a TAC of 181,900 fish. The final postseason terminal run estimate was 247,900 fish and an AC estimate of 93,300 Stikine River sockeye salmon for each country, Canada harvested 93% and the U.S. harvested 89% of their respective TACs.

The 2016 Stikine River large Chinook salmon run was estimated at 15,500 fish, of which approximately 4,940 fish were harvested in various fisheries. The estimated escapement of Stikine River large Chinook salmon was 10,550 fish; below both the escapement goal of 17,400 fish and the escapement goal range 14,000 to 28,000 fish. The run and harvest were below their respective averages. The Little Tahltan River large Chinook salmon escapement of 920 fish was 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 U.S. commercial harvest of Stikine River Chinook salmon in Districts 108 gillnet, test, troll, subsistence, and sport fisheries was 1,710 fish. The estimated Canadian commercial, Aboriginal, assessment/test, and sport fisheries harvest was 3,240 fish. Managers used harvest in the MR, model, and other assessment estimates to generate inseason run sizes after SW 25. The inseason run projections were consistent throughout the course of the fishery in predicting a terminal run size that was substantially lower than the preseason expectation of 33,900 large Chinook salmon. Weekly inseason run projections ranged from 18,100 to 22,800 large Chinook salmon.

The 2016 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 106 122,100 fish (41% Alaska hatchery) and District 108 was 22,200 fish (36% Alaska hatchery). The Canadian inriver coho salmon harvest of 5,300 fish was above average. The annual aerial surveys indicated a well below average return to the 6 index sites that were surveyed by Canada. The inseason weekly CPUE of coho salmon from both the lower Stikine River Canadian fishery and sockeye salmon test fishery (incidentally caught coho salmon) was below average.

In May 2014, a landslide occurred near the mouth of the Tahltan River. The landslide deposited approximately 8,000 m^3 of debris into the river which may have restricted access to Tahltan River Chinook and sockeye salmon spawning sites until mid-July 2014. Remedial work was done to improve fish passage at the landslide in March 2015. However, it is assumed the landslide still has the potential to continue to restrict upstream passage, especially during periods of high water. In 2016 radio telemetry results did not indicate that the Chinook salmon escapement was unduly affected, although the water levels were relatively low. Similarly, for sockeye salmon neither the timing nor the magnitude of the

escapement (well above average) to Tahltan Lake appeared to be symptomatic of any impediments to migration.

Taku River

The final postseason estimate of the 2016 Taku River sockeye salmon terminal run is 288,700 fish, 268,800 wild fish, and 20,000 hatchery fish. The U.S. harvested 68,000 Taku River wild fish, Canada harvested 33,300 wild fish and the estimated above border spawning escapement was 167,500 wild sockeye salmon. The terminal run size was above average. The wild escapement was well above average and well above the goal range of 71,000 to 80,000 fish. The U.S. and Canada harvested an estimated 45% and 76% of their respective ACs.

The estimated 2016 Taku River large Chinook salmon terminal run was 14,840 fish; above border run was 14,010 fish and spawning escapement was 12,380 fish. The run was the lowest on record and the harvests were well below average. The total harvest of large Chinook salmon in the inriver assessment/test fishery and Canadian commercial, Aboriginal, and recreational fisheries in the Taku River was 1,630 fish. The traditional District 111 mixed stock drift gillnet fishery total harvest of 580 Chinook salmon was the lowest on record dating back to 1960.

The estimated above border run of Taku River coho salmon in 2016 is 99,200 fish, which was average. The Canadian inriver commercial harvest was 9,500 coho salmon with an additional 2,000 fish harvested in the assessment/test fishery and 50 fish harvested in the aboriginal fishery. After all Canadian harvests are subtracted from the above border run the above border spawning escapement is estimated at 87,700 coho salmon, which exceeds the mid-point of the newly adopted escapement goal range of 50,000 to 90,000 fish. The U.S. harvest of 34,400 coho salmon in the traditional District 111 mixed stock fishery was below average. Alaskan hatcheries contributed an estimated 7,400 fish, or 21% of the District 111 harvest.

Alsek River

The 2016 Alsek River harvest of 6,700 sockeye salmon in the U.S. commercial fishery was below average. The Canadian inriver recreational fishery reported no harvest sockeye salmon while the Aboriginal food fishery harvest was approximately 815 fish. The Klukshu River weir count of 7,600 sockeye salmon was below average and the escapement of 7,400 fish was below the escapement goal range of 7,500 to 11,000 fish. The count of 1,400 early run sockeye salmon (i.e. through August 15) and the late run count of 6,200 were both below average.

The 650 Chinook salmon counted through the Klukshu River weir was below average and the estimated escapement (also 651 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 80 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

For brood year 2016, an estimated 5.3 million eggs were collected at Tahltan Lake, transported to Snettisham Hatchery and 3.1 million fry were planted back in Tahltan Lake. An estimated 1.8 million eggs were collected at Tatsamenie Lake, transported to the hatchery and 1.2 million fry were transported back to the lake. One

million fry were directly released into the Tatsamenie Lake and 144,000 fry were released from the extended rearing program. An estimated 271,000 eggs were collected at Lower Trapper Lake, transported to the hatchery and 212,000 fry were planted back in the lake. The fry planted into Lower Trapper Lake will help jump start the colonization of Upper Trapper Lake. In the late fall of 2017, barrier removal to Upper Trapper Lake is scheduled to begin. In the spring of 2016, brood year 2015 sockeye salmon were transported from Snettisham Hatchery to project lakes. Approximately 3.4 million sockeye salmon fry were planted in Tahltan Lake. Approximately 470,000 fry were planted in Tatsamenie Lake. An estimated 334,000 fry were designated to be directly planted in Tatsamenie Lake, but approximately 50,000 were pen reared in the lake as a "proof of concept" experiment. Approximately 86,000 sockeye salmon were reared in cap troughs on-shore, transferred to net pens and then released into the lake.

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 gillnet fisheries and to Canadian commercial fisheries in the Stikine and Taku rivers. Final estimates of stocked fish to Alaskan harvests were 31,400 Stikine River fish to District 106 and 108, and 6,800 Taku River fish to District 111. Final estimates of stocked fish to Canadian fisheries included 33,300 fish to Stikine River fisheries and 4,000 fish to the Taku River fisheries.

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 2017 AND 2018
SFEC (18)-1– December 2018

This report provides a summary of the proposed coastwide plans for mass marking (MM) of Coho and Chinook salmon and the conduct of mark-selective fisheries (MSFs) in 2017 and 2018. Issues with implications for maintenance of the coastwide coded-wire-tag program are identified and recommendations are proposed.

Summary of 2017 and 2018 Mass Marking Proposals

Throughout this report a mass marked fish refers to a fish with an adipose-fin clip and a double-index-tag (DIT) group includes two related coded-wire-tag (CWT) groups, one marked and one unmarked. The terms 'marked' and 'clipped', and likewise 'unmarked' and 'unclipped', are used interchangeably.

Mass Marking and DIT Programs

Twenty-one proposals (8 for Coho and 13 for Chinook) were received for mass marking occurring in 2017 and in 2018 (Appendix A). Of these, one was received from southern British Columbia (BC) and 21 from southern United States (SUS) in both years. The Selective Fishery Evaluation Committee (SFEC) believes these proposals cover all MM programs of relevance to the Pacific Salmon Commission (PSC).

Proposed mass marking of Coho and Chinook salmon, 2016–2018

Agency	Coho (in millions)			Chinook (in millions)		
	2016	2017	2018	2016	2017	2018
ADFG	-	-	-	-	-	-
CDFO	4.2	3.9	4.2	-	-	-
USFWS	1.7	1.7	1.7	25.0	25.0	24.2
WDFW/Tribes	22.2	22.5	23.0	71.6	70.9	70.6
ODFW/Tribes	5.5	6.2	6.1	21.2	20.3	19.7
Total	**33.4**	**34.3**	**35.1**	**117.7**	**116.2**	**114.4**

Within the MM proposals received from southern BC and SUS, approximately 34.3 million Coho were proposed to be mass-marked in 2017, approximately 900,000 more than proposed in 2016, and 35.1 million Coho are proposed for 2018 (Table 2-1). Essentially all hatchery Coho production intended for harvest, from southern BC and SUS hatcheries will continue to be mass marked. In both 2017 and 2018, there are 15 proposed Coho Salmon DIT groups (Table 2-1; Appendix B), of which one will be released from southern BC, seven from Puget Sound, four from the Washington (WA) coast, and three from the Columbia River Basin. This is unchanged from what was proposed for 2016.

Approximately 116.2 million Chinook were proposed to be mass marked in 2017 from SUS Chinook hatcheries, and 114.4 in 2018 (Table 2-1). The 2017 level was approximately 1.5 million less than the number proposed to be mass marked in 2016, and the 2018 level is another 1.8 million less than in 2017. These differences are due to minor changes in production and more coded-wire-tagged fish. Most all 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 coastal facilities, and five from Columbia River facilities.

Sampling Programs

Prior to MM, the adipose fin clip was employed as a visual indicator for fish containing a CWT. Consequently, sampling programs which were designed to collect heads from fish with missing adipose fins resulted in samples of heads, all which contained 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. Fisheries from which unmarked DIT recoveries should have been observed create gaps in analyses of fishery impacts on unmarked (wild) fish.

Considering sampling programs coastwide, some agencies already implement comprehensive electronic sampling strategies to recover CWTs from sport and commercial fisheries, while other agencies are still working to increase use of ETD. Washington State continues to implement electronic sampling in most locations and reports CWT recoveries of the unmarked components of DIT groups in recreational marine and some freshwater MSFs, as well as in non-selective 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 conducts visual sampling; however, uses electronic screening of heads for commercial fisheries and in most ports for sport fisheries, to send tagged heads only to the dissection lab.

Encounters of large numbers of mass marked Chinook Salmon are increasingly impacting catch sampling programs in northern fisheries; for example, approximately 59% of the Chinook sampled in the southeast Alaskan troll fishery and 46% of the Chinook sampled in the sport fishery with a missing adipose fin did not contain a CWT in 2017 (Figure 2-5). 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 impact the programs.

Summary of 2017 and 2018 Mark-Selective Fishery Proposals

Mark-selective fisheries have been prosecuted for Coho Salmon since 1998 and for Chinook Salmon since 2003. For 2017, the SFEC received 64 MSF proposals for Coho and Chinook salmon in ADFG, CDFO, WDFW, and ODFW fisheries. For 2018, the SFEC received 68 MSF proposals for Coho and Chinook salmon in Alaska, Canada, Washington, and Oregon fisheries. The SFEC believes these proposals cover all MSFs planned for 2017 and 2018 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 Table 3-3.

In 2017, 24 proposals were received for Coho Salmon MSFs and 40 proposals were received for Chinook Salmon MSFs. The SFEC received one new Coho proposal from WDFW, and four new Chinook proposals, three from WDFW and one from ODFW for a pre-existing fishery formerly proposed as a joint Coho/Chinook MSF.

In 2018, 25 proposals were received for Coho Salmon MSFs and 43 proposals were received for Chinook Salmon MSFs. The SFEC received one new Coho proposal from WDFW for an existing recreational MSF on the Nooksack River, one new proposal from the Lummi Nation for an existing MSF on the Nooksack River, and two new Chinook proposals from ADFG for a commercial and a recreational MSF in southeast Alaska. 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, 2016–2018

Agency	Coho			Chinook		
	2016	2017	2018	2016	2017	2018
ADFG	0	0	0	1	1	3
CDFO	5	5	5	1	1	1
WDFW	10	11	12	24	27	27
ODFW	5	5	5	5	6	6
WDFW/ODFW	3	3	3	5	5	5
IDFG	0	0	0	0	0	0
Lummi	0	0	0	0	0	1
Total	**23**	**24**	**25**	**36**	**40**	**43**

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 has more than tripled to 43 Chinook MSFs and a larger number of indicator stocks are now vulnerable to being encountered in MSFs.
are also expected to continue to occur in ocean areas in 2018 in BC, WA, and OR. These fisheries will impact many stocks and also multiple broods of Chinook Salmon.

The majority of MSF proposals are for terminal marine or freshwater areas, each of which will impact mature fish of one to several stocks. Multiple MSFs for both Coho and Chinook salmon

Issues and Concerns

Post-Season Reports

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. 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.

Mixed Bag Regulations

Regulations to implement MSFs are increasingly complex, making analyses to estimate impacts challenging in a number of ways. Mixed bag regulations are part of the MSFs proposed by Canada, Washington, and Oregon for recreational fisheries (Figure 4-1 through Figure 4-4). As MSFs expand, a larger variety of mixed bag regulations are now proposed. The regulations include a range of rules that specify when and how anglers may retain various combinations of adult and juvenile marked and unmarked fish in their daily bag limits. There are no reliable methods for estimating impacts on marked and unmarked fish under mixed bag regulations and the agencies proposing these mixed bag regulations should assist in developing the analytical tools to measure the impacts of these fisheries.

Recommendations and Issues Requiring PSC Direction

Proposal Review Process

It is recommended that the PSC request agencies to submit proposals for all potential MSFs by November 2018, and for agencies to provide both preliminary and final post-season reports on the conduct of MSFs within the timeframe adopted by the PSC. Proposals for new or substantially changed proposals are requested by June 1 of the year prior to implementation. Agencies need to prioritize these tasks so that proposals and MSF post-season reports are completed and submitted in a timely manner. Beginning in 2018, the SFEC will annually report actual releases as contained in the Regional Mark Information System (RMIS), and review proposals from agencies for any significant changes in production and mark and tag status (e.g., adding or removing DITs).

Interagency Coordination and Cooperation

Mass marking, double-index tagging, and CWT sampling programs continue to be insufficiently coordinated to support analysis by PSC technical committees. It is also not clear whether agencies are collecting adequate and necessary data to permit estimation of unmarked CWT recoveries in fisheries and escapements so that cohort reconstructions can be carried out on the unmarked component of the DIT group releases. With the expansion of Chinook marine MSFs, the geographical range of electronic CWT sampling may need to be expanded and the number of double-index-tagged stocks may need to be increased, assuming double-index-tagging is providing valid analyses. It is specifically recommended that ODFW and WDFW implement ETD for all Columbia River fall and summer Chinook fisheries. It is unclear why visual sampling continues when there are five Chinook DIT groups released in the Columbia River.

The PSC and Agencies should support technical and policy processes to develop agreements and clarify responsibilities for maintaining a functional CWT system; these processes should build upon recommendations presented by the CWT Work Group in 2008 (PSC-CWTW 2008).

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 2018/19 inclusive. For previous publications, please refer to the Pacific Salmon Commission's website at www.psc.org/publications.

A. ANNUAL REPORTS

Pacific Salmon Commission 2017/2018 Thirty Third Annual Report. November 2018.

B. REPORTS OF JOINT TECHNICAL COMMITTEES

i. Joint Chinook Technical Committee

TCCHINOOK (18)-1 *2017 Exploitation Rate Analysis and Model Calibration*. May 2018.

TCCHINOOK (18)-1 V2 *2017 Exploitation Rate Analysis and Model Calibration Volume Two: Appendix Supplement.* May 2018.

TCCHINOOK (18)-1 V3 *2017 Exploitation Rate Analysis and Model Calibration Volume Three: Appendix Documentation of circumstances and events regarding PSC model calibration 1503.* June 2018.

TCCHINOOK (18)-2 *Annual Report of Catch and Escapement for 2017*. July 2018.

ii. Joint Chum Technical Committee

TCCHUM (18)-2 *2015 Post Season Summary Report*. May 2018.

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

No reports were finalized for publication during this reporting period.

vi. Joint Transboundary Technical Committee

TCTR (18)-1 *Salmon Management and Enhancement Plans for the Stikine, Taku and Alsek Rivers, 2018.* May 2018.

TCTR (19)-1 *Final Estimates of Transboundary River Salmon Production, Harvest and Enhancement and a Review of Joint Enhancement Activities in 2016.* February 2019.

vii. Selective Fishery Evaluation Committee

SFEC (18)-1 *Review of Mass Marking and Mark-Selective Fishery Activities Proposed to Occur in 2017*. January 2019.

C. REPORTS OF THE FRASER RIVER PANEL

Report of the Fraser River Panel to the Pacific Salmon Commission on the 2017 Fraser River Sockeye Salmon Fishing Season. November 2018.

D. TECHNICAL REPORT SERIES OF THE PACIFIC SALMON COMMISSION

PSC Technical Report No. 40. *Summary of a Review of Fraser River Test Fisheries*. April 2018.

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 2018/19 were:

1. *Post Season Report for 2018 Canadian Treaty Limit Fisheries.* Fisheries and Oceans Canada. January 20, 2019.

2. *2018 Post Season Report United States Salmon Fisheries of Relevance to the Pacific Salmon Treaty.* United States Section. January 11, 2019.

Report of the Auditors for 2018/2019

PART VII
AUDITORS' REPORT AND FINANCIAL STATEMENTS FOR THE PERIOD APRIL 1, 2018 TO MARCH 31, 2019

Appendices

Appendix A

Northern Fund Projects for 2018/2019

	Enhancement				
1	Trapper Lake sockeye enhancement 2018	Mercer	Metla	TBR	sockeye
2	Iskut Watershed (Stikine River) Sockeye Salmon Enhancement Feasibility	Erhardt Collins	TAF/DFO	TBR	sockeye
3	King Salmon Lake sockeye enhancement	Erhardt	TRT	TBR	sockeye
4	Recovery Enhancement of Kilbella-Chuckwalla Chinook, 2017-18	English	LGL	NBC	chinook
5	Development and Implementation of Analytical Tools to Support WCVI Chinook Hatchery Management & Reform in Canada	Galbraith	DFO	WCVI	chinook
6	Investigation of Yearling Chinook Hatchery Production as a Conservation Tool for West Coast Vancouver Island Chinook	Brouwer	DFO	WCVI	chinook
7	2018 Tatsamenie Lake sockeye fry extended rearing and smolt project	Mercer	Metla	NBC	sockeye
	Habitat				
1	Kuthai Lake access improvement	Hudson	TRT	TBR	sockeye
2	Village Falls passage improvement	Connor	TRT	TBR	chinook sockeye
	Information				
1	Taku River Chinook Salmon Telemetry	Richards	ADFG	TBR	chinook
2	ADFG Thermal Mark Recovery	Oxman	ADFG	SEAK	sockeye
3	Boundary Area Coho Escapement	Shaul	ADFG	SEAK	coho
4	Mixed Stock Analysis of Districts 101, 102, and 103 sockeye seine fisheries.	Rogers Olive	ADFG	SEAK	sockeye
5	Mixed stock analysis of districts 106, 108 & 111 sockeye gillnet fisheries	Rogers Olive	ADFG	SEAK	sockeye
6	NB & TBR Sockeye Matched Sampling	Reynolds	ADFG	SEAK	sockeye
7	SEAK Chinook stock assessment	Jones	ADFG	SEAK	chinook
8	Assessing Effects of Supplementation on Fitness of Sockeye Salmon in Auke Creek, Alaska, Phase 2	McPhee Gilk-Baumer	UAF/ADFG	SEAK	sockeye
9	Genetic changes associated with in-basin supplementation of a population of sockeye salmon	Vulstek	NOAA	SEAK	sockeye
10	Northern Boundary Area Sockeye Salmon Genetic Stock Identification for	Guyon	NOAA	SEAK	sockeye
11	Southeast Alaska Coastal Monitoring of Epipelagic Fish and Marine Ecosystem Conditions Associated with Salmon	Gray	NOAA	SEAK	pink
12	Chum Salmon Hatchery Wild Interactions	Reifenstahl	NSRAA	SEAK	chum
13	Stikine sockeye and coho aerial surveys	Frocklage	TFN	TBR	coho sockeye
14	Alsek Sockeye Run Reconstruction Using GSI	Foos Stark	DFO	TBR	sockeye
15	L. Trapper Sockeye and Kowatua-Tatsatua Chinook	Foos Huebschwerlen	DFO	TBR	chinook sockeye
16	Taku River - Nahlin Chinook Salmon Enumeration	Foos Huebschwerlen	DFO	TBR	chinook
17	Tahltan Lake Adult Sockeye Enumeration	Foos Sembsmoen	DFO	TBR	sockeye
18	Tahltan Lake Smolt Enumeration and Sampling	Foos Sembsmoen	DFO	TBR	sockeye
19	Taku River Sockeye Assessment Program Review	Smith Foos	DFO	TBR	sockeye
	Taku River Sockeye Escapement Goal Revision	Smith Foos	DFO	TBR	sockeye
20	Taku River Coho Adult Augmentation 2018	Foos Williams	DFO ADFG	TBR	coho
21	Taku River Coho Salmon Smolt Tagging Augmentation	Foos Williams	DFO ADFG	TBR	coho
22	Skeena Test Fishery DNA (Sockeye) 2018 sample year	Cox Rogers	DFO	NBC	sockeye
23	Monitoring occurrence and prevalence of Ichthyophthirius multifiliis (Ich), Loma salmonae (Loma), and infectious hematopoietic necrosis virus (IHNV) in Skeena River sockeye. Year 4 of 4.	Garver	DFO	NBC	sockeye
24	Estimation of stock composition of Coho Salmon in northern and central coastal fisheries in British Columbia	Beacham	DFO	NBC	coho
25	Chum Stock ID Assessment (Canadian Area 3 Commercial fishery otoliths)	Davies	DFO/ADFG	NBC	chum
26	Annual run reconstruction Northern Boundary Area Sockeye	Cox Rogers Meredith	DFO/ADFG	NBC/SEAK	sockeye
27	Nass area coastal chum escapement project 2018	Desson	NLG	NBC	chum
28	Nass area coastal coho escapement project 2018	Desson	NLG	NBC	coho
29	Nass sockeye salmon fishwheel DNA analyses project 2018	Desson	NLG	NBC	sockeye
30	Nass sockeye radio tagging project 2018	Desson	NLG	NBC	sockeye
31	Kitwanga River Salmon Enumeration, 2018	Cleveland	GFA	NBC	all species
32	Babine Lake, British Columbia - Sockeye Salmon nursery ecosystem	Selbie	DFO	NBC	sockeye
33	Babine Lake watershed sockeye smolt population estimation project – mark-recapture	MacIntyre	LBFN	NBC	sockeye
34	2018 Skeena lakes juvenile sockeye hydroacoustic surveys	Doire	SFC	NBC	sockeye
35	Slamgeesh Program Operation Support	Whitmore	GWA	NBC	sockeye coho
36	Multi-species salmon assessment for the Waanukv (Wannock) River, 2018	English	LGL	NBC	all species
37	Zymachord River Coho cwt Harvest Distribution	Riemenschneider	TSES	NBC	coho
38	Mixed stock analysis of districts 108 and 111 chinook fisheries	Shedd	ADFG	SEAK	chinook
39	Origins of Chinook harvested in SEAK fisheries in 2018	Shedd	ADFG	SEAK	chinook
40	Klukshu Chinook and Sockeye	Foos Stark	DFO	TBR	chinook sockeye
41	Stikine River Coded Wire Tagging	Foos Sembsmoen	DFO	TBR	chinook coho
42	Stikine Fishery Sampling & Stock Assessment	Foos Sembsmoen	DFO	TBR	chinook sockeye coho
43	Stikine River Chinook Aerial Surveys	Foos Sembsmoen	DFO	TBR	chinook
44	Taku Fishery Sampling & Stock Assessment	Foos Huebschwerlen	DFO	TBR	chinook sockeye coho
45	Genetic Analyses of samples collected in the Recreational Chinook Fisheries in Northern BC 2018	Winther	DFO	NBC	chinook
46	Chinook salmon Escapement Estimation to the Skeena River using Genetic techniques 2018	Winther	DFO	NBC	chinook
47	Genetic Stock Identification of Chinook salmon caught in Northern BC Troll fisheries 2018	Winther	DFO	NBC	chinook
48	Area 3 and 4 Creel Survey, 2018	Addison	NCSFNSS	NBC	chinook
49	Atnarko River Chinook Escapement Estimation project 2018	Koroluk	DFO	NBC	chinook
50	Nass chinook salmon mark-recapture project 2018	Desson	NLG	NBC	chinook
51	Terminal Abundance of WCVI Chinook salmon	Luedke Dobson	DFO	WCVI	chinook
52	Lower Shuswap River Chinook Salmon Indicator Stock (Fraser River Summer-run Age 0.3 Stock)	Bailey	DFO	Fraser	chinook
53	Estimation of Fraser River - South Thompson Age 0.3 Chinook Aggregate Escapement	Bailey	DFO	Fraser	chinook
54	Upriver Bright Density Dependence Analyses of existing samples	McMichael	MFR	WA	chinook
	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		

Appendix B

Southern Fund Projects for 2018/2019

	Southern Fund 2018 Projects				
1	Calibration of visually enumerated Fraser Sockeye spawning populations	Benner	DFO	FR	sockeye
2	Size selective mortality and early marine growth: potential mechanisms regulating salmon survival at sea.	Holt	DFO	GB	sockeye
3	Collection of local real-time tide and current data to explain variability in marine catch data and improve daily abundance and run size estimates of Fraser River Sockeye and Pink Salmon	Forrest	PSC	FR	sockeye pink
4	Coldwater River Adult Coho Enumeration	Wimbush	NTA	SoBC	coho
5	Bessette Creek Resistivity Counter	H. Wright	ONFD	SoBC	coho
6	Southern BC and Puget Sound Chum mixed stock genetic identification for 2016-2019 fisheries	Candy	DFO	SoBC	chum
7	Strait of Juan De Fuca Chum Salmon Sampling program	van Will	CTC	JDF	chum
8	Increased hatchery production and Coded Wire Tagging of Interior Fraser Coho	Sandher	DFO	FR	coho
9	Burman River Chinook salmon mark-recapture 2018	Dunlop	NTC	WCVI	chinook
10	Abundance estimates for Stillaguamish River Chinook salmon using trans-generational genetic mark recapture	Small	WDFW	PS	chinook
11	Increased Chinook salmon stock coded-wire tagging to improve the quality of Chinook indicator stock analyses	Mahoney	DFO	SoBC	chinook
12	Genetic-based abundance estimates for Snohomish River Chinook salmon	Seamons	WDFW	PS	chinook
13	Automating procedures for forecasting of terminal run and escapement of Chinook, Coho and Chum salmon stocks using open-source statistical software: "Chapter 2"	Velez-Espino	DFO	PNW	chinook
14	DNA stock composition of chinook catch in the Strait of Georgia fishery	Candy & Luedke	DFO	JDF	chinook
15	DNA stock composition of Canadian Juan be Fuca chinook fishery	Candy & Luedke	DFO	JDF	chinook
16	Chilko River Chinook Salmon Indicator Stock (Fraser River Summer-run Age 1.3 stock)	Bailey & Trouton	DFO	FR	chinook
17	Automating In-Season Salmon Species Composition at Mission Using Imaging Sonar	Li	Consultant	FR	sockeye
18	Albion-based estimate of total Fraser River Chum Salmon escapement using GSI at Albion and enumeration of Chilliwack River Chum Salmon escapement, 2018 (Year 3)	Tadey & Whitehou	DFO	FR	chum
19	Qualark Acoustics: estimating abundance of salmon migrating in the lower Fraser River near Yale BC, 2018	Whitehouse	DFO	FR	sockeye
20	Expanded Bilateral Chum Salmon SNP Genetic Baseline for Genetic Stock Identification (WDFW)	Small	WDFW	PS JDF WC	chum
21	Expanded Bilateral Chum Salmon SNP Genetic Baseline for Genetic Stock Identification (DFO)	Candy	DFO	SoBC	chum
22	Understanding the mechanisms of population depression for endangered Cultus Lake Sockeye Salmon to inform fisheries and habitat management	Selbie & Miller	DFO	FR	sockeye
23	Increased CWT application in Southern B.C. coho indicator stocks	Mahoney	DFO	SoBC	coho
24	Independent Evaluation of Wild Coho Marine Survivals Rates in the Strait of Georgia (Black Creek)	Pereboom	DFO	SoG	coho
25	Cowichan Adult Chinook Enumeration methodology change	Pellett	DFO	SoG	chinook
26	Enumeration of Quesnel Basin Interior Fraser Coho using Dual-frequency Identification SONAR (DIDSON)	Ritchie & Nicklin	DFO UFFCA	FR	coho
27	Improving real time acquisition of sockeye 'catch per set' information from commercial purse seine ITQ fisheries	Nelitz	ESSA	FR	sockeye
28	Feasibility study of Imaging Sonar at Lillooet River to assess Coho Salmon escapement to the Lillooet CU	Noble	LGL	FR	coho
29	Modifications to the Chum Genetic and Environmental Management Model (ChumGEM), a run reconstruction c	Van Will	DFO	SoBC WC	chum
30	An investigation of Cowichan adult Coho run timing and marine survival	Pellett	DFO	SoG	coho
31	A pilot study on the application of hydroacoustic surveys to assess the abundance of delaying sockeye in south	Lagasse	PSC	SoG	sockeye
32	Electronic augmentation of current assessment framework Estimation of Chinook and Coho escapement using electronic counters in the Fraser River	Bailey & Ritchie	DFO	FR	chinook/coho
33	Salish Sea Marine Survival Program Year 5	Riddell	PSF	GB	chinook coho
34	Salish Sea Marine Survival Program Year 5	Schmidt	LLTK	PS	chinook coho

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 2018/2019

Effective December 1, 2018 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. McCoy Oatman
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	Ms. Laura Brown
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	Mr. Jamie Scroggie
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. Bo Meredith
Transboundary Technical Committee - Co-Chair	Can	Mr. Steve Smith
Transboundary Technical Committee - Co-Chair	U.S.	Mr. Edgar 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. Charles Swanton
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	Mr. John Holmes
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
Selective Fishery Evaluation Committee - Co-Chair	Can	Dr. Rob Houtman
Selective Fishery Evaluation Committee - Co-Chair	U.S.	Dr. Kristen Ryding

Appendix D

Approved Budget FY 2018/2019

1 INCOME	APPROVED	
A. Contribution from Canada	1,879,636	
Special contribution pension Canada	162,852	
B. Contribution from U.S.	1,879,636	
Special contribution pension U.S.A.	162,852	
Sub total	4,084,976	
C. Carry-over from prior year	1,057,561	(Note)
D. Interest	32,000	
E. Other income	185,000	
F. Total Income	5,359,537	
2 EXPENDITURES		
A. 1. Permanent salaries and benefits	2,888,750	
2. Unfunded pension liability payments	325,704	
2. Temporary salaries and benefits	261,152	
3. Total salaries and benefits	3,475,606	
B. Travel	97,396	
C. Rents, communications, utilities	199,913	
D. Contractual services	754,940	
E. Supplies and materials	49,629	
F. Transfer to CARRF (equipment)	223,000	
G. Total Expenditures	$4,800,484	
3 BALANCE (DEFICIT)	$559,053	

(Note) This was the forecasted General Fund surplus for 2017/2018 at the time the budget was prepared. The actual surplus, per audited financial statements was $1,304,734 at the end of 2017/2018.

Appendix E

Pacific Salmon Commission Secretariat Staff as of March 31, 2019

EXECUTIVE OFFICE

John Field
Executive Secretary

Teri Tarita
Records Administrator/Librarian

Kimberly Bartlett
Meeting Planner

Julie Ehrmantraut
Administrative Assistant

John Son
Information Technology Manager

FINANCE & ADMINISTRATION

Ilinca Manisali
Director of Finance

Angus Mackay
Manager, Restoration & Enhancement Funds

Witty Lam
Senior Accountant

Victor Keong
Program Assistant, Restoration & Enhancement Funds

Koey Lu
Accountant

Christina Langlois
Administrative Assistant, Restoration & Enhancement Funds

FISHERY MANAGEMENT

Mike Lapointe
Chief Biologist

Catherine Michielsens
Director, Modelling and Data Management

Catherine Ball
Scale Lab Technician

Merran Hague
Quantitative Fisheries Biologist

Eric Taylor
Test Fishing Biologist

Fiona Martens
Director, Coordination and Stock Identification

Yunbo Xie
Hydroacoustics Scientist

Steve Latham
Manager, Stock Identification

Cory Lagasse
Manager, Hydroacoustic Operations

Erica Jenkins
Director of Stock Monitoring

Jacqueline Nelitz
Hydroacoustic Technician

Maxine Forrest
Manager, Scale Lab

Mike Bartel-Sawatzky
Hydroacoustic Technician

Julie Sellars
Scale Analyst

Mark McMillan
Database Manager (term)

Angela Phung
Salmon Data Technician

Pasan Samarasin
Stock ID Biologist

Appendix F

Membership Lists for Standing Committees, Panels, Joint Technical Committees and other Appointments as of March 31, 2019

1. STANDING COMMITTEE ON FINANCE AND ADMINISTRATION

Ms. Bonnie Antcliffe (Chair)
Mr. Randy Atwal
Mr. Derek Mahoney
Ms. Rebecca Reid
Ms. Kirsten Ruecker

Mr. W. Ron Allen (Vice-Chair)
Ms. Alison Agness
Mr. William F. Auger
Ms. Natalie Howard
Ms. Christine Mallette
Mr. Mike Matylewich

Staff

Mr. John Field (ex. Officio)

Editorial Board

Ms. Alison Chang

Ms. Patti Vandetta

2. FRASER PANEL

Ms. Jennifer Nener (Chair)
Mr. Chris Ashton
Mr. Mike Griswold
Mr. Ken Malloway
Mr. Rob Morley
Mr. John Murray

Ms. Lorraine Loomis (Vice-Chair)
Mr. James Dixon
Mr. Kirt Hughes
Mr. Robert F. Kehoe

FRASER RIVER PANEL - ALTERNATES

Mr. Les Jantz
Mr. Brent McCallum
Mr. Tony Roberts Jr.
Mr. Les Rombough
Mr. Peter Sakich
Mr. Marcel Shepert

Mr. Ronald G. Charles
Mr. Aaron Dufault
Mr. Jack R. Giard
Ms. Peggy Mundy

3. SOUTHERN PANEL

Dr. Laura Brown (Chair)
Dr. Don Hall
Mr. John Legate
Mr. Jeremy Maynard
Mr. Laurie Milligan
Ms. Laurie Peterson (Vice-Chair)
Mr. Burnie Bohn
Mr. Jeromy Jording
Mr. Mark Newell
Mr. Joseph Oatman
Mr. Terry R. Williams

SOUTHERN PANEL - ALTERNATES

Mr. Rod Cootes
Mr. Michael Baird
Ms. Mara Maxwell
Ms. Marilyn Murphy
Mr. Gordon Sterritt
Mr. Phil Young
Ms. Denise Hawkins
Dr. Annette Hoffmann
Mr. Edward Johnstone
Mr. Chris Kern
Mr. Joseph C. Peters
Mr. Aldrich J. (Butch) Smith

4. NORTHERN PANEL

Ms. Sandra Davies (Chair)
Mr. Chris Cue
Mr. Tom Protheroe
Ms. Joy Thorkelson
Mr. Mike Wells
Mr. Glen Williams
Mr. Lowell Fair (Vice-Chair)
Mr. Clay Bezenek
Mr. Dennis Longstreth
Mr. Robert D. Mecum
Mr. Tom Ohaus
Mr. Robert M. Thorstenson

NORTHERN PANEL - ALTERNATES

Mr. Stuart Barnes
Mr. Ronald (George) Cuthbert
Ms. Sandra Davies
Mr. Rick Haugan
Mr. Greg Knox
Chief Harry Nyce Sr.
Mr. John Carle
Mr. Mitchell Eide
Mr. Tom Fisher
Dr. Peter Hagen
Mr. Andrew Piston
Mr. Cole Wilburn

5. TRANSBOUNDARY PANEL

Mr. Steve Gotch (Chair)
Mr. Keith Carlick
Mr. Richard Erhardt
Ms. Cheri Frocklage
Ms. Jennifer Gould
Mr. Lawrence Joe
Mr. Chris Kendel
Mr. Wolf Riedl
Mr. John Ward
Dr. John H. Clark (Vice-Chair)
Mr. Brennon Eagle
Mr. Arnold Enge
Dr. Peter Hagen
Mr. Brian L. Lynch
Mr. Patrick Robbins
Mr. Russell Thomas

6. STANDING COMMITTEE ON SCIENTIFIC COOPERATION

Dr. Carmel Lowe (Chair)
Ms. Lesley MacDougall
Mr. Alex C. Wertheimer (Vice-Chair)
Dr. Jeffrey J. Hard

7. NORTHERN FUND COMMITTEE

Mr. Steve Gotch (Co-Chair)
Mr. John McCulloch
Dr. Carmel Lowe
Mr. William F. Auger
Mr. Robert D. Mecum

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. Gayle Brown (Co-Chair)
Mr. Richard Bailey
Ms. Sabrina Crowley
Mr. Michael Folkes
Ms. Dawn Lewis
Mr. Chuck Parken
Dr. Teresa Ryan
Dr. Antonio Velez-Espino
Mr. Ivan Winther
Ms. Catarina Wor
Mr. John Carlile (Co-Chair)
Mr. Jonathan Carey
Mr. Ethan Clemons
Mr. Tim Dalton
Dr. Derek Dapp
Mr. Brian Elliott
Ms. Danielle Evenson
Mr. Gary R. Freitag
Mr. Tommy Garrison
Mr. Andrew Gray
Mr. Steve Haeseker
Mr. Grant Hagerman
Ms. Galen Johnson
Mr. Edgar Jones
Mr. David Leonard
Ms. Marianne McClure
Dr. Gary S. Morishima
Mr. John Nichols
Mr. Randy Peterson
Ms. Anne Reynolds
Dr. Kristen Ryding
Mr. Rishi Sharma
Mr. William Templin

10. JOINT TECHNICAL COMMITTEE ON COHO

Dr. John Holmes (Co-Chair)
Mr. Roger Dunlop
Mr. Peter Nicklin
Ms. Lynda Ritchie
Mr. Joel Sawada
Ms. Mary Theiss

Dr. Gary S. Morishima (Co-Chair)
Ms. Carrie Cook-Tabor
Ms. Angelika Hagen-Breaux
Mr. Craig Foster
Mr. Jeff Haymes
Dr. Diego Holmgren
Mr. Andy Rankis
Dr. Rishi Sharma
Dr. Laurie Weitkamp
Ms. Mara Zimmerman

(**Northern Coho**)

Ms. Michele Masuda
Mr. Leon D. Shaul

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

Ms. Kathryn Fraser (Co-Chair)
Mr. Nicholas Komick
Ms. Brenda Ridgway

Mr. George Nandor (Co-Chair)
Mr. Gabriel T. Garza
Mr. Gilbert Lensegrav
Mr. Ken Phillipson

13. FRASER RIVER PANEL TECHNICAL COMMITTEE

Mr. Jamie Scroggie (Co-Chair)
Ms. Kelsey Campbell
Ms. Sue Grant
Mr. Anna Magera
Mr. Mike Staley

Mr. Robert Conrad (Co-Chair)
Dr. Marisa Litz
Ms. Peggy Mundy

14. NORTHERN BOUNDARY TECHNICAL COMMITTEE

Mr. Steve Cox-Rogers (Co-Chair)
Ms. Charmaine Carr-Harris
Mr. Mark Cleveland
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
Mr. Scott Walker

15. SELECTIVE FISHERY EVALUATION COMMITTEE

Dr. Rob Houtman (Co-Chair)
Ms. Cheryl Lynch
Mr. Joel Sawada

Dr. Kristen Ryding (Co-Chair)
Ms. Jill Cady
Mr. Robert Conrad
Ms. Carrie Cook-Tabor
Ms. Danielle Evenson
Mr. Ryan Lothrop
Ms. Marianne McClure
Dr. Gary S. Morishima
Mr. George Nandor
Mr. Ron Olson
Dr. David Stormer
Ms. Michelle A. Varney
Ms. Lorraine Vercessi

16. TRANSBOUNDARY TECHNICAL COMMITTEE

Mr. Bill Waugh (Co-Chair)
Mr. Ian Boyce
Mr. Richard Erhardt
Ms. Bonnie Huebschwerlen
Mr. Johnny Sembsmoen
Mr. Sean Stark
Dr. Paul Vecsei

Mr. Edgar Jones (Co-Chair)
Ms. Sara Gilk-Baumer
Ms. Julie Bednarski
Mr. Scott Forbes
Mr. David Harris
Mr. Rick Hoffman
Mr. Phil Richards
Mr. Troy Thynes
Ms. Jeffrey Williams

ENHANCEMENT SUB-COMMITTEE

Mr. Corino Salomi (Co-Chair)
Mr. Sean Collins
Mr. Richard Erhardt
Ms. Cheri Frocklage
Mr. Garold Pryor (Co-Chair)
Mr. Eric Prestegard
Mr. Lorraine Vercessi
Mr. Scott Vulstek

17. JOINT CHINOOK INTERFACE GROUP

Mr. Paul Sprout (Co-Chair)
Mr. John McCulloch
Dr. Brian E. Riddell
Mr. Phil Anderson
Mr. McCoy Oatman

18. NATIONAL CORRESPONDENTS

Ms. Alison Chang
Ms. Patti Vandetta