



Executive Secretary's Summary of Decisions  
Fall Meeting  
October 18-21, 2021 (online)

The Pacific Salmon Commission held its Fall Meeting from October 18-21, 2021 via webinar and discussed a number of topics (see attached agenda).

The Commission AGREED:

1. The draft agenda is adopted after striking items 5b and 13.
2. The minutes from May 2021 are approved as circulated.
3. The final 2020 post-season reports are accepted.
4. The recommendations of the Chinook Interface Group (CIG) are approved as shown in the CIG report modified during Commission discussion. This includes:
  - a. Withdrawing attachment 5 from the current CIG briefing book.
  - b. Reviewing the incidental mortality (IM) report in November 2021 and adding it to the agenda for the January post-season meeting.
  - c. Updating the language on proprietary information in the data request form, as well as some editorial updates.
  - d. Addressing the Phillips River indicator stock item at the CIG meeting during the January post-season meeting.
  - e. Approving the 2021/2022 CTC workplan with the addition of the following task to be reviewed with the CIG at the post-season meeting in January and directing the CIG to revisit the CTC workplan relative to this task as needed:
    - i. Update the September 30, 2020 CTC document *COVID-19 Impacts on Chapter 3 of the Pacific Salmon Treaty Implementation* with any changes to previously reported 2020 activities and an initial review of 2021 COVID-related responses. Where changes were made to standard practices include detail about the normal practice and the deviation that was implemented.
  - f. Supporting the Mark-Selective Fisheries Fund Committee's recommendations for funding three projects in its inaugural year.
5. The recommendations from the MSF Fund Committee are approved as submitted.
6. The report from the Management Entities Workgroup is accepted.
7. All Panel and Committee work plans are accepted as submitted, noting:
  - a. The January 2022 post-season meeting will be moved from Portland to Vancouver, and the Secretariat will work with Panel and Committee leadership to ensure adequate arrangements for hybrid (in-person/virtual) meetings.
  - b. The CTC work plan has been modified by the CIG at this meeting.

- c. Panel and Committee leaders should submit any known meeting plans for November 2022 during their February 2022 reports to the Commissioners.
  - d. The Northern Panel implementation plan for amended Chapter 2 will be agreed bilaterally and submitted for Commissioners' consideration.
- 8. The F&A Committee report is accepted as submitted.
- 9. The CSC Liaison Group will continue to guide development of the CSC's 2022 work plan, including clarification of the GSI issues raised by the Endowment Fund Committees.
- 10. The slate of officers for 2021/2022 is approved.

ATTENDANCE

PACIFIC SALMON COMMISSION  
Fall MEETING  
October 18-21, 2021  
Via Webinar

COMMISSIONERS

CANADA

R. Reid (Chair)  
R. Jones  
J. McCulloch  
M. Ned  
M. Paish  
B. Riddell

UNITED STATES

D. Vincent-Lang (Vice Chair)  
W.R. Allen  
P. Anderson  
W. Auger  
R. Klumph  
D. Moore  
M. Oatman  
S. Rumsey



**Fall Meeting  
October 18-22, 2021  
via webinar**

1. Adoption of Agenda
2. Approval of minutes: May 4, 2021 webinar
3. Introduction of new Commissioners
4. Executive Secretary's Report

**Action Items Pending**

5. Adoption of final 2020 post-season reports
  - a. Finalization of January 2021 data and reports
  - b. Northern Panel Coho and Pink Salmon reports
6. Chinook issues and CIG report
  - a. Annual PSC Chinook Model calibration update
  - b. CYER update (Indirect Methods Report review and Mark-Selective Fisheries Implementation discussion)
  - c. Incidental mortality Data Standards assignment update
  - d. Data Request Proposal
  - e. Update on the Phillips River Indicator Stock
  - f. CTC work plan 2021/2022
  - g. Okanagan Chinook Work Group work plan 2021/2022



h. Update on CTC progress on evaluating COVID impacts to the PSC chinook model

7. Mark-Selective Fisheries Fund
8. Report from Management Entities Work Group
9. Update on Canada's Pacific Salmon Strategy Initiative

**Panels, Committees, and Working Groups**

10. Presentation of Panel/Committee annual work plans, including status of tasks in 2019 chapter implementation plans
11. F&A Committee
12. CSC Liaison Group
13. CEII/CWTR Working Group, as appropriate
14. Instructions to Panels and Committees

**Other Business**

15. Approval of officers for 2021/22
16. Moment of Silence for Lorraine Loomis
17. Public comments as needed

**Annotated agenda**  
**October 2021 Fall Meeting**

1. Adoption of Agenda

- *Consistent with PSC bylaws, an agenda shall be adopted by the Commission at the start of each meeting. The Commission shall not ordinarily take a decision on any item that has not been included in the draft agenda for the meeting. Where circumstances warrant, supplementary decision items may be added to the agenda with the concurrence of each National Section.*

2. Approval of minutes: May 4, 2021 webinar

- *The Parties received the draft minutes via email on June 17, 2021.*

3. Introduction of new Commissioners

- *Mr. David Moore (USA, replacing Staci MacCorkle) joined the Commission since its last meeting. The Vice-Chair will introduce and welcome him to the table.*

4. Executive Secretary's Report

- *The Executive Secretary will provide a report on significant events since the last Commission meeting, "housekeeping" items for the current meeting, and other issues needing attention.*
- *For the present meeting, the report will address the pending PICES/PSC MOU and status of Commission deliverables under the revised Annex IV chapters (see updated Implementation Plan in briefing book). Panel/Committee Annex IV deliverable status will be addressed under agenda item 10.*

**Action Items Pending**

5. Adoption of final 2020 post-season reports

- *Preliminary 2020 post-season reports were adopted at the January 2021 Post-Season meeting.*
- *Final post-season reports are due Oct. 1 each year (covering the previous calendar year) and thus ready for adoption at each Fall Meeting.*
- *This agenda item will also address outstanding reports from the Northern Panel on coho triggers and the District 104 pink salmon pattern analysis.*

6. Chinook issues and CIG report

- *The CIG will meet in the margins of the Fall Meeting and provide a report on all seven topics listed.*

7. Mark Selective Fisheries Fund

- *Consistent with its Terms of Reference, the MSF Fund Committee will recommend projects for financing in 2022. The Commission has the responsibility to review these recommendations and approve any projects it deems appropriate.*

8. Report from the Management Entities Work Group

- *The Commission formed the work group in January 2021 to build on the successes of the February 2019 meeting with management entity representatives. In February 2021, the Commission directed the group to explore options for engaging management entities and make recommendations to the Commission in October 2021.*
- *The work group met several times in 2021 and will report on its deliberations.*

9. Update on Canada's Pacific Salmon Strategy Initiative

- *The Canadian Section will summarize the initiative and its future.*

## **Panels and Committees**

10. Presentation of annual work plans

- *As per normal practice, Panels and Committees will submit work plans for October 2021-September 2022. These work plans follow a standard format and specify tasks, timelines, and meeting schedules for the next work period.*
- *These workplans will also include updated versions of the Panels/Committees' implementation plans for Annex IV amendments.*
- *The Selective Fisheries Evaluation Committee (SFEC) report may also address the pending issue from October 2020 and February 2021 regarding agency calculation of mortalities in MSF's, and any necessary amendments to the 2004 MOU.*
- *Work plans must specify the number of days, dates and location of proposed meetings. Work plans that do not include these details should be referred back for completion.*
- *Where proposed meetings would not include the full attendance of a Panel or Committee, the work plan should specify the number of attendees anticipated.*

11. F&A Committee report

- *The Committee will have met in September 2021 and will update the Commission on PSC lessons learned from COVID-19, policy for public observers at PSC meetings, and Secretariat workforce planning.*

12. CSC Liaison Group

- *In February 2020, the Commission adopted a revised process for CSC work plan development. This included creation of a four-Commissioner liaison group to prioritize CSC tasks.*
- *The liaison group met with the CSC in 2021 and will update the Commission on its deliberations.*

13. CEII/CWTR Working Group

- *The Commission approved Terms of Reference for this group in October 2020 and confirmed membership in February 2021. Its purpose is to guide implementation of Annex IV, Chapter 3, paras 2(c) and 2(d).*
- *The group will update the Commission as appropriate on its work to date.*

14. Instructions to Panels and Committees

- *The Commission is invited to specify which work plans are adopted, which require revision, and any other instructions to the Panels and Committees.*
- *To facilitate venue booking, Panels and Committees should be instructed to submit any plans for November 2022 meetings by the end of the February 2022 PSC meetings.*

**Other Business**

15. Approval of officers for 2021/22

- *The National Sections have pre-populated a slate of officers to serve from the close of the current meeting until the close of the October 2022 Fall Meeting. The Commission is invited to consider this slate for adoption.*

16. Moment of Silence for Lorraine Loomis

- *Ms. Loomis, an esteemed and long-serving member of the U.S. Section, passed away on August 10. She participated in the PSC process for decades and dedicated her life to the advancement of fisheries management, Swinomish Tribal rights, and the promotion of co-management in the United States.*

17. Public comments as needed

- *When appropriate, and with the concurrence of the Vice-Chair, the chair may provide time for public visitors to speak during the meeting.*

2019-2028 Pacific Salmon Commission and Party tasks identified in amended Annex IV:

Chapters 1, 2, 3, 5, and 6<sup>1</sup> in chronological order

Prepared by the Executive Secretary and national representatives (updated 9/20/2021)

Deadline	Chapter/para	Task (emphasis added)	Status
January 2019 – December 2028	Chapter 3, paragraph 2(c)	<p><b>[The Parties shall] implement through their respective domestic management authorities, a 10-year Chinook salmon CWT&amp;R program that begins in 2019 that provides timely data to implement this Chapter via improvements and studies designed to achieve CTC and CWT work group data standards and guidelines .</b></p> <p>The purpose of the CWT&amp;R program shall be to:</p> <p>(i) maintain and improve the precision and accuracy of critical CWT- based statistics used by the CTC and Selective Fisheries Evaluation Committee (SFEC) in support of this Chapter,</p> <p>(ii) accelerate the processing of CWT data to provide CWT data for the pre-season planning process,</p> <p>(iii) increase the number of exploitation rate indicator stocks to represent Chinook production and fishery exploitation rates for escapement indicator stocks,</p>	Ongoing: Addressed through TOR for CEII-CWT/R working group

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<sup>1</sup> This table summarizes new tasks identified for the Parties or the Commission under amended chapters 1, 2, 3, 5, and 6 in Annex IV. It does not include tasks that are conditional (e.g., if a fishery's limit is exceeded, then the Commission reviews and recommends remedial action), nor does it include routine management actions (e.g., pre-season run forecast delivery, sample collection schedules, means to achieve quota share, etc.). This summary does not address tasks assigned to Panels and Committees, which will be addressed through implementation plans developed by the relevant Panels/Committees and due to the Commission at the January 2019 Post-Season meeting.

		<p>(iv) examine the representativeness of exploitation rate indicator stocks for escapement indicator stocks and CWT model stocks, and</p> <p>(v) develop analytical tools that involve the analysis of CWT data in the implementation of this Chapter;</p>	See above
January 2019 – December 2028	Chapter 3, paragraph 2(d)	<p><b>[The Parties shall] implement through their respective domestic management authorities, a 10-year Chinook salmon CEII program that begins in 2019 that provides timely data to implement this Chapter via objective and repeatable methodologies in data limited situations and in others via improvements and studies designed to achieve CTC data standards, guidelines, and analysis schedules.</b> The purpose of the CEII program includes the development of analytical tools that involve catch and escapement data in the implementation of this Chapter...</p>	Ongoing: Addressed through TOR for CEII-CWT/R working group
February 2019	Chapter 1, Paragraph 3(a)(iii).	Increase CWT tag rates for Stikine River Chinook salmon to achieve CTC indicator stock standards.	Addressed in TBR Panel implementation plan
February 2019	Chapter 1, Paragraph 3(b)(iii).	Increase CWT tag rates for Taku River Chinook salmon to achieve CTC indicator stock standards.	Addressed in TBR Panel implementation plan
February 2019	Chapter 3, Appendix A, paragraph 14	<b>The Commission shall receive the model improvements from Phase 2 and make a decision about their implementation.</b>	Complete January 16, 2020 with adoption of revised Tables 1-2 and Appendix C

October 2019	Chapter 3, paragraph 5(b)	<p><b>The Parties agree that for the Chapter Period:</b></p> <p><b>b) the Commission shall establish a work group to explore issues related to Okanagan Chinook, including the establishment of management objectives, enhancement and the possible use of Okanagan Chinook as an indicator stock. The work group shall report to the Commission by October 2019.</b></p>	Work group formally created October 2019
December 2019	Chapter 3, paragraph 2(e)	<p><b>[The Parties shall] create and maintain a work group to discuss the programs initiated in sub-paragraphs (c) and (d)<sup>2</sup> by 2020.</b> The work group shall:</p> <p>(i) create opportunities for the exchange of project results and conclusions, advancements in knowledge, and discussion of the direction of these programs between the Parties, management entities, and knowledgeable individuals;</p> <p>(ii) review project results and conclusions from these programs and provide these reviews to the project proponents and the Commission; and</p> <p>(iii) identify, for the Commission, changes to projects or suggest new projects to fill gaps in knowledge.</p>	Ongoing: Addressed through TOR for CEII-CWT/R working group
c. February 2020	Chapter 1, paragraph 3(b)(i)(B)	<b>The Parties shall develop a joint technical report and submit it through the Parties' respective review mechanisms with the aim of establishing a bilaterally approved maximum sustainable yield (MSY) goal for Taku River sockeye salmon prior to the 2020 fishing season.<sup>3</sup></b>	Completed May 21, 2020; confirmed by PSC July 2020
c. February 2020	Chapter 1, paragraph 3(b)(i)(C)	The Taku River sockeye salmon assessment program will be reviewed by two experts (one selected by each Party) in mark-recovery estimation techniques. <b>The Parties<sup>4</sup> shall instruct these experts to make a joint recommendation to the Parties concerning improvements to the existing program including how to address inherent mark-recovery assumptions with an aim to minimize potential bias prior to the 2020 fishing season.</b>	Completed May 21, 2020; confirmed by PSC July 2020
February 2020	Chapter 3, paragraph 4(c)(i)	<b>The CTC shall recommend standards for the desired level of precision and accuracy of data required to estimate incidental fishing mortality by February 2020.</b> The Commission will consider the recommendation of the CTC regarding standards for the desired level of precision and accuracy of data required to estimate incidental fishing mortality.	Ongoing. Ad hoc IM Work Group expected to publish report by 10/31/21

<sup>2</sup> The CWT&R and CEII programs. <sup>3</sup> It is not specified if the Parties will be acting through the TBR Panel or otherwise. <sup>4</sup> It is not specified if the Parties will be acting through the TBR Panel or otherwise.



January 2022	Chapter 2, introduction	<b>By the Commission post season meeting in January 2022, the Parties will have completed a review of the performance of the provisions in this Chapter.</b> The review will identify management actions taken to support conservation of Nass River and Skeena River sockeye, evaluate the consistency of those actions with Chapter 2 obligations and outline, where feasible, the benefit of those actions for those populations.	Planning underway in Northern Panel
January 2022	Chapter 3, paragraph 2(b) footnote	The model configuration from March 2018 (CLB1804) shall be used to establish a baseline run. <b>The Parties shall document specific concerns or inconsistencies between that configuration and the management regime in 2018. The Parties agree that in order to complete this documentation, the Commission shall direct the CIG to work with the CTC to develop a draft outline on how to document specific concerns or inconsistencies between that configuration and the management regime in 2018. The Commission will review this draft outline and direct the CTC how to prepare the report.</b>	
January 2022, 2025, 2028	Chapter 5, paragraph 11(b)	Each Party may: request additional reductions in ERs to meet critical conservation concerns not adequately addressed by the ER caps. The Southern Panel shall develop bilateral guidance to indicate how this could be implemented in a responsible and timely manner during a Party's domestic preseason planning. <b>The guidance shall also include steps and timelines for communication with Commissioners. This process will require Commission approval before implementation</b>	
January 2022, 2025, 2028	Chapter 5, paragraph 11(c)	Any party may request increases in the MU-specific ER caps determined under paragraphs 9(b) to (d) if the Party can demonstrate that the ER caps prevent it from accessing its own stocks to meet its fishery management objectives or from harvesting other allocations provided under this Treaty. The Southern Panel shall develop bilateral guidance to indicate how this could be implemented in a responsible and timely manner during a Party's domestic preseason planning. <b>The guidance shall also include steps and timelines for communication with Commissioners. This process will require Commission approval before implementation</b>	

January 2022, 2025, 2028	Chapter 5, paragraph 12	<p><b>The Parties shall review this Plan no later than three years after this Chapter enters into force and every three years after that date, unless otherwise specified by the Southern Panel.</b> The review shall include an assessment of the effectiveness of this Plan in achieving the management objectives of the Parties and any other issues either Party wants to raise, including, but not limited to:</p> <p>(a) whether the ER caps established under paragraphs 9(b) to (d) have prevented either Party from accessing its own stocks to meet its fishery management objectives or from harvesting other allocations that are provided under this Treaty; and</p> <p>(b) issues associated with the procedures and methods employed to estimate and account for total coho mortalities, including those incurred in mark-selective fisheries.</p> <p><b>The Parties shall modify this Plan, if necessary, based on the review and the need to incorporate results of bilateral technical developments</b> (e.g., to establish criteria to define MUs and to biologically determine allowable ERs, to develop a common methodology for measuring ERs in Canadian and U.S. fisheries, development of bilateral management planning tools, etc.).</p>	
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January 2022	Chapter 2, paragraph 10	Canada agrees to complete a comprehensive escapement goal analysis (prior to the 2023 fishing season) for Nass and Skeena river sockeye salmon that shall be peer-reviewed by an independent contractor and then submitted to the Committee and Northern Panel for further review.	
January 2022	Chapter 2, paragraph 12	The U.S. agrees to complete a harvest pattern analysis of the pink salmon fishery in District 104 salmon that shall be peer-reviewed by an independent contractor and then submitted to the Committee and the Northern Panel for further review.	Pending Commission review Oct. 2021
January 2022	Chapter 2, paragraph 14	The Committee shall review the sockeye run reconstruction model to provide recommendations to the Northern Panel at or before the January 2022 Commission post-season meeting, regarding the creation of a simpler run reconstruction model using genetic data and to provide recommendations on any improvements to the program, if needed.	
c. December 2022	Chapter 3, paragraph 5(e)	<b>The Commission shall use the Calendar Year Exploitation Rate (CYER) metric to monitor the total mortality in ISBM fisheries and shall review the CYER metric during the year 2022 to make a decision on its continued application or the use of an alternative metric.</b> In the absence of a Commission decision to use an alternative metric, the use of the CYER metric continues.	CTC will address this through 2021/2022 workplan

c. January 2023, c. January 2026	Chapter 3, paragraphs 7(d-e)	<p><b>(d) [The Parties agree] to conduct up to two reviews of the CPUE-based approach to decide whether to continue to use this method to determine the catch limit for the SEAK AABM fishery, to return back to use of the Commission Chinook model, or to adopt an alternative method as determined by the Parties, to determine pre-season estimates of the aggregate AI of Chinook stocks available to the SEAK troll fishery and the relationship between the catch and AIs specified in Table 1.</b> The first review shall occur as soon as practical after the 2022 first post-season AI is calculated and the second review shall occur as soon as practical after the 2025 first post-season AI is calculated. The Commission decision shall be based on the outcome of:</p> <p>(i) a comparison of cumulative actual catch and the cumulative post- season catch limit from the Commission Chinook model,</p> <p>(ii) a comparison of the cumulative performance of the CPUE-based catch limit and the pre-season catch limit from the Commission Chinook model to predict the catch limit estimated from the first post-season calibration of the Commission Chinook model (model error), and</p> <p>a comparison of the abundance tier selected by use of the CPUE method and the abundance tier that is selected by use of the pre-season calibration of the Commission Chinook model with the abundance tier selected from the first post-season calibration derived from the Commission Chinook model;</p> <p><b>(e) to consider the results of reviews described in sub-paragraph (d), immediately, and decide whether to continue to use the CPUE method for the SEAK AABM fishery.</b> Unless the Commission decides to continue to use the CPUE-based approach or adopt an alternative method, the Commission Chinook model estimate of the AI and Table 1 shall be used to determine the annual pre-season and post-season catch limits;</p>	CTC forming ad hoc work group to outline task in 2021/2022. Review to begin in March 2023, after 2022 post-season AI's available c. 4/1/23.
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January 2023	Chapter 3, paragraph 7(h) and Appendix A paragraph 13	<b>The Commission will consider the draft outline of the five-year review provided by the CTC and will provide direction on how to proceed with preparing the report.</b>	CTC to develop outline in June 2022, forming ad hoc work group to address task
December 2023	Chapter 1, paragraph 3(a)(ii)	The Parties shall develop and implement an abundance-based approach to managing coho salmon on the Stikine River. Assessment programs need to be further developed before a biologically based escapement goal can be established. <b>By 2024, the Parties shall review the progress on this obligation.</b>	
c. December 2023	Chapter 1, paragraph 5	<b>The Parties shall review midway through the Chapter Period, or other time mutually decided by the Parties, the current Chapter and determine if they want to renew this Chapter for an additional period of time.<sup>5</sup></b>	
By December 2024	Chapter 1, paragraph 3(a)(i)(c). Appendix to Annex IV, Chapter 1	<b>Expand and initiate new bilateral sockeye salmon enhancement programs in the Canadian portion of the Stikine River watershed.</b>	
January 2025	Chapter 3, paragraph 7(h)	... In January 2025, <b>the Commission shall review the report [from the CTC on its 5-year review] to identify any appropriate modifications to this Chapter to improve its implementation.</b>	CTC developing 5-year outline by June 2022, ready for CIG review Jan. 2023.
December 2026	Chapter 2, paragraph 5	<b>The Parties agree to review<sup>6</sup> Annex IV, Chapter 2, a minimum of two years prior to its expiration with a view to renewing it.</b> If such renewal is not successfully concluded prior to the expiration date, then overages and underages must be carried forward to the next Chapter period.	

<sup>5</sup> Chapter does not specify how this review will be conducted, including the respective roles of the Commission and TBR Panel.

<sup>6</sup> Chapter does not specify how this review will be conducted, including the respective roles of the Commission and the Northern Panel.

Unspecified	Chapter 1, paragraph 7	<p>the Parties<sup>7</sup> shall consult with a view to developing, for the transboundary sections of the Columbia River, a more practicable arrangement for consultation and setting escapement targets than those specified in Article VII, paragraphs 2 and 3. Any such arrangement is intended to inter alia:</p> <p>(a) ensure effective conservation of the stocks;</p> <p>(b) facilitate future enhancement of the stocks as jointly approved by the Parties;</p> <p>(c) avoid interference with United States management programs on the salmon stocks existing in the non-transboundary tributaries and the main stem of the Columbia River.</p>	Ongoing since October 2019 through establishment of the Okanagan Work Group
Unspecified (2019 to December 2028)	Chapter 1, paragraph 3(b)(i)(h). Appendix to Annex IV, Chapter 1	Expand and initiate new bilateral sockeye salmon enhancement programs in the Canadian portion of the Taku River watershed.	TBR Panel addressing through its implementation plan
Unspecified (2020 to December 2028)	Chapter 1, paragraph 2 & paragraph 3(c)	Develop and implement an abundance-based management regime for Chinook and Sockeye salmon in the Alsek River.	TBR Panel addressing through its implementation plan
Unspecified	Chapter 3, Appendix A, paragraph 14	<b>The Commission shall receive the model improvements from Phase 3 and make a decision about their implementation.</b>	CTC developing work group for Phase 3 improvements.

<sup>7</sup> It is not specified how this consultation will be conducted, including the respective roles of the Commission and TBR Panel.

Ongoing	Chapter 3, paragraph 4(a-d)	<p>The Parties agree:</p> <p>(a) <b>to monitor and manage incidental fishing mortality in AABM fisheries</b> with the intent of not exceeding levels as specified in paragraph 4(f) during the Chapter Period;</p> <p>(b) that landed catch and incidental mortalities in ISBM fisheries are limited according to paragraph 5;</p> <p>(c) <b>to provide estimates of incidental mortality of Chinook salmon in all ISBM and AABM fisheries.</b> ISBM fisheries have total mortality constraints (catch plus associated incidental mortality) while AABM fisheries have catch limits.</p> <p>The CTC shall recommend standards for the desired level of precision and accuracy of data required to estimate incidental fishing mortality by February 2020 [see Commission task above];</p> <p>(d) <b>to provide estimates of encounters of Chinook released in fisheries that, when multiplied by assumed gear-specific mortality rates, provide estimates of incidental mortality that are used in sub-paragraph (c).</b> These estimates:</p> <p>(i) shall be developed by the Parties annually from direct observation of fisheries, or</p> <p>(ii) shall be calculated from a predictable relationship between encounters and landed catch based on a time series of direct observations of fisheries reviewed by the CTC;</p>	<p>Paras c and d estimates presented in TCCHINOOK 21-05 and 21-04.</p> <p>CTC recommendations on standards for precision and accuracy pending Oct. 31, 2021</p>
Ongoing	Chapter 3, paragraph 4(g)(v)	<p>...subject to the availability of funds, the U.S. shall establish a Mark Selective Fishery Fund (Fund). <b>The Fund shall be administered by the Commission</b> to assist fishery management agencies with equipment and operations, as needed, to mass-mark hatchery produced Chinook salmon, to estimate incidental mortality, and to maintain and improve the ability to estimate exploitation rates on Chinook salmon indicator stocks that are encountered in MSF, including improvements and development of bilateral analytical tools. <b>The Commission shall adopt procedures to solicit proposals</b> from U.S. and Canadian management entities for the use of the Fund, be advised on the merits of proposals by specialists as it determines appropriate, and make funding decisions.</p>	<p>MSF Fund and committee established Oct. 2020</p>

Ongoing	Attachment E, paragraph 2	<p>The Parties request the Commission to:</p> <p>(a) maintain a page on its web site that documents citations, references, or links to publicly accessible information published by the Parties, management entities, or others related to the habitat protection and restoration projects and programs that are important to Pacific salmon stocks subject to this Treaty; and,</p> <p>(b) periodically review and discuss information on the habitat of naturally spawning stocks subject to this Treaty that cannot be restored through harvest controls alone, any non-fishing factors that affect the safe passage or survival of salmon, options for addressing non-fishing constraints and restoring optimum production, and progress of the Parties' efforts to achieve the objectives for the stocks under this Treaty.</p>	<p>Website update complete</p> <p>No scheduled reviews but CohoTC workshop on use of environmental indicators (5/11/21) is related to this effort.</p>
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# **POST-SEASON REPORT FOR THE 2020 CANADIAN TREATY LIMIT FISHERIES**



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# I INTRODUCTION

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The chapters in Annex IV of the Pacific Salmon Treaty outline the joint conservation and harvest sharing arrangements between Canada and the United States of America (U.S.) for key stocks and fisheries subject to the Treaty. In August 2018, the PSC recommended new provisions, under Annex IV of the PST, to the Governments of Canada and the U.S. for review and ratification. Both governments agreed to the provisional application of the new agreements as of January 1, 2019 while the ratification process was completed. Effective May 3, 2019, the Annex IV amendments came fully into force through the exchange of diplomatic notes between Canada and the U.S., and will remain in place for 10 years. Chapter 4 (Fraser River Sockeye and Pink) expired on December 31, 2019. In February 2019, agreement-in-principle was reached and the proposed amendments were referred to the Governments of Canada and the U.S. for review and ratification. Both governments agreed to the provisional application of the amendments as of January 1, 2020 while the ratification process is completed. The new amendments came into force in Spring 2020 and will remain in place for 9 years, bringing Chapter 4 into alignment with the five other fishing Chapters under the PST.

Annex fisheries are reported in the order of the Chapters of Annex IV. Fishery summaries include expectations and management objectives, escapements (where available and appropriate) and catch results by species. The focus is on those stocks and fisheries covered by the Pacific Salmon Treaty, and not all Canadian domestic salmon fisheries are covered in this document.

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 at this time. 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 catches from years 2004 to 2020 in Canadian fisheries that have at some time been under limits imposed by the Pacific Salmon Treaty. More detailed catch data is provided for the current year for commercial, recreational, First Nations, Excess Salmon to Spawning Requirements (ESSR) and test fisheries in Appendices 2 to 7.

## **2 TRANSBOUNDARY RIVERS**

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### **2.1 STIKINE RIVER**

Following the 2020 pre-season meeting of the Transboundary Panel, Canada developed its fishing strategy for Stikine River salmon fisheries based on the catch sharing and management arrangements outlined in PST Annex IV, Chapter 1. Canada's intent was to achieve the following objectives: 1) to harvest 47% of the total allowable catch (TAC) of Stikine River Sockeye Salmon in existing fisheries; 2) to allow additional harvesting opportunities for Sockeye Salmon that were surplus to spawning requirements; and 3) to harvest up to 5,000 Coho Salmon through a directed fishery. The pre-season forecast of 13,400 Chinook Salmon was well-below the Chapter 1 fishery forecast run size threshold of 24,500, and did not allow for a directed Canadian Chinook Salmon fishery. The 2020 Chinook salmon pre-forecast also resulted in the cancellation of the 2020 assessment fishery.

The 2020 Canadian Stikine River commercial fishing season opened on June 23 (statistical week 26) and ended September 12 (statistical week 37). The directed Sockeye Salmon fishery occurred between statistical weeks 26 through 33 while the directed Coho Salmon fishery occurred between statistical week 35 and 37. The exception to 2020 directed fishing periods was statistical week 34, during which no directed commercial fishery opportunity was provided due to low abundance of non-Tahltan Lake origin Sockeye Salmon.

Commercial fishing gear permitted for the 2020 season was limited to one 135-metre (443 ft.) gill net per licence holder. The maximum mesh size permitted was 140 mm (5.5") through August 9, followed by a maximum mesh size of 204 mm (8") beginning August 25. The lower Stikine commercial fishing zone covered the area from the international (U.S./Canada) border upstream to near the confluence of the Porcupine and Stikine Rivers, and also included the lower 10 km (6 mi.) reach of the Iskut River.

In the upper Stikine River commercial fishery, located upstream from the Chutine River, fishing periods generally mirrored those in the lower Stikine River commercial fishery, but lagged by one week. Each commercial fishery licence holder was permitted the use of one net. As in past years, the commercial fishing area was located upstream of the Chutine River to the mouth of the Tuya River. The Canadian First Nation Food, Social and Ceremonial (FSC) fishery located near the community of Telegraph Creek, British Columbia (BC) was active from June to the first week of August, with no time or gear restrictions imposed in 2020. To facilitate Chinook Salmon conservation, efforts were implemented within the First Nation FSC to minimize Chinook Salmon catch.

Canadian recreational fishery effort was effectively absent in 2020 due to area, retention, and size restrictions for the duration of the Chinook Salmon season. Recreational fishery effort for Coho Salmon was below average as a result of COVID-19 domestic and international travel restrictions.

#### **2.1.1 CHINOOK SALMON**

The pre-season forecast of 13,400 large Chinook Salmon developed by the Transboundary Technical Committee (TTC) did not provide for a total allowable catch allocation in 2020. The current, bilaterally recognized fishery management strategy specifies that a pre-season forecast run size of <24,500 precludes either Party from administering directed Chinook Salmon fisheries. As a result, specific fishery management measures

were implemented within all Canadian fisheries to minimize the likelihood of interception of Chinook Salmon in 2020.

The 2020 total Canadian fishery catch of Chinook salmon was 389 large Chinook salmon and 642 jacks (all of which occurred exclusively within the First Nation FSC fishery). This was well below the 10-year average of 2,100 large Chinook salmon and 900 jacks. No Chinook Salmon were harvested within the 2020 recreational or commercial fisheries as retention was prohibited.

The post-season estimate of the 2020 Stikine River Chinook Salmon terminal run was approximately 10,300 large Chinook Salmon. Accounting for the total Canadian catch of Chinook Salmon, the spawning escapement was estimated at approximately 9,800 large Chinook Salmon. The Chinook Salmon escapement estimate of 9,800 is 44% below the management objective of 17,400 large Chinook Salmon and did not achieve the lower end of the escapement goal range of 14,000.

### **2.1.2 SOCKEYE SALMON**

The forecast for Stikine River Sockeye Salmon as developed by the TTC was for a terminal run size<sup>1</sup> of 103,000 fish which was comprised of 64,000 Tahltan Lake origin Sockeye Salmon (30,000 wild and 34,000 enhanced) and 39,000 non-Tahltan wild Sockeye Salmon. The 2020 Stikine River Sockeye Salmon terminal run size forecast was below the 10-year average terminal run size of approximately 115,000 fish.

The total 2020 Canadian fishery harvest of Stikine River Sockeye Salmon was 11,872, well below the 10-year average of 44,000 fish. The lower Stikine River commercial fishery harvested 6,153 Sockeye Salmon while the upper Stikine River commercial and First Nation FSC fisheries harvested a total of 296 and 5,423 Sockeye Salmon respectively. The estimated portion of Canadian fishery Sockeye Salmon harvest originating from the Stikine Enhancement Production Program was approximately 6,400 fish (or 54% of the total harvest). The Sockeye Salmon assessment fishery accounted for an additional 1,497 Sockeye Salmon harvested.

A total of 11,158 Sockeye Salmon returned to Tahltan Lake in 2020. The Tahltan Lake Sockeye Salmon escapement goal range is 18,000 to 30,000 while the most recent 10-year average return is 26,500. An estimated 6,500 (58%) of Sockeye Salmon returning to Tahltan Lake in 2020 originated from the Stikine Enhancement Production Program. A total of 384 adult Sockeye Salmon were removed from Tahltan Lake as part of the 2020 Stikine Sockeye Enhancement Production Plan. No fish were removed for stock identification purposes and it is estimated that approximately 10,800 Sockeye Salmon spawned in Tahltan Lake 2020. The total estimated run size of 26,700 Tahltan Lake Sockeye Salmon was approximately 58% below the pre-season forecast of 64,000.

The spawning escapement for the non-Tahltan Lake Sockeye Salmon stock group is calculated using stock identification, test fishery and in-river commercial catch and effort data. The escapement estimate for 2020 was approximately 5,000 non-Tahltan Lake Sockeye Salmon. The non-Tahltan spawning escapement estimate was below the escapement goal range of 20,000 to 40,000 and below the 10 year average of 23,000 fish.

Based on the in-river run reconstruction of the Tahltan Lake Sockeye Salmon run expanded by run timing, along with stock identification data from lower river assessment projects and estimated harvests of Stikine River Sockeye Salmon in U.S. terminal gill net fisheries, the post-season estimate of the terminal Sockeye

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<sup>1</sup> Terminal run excludes U.S. interceptions that occur outside Districts 108 and 106.



Salmon run size is approximately 35,500 fish. This estimate includes 26,700 Tahltan Lake origin fish and 8,800 Sockeye Salmon of the non-Tahltan stock group. The 2020 Stikine River Sockeye Salmon run was below the 10-year average terminal run size of ~116,000 Sockeye Salmon and the preseason forecast of 103,000 fish.

Based on the post-season run size estimate, there was no allowable catch for Stikine River Sockeye Salmon in 2020. The total Canadian fishery harvest of Stikine River Sockeye Salmon in 2020 was 13,369.

### **2.1.3 COHO SALMON**

The total Canadian fishery harvest of Coho Salmon in 2020 was 5,103. Of the total harvest, 5,098 Coho Salmon were harvested during the directed fishery period between statistical weeks 35 to 37. The total Canadian fishery harvest was below the recent 10-year average of 5,500 fish.

A Coho Salmon test fishery was not conducted in 2020. The catch per unit effort (CPUE) observed in the targeted Coho Salmon fishery was near average for statistical weeks 35 to 37. Aerial surveys of the index spawning sites for Coho Salmon were not completed due to poor weather and viewing conditions.

### **2.1.4 JOINT SOCKEYE SALMON ENHANCEMENT PROGRAM**

4.4 million Sockeye Salmon eggs collected from Tahltan Lake, British Columbia in the fall of 2019 were hatched and reared at Snettisham Hatchery (Alaska) during the 2019/20 winter period. All fry were mass-marked at the Snettisham hatchery with thermally induced otolith marks. Green egg to released fry survival was approximately 75%. Approximately 500,000 fry reared at the Snettisham hatchery were culled due to Infectious Hematopoietic Necrosis virus (IHNV). Between May 27 and June 9, 2020 approximately 2.7 million emergent Sockeye Salmon fry were transported to Tahltan Lake for release.

For 2020, the agreed bilateral Stikine River Enhancement Production Plan (SEPP) identified an egg collection objective of 5.0 million Sockeye Salmon eggs from Tahltan Lake. In-season the 2020 Sockeye Salmon egg collection target was revised to 0.5 million eggs as a result of extremely low adult Sockeye Salmon escapement to Tahltan Lake and recently observed declines in wild egg to smolt survival. A total of 0.5 million Sockeye Salmon eggs were collected from Tahltan Lake.

## **2.2 TAKU RIVER**

Following the 2020 pre-season meeting of the Transboundary Panel and the Pacific Salmon Commission (PSC) Commissioner's bilateral agreement on Taku River Sockeye Salmon harvest sharing arrangement (May 2020), Canada developed its fishing strategy for Taku River salmon fisheries based on the catch sharing and management arrangements outlined in Annex IV, Chapter 1 of the PST. Accordingly, the Canadian fishery strategy incorporated specific conservation considerations and contained the following harvest objectives: 1) to harvest 23% of the TAC of Taku River Sockeye Salmon (adjusted as necessary according to projections of the number of enhanced Sockeye), plus harvest any salmon in excess of spawning and brood stock needs; 2) to harvest enhanced Taku River Sockeye Salmon incidentally to wild Sockeye Salmon; and, 3) to harvest 5,000 Coho Salmon plus Canada's share of the TAC and any salmon surplus to spawning needs in a directed Coho Salmon fishery.

The 2020 commercial fishing season on the Taku River opened on June 30 (statistical week 27) and closed on September 23 (statistical week 39). Fishing area and gear restrictions were as per recent years, and incorporated the maximum gill net length of 36.6 metres, established in 2008 for drift gill nets and in 2009 for set gill nets.

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

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

Canadian recreational fishery effort was largely absent in 2020 due to area, retention and size restrictions for the duration of the Chinook Salmon season. Restrictions were implemented within the recreational fishery to prohibit the harvest of Taku River Chinook Salmon as abundance was well below the minimum spawning escapement requirement. Recreational fishery effort for Coho Salmon was also minimal due to COVID-19 domestic and international travel restrictions.

### **2.2.1 CHINOOK SALMON**

The bilateral pre-season forecast was for a terminal run of 12,400 large Chinook Salmon, approximately 36% below the previous 10-year average of 19,400 fish. A run size of 12,400 fish was well below the management objective of 25,500 fish (below the lower end of the escapement goal range of 19,000 to 36,000), and as a result, there was no allowable catch (AC) for either the U.S. or Canada. In response, Canada did not prosecute a directed commercial Chinook Salmon fishery. Additionally, significant efforts were made in all other fisheries to avoid the incidental harvest of Chinook Salmon. For 2020, the in-river Chinook assessment fishery was not conducted to allow for the maximum number of Chinook Salmon to pass to the spawning grounds.

The catches of large Chinook Salmon in the Canadian fisheries were: 0 large Chinook Salmon harvested in the directed commercial Sockeye and Coho salmon fisheries; 94 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 94 large Chinook Salmon was well below the Chapter 1 Canadian fishery allowance of 2,900 fish.

The Taku River large Chinook Salmon spawning escapement estimate for 2020 was approximately 15,600 fish, which was below the management objective of 25,500 and the lower end of the escapement goal range (19,000). The most recent 10-year average spawning escapement was 16,600 large Chinook Salmon.

The total Canadian catch of large Chinook Salmon was 94, which was well below the 10-year average of approximately 1,900 fish (excluding test/assessment fisheries).

### **2.2.2 SOCKEYE SALMON**

The Canadian pre-season run outlook for wild Sockeye Salmon was 139,000 fish, approximately 6% below the most recent 10-year average total run size of 148,000 fish. In addition, approximately 10,000 adult Sockeye Salmon of Tatsamenie Lake origin and a small number of Trapper Lake origin Sockeye Salmon were expected

to return from fry outplants associated with the Canada/U.S. joint Taku Sockeye Salmon enhancement program. The forecasted return of enhanced Tatsamenie Lake origin Sockeye Salmon was anticipated to be above average.

The total Canadian fishery catch of Sockeye Salmon was 11,793 fish, of which 11,556 were taken within the commercial fishery, 237 in the First Nation FSC fishery, and 0 in assessment/test fisheries. This harvest was 52% below the 10-year average total of 24,400 fish. Canadian fisheries harvested an estimated 406 enhanced Sockeye Salmon produced through the bilateral Taku Enhancement Production Plan (3% of the total Canadian catch).

To reduce the likelihood of incidental harvest of Chinook Salmon, the directed Canadian Sockeye Salmon fishery commenced on June 30 (statistical week 27) which is 2 weeks later from what would have otherwise occurred. Additionally, the use of set nets within the commercial fishery was not permitted for the first opening while retention of incidentally-caught Chinook Salmon in the directed commercial Sockeye Salmon fishery was prohibited. The maximum permissible mesh size in the first four weeks of the directed Sockeye Salmon fishery was reduced to 140 mm (5.5"), which was intended to reduce likelihood of entanglement of large Chinook Salmon and to facilitate live release. Projected estimates of the total wild Sockeye Salmon run size, TAC and total escapement were made weekly throughout the fishing season. As in past years, projections were based on the joint mark-recapture program, the estimated catch of Taku River Sockeye Salmon in U.S. fisheries, the catch in the Canadian fishery and historical run timing information. The post-season run size estimate is 122,000 fish (comprising 120,000 wild and 2,000 enhanced Sockeye Salmon). Subtracting the management objective of 58,000 from the wild run of 122,000 fish resulted in a TAC of approximately 64,000 wild fish. The 2020 Canadian allowable catch, based on a 20% harvest share (associated with an enhanced Sockeye Salmon return range of 1 to 5,000 fish), was 12,800 wild fish. The total 2020 Canadian Sockeye Salmon fishery harvest was 11,373, below the allowable catch limit. The estimated total spawning escapement of Canadian-origin wild Sockeye Salmon was 98,000, which is above both the management objective (58,000) and the as well as the upper end of the spawning escapement goal range of 75,000 fish.

### **2.2.3 COHO SALMON**

The 2020 total Canadian fishery catch of 7,036 Coho Salmon (6,970 commercial and 66 First Nation FSC) was 31% below the 10-year average of 10,200 fish. The catch during the directed commercial/assessment Coho Salmon fishery (after statistical week 33) was 5,143 fish. The bilateral estimate of 2020 total Canadian-origin Coho Salmon terminal abundance is 59,000 fish. In accordance with PST provisions a run size of this abundance provides Canada an allocation of 5,000 Coho Salmon for assessment purposes. The 2020 post-season spawning escapement estimate is 52,000 Coho Salmon which is below the management target of 70,000 but within the escapement goal range of 50,000 to 90,000 fish.

### **2.2.4 JOINT SOCKEYE SALMON ENHANCEMENT PROGRAM**

2.3 million Sockeye Salmon eggs collected from Tatsamenie Lake, British Columbia in the fall of 2019 were hatched and reared at Snettisham Hatchery (Alaska) during the 2019/20 winter period. All fry were mass-marked at the Snettisham hatchery with thermally induced otolith marks. Between June 6 and June 10, 2020 approximately 1.6 million emergent Sockeye Salmon fry were transported to Tatsamenie Lake for release. No Infectious Hematopoietic Necrosis virus (IHNV) was observed in the Tatsamenie Lake Sockeye Salmon fry in

2020. Of the 1.6 million fry transported to Tatsamenie Lake approximately 210,000 fry were released into net pens for rearing between June 10 and June 30 as part of an extended rearing evaluation project while the remaining 1.4 million fry were released directly into the lake. Fry held within the extended rearing evaluation project were released into Tatsamenie Lake at approximately 1.6 grams on June 30, 2020. A sub-sample of Tatsamenie Lake Sockeye Salmon smolts outmigrating in 2020 was assessed to evaluate both enhanced contribution and survival. The results of this analysis will be used to inform future release strategies and enhancement programs.

For 2020, the agreed bilateral Taku River Enhancement Production Plan (TEPP) identified collection of up to 3.0 million Sockeye Salmon eggs from Tatsamenie Lake and 1,000,000 eggs from Little Trapper Lake for transport to Snettisham Hatchery in Alaska for incubation and thermal marking. Approximately 2.1 million Sockeye Salmon eggs were collected from Tatsamenie Lake and approximately 530,000 Sockeye Salmon eggs were collected from Little Trapper. Egg take collections were adjusted in-season based on female abundance.

## **2.3 ALSEK RIVER**

Although abundance-based catch sharing provisions for Alsek River salmon stocks have not yet been established, Annex IV, Chapter 1 of the PST obligates Canada and the U.S. to cooperatively develop and implement abundance-based management plans and programs for Alsek River Chinook and Sockeye Salmon. In 2013, biological escapement goal ranges for Alsek River Chinook and Sockeye Salmon were bilaterally recommended by the Transboundary Panel and adopted by the Parties (3,500 to 5,300 for Canadian-origin Chinook Salmon and 24,000 to 33,500 for Canadian-origin 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 Canadian-origin Chinook, Sockeye and Coho salmon stocks on the Alsek River is the Klukshu weir, which has been operated DFO in collaboration with the Champagne and Aishihik First Nations (CAFN) since 1976.

In 2020 the Parties initiated the exploration and design of basin-wide stock assessment programs to support the development of abundance-based management and more accurately assess annual Chinook and Sockeye salmon returns to the watershed. At this time, there are no programs in place to estimate Alsek River Coho Salmon returns or spawning escapement. Current abundance assessment and spawning escapement monitoring programs include: the Klukshu River multi-species video enumeration system; the Village Creek Sockeye Salmon video enumeration; and genetic stock identification of samples collected from U.S. terminal fisheries. The long-term comparative escapement index for Alsek River drainage salmon stocks is the Klukshu River count. A feasibility evaluation of new Chinook Salmon abundance assessment programs on the Blanchard and Takhanne Rivers has been initiated in order to seek to develop an improved understanding of Alsek River Chinook Salmon production. The Blanchard River feasibility project was not conducted in 2020 as a result of COVID-19 restrictions and associated operational challenges.

The 2020 Canadian Alsek River First Nation FSC fishery harvest was 22 Chinook, 218 Sockeye and 6 Coho salmon. The Champagne and Aishihik First Nations requested Citizens to reduce salmon fishing effort during the 2020 season in response to the poor pre-season forecasts for both Chinook and Sockeye salmon. The 10-year average harvest in the Canadian First Nation FSC fishery on the Alsek River is 54 Chinook, 1,027 Sockeye and 15 Coho salmon (noting that this most recent 10-year period has experienced several years of very low

Chinook and Sockeye salmon returns and associated fishery harvests). Retention of Chinook and sockeye salmon within the 2020 Alsek River recreational fishery was prohibited due to low pre-season and in-season abundance estimates and, as a result, none were retained. Although the abundance of Alsek River Coho salmon was estimated to be at or above average and recreational possession limits were liberalized, reported Coho Salmon harvest was 6 fish.

The total return of Sockeye Salmon to the Klukshu River in 2020 was 4,396 while the spawning escapement was 4,287 fish. Both the return and spawning escapement were below the most recent 10-year average of 12,400 and 12,100 respectively and lower end of the escapement goal range (7,500) was not achieved. The 2020 total Sockeye salmon count at Village Creek was 65 fish, which represents the lowest recorded abundance since 1986 (compared to the most recent 10-year average of 700 fish).

The total return of Chinook Salmon to the Klukshu River in 2020 was 1,327 while the spawning escapement was 1,316 fish. Both the return and spawning escapement were slightly above the most recent 10-year average of 1,200 and 1,180 respectively while the upper end of the escapement goal range (1,200) was exceeded.

The 2020 Klukshu River Coho Salmon count was 3,869. The Klukshu River enumeration program is not operated for the full duration of the Coho Salmon run and as a result the annual count does not represent total abundance. When used as a partial indicator of run strength, the 2020 Coho Salmon count was well-above the most recent 10 year average of ~2,100.

## 3 NORTHERN BC

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

#### 3.1.1 OBJECTIVES AND OVERVIEW

Escapements of Northern Chinook Salmon have declined in recent years. Reduced survival rates and reduced productivity have been observed across British Columbia and South East Alaska. Conservation measures were implemented in 2020 Salmon fisheries in response to declines in Fraser River Chinook Salmon abundance. Chinook Salmon fisheries implemented in Northern BC under the PST AABM management regime include the Northern British Columbia troll and Haida Gwaii recreational fisheries.

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

#### 3.1.2 STOCK STATUS

The pre-season distribution of the NBC AABM TAC by fishery is shown in Table 3-1 below. The total Chinook catch in the Area F Troll fishery and recreational fishery can be found in Appendix 3.

Table 3-1: Pre-Season Total Allowable Catch Estimate for NC AABM Chinook

	Pre-Season	In-Season
NC BC Troll AABM and Haida Gwaii Sport Abundance Index	1.08	-
NC BC Troll AABM and Haida Gwaii Sport Chinook TAC	133,000	-
NC BC Troll AABM Chinook TAC	92,600	Actual catch: 30,096
Haida Gwaii Sport Chinook TAC	40,400	Actual catch 6,087
Total NBC AABM	133,000	Actual catch: 36,903

#### 3.1.3 RECREATIONAL FISHERIES

Due to the ongoing global COVID-19 pandemic, recreational fishing effort was markedly different than in other years. Border closures and travel restrictions significantly reduced AABM tidal sport effort, as most lodges were not in operation for much of 2020. Catch estimates are subsequently significantly lower than anticipated pre-season, but will be updated should more data become available.

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

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

### **3.1.4 COMMERCIAL FISHERIES**

The North Coast BC troll fishery opening for Chinook fishing was delayed and opened from August 15 to September 30 as part of fishery restrictions designed to pass through Fraser Summer 4<sub>1</sub> (South Thompson) Chinook to Fraser River fisheries. The entire 2020 Northern BC troll fishery was conducted under a system of individual transferable quotas. The minimum 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 2020.

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

### **3.2.1 OBJECTIVES AND OVERVIEW**

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

### **3.2.2 STOCK STATUS**

Since assessments of the ISBM fisheries are relative to the escapements achieved in the Chinook indicator stocks, a brief overview of the 2020 returns is provided. Chinook escapements to the upper Nass River were 12,868 (based on mark-recapture data). The estimated 2020 escapement for the Skeena River aggregate was 13,386 Chinook and is based on a Kitsumkalum River estimate of 4,500 fish. The estimated total escapement in the Bella Coola/Atnarko River in 2020 was 19,176 large Chinook and is based on the maximum likelihood estimate. These estimates will be refined by the Chinook Technical Committee.

The total Chinook catch in the Tyee Test fishery on the Skeena River was 550 (392 Large Chinook and 158 Jack Chinook). ISBM catch data can be found in Appendix 3.

### **3.2.3 FIRST NATIONS FSC FISHERIES**

A total of 4,482 large Chinook were reported caught by First Nations in the Skeena watershed. In addition, Nisga'a Treaty catch was reported at 5,577 Chinook (all in Area 3/Nass River). First Nations' catches in marine waters of Areas 4 to 6 were reported as 819 Chinook. First Nations Chinook catch in Areas 1 to 3 were not reported at the time of this document. A total of 2,628 Chinook were reported caught in Areas 6, 7, 8 and 9. No Chinook catches were reported by First Nations in Smith Inlet (Area 10).

### **3.2.4 RECREATIONAL FISHERIES**

#### **3.2.4.1 TIDAL WATERS**

Estimates for tidal sport catches near the mainland coast of Northern BC were obtained from a creel survey conducted in Areas 3 and 4 in 2020. Chinook daily limits started at 2 per day, but were reduced in Area 3, 4, and 5 to 1 (one) Chinook per day from June 1, 2020 to July 14, 2020. This reduction was planned pre-season, and was designed to address concerns to forecast weak returns of Skeena Chinook, and to provide for FSC priority access.

Area 6 had a daily limit of 2 per day for the 2020 season.

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

For 2020, recreational fishing lodge operations were significantly reduced by the restrictions in place due to COVID-19. Most lodges did not operate, while others operated at a significantly reduced capacity.

#### **3.2.4.2 NON-TIDAL WATERS**

The Skeena River watershed started with normal daily limits and opening times for Chinook, Coho, and Pink Salmon in 2020. Sockeye started closed on the Skeena River.

From May 21, 2020 to July 14, 2020, the Department closed the entire Skeena River watershed to fishing for Chinook salmon. This closure was planned pre-season, and was designed to address concerns to forecast weak returns of Skeena Chinook, and to provide for FSC priority access.

The Nass River watershed started with normal daily limits and opening times for Chinook; however, closed to all fishing for salmon on July 1, 2020 in reaction to poor Sockeye escapements in order to provide for FSC priority access. The Nass River remained closed to fishing for Chinook for the remainder of the 2020 season.

### **3.2.5 COMMERCIAL FISHERIES**

Chinook commercial fisheries were closed in the North Coast (Areas 3-10), except for limited opportunities Area 8. In Area 8, the gillnet fishery opened for 24 hours on June 15, 2020. Due to concerns related to COVID-19, this was the only targeted Chinook opening in Area 8. Chinook retention was allowed during Chum targeted opportunities in July. Due to poor escapements of Chum Salmon, there were only three targeted Chum fisheries in Area 8. In total, there were 4 openings in Area 8, with a total effort of 436 boat days.



Refer to Appendix 3 for Chinook catch totals.

### **3.3 NORTHERN BC PINK SALMON FISHERIES**

#### **3.3.1 OBJECTIVES AND OVERVIEW**

In 2020, 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 F (NBC) 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.

#### **3.3.2 COMMERCIAL FISHERIES**

##### *Areas 3-1 to 3-4 Pink Net Catch*

In the Canadian Northern Boundary Area, Pink Salmon returns were anticipated to be 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. One seine opening occurred in Area 3-3 in 2020 on July 6. Effort was minimal and total catch was 1,816 Pink Salmon.

##### *Area F (NBC) Pink Troll Catch*

The Canadian commercial troll fishery targeting Pink Salmon with retention of Coho Salmon was open in the northern portion of Area 101 (Dixon Entrance AB Line) from July 1 to August 1, and then expanded to the rest of Area 1 until it the fishery closed on September 30. Pink retention was also permitted during the Chinook directed fishery in parts of Area 1 which opened from August 15 to September 30. Area 1 and 101 Pink Salmon directed effort was minimal and the total Pink catch in the Area F Troll fishery and recreational fishery can be found in Appendix 3. Area F retained catch of 136,890 Pink Salmon was improved over recent years averages.

## 4 SOUTHERN BC CHINOOK SALMON

### 4.1 SOUTHERN BC AGGREGATE ABUNDANCE-BASED MANAGEMENT (AABM) CHINOOK

#### 4.1.1 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 PST 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 of October 2019 through September 2020, the forecast Chinook abundance index was 0.75 of the PST base period; therefore, under Treaty provisions, the maximum allowable catch was 87,000 Chinook for WCVI AABM fisheries, which includes a 12.5% reduction consistent with the treaty provisions that came into effect in January 2019.

Domestic considerations for managing Chinook catch in WCVI AABM fisheries are driven by concerns regarding the low status of natural WCVI, Lower Strait of Georgia (LGS) and Fraser River Chinook, as well as Interior Fraser Coho and Interior Fraser River (IFR) Steelhead populations. Management measures in AABM Chinook fisheries to limit impacts to these domestic stocks of concern are summarized in the fishery subsections.

To protect returning Fraser Chinook stocks of concern, the Area G troll fishery was closed until August 1, 2020. Additionally, a 27-day rolling window closure was applied in portions of September/October to protect IFR Steelhead.

The pre-season planning distribution of the total WCVI AABM TAC by fishery is shown in Table 4-1 below.

AABM Chinook catch and release information from all fisheries can be found in Appendix 4.

Table 4-1 Pre-Season Total Allowable Catch Estimate for October 2019 to September 2020 WCVI AABM Chinook

	Pre-Season	In-Season
WCVI AABM Abundance Index	0.75	0.75
WCVI AABM Chinook TAC	87,000	
AABM Recreational Harvest Projection	40,000	Actual catch: 19,393
First Nations Harvest Projection (FSC)	5,000	Actual catch: 1,758
Maa-nulth First Nations Domestic Allocation (FSC)	3,424	Actual catch: 1,951
Five Nations Allocation	7,724	Actual catch: 4,170
Area G Troll Allocation	30,852	Actual catch: 11,350
Total AABM	87,000	32,970

#### **4.1.2 FIRST NATIONS DOMESTIC AND FSC FISHERIES**

The 2020 WCVI AABM FSC Chinook reported catch (to date) can be found in Appendix 4. Catch from Maanulth Nations Domestic fisheries can also be found in Appendix 4.

#### **4.1.3 FIRST NATIONS COMMERCIAL HARVEST**

##### *Five Nations Communal Sale Fishery*

In 2020, the Department provided communal sale fishery opportunities for the Five Nations (five Nuuchah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht and Tla-o-qui-aht) that included AABM Chinook. These opportunities were categorized as Offshore Integrated Hook and Line communal sale fisheries.

The AABM Chinook allocation was 7,724 pieces. The fishery was carried out in portions of Areas 24, 25, 26, 124, 125 and 126 on the west coast of Vancouver Island over several openings from May to November. A 100% independent dockside monitoring program was in place for the entire season. Sale of Chum, Pink and marked Coho was also permitted, as well as several groundfish species. Total salmon catches from this fishery can be found in Appendix 4.

#### **4.1.4 COMMERCIAL FISHERIES**

For the 2019/2020 Chinook year (October 1, 2019 to September 30, 2020), fisheries were shaped by conservation concerns for the following domestic stocks: Fraser River Spring 4<sub>2</sub> Chinook, Fraser River Spring 5<sub>2</sub> and Summer 5<sub>2</sub> Chinook, WCVI wild Chinook, LGS Chinook, IFR Coho and IFR Steelhead.

The distribution of the WCVI AABM TAC between fisheries is shown above in Table 4-1.

##### *Area G Troll*

The Area G troll annual management plan is designed to maintain exploitation rates (ERs) on domestic stocks of concern within established limits through the use of fishing time and area closures in conjunction with fishing effort limits. The management plan is subject to change when required to address specific conservation concerns. For the 2020 fishing season, the following changes to the annual fishing plan were implemented similar to 2019:

- Additional conservation measures to further protect low returns of Fraser River Chinook were implemented. For Area G troll this was addressed by implementing a fishery closure that remained in place until August 1, 2020.
- A 27-day rolling window closure starting in September was applied to protect IFR Steelhead.

The Area G catch in 2020 occurred in one opening from August 1 to September 15. Catch is summarized in Appendix 4.

#### **4.1.5 RECREATIONAL FISHERIES**

The WCVI AABM recreational Chinook fishery primarily takes place in offshore Areas 121 to 127 from June to September. Chinook catch from inshore Areas 21 to 27 in June and Areas 21 to 24 in July are also included in the AABM estimate. Catch and effort are largely driven by abundance and weather, and together both have impacts on annual harvest. Previous sampling has indicated that there is minimal AABM catch and effort outside of this period. In 2020 the Creel Survey was not conducted in the month of June due to the impacts of Covid-19, so total catch estimates do not include catch from June 2020.

Domestic Chinook management measures are in place in the near-shore AABM areas to protect migrating WCVI-origin Chinook. In 2020, management measures continued to include finfish closures in several areas, increasing terminal Chinook non-retention areas, and focussing recreational opportunities in areas where DNA samples indicated that WCVI Chinook presence is lower.

The domestic management actions that were implemented in 2019 continued in 2020 designed to further protect Fraser River Chinook populations. This includes a Chinook non-retention area in effect from April 1 to July 14 (inclusive) in Areas 121 to 127 seaward of a 1 nm surfline boundary and a maximum size to 80 cm for Chinook from July 15 – to July 31.

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

The Chinook recreational catch estimate from the creel survey for the 2020 WCVI AABM fishery is provided in Appendix 4.

See Figure 4-1 below which illustrates catch and effort from 2000 through 2020.

## AABM Chinook Catch and Effort

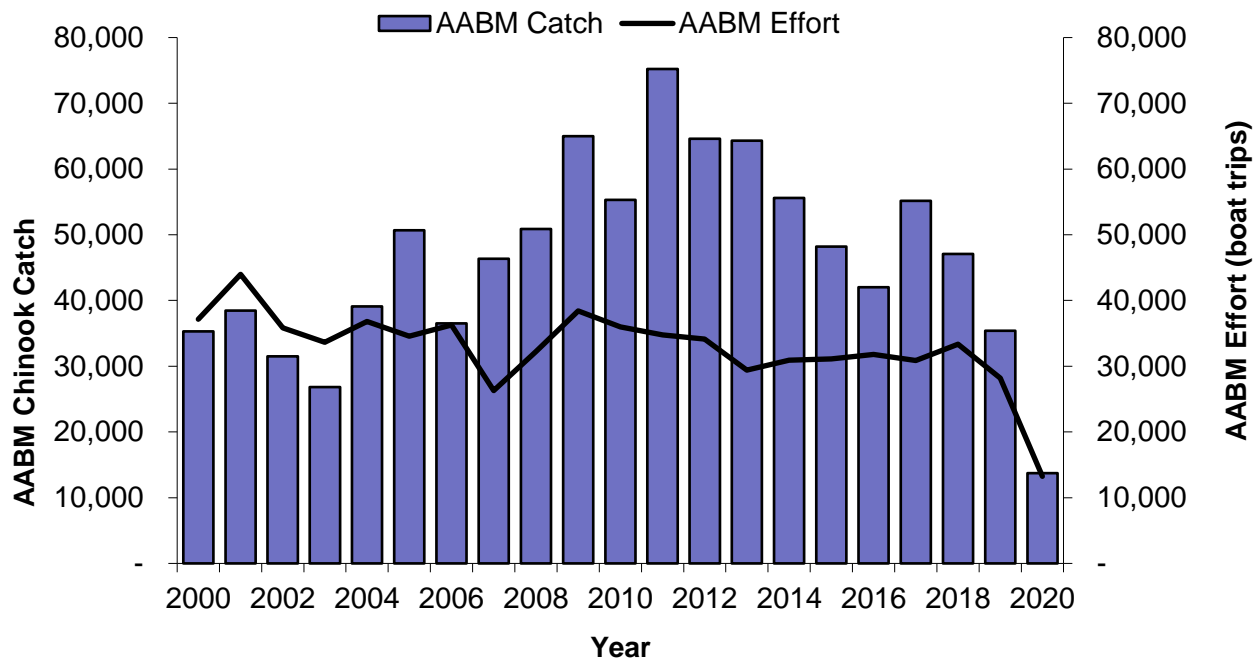


Figure 4-I WCVI Recreational AABM Catch and Effort- Chinook, 2000-2020

## 4.2 SOUTHERN BC CHINOOK INDIVIDUAL STOCK BASED MANAGEMENT (ISBM) FISHERIES

### 4.2.1 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 2020 in First Nations FSC, recreational and commercial Chinook fisheries to protect West Coast Vancouver Island (WCVI), Southern Strait of Georgia and Fraser River Chinook stocks of concern.

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 ER of 10%. Fisheries to which this limit applies are the northern troll, Haida Gwaii recreational, WCVI troll and WCVI recreational. Most Southern BC fisheries were managed such that impacts on WCVI wild Chinook stocks were minimized, with the exception of terminal fisheries focussed on enhanced stocks.

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

A suite of precautionary fishery restrictions were intended to provide a high degree of protection to at-risk Fraser Spring 4<sub>2</sub>, Spring 5<sub>2</sub> and Summer 5<sub>2</sub> Chinook returning in 2020. This approach was expected to reduce overall Canadian fishery mortalities on these populations to very low levels (e.g. approaching 5%). Expected fishery mortalities were not intended to be a management target and the objective was to allow as many fish to pass through to the spawning grounds as possible.

First Nations FSC management actions in the Fraser River included time and area closures, and reduced fishing times. Specifically, Fraser River First Nations food, social and ceremonial fisheries were restricted to unplanned events (e.g. funerals) or First Fish ceremonies until July 15 followed by opportunities to target healthy Summer 4<sub>1</sub> Chinook primarily in August.

South Coast FSC fisheries opportunities on mixed stocks over the period of April 1 to June 18 were permitted with approved fishing plans and using selective gear. Commencing June 19 fisheries were unrestricted in marine areas with the exception of the approaches to the Fraser River (Subareas 29-6, 29-7, 29-9 and 29-10).

Recreational fisheries in Johnstone Strait, Strait of Georgia, Juan de Fuca Strait, and the approach waters to the Fraser River were managed to Chinook non-retention between April 1 and varying dates between July 14 and August 31, with a maximum size limit of 80 cm in effect where Chinook retention was permitted before August 31. In 2020, commercial fisheries in Barkley Sound and Nootka Sound targeted ISBM Chinook. Chinook non-retention was in place for other southern BC commercial fisheries (excluding AABM Chinook).

ISBM Chinook catch and release information from all fisheries can be found in Appendix 4.

## **4.2.2 STOCK STATUS**

### **4.2.2.1 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 Nations FSC, sport and commercial) in the near approach areas of the hatchery plus escapement (brood collection plus natural spawners and ESSR if applicable). In these approach areas, catch is dominated by the hatchery stock (e.g. > 95%); therefore, higher ERs are permitted than in times and areas dominated by naturally produced WCVI Chinook stocks.

Due to Covid-19, the test fishery conducted near the Mquq<sup>win</sup> / Brooks Peninsula from 2016 to 2019, did not occur in 2020. The objective of the test fishery was to assess the ability to improve the precision and accuracy of annual WCVI Chinook return estimates.

### **4.2.2.2 STRAIT OF GEORGIA CHINOOK**

*Fall Season*

Adult returns of fall Chinook to SEP facilities south of Campbell River were average to above average again in 2020. Puntledge River escapements were strong with 8,580 adults returning compared to the 10 year average of 6,834. Further south, the Big Qualicum River escapement was well above the 4 year average of 6,980 with 11,175 fish. Swim counts in the Little Qualicum River were also above average at 8,958 after an area under the curve (AUC) expansion.

Chinook escapements to mid-island streams were average to above average in 2020. The AUC expanded estimate of 781 adults in the Englishman River was similar to the 12 year average of 870. Nanaimo River abundance was near the four year average with a return of 4,046 adults and 2,970 jacks. Cowichan River escapement estimates were above the target of 6,500 naturally spawning adults for the fifth year in a row with a final estimate of 10,129 fish. Age 2 jack returns to Cowichan were exceptional at 14,597. A similar abundance was observed in 2017 which produced large escapements of subsequent age classes in 2018 and 2019 from the 2016 ocean entry cohort.

On the mainland side of the northern Strait of Georgia, Sliammon and Lang hatcheries continue to have variable returns; however, in the last five years the returns to Lang Creek have been stronger than in previous years with 1,739 adults in 2019. 2020 returns were close to the 4 year average at 1,276 adults of which 416 were retained for brood stock.. Adult Chinook returns to Sliammon Creek were very low in 2020 with only 12 fish observed compared to the 12 year average of 110.

There are a few very small, wild populations remaining in the Theodosia and Skwakwa rivers, and those rivers entering Jervis Inlet, where assessment data are poor or not available. Historically, a large proportion of the Chinook stock aggregate originating from rivers north of Nanaimo migrate into central and northern BC and Alaska. ERs on this stock aggregate have gradually been reduced over the last 15 years, thus the stable trend in annual returns to rivers over this period suggests a reduction in marine survival.

#### *Spring/Summer Season*

The Puntledge, Nanaimo and more recently the Cowichan systems have identified early runs of Chinook in the Strait of Georgia. Efforts to recover Puntledge summers to viable levels have resulted in improved returns to the river since 1999. The 2020 escapement estimate for Puntledge was 489 fish including 37 jacks, which is less than the four year average of 750 adults. This was not unexpected due to reduced hatchery releases in contributing brood years. Monitoring of Nanaimo spring/summer Chinook escapement was improved in 2020 with a series of swims from May through September. Several surveys of the reach upstream of second lake where spring run fish are believed to reside produced a peak count of three jacks. A total of 634 summer run adults for 2020 was near the 4 year average of 670. The Chemainus River was not surveyed in 2020. Recent counts in this system have been very low but the rock slide in the lower canyon was cleared naturally in winter 2018/2019, restoring access to a significant portion of the system.

#### **4.2.2.3 JOHNSTONE STRAIT MAINLAND INLET CHINOOK**

Currently only three systems are monitored consistently. In Area 12, the Nimpkish River is assessed using standardized swim surveys 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). Survey coverage was also increased on systems

like the Adam/Eve and Salmon rivers on Vancouver Island. Mainland Pink coverage timing also overlaps some of the Chinook populations in the mainland inlets of Area 12. Other systems are covered using intermittent visual surveys.

#### *Nimkish River*

In 2020, observations of Chinook abundance were up relative to both the 2019 and 2016 (BY) returns. The estimate of 3,000 Chinook (peak count 915) is double the 5-year average (1,474) and approximately 50% larger than the dominant 2016 parental brood year (1,996). Hatchery broodstock targets were met.

#### *Campbell/Quinsam System*

The 2020 program has the combined system Chinook escapement estimate at approximately 10,000 adults; the last return at this level occurred in 2004. Similar, but slightly lower abundances (~9,500) returned in 2006 and 2017. The 2020 Chinook escapement is above the 5- and 10-year averages for this system, as well as the long term (1984-2019) average (6,991). The 2016 parental brood year for the returning age-4s was approximately 7,550. The 2020 broodstock target was attained by the hatchery.

#### *Phillips River*

Results from the 2020 Phillips River program indicate an above average Chinook escapement estimate of 3,330 adults. The 5-year historic average for this system is approximately 2,100. The 2019 brood was the final enhanced release of Phillips Chinook; the mark-recapture program will continue.

### **4.2.2.4 FRASER RIVER CHINOOK**

Fraser River Chinook are assessed as five naturally spawning stock groups for PSC management under the 2019 PST agreement including Fraser Spring 4<sub>2</sub>, Fraser Spring 5<sub>2</sub>, Fraser Summer 5<sub>2</sub>, Fraser Summer 4<sub>1</sub> and the Harrison River (Fall 4<sub>1</sub>).

Within the Fraser, there are four active and one discontinued CWT-indicator stocks: Nicola River (Fraser Spring 4<sub>2</sub>), Lower Shuswap (Fraser Summer 4<sub>1</sub>), Harrison River and Chilliwack River (Fraser Fall 4<sub>1</sub>) and Dome Creek (Fraser Spring 5<sub>2</sub>) that was discontinued in 2005. Two new CWT-indicator stocks are under development: Lower Chilcotin River (Fraser Spring 5<sub>2</sub>) to replace Dome Creek and Chilko River (Fraser Summer 5<sub>2</sub>).

Escapements to the Fraser Summer 4<sub>1</sub> stock group increased during the 1990s and remained abundant until 2011; followed by lower years in 2012, 2014 and 2016-2018. The spawning escapement in 2020 based on the CTC index for the aggregate was 147,504, which is higher than the long-term average (1999-2018) of 95,726 and above the parental brood from 2016 (93,247). One exception is Maria Slough where abundance was extremely low (47). The 2020 Lower Shuswap River escapement estimate was 25,528, which exceeded the escapement goal of 12,300.

In 2019, the Big Bar Landslide on the Fraser Mainstem obstructed migration of some populations in the Fraser Spring 5<sub>2</sub> and Fraser Summer 5<sub>2</sub> stock groups. For Chinook returning to rivers upstream of the landslide, 13% of the Spring and 48% of the Summer Chinook were estimated to be able to pass the landslide and return to their spawning grounds in 2019. Since there are populations within these stock groups that are downstream of



the slide, the overall mortality relative to the terminal runs were 81% for the Spring 5<sub>2</sub> stock group and 39% for the Summer stock group. Passage of Chinook Salmon through Big Bar Landslide occurred at higher flows in 2020 compared to 2019; however, prolonged high water levels delayed passage in 2020. Big Bar Landslide passage and mortality rates are not yet available for 2020.

The 2020 Spring 5<sub>2</sub> stock group spawning escapement estimate based on the CTC index for the aggregate was 17,136, which is lower than the long-term average (1999-2018) of 20,140 but greater than the parental brood from 2016 (13,498). However, there is considerable variation amongst the populations in the stock group.

The 2020 Summer 5<sub>2</sub> stock group spawning escapement estimate based on the CTC index for the aggregate was 13,166, which is lower than the long-term average (1999-2018) of 19,697 but greater than the parental brood from 2016 (9,522). However, there is considerable variation amongst the populations in the stock group.

The Fraser Spring 4<sub>2</sub> stock group spawning escapement for 2020 based on the CTC index for the aggregate was 8,463, which is lower than the long-term average (1999-2018) of 11,668 and 95% of the parental brood from 2016 (8,908). The Nicola River escapement estimate was 3,955, is lower than the long-term (1999-2018) average of 5,394 but greater than the parental brood from 2017 of 1,702.

The Harrison River (Fraser wild Fall 4<sub>1</sub> stock group) escapement estimate for 2020 was 43,087, which is lower than the long-term average (1999-2018) of 93,562 but greater than the parental brood from 2017 of 29,799 and lower than escapement goal of 75,100. The Harrison River escapement estimate has only met the escapement goal once in the past nine years.

There have been five consecutive years (2016-2020) of low escapements to the three Fraser stock groups with yearling smolt life history (Spring 4<sub>2</sub>, Spring 5<sub>2</sub>; and Summer 5<sub>2</sub>) and also to the Harrison (Fall 4<sub>1</sub>). These four stock groups are of continuing conservation concern. Canadian marine and Fraser River fisheries were further restricted in 2020 to continue to address these conservation concerns.

#### **4.2.3 FIRST NATIONS DOMESTIC AND FSC FISHERIES**

##### *WCVI FSC Fisheries and Treaty Domestic Fisheries*

Somass First Nations (Tseshaht and Hupacasath First Nations) caught Chinook by gill net, rod and reel, and as bycatch during other salmon fisheries in Area 23. Catch reports for Maa-nulth Treaty harvest and WCVI Nuu-chah-nulth FSC harvest can be found in Appendix 1.

##### *Strait of Georgia FSC Fisheries and Treaty Domestic Fisheries*

Chinook Salmon FSC and Treaty Domestic fisheries were very limited in the Strait of Georgia from April 1 to June 18, 2020 to protect Fraser River-bound Chinook Salmon stocks of concern. Over this period, very limited harvests took place using hook and line gear by approved fishing plan. Terminal harvests of Chinook took place in Puntledge and Qualicum Rivers in September and October, using hatchery brailing and hand-picking/sorting methods. Chinook Salmon were also harvested in hook and line and gill net fisheries in Cowichan and Nanaimo Rivers from late September through October. Tla'amin Treaty and other First Nations catch reports in the Strait of Georgia can be found in Appendix 4.

##### *Johnstone Strait FSC Fisheries*

Chinook Salmon FSC Fisheries were very limited in most of Johnstone Strait from April 1 to June 18 in 2020 to protect Fraser River-bound Chinook Salmon stocks of concern. Over this period, very limited harvests took place using hook and line gear by approved fishing plan. First Nations catch summaries from Johnstone Strait can be found in Appendix 4.

#### *Fraser River FSC Fisheries*

FSC fisheries took place in the Lower Fraser River (LFR) between the mouth and Sawmill Creek from April through November 2020. The total number of Chinook harvested from Chinook-directed fisheries and Chum-directed FSC openings or limited participation openings, can be found in Appendix 4. No Sockeye-directed fisheries were authorized in 2020. Sockeye, Pink, Coho and Chum bycatch that occurred during Chinook-targeted FSC openings is also listed in those appendices.

Chinook-directed FSC fisheries took place in the Fraser River and tributaries above Sawmill Creek from June through early October 2020. The total of Chinook harvested, as well as bycatch estimates can be found in those appendices.

### **4.2.4 FIRST NATIONS COMMERCIAL HARVEST**

#### *Somass Economic Opportunity*

In 2020, agreements were reached with the Hupacasath and Tseshah First Nations for Economic Opportunity (EO) fisheries; however, Hupacasath was the first with an agreement and had some EO openings before Tseshah signed an EO agreement. The fisheries occurred in portions of Subareas 23-1 and 23-2, in upper Alberni Inlet, including the tidal portion of the Somass River. The target species was Chinook with bycatch Coho and Chum allowed to be retained for FSC. There were several EO Chinook openings from August 23 to September 30. The initial EO TAC for Chinook was 20,355 in 2020 and was raised with run size upgrades to 27,481. The total EO Chinook catch and Coho bycatch can be found in Appendix 4.

#### *Five Nations Communal Sale Fishery*

In 2020, the Department provided communal sale fishery opportunities for the Five Nations (five Nuuchahnulth First Nations located on the West Coast of Vancouver Island - Ahousah, Ehatesah, Hesquiaht, Mowachah/Muchalah and Tla-o-qui-aht) that included ISBM Chinook. These opportunities were categorized as Nearshore Integrated Hook and Line, Terminal salmon fisheries and a Surplus to Escapement Salmon fishery.

The Nearshore Integrated Hook and Line fisheries occurred in Area 25 and targeted Conuma River enhanced Chinook using troll and gillnet gear and Coho using troll gear. Fishery openings for Conuma Chinook occurred between July 10 and August 31. The initial in-season TAC was 2,629 Chinook.

The Terminal fishery targeted Burman and Gold River enhanced Chinook returns in Muchalat Inlet using troll gear. Fishery openings occurred between August 8 and September 25. The initial in-season TAC was 250 Chinook.

The Surplus to Escapement Salmon fishery targeted Conuma River enhanced Chinook in the approach waters and tidal portions of the Conuma River using gillnet and beach seine gear to harvest excess salmon to spawning

requirements. Fishery openings occurred between September 4 and September 14. Surpluses to escapement were identified in-season based on Conuma Hatchery and stock assessment information.

The total Chinook catch from the Five Nations communal sale fisheries targeting Conuma, Burman and Gold River Chinook can be found in Appendix 4. Coho caught in Chinook directed fisheries were also permitted to be sold.

#### *Fraser River Economic Opportunity and Inland Demonstration Fisheries*

EO or inland demonstration fisheries did not occur in 2020 for ISBM Chinook in either the upper or lower reaches of the Fraser River as part of additional management actions to provide protection for Fraser Chinook stocks.

In 2020, no EO or demonstration fisheries occurred for Fraser Sockeye due to extremely low returns and no available Canadian Commercial TAC (CCTAC). There is currently one Inland Commercial Fishing Enterprise (CFE) operating in the Lower Fraser: Harrison Fisheries Authority. This CFE was not authorized to conduct a demonstration fishery for Sockeye using gill nets in the Harrison River; as the run size for the Harrison River Sockeye return was not sufficient to support a fishery. Therefore, there were no incidental impacts on Chinook from these fisheries.

It was not a Pink year therefore no EO and or demonstration fisheries occurred for Fraser Pink in the LFR in 2020 by the Harrison Fisheries Authority and the 16 communities from the Port Mann Bridge to Sawmill Creek. Therefore, there were no incidental impacts on Chinook from these fisheries.

In 2020, there was an EO/ Demonstration fishery for Fraser Chum occurring in the lower reaches of the Fraser River. The total Chinook catch from the Fraser Chum EO/Demonstration fishery can be found in Appendix 4.

There are three Inland CFEs that have operated in the BC Interior: Okanagan Nation Alliance, Upper Fraser Commercial Fishing Enterprise and Riverfresh (Secwepemc Fisheries Commission). In 2020, ONA was the only inland CFE fisheries that conducted commercial fisheries operations.

### **4.2.5 COMMERCIAL FISHERIES**

#### *Area B Seine*

Due to a relatively large pre-season forecast of 91,000 Chinook for Robertson Creek Hatchery, Area B seine fisheries were provided in Area 23. The fisheries occurred in portions of Subarea 23-1 and 23-2, upper Alberni Inlet, targeting Chinook. Due to low WCVI Coho forecasted returns retention was not permitted in any commercial fisheries. The fisheries were operated using a pool system with only designated vessels permitted to fish. The fishery opened daily from August 26-27, September 9-11 and Sept 13-16. The Area B in-season TAC was 6,425 Chinook. The seine Chinook catch can be found in Appendix 4.

#### *Area D Gill Net*

Area D gill net fisheries were provided in Area 23. The fisheries occurred in portions of Subarea 23-1 and 23-2, in upper Alberni Inlet, targeting Chinook with no bycatch of Coho allowed. The fisheries were opened one night a week in the last two weeks of August. Due to the success of the August 30 opening in particular there

was only one opening in mid-September. The fisheries occurred on August 25, 30 and September 18. The Area D in-season TAC was 11,930 Chinook. The total gillnet Chinook catch can be found in Appendix 4.

In 2020, a gill net fishery occurred in Tlupana Inlet (Area 25) targeting Conuma River Chinook. The Area D in-season TAC for Conuma Chinook was 6,121. There was one opening on August 12. The total gillnet catch during the Chinook-directed fishery can be found in Appendix 4.

#### *Area E Gill Net*

There were no Area E gill net fisheries for ISBM Chinook on WCVI in 2020.

There were three Area E gill net commercial Chum openings in the Fraser River (Area 29) in 2020 during the week of November 2. The number of Chinook released can be found in Appendix 4. There was mandatory non-retention of Chinook in place.

### **4.2.6 RECREATIONAL FISHERIES**

ISBM Chinook catch and release information from all fisheries can be found in Appendix 4.

#### *West Coast Vancouver Island*

In 2020, a strong return of Chinook was expected to the Robertson Creek hatchery and a moderate return to the Conuma River hatchery. Actual returns were above forecast for Robertson Creek and around forecast for Conuma River, and provided recreational fishing opportunities in terminal areas supported by these enhanced stocks.

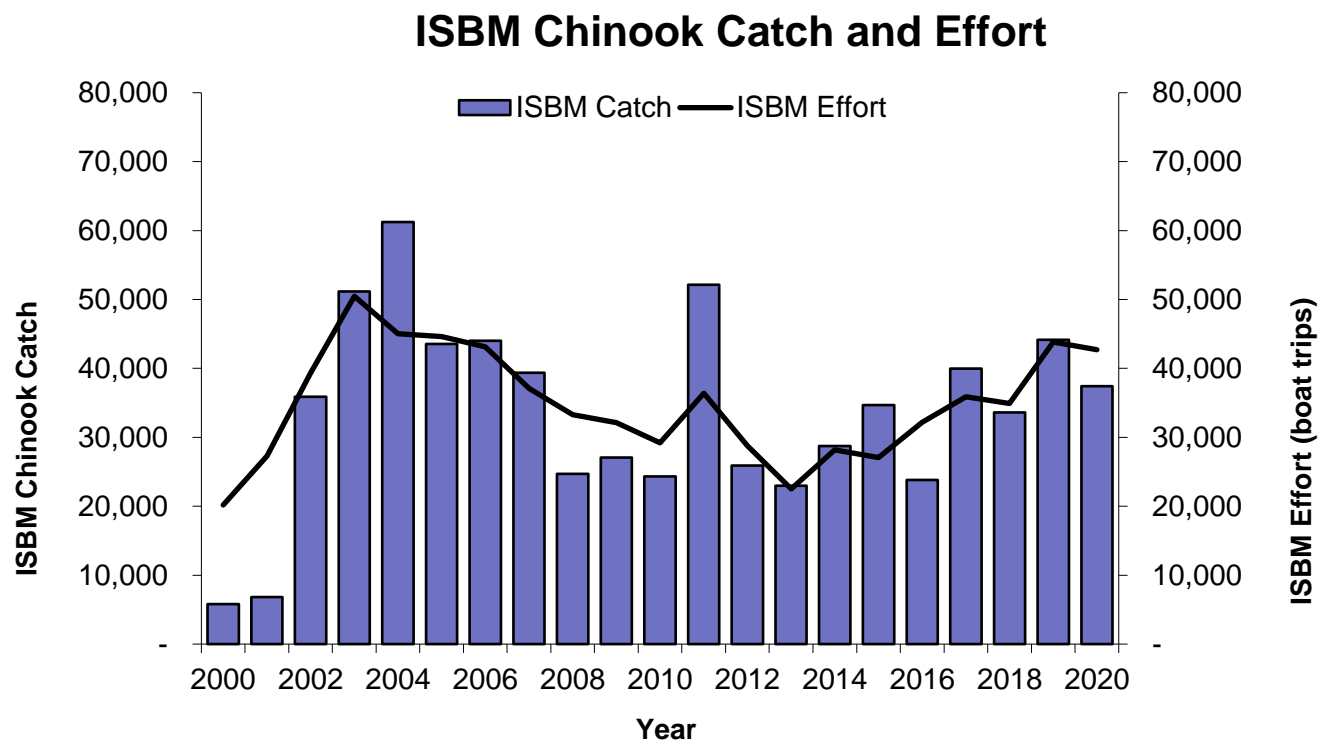


Figure 4-2 Recreational WCVI Chinook ISBM Catch and Effort, 2000 to 2020.

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

The 2020 recreational fisheries in the Inside Areas Recreational fisheries in Johnstone Strait, Strait of Georgia, Juan de Fuca Strait, and the approach waters to the Fraser River were managed to Chinook non-retention between April 1 and varying dates between July 14 and August 31, with a maximum size limit of 80 cm in effect where Chinook retention was permitted before August 31 to minimize impacts on returning Fraser River Chinook stocks of concern. Salmon closures and Chinook non-retention areas were also implemented in portions of the Fraser River approach waters, Southern Gulf Islands and Juan de Fuca Strait to support the recovery of Southern Resident Killer Whales.

The following regulations were in place for the inside areas for 2020:

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

- 00:01 hours January 1 to 23:59 hours March 31, two (2) Chinook per day;
- 00:01 hours April 1 to 23:59 hours July 14, Chinook non-retention;
- 00:01 hours July 15 to 23:59 hours August 16, one (1) Chinook per day with a maximum size limit of 80 cm;
- 00:01 hours August 17 to 23:59 hours August 31, one (1) Chinook per day;
- 00:01 hours September 1 to 23:59 hours December 31, two (2) Chinook per day.

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

- 00:01 hours January 1 to 23:59 hours March 31, two (2) Chinook per day;
- 00:01 hours April 1 to 23:59 hours July 14, Chinook non-retention;
- 00:01 hours July 15 to 23:59 hours August 31, one (1) Chinook per day with a maximum size limit of 80 cm;
- 00:01 hours September 1 to 23:59 hours December 31, two (2) Chinook per day.

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

- 00:01 hours January 1 to 23:59 hours March 31, two (2) Chinook per day.
- 00:01 hours April 1 to 23:59 hours July 31, Chinook non-retention;
- 00:01 hours August 1 to 23:59 hours August 31, one (1) Chinook per day with a maximum size limit of 80 cm;
- 00:01 hours September 1 to 23:59 hours December 31, two (2) Chinook per day.

In 2020 pilot opportunities in near-shore and terminal areas were as follows:

Subareas 12-27, 12-28, 12-35, 12-38, 12-40, 12-43 and portions of Subareas 12-26 and 12-39; Portions of Subareas 13-19 and 13-21; Portions of Subareas 15-5 and 15-6:

- 00:01 hours July 1 to 23:59 hours July 14, one (1) Chinook per day. Unmarked Chinook maximum size limit of 80 cm.

Portions of Subarea 20-5:

- 00:01 hours July 1 to 23:59 hours July 31, one (1) Chinook per day, hatchery-marked only.

Portions of Subarea 20-6:

- 00:01 hours August 15 until 23:59 hours August 31, one (1) Chinook per day, with a maximum size limit of 80 cm on marked and unmarked Chinook.
- 00:01 hours September 1 until 23:59 hours October 15, two (2) Chinook per day, no maximum size limit.

In consideration of the increased management measures for Fraser Chinook implemented in the Strait of Georgia and other mixed-stock areas, the previous annual finfish closure near Cape Mudge on Quadra Island and the Chinook non-retention closures near Sentry Shoals, Harwood Island, Denman Island-Hornby Island and Kitty Coleman were no longer in effect as of the 2019 season and was continued in 2020. Reductions to the annual limit to 10 Chinook salmon per year first implemented in 2019 in BC tidal waters, including the inside areas listed above, were continued in 2020. Chinook management measures also include a minimum size limit of 62 cm in the Johnstone Strait/Queen Charlotte Strait and Strait of Georgia, and Areas South to Cadboro Point (Subarea 19-5). For the Canadian portion of Juan de Fuca Strait south of Cadboro Point, the minimum size limit is 45 cm.

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

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

In 2020, marine sport fisheries were monitored by creel surveys in three main areas: 1) Juan de Fuca including Victoria (south of Cadboro Point) and Juan de Fuca Strait through Subarea 20-1; 2) Portions of the Strait of Georgia including Areas 14 through 18, that portion of Area 19 north of Cadboro Point, Areas 28 and 29; and 3) Johnstone Strait including Areas 11 to 13. Creel survey monitoring of these fisheries includes using an access point (landing site) survey for collecting catch, CPUE and biological information combined with an aerial survey for effort counts. In addition, logbook programs, directed at estimating the sport catch by fishing guides during guided trips, were conducted in the Campbell River and intermittently throughout other areas in the South Coast. The Avid Angler program and the Area 13 remote lodges around Stuart Island typically provide the majority of logbook program data. However, this was reduced due to lodge closures as a result of the COVID-19 pandemic. 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 mid-June through August.

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

Effort, catch and release information from marine fisheries are summarized in Figure 4-3.

### *Region 1 Vancouver Island Tributaries*

River conditions in most tributaries on Vancouver Island were improved in 2020 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 2020, with the exception of Regions 1-1 to 1-6 that are managed using seasonal closures between July 15 to August 31. Many Chinook systems on the east and west coasts of Vancouver Island saw strong Chinook returns in 2020; particularly those from enhanced systems. These returns provided early and productive opportunities for recreational freshwater fisheries. The Campbell River, Qualicum River, Little Qualicum River, Puntledge River, Nitinat River, Somass River and Conuma River all provided some recreational opportunities to harvest Chinook stocks during this time period.

### *Fraser River and Tributaries*

Fraser River Chinook stocks required additional management measures in 2020 due to continued concerns about poor stock status.

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

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

### *Tidal Fraser River:*

In the tidal waters of the Fraser River the following regulations were in place for 2020:

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

### *Non-Tidal Fraser River:*

Region 2:

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

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

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

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

### *Fraser River Tributaries:*

#### *Fraser River Tributaries - Region 2*

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 November 30;
- Chehalis River: daily limit of four Chinook with only one over 50 cm from August 7 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 one from July 1 until August 31, daily limit of four with two over 62 cm from September 1 to December 31; Coquitlam River: fishing for salmon was permitted but Chinook Salmon could not be retained from September 1 to December 31;
- Harrison River downstream of the Highway No. 7 Bridge, fishing for salmon was permitted but Chinook Salmon could not be retained from September 1 to December 31.

*The Chilliwack/Vedder River recreational fishery was assessed from September 1 to November 15 in 2019. Catch estimates can be found in Appendix 5.*

### Fraser River Tributaries - Region 3

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

- August 28 to September 22, daily limit of four Chinook, zero over 50 cm.

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

- August 28 to September 22, 2020 daily limit of four Chinook, only one over 50 cm.

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

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

### Fraser River Tributaries - Region 5

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

### Fraser River Tributaries - Region 7

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

### Fraser River Tributaries - Region 8

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

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

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



Middle Shuswap River: No fishing for salmon.

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

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

#### **4.2.7 EXCESS SALMON TO SPAWNING REQUIREMENTS (ESSR) FISHERIES**

The Tseshaht and Hupacasath First Nations were issued a joint Excess Salmon to Spawning Requirements (ESSR) Licence for Chinook and Coho at the Robertson Creek Hatchery facility.

The Ditidaht First Nation was issued an ESSR Licence for Chinook, Coho and Chum at Nitinat Lake and Nitinat hatchery.

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

A Chinook Salmon ESSR fishery for the Qualicum First Nation took place at the Big Qualicum Hatchery early September 2020 to present, and at Little Qualicum Hatchery mid- to late-October, 2020.

The K'ómoks First Nation ESSR fishery on Fall Chinook Salmon took place in early November, 2020.

There were ESSR fisheries at the Capilano hatchery in 2020 that harvested Chinook Salmon.

There were ESSR fisheries at the Chilliwack hatchery in 2020 that harvested Chinook Salmon.

No Johnstone Strait ESSR opportunities on Chinook occurred in 2020.

There were no Interior BC ESSR opportunities on Chinook in 2020

There were no ESSR fisheries opportunities for either the Maa-nulth or the Tla'amin treaty nations.

All ESSR harvest information can be found in Appendix 7.

## 5 FRASER RIVER

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### 5.1 SOCKEYE SALMON

#### 5.1.1 OBJECTIVES AND OVERVIEW

In 2020 the Fraser River Panel (FRP) adopted the p50 probability run size forecast for all run timing groups (941,000 Fraser Sockeye) for pre-season planning purposes (note that there was an update to the forecast in June 2020 that reduced the run size to 924,000). There was no TAC available for international sharing until Early Summer run sizes reached the p75 or higher. The Early Stuart and Late runs did not have International TAC at any predicted run size. 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 and conservation objectives for stocks of concern while considering other international and domestic objectives. Fishing plans include the following assumptions and guiding principles in no particular order:

- The Fraser River Panel (FRP) operated in accordance with Chapter 4, Annex IV of the PST;
- 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 ER is assumed to be the same as the ER 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 PST Annex generally contain stocks with similar timing in the marine area;
- 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 ER). The TAM cap was reduced to 50% for all run timing/management groups in 2020;
- 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 2020 Canada's escapement plan permitted up to a 10% LAER for all stock groups. If the overall return was greater than the p75 forecast a maximum 20% LAER for Late Run would be considered.
- The allowable harvest in a LAER situation is not a target; the objective is to allow as many fish as possible to pass to the spawning grounds. In most circumstances harvests under a LAER scenario would be considered incidental harvest or bycatch only; however, in some circumstances limited directed harvest in terminal areas may be considered. All fishery impacts are to be accounted for under the LAER;
- In 2020, the Early Stuart Sockeye window closure and other fishing restrictions were planned for commercial, recreational and First Nations fisheries to protect a significant proportion (90%) of the Early Stuart return. These measures included a 3-week rolling window closure based on the run timing of the Early Stuart Sockeye migration through the various fishing areas. The 2020 closure was extended by one week (4 weeks total) to protect the earliest of the Early Summer Sockeye that have conservation concerns (Bowron, Taseko); and
- Conservation concerns for other Sockeye stocks and species continued to impact the planning of Sockeye fisheries. The stocks and species of concern in 2020 included: Cultus Lake Sockeye, Nimpkish River Sockeye, Sakinaw Lake Sockeye, IFR Coho, Southern BC Chinook including Fraser River Chinook and IFR Steelhead.

### **5.1.2 STOCK STATUS**

Please Note: Tables 5-2 and 5-4 are adapted from or courtesy of the PSC.

#### **5.1.2.1 PRE-SEASON ASSESSMENT**

Pre-season expectations were for a median run size (p50 level) of 941,000 Fraser River Sockeye Salmon with a one-in-two chance that the run size would be between 488,000 (p25 level) and 1,558,000 (p75 level).

Table 5-1 2020 pre-season run size abundance forecast range by management group for Fraser Sockeye

Run timing group	Probability that return will be at/or below specified run size				
	10%	25%	50%	75%	90%
<b>Early Stuart</b>	5,000	8,000	13,000	23,000	33,000
<b>Early Summer</b>	72,000	116,000	218,000	469,000	1,098,000
<b>Summer</b>	169,000	311,000	611,000	1,231,000	2,376,000
<b>Late</b>	28,000	53,000	99,000	190,000	374,000
<b>Total</b>	274,000	488,000	941,000	1,913,000	3,881,000

The pre-season diversion rate forecast for Fraser River Sockeye through Johnstone Strait was 35%. Expected Area 20 50% migration timing dates were July 4<sup>th</sup> for Early Stuart, July 24<sup>th</sup> for Early Summer, July 31<sup>st</sup> for Summer and August 6<sup>th</sup> for Late-run Sockeye.

As all management units were forecast to be very low, pre-season spawning escapement goals at the p50 run size were equal to the forecast; 13,000 Early Stuart, 218,000 Early Summer, 611,000 Summer and 99,000 Late-run Sockeye for a total of 941,000 Sockeye spawners (Table 5-2).

Table 5-2. Fraser Sockeye 2020 Pre-season (top) and Final In-season (bottom) Values for Total Allowable Catch (TAC) and Other Management Parameters.

Date	Management Group	Total Abundance	Spawning Escapement		pMA	Management Adjust.	Test Fishing	Aboriginal Fishery Exemption	Total Deductions	*Total Allowable Catch	**Allowable Catch	50% Migration Date	Diversion Rate
			Target	TAM								Area 20	To-date
June 24	Pre-season	Early Stuart	13,000	0.00	0.69	9,000	200	1,100	13,000	0	1,300	4-Jul	
		Early Summer	218,000	0.31	0.52	78,200	2,400	19,400	218,000	0	21,800	24-Jul	
		Summer	611,000	0.00	0.16	97,800	5,100	56,000	611,000	0	61,100	31-Jul	
		Late	99,000	0.00	0.41	40,600	600	9,300	99,000	0	9,900	6-Aug	
		<b>Sockeye</b>	<b>941,000</b>			<b>225,600</b>	<b>8,300</b>	<b>85,800</b>	<b>941,000</b>	<b>0</b>	<b>94,100</b>		<b>35%</b>
September 23	Post-season	Early Stuart	16,000	0.00	0.69	11,000	118	1,482	16,000	0	1,600	6-Jul	
		Early Summer	72,000	0.00	0.52	37,400	1,270	5,930	72,000	0	7,200	15-Jul	
		Summer	191,000	0.00	0.16	30,600	3,150	15,950	191,000	0	19,100	28-Jul	
		Late	14,000	0.00	0.41	5,700	125	1,275	14,000	0	1,400	2-Aug	
		<b>Sockeye</b>	<b>293,000</b>			<b>84,700</b>	<b>4,663</b>	<b>24,637</b>	<b>293,000</b>	<b>0</b>	<b>29,300</b>		<b>25%</b>

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

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

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, Early Summer, Summer and Late Sockeye was constrained by a LAER limit of up to 10% at the p50 run size. If the overall in-season return of Fraser Sockeye reached the p75 level a Late Run LAER increase to 20% would be considered. Harvest rules were further constrained by a 50% TAM rate for all management groups (Table 5-3).

Table 5-3 Fraser River Sockeye Salmon 2020 Escapement Plan and Application of the Plan to each Management Group across a Range of Forecast Abundances

Harvest Rule Parameters					
Management Unit	Low Abundance ER (LAER)	TAM Cap	Lower Fishery Reference Point	Upper Fishery Reference Point	
Early Stuart	10%	50%	108,000	216,000	
Early Summer (w/o misc)	10%	50%	100,000	200,000	
Summer (w/o misc)	10%	50%	640,000	1,280,000	
Late (w/o misc)	10-20%	50%	300,000	600,000	

Management Unit	Pre-season Forecast Return				
	p10	p25	p50	p75	p90
<i>lower ref. pt. (w misc)</i>	108,000	108,000	108,000	108,000	108,000
<i>upper ref. pt. (w misc)</i>	216,000	216,000	216,000	216,000	216,000
<b>Early Stuart</b>					
forecast	5,000	8,000	13,000	23,000	33,000
TAM Rule (%)	0%	0%	0%	0%	0%
Escapement Target	5,000	8,000	13,000	23,000	33,000
MA	3,500	5,500	9,000	15,900	22,800
Esc. Target + MA	8,500	13,500	22,000	38,900	55,800
LAER	10%	10%	10%	10%	10%
Available ER at Return	0%	0%	0%	0%	0%
Allowable ER	10%	10%	10%	10%	10%
Allowable Harvest	500	800	1,300	2,300	3,300
<u>2020 Performance</u>					
Projected S (after MA)	2,700	4,200	6,900	12,200	17,500
BY Spawners	8,612	8,612	8,612	8,612	8,612
Proj. S as % BY S	31%	49%	80%	142%	203%
cycle avg S	35,354	35,354	35,354	35,354	35,354
Proj. S as % cycle S	8%	12%	20%	35%	49%
<u>2020 Performance</u>					
<b>Early Summer (w/o RNT)</b>					
<i>lower ref. pt. (w misc)</i>	112,800	125,300	150,300	188,400	252,400
<i>upper ref. pt. (w misc)</i>	225,500	250,600	300,600	376,700	504,800
forecast (incl. misc)	72,500	116,400	217,900	469,000	1,098,000
TAM Rule (%)	0%	0%	31%	50%	50%
Escapement Target	72,500	116,400	150,300	234,500	549,000
MA	29,700	52,400	78,200	131,300	334,900
Esc. Target + MA	102,200	168,800	228,500	365,800	883,900
LAER	10%	10%	10%	10%	10%
Available ER at Return	0%	0%	0%	22%	19%
Allowable ER	10%	10%	10%	22%	19%
Allowable Harvest	7,300	11,600	21,800	103,200	214,100
<u>2020 Performance</u>					
Projected S (after MA)	46,600	72,300	130,200	234,500	550,200
BY Spawners	156,520	156,520	156,520	156,520	156,520
Proj. S as % BY S	30%	46%	83%	150%	352%
cycle avg S	155,761	155,761	155,761	155,761	155,761
Proj. S as % cycle S	30%	46%	84%	151%	353%

Management Unit		Pre-season Forecast Return				
		p10	p25	p50	p75	p90
Summer	<i>lower ref. pt. (w misc)</i>	804,200	881,600	967,400	1,080,700	1,199,200
(w. RNT & Har)	<i>upper ref. pt. (w misc)</i>	1,608,500	1,763,100	1,934,900	2,161,400	2,398,500
	forecast	169,390	311,300	610,700	1,231,000	2,376,000
	TAM Rule (%)	0%	0%	0%	12%	50%
	Escapement Target	169,390	311,300	610,700	1,080,700	1,199,200
	MA	20,300	43,600	91,600	172,900	215,900
	Esc. Target + MA	189,690	354,900	702,300	1,253,600	1,415,100
	LAER	10%	10%	10%	10%	10%
	Available ER at Return	0%	0%	0%	0%	40%
	Allowable ER	10%	10%	10%	10%	40%
	Allowable Harvest	16,939	31,130	61,070	123,100	960,900
	<u>2020 Performance</u>					
	Projected S (after MA)	135,800	246,800	476,800	947,400	1,197,100
	BY Spawners	277,805	277,805	277,805	277,805	277,805
	Proj. S as % BY S	49%	89%	172%	341%	431%
	cycle avg S	653,758	653,758	653,758	653,758	653,758
	Proj. S as % cycle S	21%	38%	73%	145%	183%

Management Unit		Pre-season Forecast Return				
		p10	p25	p50	p75	p90
Late	<i>lower ref. pt. (w misc)</i>	349,600	398,000	418,300	413,200	400,700
(w/o Har)	<i>upper ref. pt. (w misc)</i>	699,300	796,000	836,600	826,400	801,400
	forecast	28,180	52,800	99,000	189,800	374,000
	TAM Rule (%)	0%	0%	0%	0%	0%
	Escapement Target	28,180	52,800	99,000	189,800	374,000
	MA	12,700	22,700	42,600	81,600	160,800
	Esc. Target + MA	40,880	75,500	141,600	271,400	534,800
	LAER	10%	10%	10%	20%	20%
	Available ER at Return	0%	0%	0%	0%	0%
	Allowable ER	10%	10%	10%	20%	20%
	Allowable Harvest	2,818	5,280	9,900	37,960	74,800
	<u>2020 Performance</u>					
	Projected S (after MA)	17,600	33,200	62,400	105,800	208,300
	BY Spawners	45,091	45,091	45,091	45,091	45,091
	Proj. S as % BY S	39%	74%	138%	235%	462%
	cycle avg S	435,329	435,329	435,329	435,329	435,329
	Proj. S as % cycle S	4%	8%	14%	24%	48%
	Allowable Harvest (TF, US, CDN)	27,557	48,810	94,070	266,560	1,253,100
	Total projected spawners	202,700	356,500	676,300	1,299,900	1,973,100

Pre-season Management Adjustments (MAs) of 9,000 Early Stuart, 78,200 Early Summer, 97,700 Summer-run and 40,600 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 2020 this was the case pre-season for Early Stuart and Late Run Sockeye as it was apparent that for the entire range of pre-season run size forecasts LAER management was necessary. Early Summer Sockeye would be in a LAER scenario around run sizes less than p75, Summer Sockeye would be in a LAER at an abundance less than p90.

The pre-season MAs were derived from historical proportional differences between estimates (pDBEs) as follows: Early Stuart - all years median; Early Summer - weighted all years median (-0.36) for Early Summer excluding Pitt and Chilliwack (-0.15 for Pitt and -0.42 for Chilliwack); Summer - weighted all years median (-0.08) for Summers excluding Harrison and -0.28 for Harrison; Lates - weighted 2020 cycle year median for Lates excluding Birkenhead (-0.92) and -0.27 for Birkenhead using p50 forecast abundance.

There was no projected TAC of Fraser River Sockeye for international sharing based on the median forecasted abundances.

Pre-season model runs indicated that there would be no international TAC unless the Early Summer Sockeye returned at the p75 or greater or the Summer Sockeye returned at the p90 or greater. In Canada, at the p50 forecast, no TAC would be available for directed commercial, recreational or FSC fisheries. Expected timing indicated access to one stock group without incidentally impacting another would be difficult.

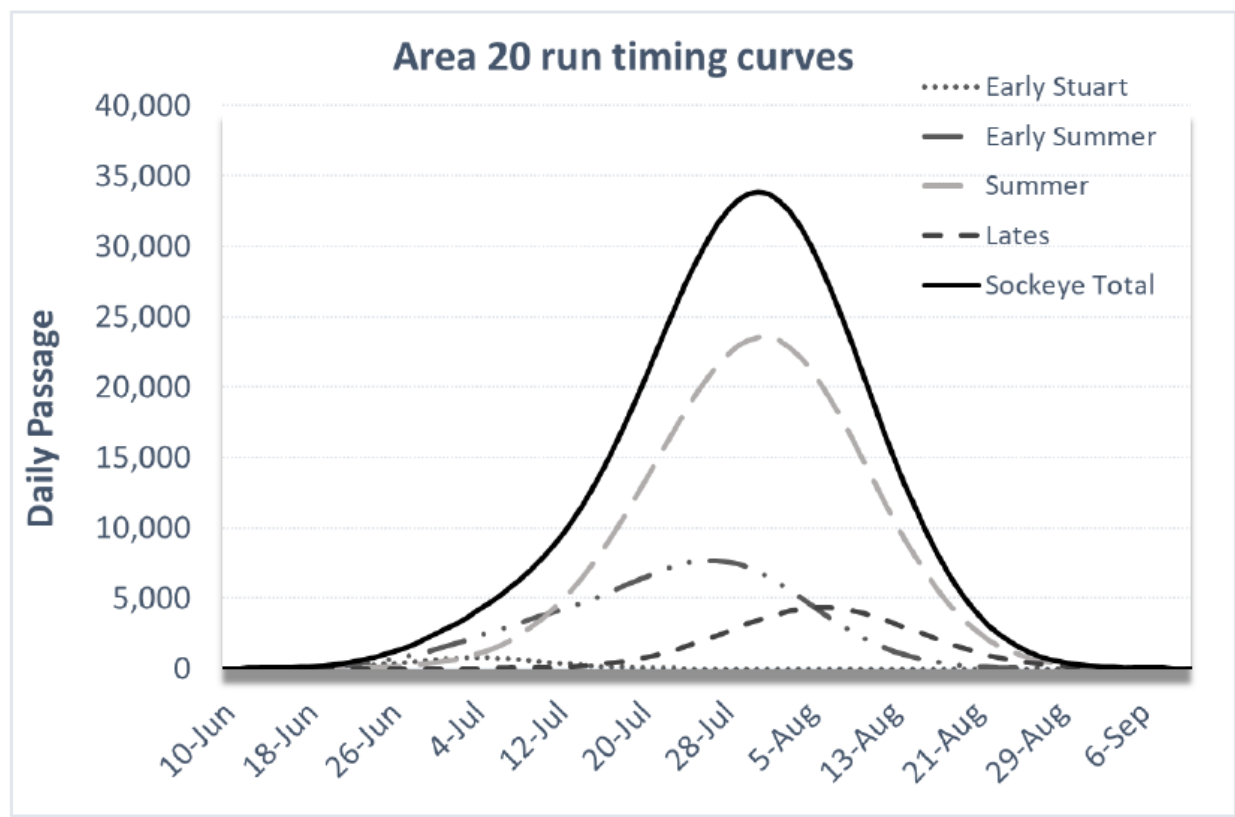


Figure 5-1 Pre-Season Projections of Daily Fraser River Sockeye Salmon Abundance by Management Group

### 5.1.3 IN-SEASON ASSESSMENT

Overall the marine migration timing was earlier than pre-season expectations for all management groups with the exception of the Early Stuart run which was slightly later than anticipated: 2 days later for Early Stuart, 9 days earlier for Early Summer, 3 days earlier for Summer and 4 days earlier for Late-run Sockeye.

The Johnstone Strait post-season diversion rate was 25% compared to a pre-season adopted value of 35%.

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

- The return of Early Stuarts was low, but near expected values: 16,000 or 23% higher than the pre-season 50% probability level (p50) forecast (13,000).

- The return of Early Summers was very low: 72,000 or 68% lower than the pre-season p50 forecast (218,000), i.e. at the p10 forecast overall (72,000).
- The return of Summers was very low: 191,000 or 69% lower than the pre-season p50 forecast of 611,000. i.e. slightly higher than the p10 forecast of 169,000.
- The return of Lates was also very low: 14,000 or 84% lower than the pre-season p50 forecast of 99,000. This was also notably lower than the p10 forecast (28,000).

A landslide in the Big Bar area on the Fraser River upstream of Lillooet was discovered on June 23, 2019 and is thought to have occurred sometime between October and November 2018. It created a 5-metre-high waterfall/cascade that posed a migration passage challenge to salmon migrating to rivers and streams upstream of the slide. The Big Bar landslide had notable impacts to Sockeye passage to the spawning grounds in 2019, especially prior to August 28, 2019 when water flow was too high for natural Sockeye migration above the slide.

Over the winter in 2019/2020 substantial work was undertaken by a Unified Command Team consisting of representatives from First Nations, the Department of Fisheries and Oceans and the Province of British Columbia. This work improved passage at Big Bar but did not completely resolve the impacts to migrating salmon. Mitigation measures included the installation of a Whooshh Passage Portal™, the construction of a nature-like fishway along the west bank of the river, construction of a road for truck transport of captured fish upstream of the slide site, and the implementation of emergency conservation enhancement programs for salmon populations most heavily affected by migration barriers (e.g. Early Stuarts). Estimates of survival past the slide site in 2020 are not yet available, though preliminary analysis has indicated it has likely improved from estimates of survival in 2019.

Post-season estimates of survival in 2019 indicated less than 1% survival for July and Early August Sockeye migrants (Early Stuart, some Early Summer), approximately 50% survival for late July to early September migrants (Early Summer, some Summer) and approximately 80% survival for mid-August through September migrants (mostly Summer). Current estimates of survival past Big Bar in 2020 are [less than 5% survival for July and Early August Sockeye migrants \(Early Stuart, some Early Summer\)](#), [approximately 80-100% survival for late July to early September migrants \(Early Summer, some Summer\)](#) and [approximately 100% survival for mid-August through September migrants \(mostly Summer\)](#). [Some of the impact in 2020 can be attributed to the cumulative impact of Big Bar and Hells Gate which was also an area of passage difficulties due to the very high freshet conditions in June and July.](#)

Due to uncertainty surrounding the mitigations efforts at the Big Bar landslide and the low in-season return estimates, the Department decided to: (i) delay and not licence Sockeye-directed fisheries as no in-season TAC was identified, and (ii) plan fisheries directed on other species in a way that allowed as many Sockeye to reach the spawning grounds as possible by minimizing bycatch impacts to levels well below the LAER limits identified in the escapement plan. Management Adjustments had no management implications in-season, but post-season, the Big Bar landslide will likely impact the Difference Between Estimates (DBEs) for Early Stuart, Early Summer and Summer runs.



Fraser River discharge was well above the mean discharge (1981-2010) throughout the watershed for most of the 2020 season. In July, salmon were observed being pushed downstream and holding at Mission, Qualark and within some smaller tributaries. Reduced migration speeds were observed especially early in the season and may have contributed to increased en-route migration mortality. For most of the season, the Fraser River daily water temperatures fluctuated a few degrees below the historical mean; in the middle of August this trend reversed, with daily temperatures fluctuating by a few degrees above the historical mean.

#### 5.1.4 POST-SEASON ASSESSMENT

The post-season return of adult Fraser Sockeye of 292,000 was estimated to be ~69% below the pre-season median forecast and the lowest return on record (1893 to 2020) (Table 5-2). The run size was ~69% below the brood year run size (0.89M) and ~91% below the 2020 cycle line average of (3.1M).

Even though there were no licenced Sockeye-directed fisheries in 2020, there were fisheries licenced for other species where Fraser Sockeye were encountered, notably Chinook Salmon-directed fisheries (e.g. in Canada, FSC for Chinook). Fishery-induced mortality estimates were considered in fishery planning. There was no Fraser Sockeye TAC for international sharing, based on the calculation method set out in Annex IV, Chapter 4 of the PST.

The total Canadian Fraser Sockeye catch can be found in Appendix 5 as well as Appendices 1 and 2. The post-season ER is estimated to be 5.5%. See Table 5-4 for projected post-season ERs relative to allowable ERs.

Table 5-4. 2020 Post-Season Exploitation Rate Estimates for All Fraser Sockeye Catch by Management Group

Management Group	Early Stuart	Early Summer	Summer	Late	Total
<b>Preliminary Exploitation Rate</b>	0.9%	2.3%	7.4%	0.9%	5.5%
<b>Allowable Exploitation Rate*</b>	10.0%	10.0%	10.0%	10.0%	10.0%
<b>LAER?*</b>	Yes	Yes	Yes	Yes	Yes

\*The Low Abundance Exploitation Rate (LAER) is not a target. Due to the very low returns, as well as challenges and uncertainties surrounding the Big Bar landslide in 2020, all efforts were made to minimize fisheries impacts to Fraser Sockeye.

DFO Near Final estimates of spawning escapement data from 2020 for Early Stuart, Early Summer, Summer and Late-run groups are provided in Table 5-5.

Table 5-5. Near Final 2020 Fraser Sockeye Salmon Escapement Summary by Management Unit.

Management Unit	Spawning Escapement	Spawning Success	% high precision
Early Stuart	30	100% <sup>1</sup>	0%
Early Summer	80,334	98.9%	77%
Summer	186,916	97.8%	95%
Late	6,563	65.5%	97%
Total	273,843		

<sup>1</sup> Assumed spawning success.

Ongoing post-season work continues on the following topics that were highlighted during the 2020 season:

1. **Impacts of the Big Bar landslide:** The effect of the Big Bar landslide on 2020 passage and escapement in the Fraser River is still being evaluated. Work to mitigate the effects of the Big Bar slide are ongoing, and potential implications for passage in 2021 or in the future are still uncertain and will require ongoing evaluation.
2. **Low productivity:** In recent years there has been declining productivity, climate change and the increased variability that accompanies it, as well as low Sockeye abundances (the three lowest on record occurred in 2016, 2019 and 2020). As part of adaptive management, DFO will be reviewing potential adjustments/improvements to current harvest control rules, alternative strategies that take into account changing conditions and key uncertainties, and what implications there may be for future advice. Initial work began in 2019 through the Fraser River Sockeye Spawning Initiative (FRSSI) and is anticipated to be ongoing in 2021. Forecast model methods may also be reviewed.
3. **Estimation of species composition and passage at Mission hydroacoustic site:** There are a variety of methods used to determine the number of Sockeye, Pink and Chinook salmon that pass by Mission. The Mission estimates are critical to in-season estimates of run size and migration timing. For example, Sockeye escapement estimates are typically based on total salmon past Mission minus Pink and Chinook. Later in the season when Pink proportions increase, an alternate method is used instead (i.e. Sockeye CPUE at Whonnock multiplied by the expansion line). Species proportions are also derived from hydroacoustic-based length data and the previous year's species-specific average lengths. These methods and others have been reviewed by the Fraser River Panel Technical Committee but remain a considerable source of uncertainty. If numbers of one species are inaccurately or imprecisely estimated it may affect in-season estimates and expectations of catch of the other species in all fisheries.
4. **Species and stocks of concern:** In 2017, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determined that of the 24 Fraser Sockeye designatable units (DUs), 8 were endangered, 2 were threatened and 5 were of special concern. In 2020, one Recovery Potential Assessment was completed, the first part of a second was completed and part two of the second is in progress and should be completed by the end of 2021.

The two completed Recovery Potential Assessments can be found here:

Cultus Lake Sockeye <https://cat.fsl-bsf.scitech.gc.ca/record=b4087614~S1>

Nine Designatable Units –Part 1 <https://cat.fsl-bsf.scitech.gc.ca/record=b4087615~S1>

### **5.1.5 FIRST NATIONS FSC AND TREATY DOMESTIC FISHERIES**

Due to extremely low returns and uncertainty surrounding the impacts of the Big Bar rock slide, there were no licenced Sockeye-directed fisheries in 2020. There were fisheries in both marine and in-river areas directed at other species where Fraser Sockeye were encountered (notably Chinook Salmon-directed FSC fisheries). In these fisheries the retention of Sockeye was not authorized.

Gear-specific fishery-induced mortality estimates, as described in the Integrated Fisheries Management Plan, may be applied to all non-retained Sockeye where estimates are available. Post season total mortality estimates also included unauthorized kept catch where estimates were available.

For catch estimates, see Appendix 5.

#### **5.1.6 COMMERCIAL FISHERIES**

There were no directed commercial fisheries on Fraser River Sockeye in Canada or the United States in 2020.

#### **5.1.7 RECREATIONAL FISHERIES**

##### **5.1.7.1 TIDAL RECREATIONAL FISHERIES**

In southern BC in all areas except Area 23 (Barkley Sound), the marine recreational fishery was not permitted to retain Sockeye Salmon in 2020. However, the creel survey reported a small number of Sockeye kept in areas closed to Sockeye retention.

The tidal waters of the Fraser River remained closed to fishing for Sockeye Salmon in 2020.

##### **5.1.7.2 NON-TIDAL RECREATIONAL FISHERIES**

The non-tidal waters of the Fraser River remained closed to fishing for Sockeye Salmon in 2020.

For catch estimates, see Appendix 5.

#### **5.1.8 EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES**

There were no ESSR opportunities directed on Fraser River Sockeye in 2020.

### **5.2 PINK SALMON**

#### **5.2.1 OBJECTIVES AND OVERVIEW**

Pink Salmon return to the Fraser River in significant numbers in odd years only; negligible numbers of Pink Salmon returned to the Fraser River in 2020.

#### **5.2.2 STOCK STATUS**

Pink Salmon return to the Fraser River in significant numbers in odd years only; negligible numbers of Pink Salmon returned to the Fraser River in 2020.

#### **5.2.3 FIRST NATIONS DOMESTIC AND FSC FISHERIES**

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 2020, therefore there were no directed fisheries.

#### **5.2.4 FIRST NATIONS COMMERCIAL HARVEST**

Pink Salmon return to the Fraser River in significant numbers in odd years only; negligible numbers of Pink Salmon returned to the Fraser River in 2020, therefore there were no directed fisheries.

#### **5.2.5 COMMERCIAL FISHERIES**

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 2020, therefore there were no directed fisheries.

#### **5.2.6 RECREATIONAL FISHERIES**

##### **5.2.6.1 TIDAL RECREATIONAL FISHERIES**

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 2020, therefore there were no directed fisheries.

##### **5.2.6.2 NON-TIDAL RECREATIONAL FISHERIES**

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 2020, therefore there were no directed fisheries.

#### **5.2.7 EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES**

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 2020, therefore there were no directed fisheries.

## **6 SOUTHERN BC COHO**

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### **6.1 OBJECTIVES AND OVERVIEW**

Management of Southern BC Coho stocks is subject to Abundance Based Management provisions outlined in Chapter 5 of the Pacific Salmon Treaty, which defines allowable exploitation rates (ERs) for Canada and the US based on the status of Coho Management Units (MUs). There are three Canadian Coho MUs identified within the Southern Coho Management Plan section of Chapter 5. These are: Interior Fraser River Coho, Lower Fraser River Coho, and Strait of Georgia Coho.

Given the limited stock assessment data available for Strait of Georgia and Lower Fraser River Coho MUs, Canada's management approach is currently driven by the status of the Interior Fraser River (IFR) Coho MU. IFR Coho status determination is based on an integration of marine survival rates and spawner abundance. Under this approach, bilateral ER caps are set at 20%, 30% and 45% for Low, Moderate and Abundant status. The Canadian ER caps are 10%, 12%, and 15% for those same status levels. Canada is required to confirm the status of Interior Fraser River Coho MU to the US in March of each year.

IFR Coho have been in a low productivity regime since the mid 1990's, and were assessed to be within the Low status level in 2020, which limits the Canadian ER on IFR Coho to 10%. However, given the ongoing low productivity of this MU, Canada has opted to manage domestic fisheries to achieve an exploitation rate cap of 3%-5% for this Management Unit in recent years.

While Chapter 5 includes three Canadian Management Units under the provisions of the PST, domestically, Southern BC Coho management includes two additional MUs: Johnstone Strait and West Coast Vancouver Island (WCVI). For completeness in reporting and understanding of Canadian Coho fisheries management and stock status, details for these additional MUs are contained within this report.

### **6.2 STOCK STATUS**

#### **6.2.1 STOCK STATUS - INTERIOR FRASER RIVER**

The 2020 escapement estimate for Interior Fraser River Coho was 74,662.

#### **6.2.2 STOCK STATUS – LOWER FRASER RIVER**

Currently there is no whole system escapement estimate available for Lower Fraser River Coho. A pilot mark-recapture program was initiated in 2020 to provide an escapement estimate for this system, funded in part by PST. If successful, this program will provide annual escapement estimates for LFR Coho in the near future, although published estimates are not expected in this pilot year. Further details of the LFR Coho escapement program can be obtained through the PST Coho Technical Committee.

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 produces data for survival information. Survival estimates for coded-wire-tag marked LFR Coho from the 2017 brood year for fish that return in 2020 are yet not available but will be provided in the final report.

### **6.2.3 STOCK STATUS - STRAIT OF GEORGIA**

Coho Salmon production within the Strait of Georgia has declined dramatically since the early 1990s. Marine survivals have been fluctuating in the 1 to 4% range. 2020 escapement estimates were average to above average while forecasts based on recent returns and ocean conditions throughout the Strait of Georgia were conservative in some systems.

#### *Hatchery stocks*

Coho returns to most hatcheries north of Nanaimo were above average in 2020. Escapement to the Puntledge River was above the 12-year average at 7,804. The Big Qualicum River experienced a strong return with 24,742 fish compared to the 12-year average of 10,340. Swim surveys of the Little Qualicum River indicated abundance for this system was modest at 2,969 fish compared to the recent 4 year average of 4,750. Nanaimo River returns out-paced the 4-year average of 6,430 at 8,887 following an AUC expansion.

#### *Wild stocks*

Area Under the Curve (AUC) expanded counts on the Englishman River have averaged 4,705 in the last 4 years. The 2020 peak count was 1,750 adults which expanded to a below average return of 2,918.. Returns to the Colquitz River (near Victoria) were low with 176 adults compared to the 4-year average of 500 fish. Returns to Craigflower Creek (249) and Shawnigan Creek (746) were approximately half of the long-term average.

New Coho escapement and survival indicators are currently under development in several systems with PST funding. A camera and PIT tag system operated at the Sakinaw Lake fence for the first time in 2019 producing a count of 570 adults and 270 jacks. 2020 returns were lower with a 143 jacks and 184 adults returning to the lake. 17 jacks were also carrying PIT tags from a deployment of 1,100 tags in spring 2020.

A camera was also operated in the Skutz Falls fishway at Cowichan River for the first time in 2019 producing a count of 8,271 adult Coho. A PIT tag program was used to expand the count to a population estimate of 16,534 fish. 2020 Skutz Falls counts were 6,371 adults and 664 jacks while 249 PIT tagged adults returned across the lower river array. The smolt to adult return rate for fish tagged in the lower river in spring 2019 was 6.1% while tag detections at Skutz Falls produced an escapement estimate of 17,699 adults; 1,165 more than in 2019.

Black Creek is the primary wild stock indicator in the Strait of Georgia. So far environmental conditions have been favourable for enumeration activities in fall 2020 without the fence being over-topped by high flows. The return of 1,991 adults was an improvement over the 976 estimated in 2019. Jack abundance was moderate at 1,7431 compared to 2,909 last season. The parental brood year (2017) estimate was 1,333 adults.

The smolt production contributing to 2020 return was 46,469. This was below the 24-year average smolt production of 51,109 smolts.

### **6.2.4 STOCK STATUS - WEST COAST VANCOUVER ISLAND**

Until recently, spawning abundances for wild WCVI Coho populations have been near historic levels. However, it appears that productivity of wild WCVI Coho has likely fallen from historic highs given observed decreases

in spawning abundances despite reductions in harvest of these stocks. In addition, there have been decreases in hatchery production. Expected declines in marine survival of Robertson Creek Hatchery (RCH) (42% projected decrease from 2019) and Carnation Creek wild Coho (23% projected decrease from 2019) indicators led to a low 2020 pre-season expectation for WCVI Coho stocks. With a low categorical return, marine survival is forecasted in the second quartile (25-50%) of survival data from brood years 1996-2016 for RCH and Carnation Creek Coho. 2020 escapement is below recent-year averages in most WCVI systems, with higher than recent-year average returns in a few Area 24 and 25 systems.

Management measures in place for WCVI Coho provided opportunities for recreational harvest in WCVI areas where IFR Coho are not considered to be impacted. No commercial harvests of WCVI Coho are permitted with the exception of the Five Nations communal sale fishery. In times and areas where IFR Coho are known to be prevalent, non-retention of unmarked Coho remained in effect.

### **6.2.5 STOCK STATUS - JOHNSTONE STRAIT AND MAINLAND INLETS**

The Keogh River plays an important role as the wild Coho indicator stock for the upper Johnstone Strait area. Historically, the Keogh River adult Coho Salmon return has averaged 2,586 (range: 230 to 9,465), while the juvenile abundance has averaged 62,213 (range 26,940 to 110,565). Following a peak in adult abundance in 2014 (9,465), annual escapement decreased to reach its lowest level in 2016 (230). Returns have increased each year, and the final estimate of adult Keogh River Coho Salmon in 2020 was 3030 fish. The 2021 enumeration program is ongoing and estimates will be provided as they become available, but early indications suggest similar abundance to 2020. The number of migrant Coho smolts in 2021 (129,400), is the highest smolt count since the project started in 1977, suggesting continuation of high freshwater productivity that first began in 2011. Coho tend to be extremely productive at low abundance, and individual productivity has increased dramatically in recent years, peaking with the 2016 brood year at 270 smolts per spawner (average 38 smolts per spawner, brood years 1998 to 2015). Expectations for escapement in 2021 will likely approach the average, which would signal continued improvement over recent years of low abundance.

Quinsam River Hatchery is the Coho marine survival indicator for Area 13. In 2020, the Quinsam Coho return of 8,355 adults is well above the 4-year average (4,998) and also exceeds the 12-year average of 7,540. The 2020 return is more than double the 2017 parental return of 3,650; in 2019 a substantially higher than normal jack return (~8,100) was also observed from the 2017 brood. In 2020, 4,366 jacks are estimated to have returned to the Quinsam.

In 2020, Village Bay Creek on Quadra Island continued with video monitoring of returning Coho. A total of 468 adults were counted through the fence; more than triple the 2017 adult escapement. The 2020 return was higher than expected, and exceeds the 4-year average and similar to the 12-year escapement average. This magnitude of improvement is similar to 2019, demonstrating an improving trend in this population.

Heydon Bay Creek in Loughborough Inlet is in the process of being developed into a mainland inlet Coho indicator system. A total of 232 Coho (142 adults and 90 jacks) were counted through the fence in 2020, which is an improvement over 2019 (88 adults and 50 jacks) but still well below the historical average (as determined during the period the fence was in operation prior to 2013).

Extensive escapement reports for Coho in many systems are indicating large variation in escapements for 2020. As anticipated, Coho marine survivals continue to be low with some improvement evident in the consistently monitored populations. Similar conditions are expected through 2021; consequently, a continued trend of low escapement is anticipated next year.

## **6.3 FIRST NATIONS DOMESTIC AND FSC FISHERIES**

### *WCVI FSC and Treaty Fisheries*

First Nations Coho catch reports are preliminary at this time. Estimates based on catch reports from Maa-nulth Treaty harvest and WCVI Nuu-chah-nulth FSC harvest can be found in Appendix 4.

### *Lower Fraser FSC Fisheries*

There were no Coho-directed fisheries in the Lower Fraser in 2020. Both hatchery-marked and wild Coho were authorized to be retained in FSC fisheries before and after the Interior Fraser Coho window closure. During the window closure, harvest was limited to hatchery-marked Coho. The total hatchery-marked and wild Coho harvested and released during Chinook, Pink and Chum FSC fisheries can be found in Appendix 5.

### *Interior Fraser FSC Fisheries*

Most FSC fisheries in the area target Sockeye, Chinook or Pink salmon. In 2020, First Nations harvesters were requested to release unharmed any incidentally caught Coho.

Directed opportunities on Coho are permitted in terminal areas subject to abundance. In 2020, small fisheries occurred at Dunn Creek, Bonaparte River and McKinley Creek fish enumeration fences. Dunn Creek is a tributary to the North Thompson River. The Bonaparte River is a tributary to the Thompson River and McKinley Creek is a tributary to the Horsefly River in the Quesnel watershed. The total Coho catch (either directed or bycatch) in First Nations fisheries can be found in Appendix 5.

### *Strait of Georgia FSC Fisheries and Treaty Domestic Fisheries*

Coho Salmon FSC fisheries of very limited effort occurred in the Strait of Georgia from late July to early October using primarily hook and line in 2020. Coho Salmon were harvested terminally in the Puntledge and Qualicum Rivers using hatchery brailing and hand-picking/sorting methods. Estimates based on catch reports from Tla'amin Treaty harvest and non-treaty First Nations harvest can be found in Appendix 4.

### *Johnstone Strait FSC Fisheries*

Small numbers of Coho Salmon were harvested in Johnstone Strait by hook and line and gill net between July and late September. Estimates for the Johnstone Strait are found in Appendix 4.

## **6.4 FIRST NATIONS COMMERCIAL HARVEST**

### *WCVI Economic Opportunity Fisheries*



In 2020, Economic Opportunity agreements were in place with Hupacasath and Tseshah First Nations during the Coho season; however, abundance did not permit a targeted opportunity.

#### *Five Nations Communal Sale Fishery*

In 2020, communal sale fishery opportunities for the Five Nations (five Nuuchahnulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehatesaht, Hesquiaht, Mowachaht/Muchalaht and Tla-o-qui-aht) included southern BC Coho. These opportunities are categorized as: offshore integrated hook-and-line communal sale fisheries; nearshore integrated hook-and-line communal sale fisheries; or terminal communal sale fisheries. The TAC for the offshore fishery was 2,000 Coho (hatchery-marked only until September 15, after which both hatchery-marked and unmarked Coho were permitted to be retained for sale). Additionally, hatchery-marked and unmarked Coho were permitted for sale in the Nearshore hook and line fishery targeting Conuma Chinook and the terminal fishery targeting Burman and Gold River Chinook. Hatchery-marked Coho were also permitted to be retained for sale in the Surplus to Escapement fishery for Conuma Chinook. The directed Coho Five Nations communal sale fishery in Area 25 was open between September 26 and October 16 with a TAC of 2,000 including both hatchery-marked and unmarked Coho. This fishery had no participation in 2020. Total Coho catch in these fisheries can be found in Appendix 4.

#### *Lower Fraser First Nations Commercial Fisheries*

There were no directed Coho fisheries authorized in the Lower Fraser in 2020.

#### *Interior Fraser First Nations Commercial Fisheries*

There were no EO or demonstration fisheries in the BC Interior (Fraser River above Sawmill Creek) targeting Coho in 2020.

## **6.5 COMMERCIAL FISHERIES**

Southern BC commercial fisheries are regulated so that impacts on Coho, in particular Interior Fraser River Coho stocks, are minimized. Retention of Coho bycatch was not permitted in most of these fisheries, including the Fraser River. Some limited opportunities for Coho retention occurred in terminal fisheries targeting Chinook and Sockeye in areas where IFR Coho were not present.

#### *WCVI Offshore Area Commercial Coho Fisheries*

Coho retention was not permitted in the 2020 Area G WCVI AABM Chinook troll fishery.

#### *WCVI Terminal Area Commercial Coho Fisheries*

In 2020, Chinook-targeted commercial gill net and seine fisheries occurred in Area 23 (Alberni Inlet). Retention of Coho was not permitted.

A Chinook targeted fishery in Area 25 (Tlupana Inlet) and Chum targeted fisheries in Area 25 and 26 also occurred. Coho retention was not permitted in these fisheries in 2020. The total WCVI Coho bycatch in commercial terminal fisheries can be found in Appendix 4.

## 6.6 RECREATIONAL FISHERIES

### 6.6.1 TIDAL RECREATIONAL FISHERIES

Tidal recreational fisheries can be categorized as occurring in either mixed-stock areas, where multiple stocks are found concurrently in the same fishing area, or 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 River Coho stocks. In terminal areas, opportunities may be permitted based on expectations of wild abundance and production from local Coho enhancement programs. The table below outlines the areas in Southern BC and the general Coho regulations pertaining to them.

Table 6-1 Southern BC Coho Fishery Regulations in 2020

Mixed stock fishing area	Daily limit (marked or unmarked)	Minimum size limit (cm)	Coho Season
Johnstone Strait	2, 1 may be unmarked	30	June 1 – July 31
Johnstone Strait	2 marked	30	Aug – Dec 31
Strait of Georgia - north	2 marked	30	June 1 – Dec 31
Strait of Georgia - south	2 marked	30	June 1 – Dec 31
Strait of Georgia (19)	2, 1 may be unmarked	30	Oct 1 – Dec 31
Juan de Fuca Strait	2 marked	30	June 1 – Dec 31
Juan de Fuca Strait (20-5 to 20-7)	4, 1 may be unmarked	30	Oct 1 – Dec 31
WCVI – Inshore	2, 1 may be unmarked	30	June 1 – Dec 31
WCVI- Offshore	2 marked	30	June 1 – Dec 31

\*for in-season management measures in specific areas refer to the information provided in the Fishery Notices

\*\*some terminal portions of Areas 23 and 25 had higher daily limits of hatchery Coho (4) from August 1 – Dec 31 (portions of Area 23) and from July 15 – Dec 31 (portions of Area 25).

Catch and release information for Coho from these fisheries can be found in Appendix 4.

#### *WCVI – Inshore Recreational Fisheries*

In 2020, hatchery-marked Coho retention was reduced to 2 per day (with unmarked retention remaining 1 per day) in Areas 23 to 27. Some terminal areas in portions of Area 23 (23-1 to 23-3) and 25 (25-4 to 25-5) had daily limits of 4 per day, with unmarked retention remaining at 1 to target hatchery stocks.

#### *Fraser River – Tidal Water Recreational Fisheries*

In the tidal waters of the Fraser River downstream of the Canadian Pacific Railway (CPR) Bridge at Mission, BC, from November 2 to December 31 the retention of two hatchery-marked Coho per day was permitted.

This recreational fishery was assessed from November 2 to November 30, 2020. Catch estimates can be found in Appendix 5.

## **6.6.2 NON-TIDAL RECREATIONAL FISHERIES**

### *Vancouver Island Tributary Recreational Fisheries*

Fresh water conditions continued to remain favourable in 2020 compared to past years and no additional restrictions were in effect on Vancouver Island due to drought-like conditions.

### *Northern Vancouver Island Tributary Recreational Fisheries*

Typical non-tidal openings for Coho were available on:

- Campbell/Quinsam River from October 1 to December 31 for four per day, two of which could be marked over 35 cm;
- Cayeghle River (including the Colonial River) from April 1 to March 31 for one per day;
- Cluxewe River from April 1 to March 31 for two per day, hatchery-marked only;
- Kokisilah River from April 1 to March 31 for one per day, maximum size limit of 35 cm;
- Nahwitti River from April 1 to March 31 for one per day; and
- Quatse River from June 15 to March 31 for two per day, hatchery-marked only.

Anglers were restricted to the use of barbless hooks. Catch is not estimated in these freshwater fisheries.

### *Strait of Georgia Tributary Recreational Fisheries*

In 2020 Coho openings were provided on:

- Cowichan River from November 1 to December 31 for one Coho per day, minimum size limit of 25 cm;
- Nanaimo River from November 1 to December 31 for 2 hatchery-marked only Coho per day, minimum size limit of 25 cm;
- Puntledge River from October 1 to November 30 for 1 hatchery-marked only Coho per day, minimum size limit of 25 cm; and
- Chemainus River from October 15 to March 31 for one per day, maximum size limit of 35 cm.

Catch is not estimated in these freshwater fisheries.

### *WCVI Tributary Recreational Fisheries*

Typical non-tidal openings for Coho were available on:

- Somass/Stamp River from August 25 to December 31 the daily limit was two, hatchery-marked or unmarked. A single, barbless hook restriction is in effect all year and there was a bait restriction in the Upper Somass and Stamp rivers from May 1 to October 31.
- Nitinat River from October 15 to December 31 the daily limit for Coho was two, hatchery-marked or unmarked. A two-week closure occurred between October 1 and October 14 to protect Chinook Salmon during their peak spawning period. The area above Parker Creek is closed to fishing. A single barbless hook restriction and bait restriction is in effect all year.
- Conuma River from August 25 to December 31 with a daily limit of two Coho, hatchery-marked or unmarked.
- Washlawlis River and Waukwass River and other west coast rivers are open year-round with a daily limit of one Coho, hatchery-marked or unmarked. Barbless hooks are required. No creel survey information is collected. Other rivers receiving some directed catch and release effort for Coho stocks are the Wakeman, Artlish, Zeballos, Tahsis, Burman, Ash, Taylor, Pacheena, Toquart and Leiner. The quota for all west coast streams, unless identified above, is zero (0).

Catch is not estimated in these freshwater fisheries.

#### *Fraser River and Tributaries – Non-tidal Recreational Fisheries*

Region 2: The retention of two hatchery-marked Coho per day was permitted once the majority of the Interior Fraser wild Coho population was through the area and following the Steelhead window closure in the following area:

- From the CPR Bridge at Mission, BC upstream to the Highway #1 Bridge at Hope - November 3 to December 31.

In 2020, this Fraser River recreational fishery in Region 2 was assessed from November 3 to November 30. Catch estimates can be found in Appendix 5.

There are no directed Coho openings in the Fraser River or tributaries upstream of the Highway #1 Bridge at Hope, BC. This includes all of Regions 3, 5, 7 and 8.

The following tributaries to the Fraser River in Region 2 were open during the dates stated below:

- Alouette River and De Boville Slough from October 1 to December 31 for one hatchery-marked Coho per day.
- Coquitlam River from September 1 to December 31 for one hatchery-marked Coho per day.
- Kanaka Creek from November 1 to November 30 for one hatchery-marked Coho per day.
- Chilliwack River/Vedder for four hatchery-marked Coho per day from September 1 to December 31.
- Chehalis River from September 1 to December 31 for four hatchery-marked Coho per day.

- Harrison River for four hatchery-marked Coho per day from September 1 to December 31.
- Nicomen Slough, Norrish Creek and the Stave River for four hatchery-marked Coho per day from September 1 to December 31, with only two over 35 cm.

In 2020, the Chilliwack/Vedder recreational fishery was assessed from September 15 to November 30 and the Nicomen/Norrish fishery was assessed from October 1 to December 15. Catch estimates can be found in Appendix 5. No assessments were conducted on the recreational fisheries occurring on the remaining rivers listed above.

During 2019, there were limited non-tidal openings for hatchery-marked Coho on the following systems which enter Boundary Bay:

- Little Campbell River, Nicomekl River and the Serpentine River one hatchery-marked Coho per day from September 1 to December 31.
- These recreational fisheries were not assessed in 2020.

## **6.7 EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES**

### *WCVI ESSR Fisheries*

The Somass First Nations were issued an ESSR licence at the Robertson Creek Hatchery in 2020 that included Coho and Chinook salmon.

The Ditidaht First Nation was issued an ESSR Licence for Chinook, Coho and Chum at Nitinat Lake and Nitinat hatchery.

All ESSR harvest information can be found in Appendix 7.

### *Lower Fraser ESSR Fisheries*

In 2020, there were ESSR fisheries at the Capilano, Chilliwack and Inch Creek hatcheries; harvest of Coho Salmon was permitted. All ESSR harvest information can be found in Appendix 7.

### *Strait of Georgia ESSR Fisheries*

A Coho Salmon ESSR fishery for Qualicum First Nation took place at Big Qualicum Hatchery from late September to Mid-October.

An ESSR fishery for the Snuneymuxw First Nation for Chum Salmon and hatchery-marked Coho Salmon took place in Early November.

All ESSR harvest information can be found in Appendix 7.

### *Johnstone Strait ESSR Fisheries*

For 2020, there were no ESSR opportunities on Coho in Johnstone Strait.

## 7 SOUTHERN BC CHUM

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### 7.1 JOHNSTONE STRAIT CHUM SALMON

#### 7.1.1 OBJECTIVES AND OVERVIEW

The Johnstone Strait Chum Salmon fishery targets Southern BC Chum that spawn primarily in the Fraser River and in tributaries of Johnstone Strait and the Strait of Georgia. This fishery also intercepts a small proportion of Puget Sound Chum. Since 2002, the Johnstone Strait Chum fishery has been managed using a 20% fixed ER strategy. This approach has provided predictable harvest opportunities for the commercial sector and has increased the probability of meeting escapement goals across the many populations contributing to this fishery. Of the 20% ER, 15% is allocated to commercial fisheries and the remaining 5% is set aside for test fisheries, First Nations FSC, sport harvesters and to also provide a buffer to commercial exploitation. Since the implementation of this management strategy, annual fisheries have been planned well in advance of the Chum return.

On July 11<sup>th</sup> 2019, the Government of Canada and the Province of British Columbia announced a joint Steelhead Action Plan identifying new conservation measures for Thompson and Chilcotin Steelhead Trout (two population components of the Interior Fraser River (IFR) Steelhead aggregate). Based on our current understanding, there is considerable overlap in the timing and location of the return migration of IFR Steelhead and several South Coast salmon fisheries. The timing of this stock of concern is particularly overlapped with that of Fraser River Chum. Given the potential for salmon fisheries to incidentally harvest co-migrating IFR Steelhead, the Department of Fisheries and Oceans implemented a series of window closures for fisheries occurring in times and areas that overlap with the IFR Steelhead migration, in both marine and freshwater fishing areas.

The announcement of these closures precipitated significant changes to the 20% fixed ER strategy for the Johnstone Strait Chum fishery. In 2020, the pre-season commercial fishing plan was modified to maintain opportunity in Johnstone Strait, while ensuring that fishing did not occur within the outlined IFR Steelhead closure times and areas. With the window closures reducing access to the earlier timed components of the Inside Southern Chum (ISC) run, fisheries were planned at a reduced ER (below the typical 20% ER).

As outlined in Chapter 6 of the PST, 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. As numbers exceeded 1 million Chum in 2020, all fisheries proceeded as scheduled.

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.

#### 7.1.2 STOCK STATUS

##### *Johnstone Strait In-season Assessment*

In 2020, the main components of the Inside Southern Chum (ISC) return assessed by the Johnstone Strait test fishery were expected to be both Fraser and non-Fraser stocks. These stocks are typically dominated by four-

year-old fish, and the abundance of the 2016 brood return that out-migrated in 2017 was well above average. Other salmon species that out-migrated in 2017 had encountered poor survival conditions (i.e. local Pink and Coho returns in 2018 were poor). The pre-season expectation for ISC was therefore for below to near target returns to the area. Based on the very strong 2016 brood year, it was expected that the age 4<sub>1</sub> component would contribute more than average to the 2020 Chum return.

The Johnstone Strait test fishery, which ran from September 21<sup>st</sup> through October 28<sup>th</sup>, provided timing and abundance information for the 2020 return, which is important in assessing the performance of the 20% fixed ER strategy. It also provided an index of abundance, used to determine the likelihood of the number of returning Chum being over the 1.0 million critical level (requirement for commercial openings). From the onset of the program, the Chum CPUE in the test fishery was tracking much lower than the 2016 brood year but better than the low returns encountered in 2010 and 2019. On October 7<sup>th</sup> it was determined that the ISC index of abundance was likely above the 1.0 million critical level (Figure 11-1) and any planned Johnstone Strait commercial mixed stock fisheries would continue as planned with a focus on the later portion of October due to Steelhead conservation measures. The Chum CPUE from the test fishery continued to track above the 2010 and 2019 return years but well below the 2016 brood indicating a continued trend of reduced productivity since 2016 (Figure 11-1). The age composition derived from the test fishery samples exhibited a much higher than average contribution of 4-year-olds throughout the season with extremely low contribution of 5-year-olds from the 2015 brood.

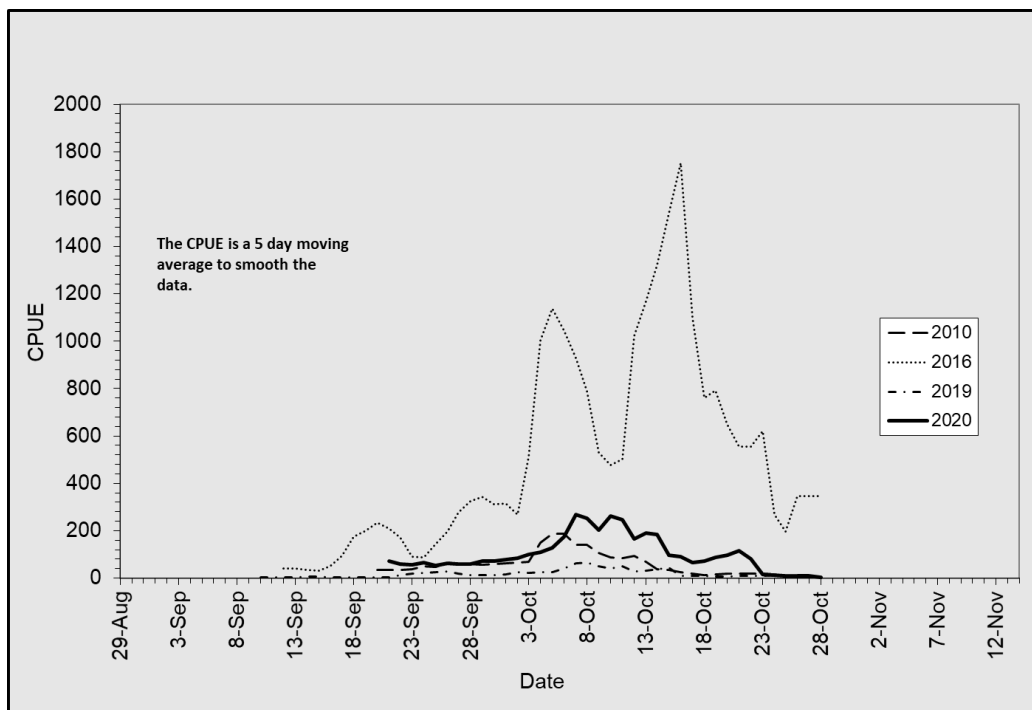


Figure 11-7-1 2020 Johnstone Strait Chum Test Fishery CPUE compared to 2016 (dominant brood year), 2010 and 2019(two of the lowest returns in recent years).

### *Terminal returns*

Although escapement monitoring is limited, Summer Chum returns tended to be well below average.

Escapements to ISC aggregate populations (Johnstone Strait, Strait of Georgia and Fraser combined) were below average and many populations were below their respective escapement goals throughout the ISC area. Stocks in the Southern portion of Vancouver Island and the Fraser performed much better than to the north on Vancouver Island and over on the mainland portions of the Strait of Georgia. Nanaimo River Chum achieved escapement goal and terminal fisheries were initiated. Cowichan was near target in 2020 and Goldstream Chum less than 1,900 fish over the target following AUC expansions.

### **7.1.3 FIRST NATIONS DOMESTIC AND FSC FISHERIES**

Johnstone Strait's First Nations fisheries for Chum Salmon were not subject to IFR Steelhead restrictions in 2020. Chum Salmon harvests took place using hook and line, gill nets and seine nets in Johnstone Strait in mid-September, with most of the effort throughout October. The total Chum Salmon catch in the Johnstone Strait FSC fishery can be found in Appendix 4.

### **7.1.4 FIRST NATIONS COMMERCIAL HARVEST**

There was no First Nations commercial harvest of Johnstone Strait Chum in 2020.

### **7.1.5 COMMERCIAL FISHERIES**

Commercial Chum fisheries in 2020 were planned as per the PST, however a modified approach was taken to maintain opportunity in Johnstone Strait while aligning with the intent of the Interior Fraser Steelhead rolling window closure. Fisheries are usually scheduled to achieve a 20% fixed ER on ISC stocks passing through Johnstone Strait with 15% ER for commercial and 5% ER for test, FSC, recreational and a commercial buffer. Shares of the 15% commercial ER are usually shared among the Area B seine (11.55%), Area D gill net (2.55%) and Area H troll fleets (0.9%). With the Steelhead window closure reducing access to a portion of the ISC, the 2020 fisheries were planned pre-season to a reduced commercial ER of 9.83%, shared between the Area B seine (6.67%), Area D gill net (2.29%) and Area H troll (1.09%) fleets.

#### *Area B Seine Fisheries*

In 2020 the pre-season plan for seines was to have one 10-hour opening, followed by one 3 hour opening for Chum Salmon in portions of Areas 12 and 13. The openings were scheduled pre-season to occur October 21<sup>st</sup> and 22<sup>nd</sup>. Due to weather impacting the fishery, and lower than expected effort on the October 21<sup>st</sup>, a 5-hour extension was given on October 22<sup>nd</sup>.

The estimated catches from the 2020 Area B Seine Johnstone Strait Chum directed fisheries can be found in Appendix 4. The peak effort in the fishery was 68 vessels.

#### *Area D Gill Net Fisheries*

In 2020 the pre-season fishing plan consisted of two Area D gill net openings planned for 41 hours in duration each and subject to change based on in-season assessment, effort information and weather events. The first gill net opening was for 41 hours from 16:00 hours on October 18 to 09:00 hours on October 20 in Area 12 only. The second opening was lengthened in response to lower than predicted effort during the October 18 to 20;



opening to 65 hours from 16:00 hours on October 23 to 09:00 hours on October 26 in both Areas 12 and 13. The estimated catches from the 2020 Area D gill net Johnstone Strait Chum directed fisheries can be found in Appendix 4. The peak effort on the October 18 to 20 opening was 104 vessels and 132 vessels on the October 23 to 26 opening.

#### *Area H Troll Fisheries*

In 2020 the pre-season plan for Area H troll Individual Transferrable Effort (ITE) demonstration fishery was to have only one fishing period which was to occur from October 12 to October 31 with a one-day closure during the first day of the Area B Seine fishery. Each licence was allocated five boat days during fishing period. Boat days could be transferred between vessels and could be fished at any time within the fishing period. Total effort for the Johnstone strait fishery was 142 boat days. The estimated catches from the 2020 Area H troll (ITE) Johnstone Strait Chum directed fisheries can be found in Appendix 4.

### **7.1.6 RECREATIONAL FISHERIES**

#### **7.1.6.1 TIDAL RECREATIONAL FISHERIES**

The marine recreational daily limits for Chum are four (4) with a possession limit of eight (8) salmon. Chum opportunities are typically opened at full limits in the Johnstone Strait area, but may be reduced if Chum returns are low. Peak participation in the recreational Chum fishery typically occurs over the Thanksgiving weekend in mid-October and activity is usually driven by abundance. The Strait of Georgia creel survey for Areas 13 and 14 was conducted from July to October. Recreational catches were reported as very low, as Chum abundance in the marine area was below average in 2020. The majority of the recreational Chum Salmon fishing effort occurs in Area 13, which is included in the Strait of Georgia catch estimate.

#### **7.1.6.2 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 be very minimal.

### **7.1.7 EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES**

There were no ESSR opportunities for Johnstone Strait Chum in 2020.

## **7.2 FRASER RIVER CHUM**

### **7.2.1 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 five years; escapement to spawning grounds in 2009, 2010, 2017, 2018 and 2019 did not meet the escapement goal, with approximately 460,000, 590,000, 620,000, 650,000 and 190,000 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 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.

In 2020, the Department implemented management measures to reduce the incidental impacts of Chum fisheries on co-migrating IFR Steelhead (including Thomson and Chilcotin River populations). Measures that were implemented in 2020 were the same as those introduced in 2019, with additional restrictions for set gillnet fisheries in the Fraser River. Moving window closures 42 days in duration were put in place for commercial gillnet and seine salmon fisheries located along the migratory route of IFR Steelhead, including Southern BC marine waters and the Fraser River and tributaries downstream of Thompson and Chilcotin River Steelhead spawning areas. This 42-day rolling window closure also applied to recreational salmon fisheries within the Fraser River and tributaries (including areas immediately off the Fraser River mouth). Commercial troll fisheries in the marine area and First Nations' FSC salmon fisheries occurring within the Fraser River and tributaries downstream of Thompson and Chilcotin River Steelhead spawning areas were subjected to a 27-day moving window closure. Following the closure window (and new for 2020), set gillnet gear was further restricted to operate during daylight hours only, while attended by a harvester.

### **7.2.2 STOCK STATUS**

The number of adult Chum Salmon arriving at the mouth of the Fraser River each fall (terminal return) is estimated in-season with a Bayesian model based on Albion test fishery catch.

The Fraser River Chum test fishery at Albion operated every other day from September 1 until October 19, alternating days with the Albion Chinook test fishery. From October 21 until November 9, the Chum net fished every day and then every other day from November 11 until November 23. Total Chum catch for the Albion test fishery can be found in Appendix 2.

DFO provided an in-season terminal return estimate on October 15 of 1,082,000 Chum Salmon. The estimated 50% migration date of the run was October 22.

A subsequent estimate of Fraser River Chum terminal return was provided on October 21. The estimated terminal return on that date was 1,084,000 (80% probability that the run is between 702,000 to 1,697,000), with a 50% migration date through the lower river of October 20. This peak date is slightly later than that observed in recent years (average peak date from 1997-2019 is October 18). It was estimated it was very likely that the run would exceed the escapement goal of 800,000.

Additional in-season terminal return estimates were not provided, as subsequent test fishing information was consistent with a terminal return run size of 1,084,000.

Fraser River Chum Salmon return to numerous spawning locations in the Lower Fraser River and its tributaries. Spawning escapement for Fraser River Chum Salmon is currently assessed for five of the largest Chum producing systems, as well as for a number of smaller tributaries. The largest observed escapement of Fraser River Chum (greater than 3 million fish), was seen in 1998. From 1999 to 2010, Fraser Chum Salmon escapement (for the annually assessed systems) trended downward. The escapement decline was then halted and reversed with an estimated 1.1 million spawners reported in 2011. Spawning escapement had remained stable through 2016 and achieved the escapement goal in each year (2011-2016 estimated escapement averaged 1.3 million spawners). However, spawning escapements in 2017 (660,000), 2018 (690,000) and most notably 2019 (300,300) were estimated to be below the escapement goal of 800,000 Chum Salmon spawners. The preliminary escapement estimate for 2020 is 614,052.

### **7.2.3 FIRST NATIONS DOMESTIC AND FSC FISHERIES**

First Nations Food, Social and Ceremonial (FSC) Chum-directed gill net fisheries commenced October 24 (below Port Mann Bridge), October 25 (Port Mann Bridge to Mission Bridge) and October 26 (Mission Bridge to Hope Bridge), following closures to protect co-migrating IFR Coho and IFR Steelhead.

The total Fraser River Chum catch (either directed or bycatch) in First Nations FSC fisheries can be found in Appendix 5.

### **7.2.4 FIRST NATIONS COMMERCIAL HARVEST**

In 2020, there were Chum-directed EO or demonstration fisheries in the LFR:

- Musqueam and Tsawwassen: November 1, 2020.
- Harrison Fisheries Authority: November 3-6, 2020

Hatchery Coho caught in Chum-directed fisheries were also permitted to be sold.

The total Fraser River Chum catch (either directed or bycatch) in First Nations Commercial fisheries can be found in Appendix 5.

### **7.2.5 COMMERCIAL FISHERIES**

#### *Area B Seine Fisheries*

There were no Area B fisheries in Area 29 for Sockeye or Chum salmon in 2020 and, therefore, no catch of Chum Salmon to report.

#### *Area E Gill Net Fisheries*

Commercial salmon fisheries in the Lower Fraser River (below Mission) were closed during the IFR Coho window closure, and closures remained in place through until November 1, 2020 to meet the IFR Steelhead

management objectives. Following the IFR Steelhead window closure, there were three (3) Area E fishery openings in the Fraser River, with a total estimated harvest of 33,339 Chum.

#### *Area H Troll Fisheries*

There were no Area H fisheries in Area 29 for Sockeye or Chum salmon in 2020 and, therefore, no catch of Chum Salmon to report.

### **7.2.6 RECREATIONAL FISHERIES**

#### **7.2.6.1 TIDAL RECREATIONAL FISHERIES**

In most southern BC tidal waters, the daily limit for Chum Salmon was four (4) in 2020.

##### *Fraser River – Tidal Recreational Fisheries*

January 1 to November 1, 2020, this area was closed to fishing for salmon.

November 2 to December 31, 2020, open to the retention of Chum Salmon with a daily limit of four (4).

An assessment of the in-river tidal Fraser River recreational fishery occurred from November 2 to November 30. Catch estimates can be found in Appendix 5.

#### **7.2.6.2 NON-TIDAL RECREATIONAL FISHERIES**

Chum Salmon fishery assessments only occur in Region 2 of the Fraser River between Mission and Hope, BC. Above Hope the number of Chum Salmon likely to be encountered is very low. Chum Salmon are not known to migrate into Regions 3, 5, 7 or 8.

##### *Fraser River – Non-Tidal Recreational Fisheries*

January 1 to November 2, 2020, area closed to fishing for salmon.

November 3 to December 31, the Region 2 non-tidal Fraser River from the CPR Bridge at Mission, BC to the Highway No. 1 Bridge at Hope, BC was open to retention of Chum Salmon with a daily limit of two (2).

An assessment of the non-tidal Fraser River recreational fishery occurred from November 3 to November 30. Catch estimates can be found in Appendix 5.

##### *Fraser River Tributaries Recreational Fisheries*

The following Fraser River tributaries were open to Chum Salmon retention during the dates noted in 2020.

- Alouette River – October 1 to December 31, daily limit of one (1) Chum Salmon.
- Chilliwack and Vedder Rivers – October 1 to December 31, daily limit of one (1) Chum Salmon.
- Harrison River – October 1 to December 31, daily limit of two (2) Chum Salmon.
- Nicomen Slough – October 1 to December 31, daily limit of two (2) Chum Salmon.

- Stave River – October 1 to December 31, daily limit of two (2) Chum Salmon.

The Chilliwack and Vedder rivers recreational fishery was assessed from September 15 to November 30 in 2020. Catch estimates can be found in Appendix 5. In 2020, no assessment was conducted on the fisheries in the Alouette, Harrison and Stave rivers; however, the Nicomen Slough/Norrish Creek fishery was assessed from October 1 to December 15, 2020. Catch estimates can be found in Appendix 5.

The following systems that flow into Boundary Bay were open to Chum Salmon retention during the dates noted.

- Serpentine River – October 1 to October 31, 2020, daily limit of one (1) Chum Salmon.

This recreational fishery was not assessed.

### **7.2.7 EXCESS-TO-SPAWNING REQUIREMENT (ESSR) FISHERIES**

There were ESSR fisheries in 2020 that harvested Chum Salmon at:

- Chilliwack Hatchery;
- Inch Creek Hatchery; and,
- Chehalis Hatchery.

All ESSR harvest information can be found in Appendix 7.

## **7.3 STRAIT OF GEORGIA CHUM**

### **7.3.1 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.

### **7.3.2 STOCK STATUS**

In 2020 escapement was forecast to be above target in every system except for the Puntledge River, which was forecast to meet the escapement target of 60,000 on the normal run timing curve (Table 7-1). Nanaimo River reached escapement target of 40,000 at 47,556 Chum. This was well below the low-range forecast of 111,800 for 2020, but higher than the escapement of 21,905 in 2019. Cowichan River was close to reaching the escapement target at 153,570 Chum. This was above the 2019 escapement of 94,500, but below the low-range

forecast of 186,900 for 2020. Goldstream River was above the escapement target of 15,000 at 16,843 based on AUC expansions. This is also above the 2020 forecast of 16,500, but below the 2019 escapement of 21,547.

Mid-Vancouver Island rivers, which include Puntledge, Big Qualicum and Little Qualicum with a combined escapement target of 230,000 had a low-range forecast of 284,800 for 2020. Returns to these mid-Vancouver Island systems were well below the escapement target and forecast at 62,481 Chum. Puntledge River had 27,675, Big Qualicum 11,868 and Little Qualicum had 22,938 Chum. However, escapement in 2020 was an improvement over 2019, which was only 18,217 for all three systems combined.

Combined escapement estimates for Jervis/Narrows Inlet rivers were 28,151 Chum in 2020. By system, there were 525 Chum counted in Vancouver River, 196 in Brittain River, 12,231 estimated from AUC in Skwakwa River, 10,479 estimated from AUC in Deserted River and 4,720 estimated from AUC in Tzoonie River. The escapement total for all of the systems is substantially below the target of 85,000 and the low-range forecast of 99,200. The combined escapement for 2020, however, is an improvement compared to the low return of 6,612 fish in 2019.

Escapement in Sliammon Creek exceeded the low count of 1,036 Chum in 2019 at 6,822, which included fish counted at the fence, in the spawning channel, brood stock and an estimate of fish below the fence. While escapement was higher than 2019, the 2020 count was significantly below the target of 11,000 and the 2020 low-range forecast of 25,000. In Theodosia, 19,396 Chum returned in 2020 which is considerably higher than 2,654 in 2019 and close to the escapement target of 21,000. Okeover Creek abundance was estimated at 2,832 fish which is near the 4 year average but below the escapement target and low-range forecast of 6,000 and 6,400, respectively. 2,364 Chum returned to Lang Creek in 2020 which was below the 4 year average of 3,710 and escapement target of 2,500.

Table 7-1: 2020 escapement of Chum in Strait of Georgia Rivers along with the low and high forecast values for 2020, the 2019 escapement and the 2020 escapement targets.

Forecast Area	2020 Forecast		2019 Escapement	2020 Escapement Target	2020 Escapement
	Low	High			
Mid-Vancouver Island	284,800	427,200	18,217	230,000	62,481
- Puntledge	48,600	73,000	6,531	60,000	27,675
- Big Qualicum	145,300	217,900	2,020	85,000	11,868
- Little Qualicum	90,900	136,300	9,666	85,000	22,938
Jervis/Narrows Inlets	99,200	148,800	6,612	85,000	28,151
Nanaimo River	111,800	167,600	21,905	40,000	47,556
Cowichan River	186,900	280,300	94,500	160,000	153,570
Goldstream River	16,500	24,800	21,547	15,000	16,843
Sliammon Creek	25,000	37,400	1,822	11,000	6,822
Theodosia River	29,400	44,200	2,654	21,000	19,396
Okeover Creek	6,400	9,600	117	6,000	2,832
Lang Creek	4,500	6,700	1,036	2,500	2,364

### **7.3.3 FIRST NATIONS DOMESTIC AND FSC FISHERIES**

Strait of Georgia First Nations FSC fisheries for Chum Salmon were not restricted in 2020. Seine net and gill net fisheries targeting Chum Salmon in the marine mixed stock areas began in early October, with effort increasing towards late October and early November. Chum Salmon catch summaries from Tla'amin Treaty and non-Treaty First Nations FSC fisheries in the Strait of Georgia can be found in Appendix 4.

### **7.3.4 FIRST NATIONS COMMERCIAL HARVEST**

#### *Area 14 First Nations Commercial Fisheries*

Discussions with the K'omoks First Nation occurred around the harvest of surplus Chum for a Demonstration Fishery, however the Chum returns were poor and no commercial demonstration fisheries occurred.

#### *Area 17 First Nations Commercial Fisheries*

Pre-season discussions with the Nanaimo First Nation occurred to identify potential triggers and develop fishing plans to harvest surplus Nanaimo River Chum. During the season communication happened on a day to day basis to discuss stock status and potential fishing opportunities. In 2020 the Area 17 Demonstration fishery began October 14 for a TAC of 5,000 Chum. The fishery continued until October 24 when the initial allowable harvest was achieved. The Demonstration fishery reopened November 5 when the Nanaimo River target escapement of 40,000 Chum was achieved. Chum catch can be found in Appendix 4.

#### *Area 18 First Nations Commercial Fisheries*

A bi-weekly conference call was held with the Cowichan Fisheries Harvest Roundtable to discuss stock status and potential fishing opportunities in Area 18. The Area 18 Demonstration Fishery was triggered when 60,000 Chum had been estimated passed the Didson counter on October 28. The fishery began October 29 for a TAC of 5,000 Chum. The fishery continued until November 7. Chum catch can be found in Appendix 4.

#### *Area 19 First Nations Commercial Fisheries*

Pre-season meetings occurred with Saanich Tribes to discuss potential triggers and fishing plans to harvest surplus Goldstream Chum. On November 23 the demonstration fishery was triggered but not activated as it was deemed unlikely to be successful. There was no Saanich Tribes Demonstration fishery in 2020 targeting Chum.

### **7.3.5 COMMERCIAL FISHERIES**

#### *Area 14 Commercial Fisheries*

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 size is assessed by escapement counts to the three major river systems and DFO hatcheries contributing to the stock aggregate.

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 depending on whether the pre-season forecast is greater than or less than 340,000 Chum. When the pre-season forecast is greater than 340,000, early Chum openings can target up to 65% of the anticipated surplus above 340,000. When pre-season forecast is less than 340,000, an early-timed limited effort gillnet fishery may be used to evaluate the mid-Vancouver Island aggregate abundance.

In 2020 the mid-Vancouver Island aggregate was managed based on the pre-season forecast of less than 340,000 Chum. An Area D gill net assessment fishery consisted of three (3) openings of 50 hours each, weekly, between October 14 and October 31. During the third opening scheduled October 28-30 there was a 30 hour pause due to weather, with the fishery resuming on October 30.

Chum catch for can be found in Appendix 4.

#### *Area 16 Commercial Fisheries*

This fishery targets wild Chum stocks returning to river systems in the Jervis Inlet area. The main systems are Tzoonie, Deserted and Skwawka Rivers. The overall escapement goal for rivers in Jervis/Narrows Inlet is 85,000. Terminal fisheries may occur in these areas when the individual or combined escapement goals have been assured, but fishing opportunities do not occur on a regular basis. There were no fisheries in Area 16 in 2020.

#### *Area 17 Commercial Fisheries*

This fishery is a terminal fishery targeting Nanaimo River stocks. The Nanaimo River Chum stocks are supplemented by the Nanaimo River hatchery. Hatchery supplementation occurs 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 and a sonar counting system (DIDSON). The DIDSON was installed and operational on October 2. Early escapement information indicated potential surplus to the Nanaimo River and on October 14 a demonstration fishery was initiated for a TAC of 5,000 chum. In-season chum migration slowed and not until November 3 was there indications that the escapement goal was likely to be met. Terminal fisheries began November 4.

In 2020, terminal commercial fisheries for Nanaimo River Chum began with gill nets fishing November 4 and seines on November 5 & 6. Gear types fished separately until vessel count was low enough to avoid gear conflict. Chum catch can be found in Appendix 4. Area 17 closed for the balance of the season on November 16.

#### *Area 18 Commercial Fisheries*



This fishery is directed at Cowichan River stocks, with some incidental harvest of Goldstream-bound Chum. Fishery openings in early to mid November are limited to Satellite Channel, to minimize impacts on Goldstream stocks. Chemainus River stocks may also be impacted if fisheries occur earlier in November, but likely to a lesser extent.

Fishery openings are planned in-season based on escapement estimates from a DIDSON counter. Management is also guided by advice from the Cowichan Fisheries Roundtable and the Mid-Vancouver Island (MVI) Chum Subcommittee, and an in-season Chum Escapement Forecast Tool based on the DIDSON count and date. The overall escapement goal for the Cowichan River is currently 160,000 Chum passing by the DIDSON counter.

A bi-weekly conference call was held with the Cowichan Fisheries Roundtable to discuss stock status and potential fishing opportunities in Area 18. In 2020 there were no commercial fisheries for Cowichan River Chum except for the Cowichan Tribes Demonstration fishery.

#### *Area 19 Commercial Fisheries*

This fishery is directed primarily at Goldstream River stocks, although some Cowichan River Chum Salmon are also harvested. Fisheries are planned in-season based on escapement estimates. Area 19 falls under the same management regime as Area 18. The overall escapement goal for the Goldstream River is 15,000. Weekly stream walks are conducted on Goldstream River by Goldstream Hatchery staff to estimate Chum escapement. Enumeration began in the second week of October. In 2020, there were no commercial fisheries in Area 19.

### **7.3.6 RECREATIONAL FISHERIES**

#### **7.3.6.1 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 was suspended in 2020 due to the Covid-19 pandemic but it is usually the most active Chum recreational fishery in the area. There was a creel survey during the month of October in the Strait of Georgia (Areas 13 and 14).

Marine recreational Chum fisheries also occur in the approach waters of the Puntledge, Qualicum, Little Qualicum, Nanaimo and Cowichan Rivers on Vancouver Island, as well as in Howe Sound, with effort increasing with Chum abundance. Due to below average Chum abundances observed in the marine area north of Nanaimo and average abundances south of Nanaimo, recreational effort in 2020 was minimal. Catch estimates for Chum in the marine recreational fisheries can be found in Appendix 4.

#### **7.3.6.2 NON-TIDAL RECREATIONAL FISHERIES**

Chum retention fisheries in Region 1 (Vancouver Island) took place in 2020 on the Courtenay, Nanaimo and Puntledge Rivers on Vancouver Island commencing in October. Due to low returns on the Qualicum and Cowichan Rivers there were no in-river recreational Chum opportunities for 2020. 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.

### **7.3.7 EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES**

The Qualicum First Nation was issued an ESSR licence for Chum, Chinook, Coho and Pink salmon in 2020, however there were no surplus Chum Salmon in 2020.

An ESSR fishery for the Snuneymuxw First Nation for Chum Salmon and hatchery-marked Coho Salmon took place in Early November. In 2020, the Nanaimo River Chum ESSR was triggered November 4 when terminal escapement was assumed to be achieved. The fishery began November 5 and continued until November 12. Chum catch for the Nanaimo River ESSR fishery can be found in Appendix 7.

The K'ómoks First Nation was issued an ESSR licence to harvest Chum Salmon and fall Chinook Salmon at the DFO Puntledge River Hatchery in 2020. There were no surplus Chum Salmon available in 2020.

There were no ESSR fisheries at the Capilano hatchery in 2020 that included Chum Salmon.

## **7.4 WEST COAST VANCOUVER ISLAND CHUM**

### **7.4.1 OBJECTIVES AND OVERVIEW**

Commercial Chum Salmon fisheries normally occur in West Coast Vancouver Island (WCVI) from late September to early November in years of Chum abundance. The majority of Chum fishing on WCVI takes place adjacent to Nitinat Lake (Area 21). In some years there have been limited-effort gill net fisheries in Barkley Sound (Area 23), Clayoquot Sound (Area 24), Nootka Sound and Esperanza Inlet (Area 25) and Kyuquot Sound (Area 26).

Commercial fisheries for WCVI Chum employ a two-tiered strategy for managing harvest; either a constant harvest rate strategy or a surplus-to-escapement goal strategy.

*Fixed Harvest Rate Strategy (fisheries targeting natural origin stocks, hatchery stocks at low abundance):*

For those fisheries where a significant component of the target stock is from naturally spawning populations, a constant harvest rate strategy of 10 to 20% is implemented. The maximum harvest rate is set at a precautionary level relative to stock-recruit derived optimal ER for WCVI Chum; which are in the order of 30 to 40%. This approach allows limited harvest while protecting the biodiversity of Chum stocks and permitting rebuilding when the population is low. In areas of low quality data or only naturally spawning stocks, including Barkley (Area 23), Clayoquot Sound (Area 24), Esperanza Inlet (Area 25) and Kyuquot Sound (Area 26), the maximum allowable harvest rate is 10 to 15%. In Nootka Sound, up to 20% harvest is permitted given the prevalence of hatchery production in the area. The harvest rate is controlled by limiting effort (i.e. number and duration of openings and, in some areas, the number of permitted vessels) and limiting fishing areas to approach areas only (i.e. to those areas where fish are migrating not holding).

Since 2013, a fixed harvest rate strategy has also been used to harvest Nitinat Hatchery Chum when the stock abundance is considered above the lower fishery reference point but below the target fishery reference point. The maximum harvest rate for the Nitinat stock is 25% when it is below the target fishery reference point.

*Surplus-to-Escapement Goal Strategy (fisheries targeting hatchery stocks at high abundance):*

For fisheries that target primarily hatchery surpluses, the allowable harvest rate is determined by the escapement goal when it is determined the stock above the Upper Fishery Reference Point and broodstock capture targets have been or will be met. These fisheries occur only in ‘terminal areas’, defined as an area in close proximity to the origin watershed of the target stock where little or no interception of other stocks occurs. Surplus to escapement goal fisheries for Conuma Hatchery stock have occurred within the Tlupana Inlet portion of Area 25. Surplus to escapement goal fisheries for Nitinat Hatchery stock have occurred in Area 21 near the mouth of Nitinat Lake or in Area 22 in Nitinat Lake. All Nitinat and Conuma hatchery Chum are thermally marked, which allows for assessment of the hatchery contribution to fisheries and spawning.

#### **7.4.2 STOCK STATUS**

The recent stock status of wild WCVI Chum has generally been poor relative to historic levels, with spawning abundance for wild indicator stocks frequently below Lower Fishery Reference Points (LRPs) despite the implementation of a precautionary harvest regime (fixed harvest rate). In addition, hatchery production has declined in recent years, particularly at the Conuma Hatchery in Area 25 (Tlupana Inlet). In 2020, only two of the six WCVI Chum management areas had forecasted returns above the Lower Fishery Reference Points. In these two areas Stage 2 limited effort fisheries were implemented (Esperanza, Area 25 and Kyuquot, Area 26) and reported moderate to low CPUEs. Observed returns in 2020 suggest a continued low stock abundance.

#### **7.4.3 FIRST NATIONS FSC AND TREATY FISHERIES**

The 2020 WCVI FSC Chum reported catch (to date) can be found in Appendix 4 which includes fish retained for food, social and ceremonial purposes from Nuu-chah-nulth First Nations and Treaty harvests from Maa-nulth Nations.

#### **7.4.4 FIRST NATIONS COMMERCIAL HARVEST**

*WCVI Economic Opportunity Fisheries*

In 2020, EO agreements were in place with Hupacasath and Tseshah First Nations during the Chum season however abundance did not permit a targeted opportunity.

*Five Nations Communal Sale Fishery*

In 2020, the Department provided communal sale fishery opportunities for the Five Nations (five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousah, Ehatesah, Hesquiaht, Mowachah/Muchalah and Tla-o-qui-ah).

Nearshore and terminal Chum fishery planning discussions occurred between the Five Nations and DFO during pre-season and in-season meetings. Implementation of nearshore Chum fisheries did not occur and no terminal harvest opportunities for Chum were identified in-season.

## **7.4.5 COMMERCIAL FISHERIES**

Commercial fisheries on the WCVI targeted two Chum stocks in 2020: Esperanza (Area 25) and Kyuquot (Area 26).

### *Nitinat (Area 21/121) Commercial Fisheries*

In 2020, the preseason forecast for Nitinat Chum was of 92,000. This is below the minimum forecast of 225,000) which allows Area E gill net and Area B seine fisheries. Due to ongoing declines in IFR Steelhead escapement, DFO implemented a precautionary approach to the management of those fisheries in Southern BC that are likely to impact this stock of concern. In Areas 21 and 121, a fishing window closure was in took place from September 11 to October 22 to address IFR Steelhead bycatch concerns. Following the window closure if in season abundance confirms that the return in Nitinat Lake is above the 225,000, fisheries would be permitted within a two mile boundary of the shore line between Bonilla Point and Pachena Point. Due to low Chum return of 160,000, escapement goals to the Nitinat system were not met in season; therefore, no commercial fisheries were authorized in 2020.

### *Nootka Sound (Area 25) Commercial Fisheries*

Based on pre-season forecasts no fisheries were planned in Nootka Sound.

### *Esperanza Inlet (Area 25) Commercial Fisheries*

Based on pre-season forecasts, a limited effort gill net Chum fishery opened in Esperanza Inlet on September 28, 2020. Effort was limited to a maximum of five vessels. The fishery was open for 1.5 days per week during daylight hours for 4 weeks. The total catch for the Esperanza Inlet Area D gill net limited effort fishery can be found in Appendix 4.

### *Kyuquot Sound (Area 26) Commercial Fisheries*

Based on pre-season forecasts, a limited effort gill net Chum fishery opened in Kyuquot Sound on September 28, 2020. Effort was limited to a maximum of four vessels. The fishery was open for 1.5 days per week during daylight hours for 3 weeks. The total catch for the Kyuquot Sound Area D gillnet limited effort fishery can be found in Appendix 4.

## **7.4.6 RECREATIONAL FISHERIES**

### **7.4.6.1 TIDAL RECREATIONAL FISHERIES**

Daily limits of Chum in the WCVI recreational fishery are dependent on pre-season abundance forecasts relative to biologically based targets. In areas where the forecast was above target reference points (Area 25, Esperanza and Area 26, Kyuquot), the daily limit was four (4). In areas where the forecast was below target reference points (Area 23, Barkley, Area 24, Clayoquot and Area 25, Nootka), the daily limit was zero (0). At Nitinat (Areas 21, 22), the daily limit was two (2). In 2020, due to conservation concerns for Southwest Vancouver Island Chum stocks, daily limits were reduced or closed as follows:

Areas 21 and 22 the daily limit was reduced to 2 per day from July 15 – Dec 31.

Areas 23, 24 and Subareas 25-1 to 25-8 and 25-15 the daily limit was reduced to zero.

The remaining portions of Areas 25, Area 26 and Area 27 were at daily limits of 4 per day.

Anglers are restricted to the use of barbless hooks and there is a minimum size limit of 30 cm.

#### **7.4.7 EXCESS SALMON TO SPAWNING REQUIREMENTS (ESSR) FISHERIES**

The Ditidaht First Nation was issued an ESSR Licence for Chinook, Coho and Chum at Nitinat Lake and Nitinat hatchery.

The total Chum ESSR catch can be found in Appendix 7.

There were no other Chum ESSR fisheries on the WCVI in 2020.

## 8.1 APPENDIX I: CATCHES IN CANADIAN TREATY LIMIT FISHERIES, 2004 TO 2020

[illegible]

## 8.2 APPENDIX 2: TRANSBOUNDARY CATCH TABLE

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	Stikine	5,423	-	2	-	-	-	-	-	389	-
	Taku	237	-	66	-	-	-	-	-	94	-
	Alsek	218	-	-	-	-	-	-	-	22	-
Total First Nations FSC Catch		5,878	-	68	-	-	-	-	-	505	-
Commercial											
	Stikine	6,153	-	5,101	-	-	-	-	-	-	749
	Taku	11,556	2	6,970	6	-	7,306	-	157	-	259
Total Commercial Catch		17,709	2	12,071	6	-	7,306	-	157	-	1,008
Recreational											
	Alsek	-	-	6	-	-	-	-	-	-	-
Total Recreational Catch		-	-	6	-	-	-	-	-	-	-
TOTALS		23,587	2	12,145	6	-	7,306	-	157	505	1,008

## 8.3 APPENDIX 3: NORTHERN BC CATCH TABLE

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	Skeena	110,685		3,081		2,148		56		4,482	
	Nass	39,390		897		6,606		80		5,577	
	Central Coast	608		13		125		173		1,621	
<b>Total First Nations FSC Catch</b>		<b>150,683</b>	<b>-</b>	<b>3,991</b>	<b>-</b>	<b>8,879</b>	<b>-</b>	<b>309</b>	<b>-</b>	<b>11,680</b>	<b>-</b>
Commercial											
Area C Gillnet	Central Coast	199	23	-	186	10,666	31	12,974	1	4,130	5
Demo	Central Coast	-	-	-	-	-	-	-	-	-	-
Area F Troll	Haida Gwaii AABM	-	280	11,802	36	10,441	6,175	25	1,825	30,096	3,250
Area F Troll	Haida Gwaii Pink/Coho	-	389	77,579	202	126,449	26,839	-	216	-	7,151
Area A Seine	Nass		212		94	1,816		1,751			161
<b>Total Commercial Catch</b>		<b>199</b>	<b>904</b>	<b>89,381</b>	<b>518</b>	<b>149,372</b>	<b>33,045</b>	<b>14,750</b>	<b>2,042</b>	<b>34,226</b>	<b>10,567</b>
Recreational											
	Skeena/Nass	1,737		583		167		-		534	
	Central Coast	-	-	3,055	20	110		10		1,387	355
	Haida Gwaii	7		3,198		787		173		6,087	
<b>Total Recreational Catch</b>		<b>1,744</b>	<b>-</b>	<b>6,836</b>	<b>20</b>	<b>1,064</b>	<b>-</b>	<b>183</b>	<b>-</b>	<b>8,008</b>	<b>355</b>
<b>TOTALS</b>		<b>152,626</b>	<b>904</b>	<b>100,208</b>	<b>538</b>	<b>159,315</b>	<b>33,045</b>	<b>15,242</b>	<b>2,042</b>	<b>53,914</b>	<b>10,922</b>



## 8.4 APPENDIX 4: SOUTHERN BC CATCH TABLE

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	WCVI - Inshore ISBM			2,467				2,080		8,608	
	WCVI - Offshore AABM			21,448	115			6		4,068	113
	Strait of Georgia			729				6,477		3,359	
	Johnstone Strait			514				19,686		896	38
Total First Nations FSC Catch		-	-	25,158	115	-	-	28,249	-	16,931	151
First Nations Commercial											
EO	WCVI - Inshore ISBM									29,829	-
Total First Nations Commercial Catch				-						29,829	
Taaq-wiihak											
	WCVI - Offshore AABM			65				2		4,170	
	WCVI - Inshore ISBM			45	132			19	13	6,174	
Total Taaq-wiihak Catch		-	-	110	132	-	-	21	13	10,344	-
Commercial											
Area B		-	1	2	761	10	3	80,884	23	7,984	939
Area D		-	1	-	240	2	5	71,296	6	34,899	12
Area E		-	-	-	-	-	-	18,510	-	-	-
Area G		-	2	5	3,272	-	18	-	-	11,350	762
Area H		-	1	-	18	3	4	12,771	-	-	31
Total Commercial Catch		-	5	7	4,291	15	30	183,461	29	54,233	1,744
Recreational											
	Johnstone Strait	-	6	3,076	5,033	3,161	3,586	36	10	6,592	9,133
	Strait of Georgia	-	150	6,798	20,451	2,235	966	2,219	277	33,285	108,013
	Juan de Fuca	16	57	17,038	37,074	116	78	82	-	7,358	22,838
	WCVI - Inshore ISBM	8	17	11,640	8,755	51	122	7	6	37,156	19,331
	WCVI - Inshore AABM	4,974	685	1,153	349			43	-	8,822	5,057
	WCVI - Offshore AABM	33	24	8,044	10,790	10	11	-	1	10,561	4,044
Total Recreational Catch		5,031	939	47,749	82,452	5,573	4,763	2,387	294	103,774	168,416
<b>TOTALS</b>		<b>5,031</b>	<b>944</b>	<b>73,024</b>	<b>86,990</b>	<b>5,588</b>	<b>4,793</b>	<b>214,118</b>	<b>336</b>	<b>215,111</b>	<b>170,311</b>

## 8.5 APPENDIX 5: FRASER RIVER CATCH TABLE

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	Fraser	12,576	4,077	372	1,909	-	1	28,482	48	33,381	1,374
Total First Nations FSC Catch		12,576	4,077	372	1,909	-	1	28,482	48	33,381	1,374
First Nations Commercial											
	Fraser	1		46	12			6,318		3	3
Total First Nations Commercial Catch		1	-	46	12	-	-	6,318	-	3	3
Commercial											
	Fraser	-	1	94	348	-	1	33,339	19	-	18
Total Commercial Catch		-	1	94	348	-	1	33,339	19	-	18
Recreational											
	Fraser	21	0	23,570	19,225	0	0	6,618	22,134	11,861	3,412
Total Recreational Catch		21	0	23,570	19,225	0	0	6,618	22,134	11,861	3,412
<b>TOTALS</b>		<b>12,598</b>	<b>4,078</b>	<b>24,082</b>	<b>21,494</b>	<b>-</b>	<b>2</b>	<b>74,757</b>	<b>22,201</b>	<b>45,245</b>	<b>4,807</b>

## 8.6 APPENDIX 6: TEST FISHING CATCH TABLE

[illegible]

## 8.7 APPENDIX 7: ESSR CATCH TABLE

Hatcheries	Sockeye kept	Sockeye released	Coho kept	Coho released	Pink kept	Pink released	Chum kept	Chum released	Chinook kept	Chinook released	GRAND TOTAL
Robertson Creek	-	-	3,642		-	-	-	-	23,700		27,342
Quinsam River					160,667						160,667
Puntledge River									1,197		1,197
Nitinat River	-	-	92		-	-	32,288		15,922		48,302
Conuma River											-
Weaver Spawning Channel											-
Chehalis Hatchery							5,892	-		-	5,892
Inch Hatchery			7,324	-			4,841	-			12,165
Chilliwack Hatchery			28,615	-			649	-	3,302	-	32,566
Capilano Hatchery			2,285						1,018		3,303
Tenderfoot Hatchery											-
Big Qualicum River			15,223		10,269				8,285		33,777
Little Qualicum River									4,732		4,732
Cowichan River											
Nanaimo River			30				1,873				1,903
											-
<b>Grand Total</b>	<b>-</b>	<b>-</b>	<b>57,211</b>	<b>-</b>	<b>170,936</b>	<b>-</b>	<b>45,543</b>	<b>-</b>	<b>58,156</b>	<b>-</b>	<b>331,846</b>

# **2020 POST SEASON REPORT UNITED STATES SALMON FISHERIES OF RELEVANCE TO THE PACIFIC SALMON TREATY**

**Report Submitted to the Pacific Salmon Commission  
By the United States Section**

**January 4, 2021**

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# POST SEASON REPORT

## I. PRELIMINARY 2020 SOUTHEAST ALASKA FISHERIES

### **INTRODUCTION**

This report describes the conduct of Alaska fisheries of interest to the Pacific Salmon Commission (PSC) that occurred during 2020 in the area south and east of Cape Suckling, Alaska and north of the U.S./Canada border. These fisheries were conducted under preseason management plans that were consistent with Annex IV of the Pacific Salmon Treaty (PST), including obligations defined within Chapter 3 for Chinook salmon aggregate abundance-based management regimes (AABM).

The 2020 season was challenging due to the broad impact of the COVID-19 pandemic on all aspects of society, including fisheries and fisheries management. In March, the State of Alaska designated fisheries as critical infrastructure to protect the food supply chain and the economy. The Commissioner of the Alaska Department of Fish and Game (ADF&G) immediately directed staff to develop action plans to safely implement field projects to the extent practicable so that fisheries could be prosecuted with the least amount of disruption. Alaska was successful in maintaining all its domestic projects necessary for fisheries management with no incidence of COVID-19, and fisheries occurred as planned with extra safety precautions in place for vessel operators, processors, and staff. We would like to recognize the numerous ADF&G staff who put in extraordinary efforts to ensure Alaska's fisheries continued uninterrupted during this difficult time.

Bilateral projects operating on the transboundary rivers (TBR) were particularly challenging this season, due to the varied mandates put in place by both countries to stop the spread of COVID-19 and the stricter rules regarding border crossings, which are inherent to bilateral operations. Despite the challenges, there was excellent bilateral communication between ADF&G, Canadian Department of Fisheries and Oceans (DFO), and Canadian First Nations that helped ensure that TBR projects operated as close to normal as possible and provided the data critical for management of fisheries harvesting salmon originating from the Stikine, Taku, and Alsek rivers. The enhancement programs on the Taku and Stikine rivers also faced unique challenges with the transport of eggs and fry across the border, but by close coordination between Alaska and Canada, fry transports were ultimately successful. Alaska would like to thank all the Canadian personnel that made extra effort to ensure these essential projects were able to operate.

Due to these extraordinary efforts, Alaska was able to meet all its PST obligations with respect to data collection inclusive of catch accounting, sampling, escapement monitoring, and hatchery marking and tagging. All programs generally proceeded as normal, with exception of the federally operated Little Port Walter research facility which suspended marking and tagging. The State of Alaska does not anticipate any implications for meeting annual Treaty commitments due to the COVID-19 pandemic.

All fisheries were managed consistent with the obligations outlined in the PST. Preliminary data suggest that the harvests of sockeye salmon in Alaska were very low in all fisheries and will be below annual allowable harvests in Northern Boundary and Taku River fisheries. The District 104



purse seine fishery was limited to a single 6-hour opening prior to statistical week 31 to reduce harvest of Nass and Skeena river sockeye salmon. For Chinook salmon, all fisheries were managed conservatively and monitored closely inseason to avoid exceeding the harvest level defined in the 2019 PST Agreement, and the 2020 all-gear Treaty harvest of 204,624 was below the CPUE-based catch limit of 205,165.

## ***NORTHERN BOUNDARY AREA FISHERIES***

### ***District 104 Purse Seine Fishery***

The 2019 revision of the Pacific Salmon Treaty (PST) Agreement calls for abundance-based management of the District 104 purse seine fishery. The Agreement allows the District 104 purse seine fishery to harvest 2.45 percent of the Annual Allowable Harvest (AAH) of Nass and Skeena sockeye salmon prior to ADF&G statistical week 31 (referred to as the Treaty period). The AAH is calculated as the total combined run of Nass and Skeena sockeye salmon minus either the escapement requirement of 1.1 million (200,000 Nass River and 900,000 Skeena River) 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 2020, the first potential opening was July 5 (week 28). The pre-week 31 fishing plan for District 104 was based on the preseason DFO forecast runs of approximately 1.37 million Nass and Skeena sockeye salmon. In the 2020 Treaty period (Alaska statistical weeks 28–30), 6,923 sockeye salmon were harvested during a 6-hour opening in week 30 (Table 1). The fishery was closed in weeks 28 and 29 due to low Skeena River sockeye salmon abundance. A total of 13 purse seine vessels fished at some time in the district during the Treaty period. A preliminary estimate of 5,300 Nass and Skeena sockeye salmon were harvested in the District 104 purse seine fishery during the 2020 Treaty period. The final estimate of the number of Nass and Skeena sockeye salmon harvested during the Treaty period in District 104, will be determined at the January 2022 PSC post season meeting.

In 2020, a total of 1,453,277 pink salmon, 143,877 sockeye salmon, 84,027 chum salmon, 19,705 coho salmon, and 3,833 Chinook salmon were harvested in the District 104 purse seine fishery (Table 1). The number of days that the fishery was open, and the number of boats fishing were both below the 1985–2019 average (Figure 1 and 2). Purse seine fisheries were on non-retention for Chinook salmon throughout most of the salmon season, except for weeks 32 through 34. Sockeye salmon harvests were below average in all weeks (Figure 4) and the Treaty period (week 28–30) harvest of 6,923 fish was only 7% of the long-term average (1985–2019). The total sockeye salmon harvest of 143,877 fish was 32% of the long-term average of 453,000 fish. Harvests of coho salmon were also well below average in all weeks (Figures 5) and the overall harvest of 19,705 fish was 18% of average. The overall pink salmon harvest of 1,453,277 fish was only 19% of average (Figure 6) and the chum salmon harvest of 84,027 fish was 29% of 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%, 63% and 85% respectively compared to averages in the pre-Treaty 1980–1984 period (Table 2). The total pre-week 31 Treaty-period sockeye salmon harvest is also down 51%. The purse 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. Weekly salmon harvest and fishing effort in the Alaska District 104 purse seine fishery, 2020.

Week/ Opening	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Hours
28	Closed	—	—	—	—	—	—	—
29	Closed	—	—	—	—	—	—	—
30	7/19	0	6,923	2,199	66,720	3,960	13	6
31	7/26	0	12,510	2,707	85,307	6,874	33	15
31B	7/30	0	41,647	4,166	509,164	19,872	71	15
32	8/2	771	26,546	2,195	191,282	15,571	68	15
32B	8/5	181	11,930	1,352	136,292	12,570	35	15
32C	8/8	103	10,158	1,085	111,983	7,812	23	15
33	Closed	—	—	—	—	—	—	—
33B	8/13	1,914	21,002	2,975	260,760	12,031	37	15
34	8/16	864	13,161	3,026	91,769	5,337	39	15
Permits Fished								
Weeks 28–30		0	6,923	2,199	66,720	3,960	13	6
Weeks 31–34		3,833	136,954	17,506	1,386,557	80,067	98	105
Total		3,833	143,877	19,705	1,453,277	84,027	99	111

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

Year	Hours Fished	Individual Permits Fished	Days Fished (1d=15hrs)	Approximate Boat-Days	Sockeye Harvest	Sockeye Catch per Boat-Day
2020	6	13	0.4	5	6,923	1,385
Avg. 80–84	139	225	9	1,487	187,647	136
Avg. 85–19	61	84	4	222	92,873	454
% Change	-56%	-63%	-56%	-85%	-51%	235%

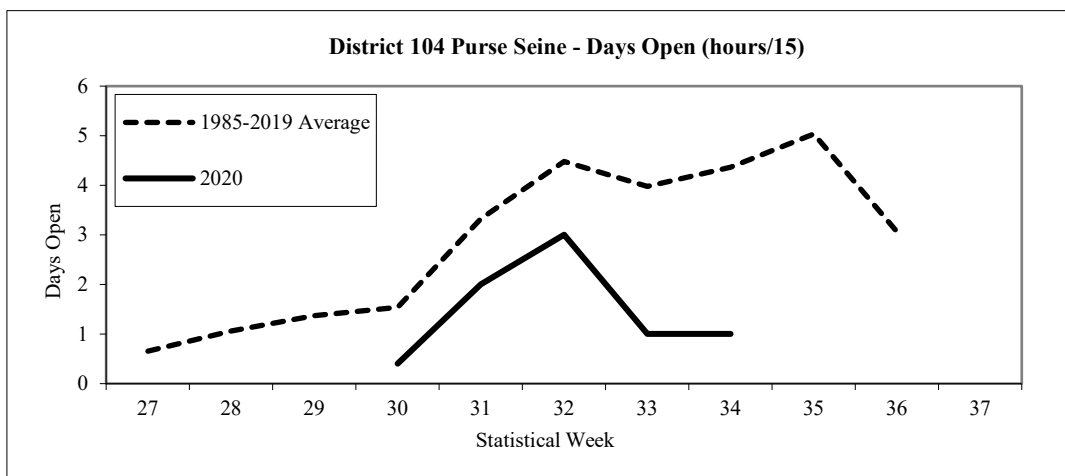


Figure 1. Days open by week in the District 104 purse seine fishery, 2020.

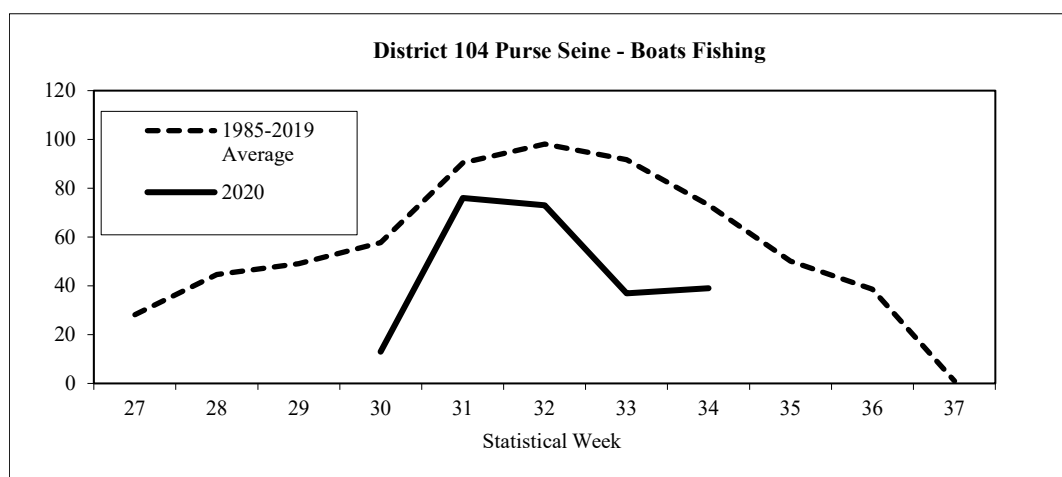


Figure 2. Number of boats fishing by week in the District 104 purse seine fishery, 2020.

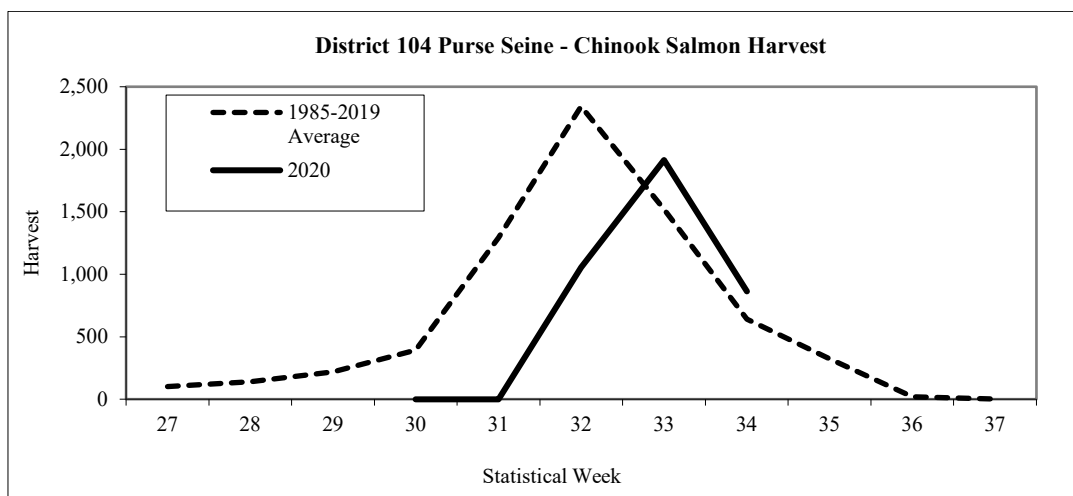


Figure 3. Chinook salmon harvest by week in the District 104 purse seine fishery, 2020.

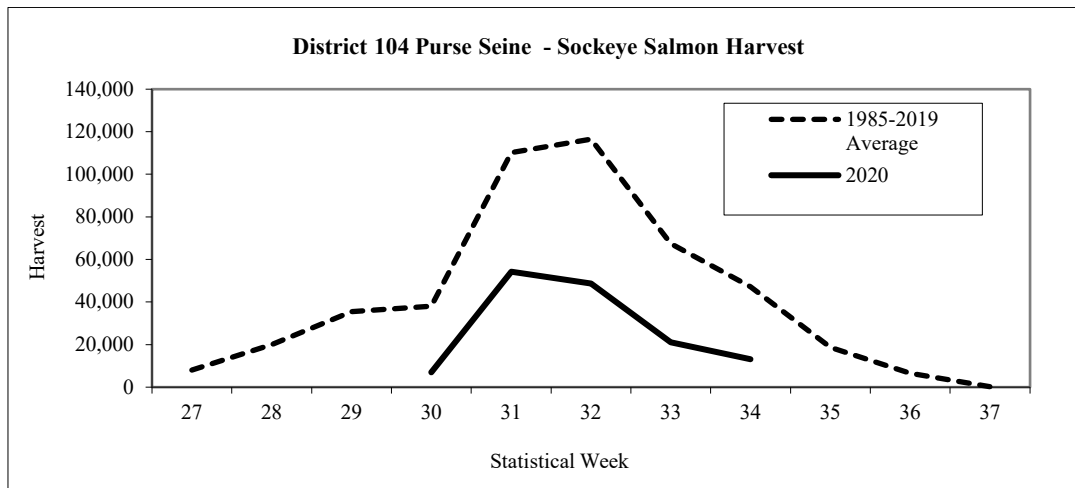


Figure 4. Sockeye salmon harvest by week in the District 104 purse seine fishery, 2020.

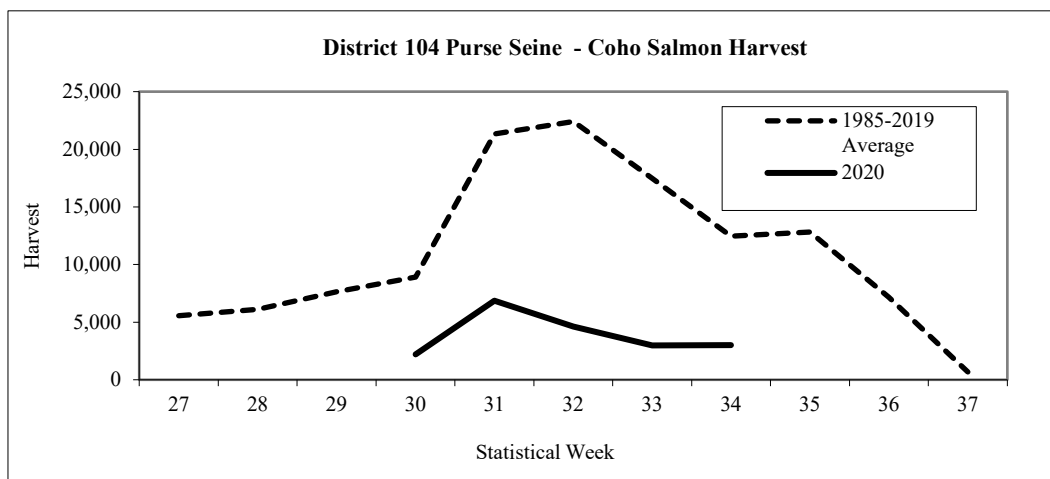


Figure 5. Coho salmon harvest by week in the District 104 purse seine fishery, 2020.

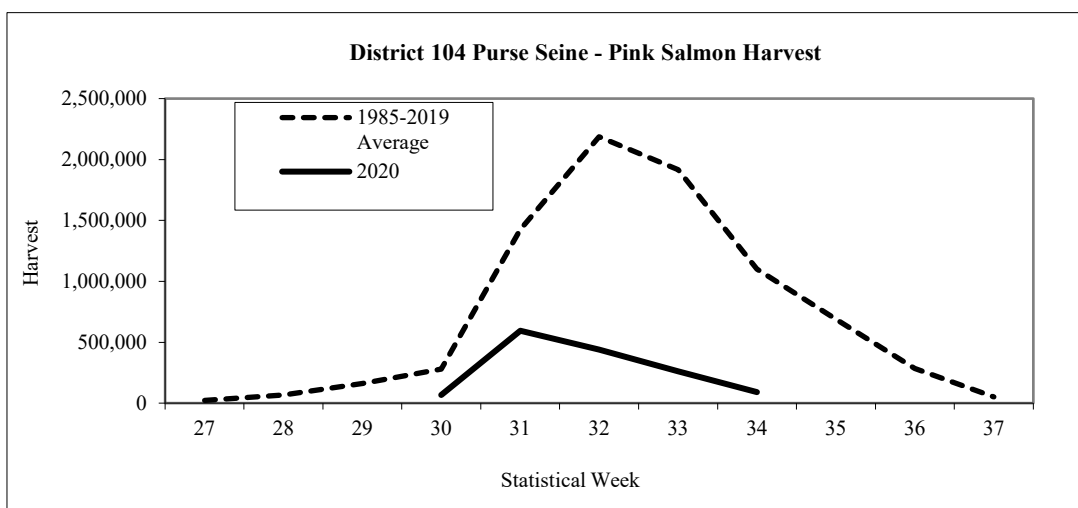


Figure 6. Pink salmon harvest by week in the District 104 purse seine fishery, 2020.

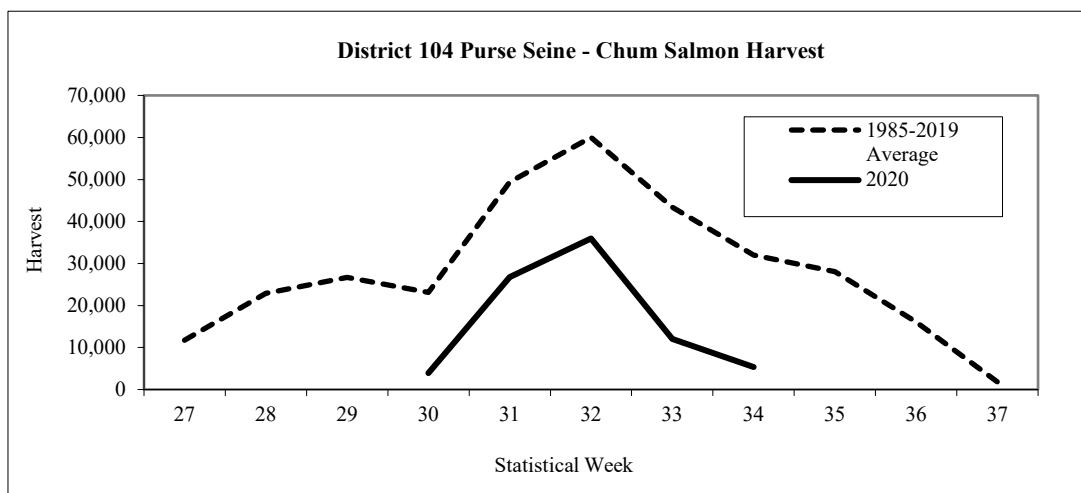


Figure 7. Chum salmon harvest by week in the District 104 purse seine fishery, 2020.

#### District 101 Drift Gillnet Fishery

The 2019 PST agreement calls for abundance-based management of the District 101 (Tree Point) drift gillnet fishery. The agreement specifies that the U.S. manage for 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 River sockeye salmon minus either the escapement requirement of 200,000 fish or the actual in-river escapement, whichever is less. The run of Nass River sockeye salmon was forecasted at 494,000 fish in 2020 which, minus an escapement goal of 200,000 fish, would result in an AAH of about 294,000 fish. Using this forecast, the 2020 allowable harvest in the District 101 drift gillnet fishery was approximately 41,000 Nass River sockeye salmon.

The District 101 drift gillnet fishery opens by regulation on the third Sunday in June, which was June 21 (week 26) in 2020. 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

drift gillnet fishing time in this district in relation to the District 101 purse seine fishing time. Beginning in Week 35 (August 23) management was based on the strength of wild stock fall chum and coho salmon.

The number of days the fishery opened was near average most of the 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 50, which was approximately 48% of the long-term (1985–2019) average of 105 boats. A total of 9,348 sockeye salmon were harvested, which was just 9% of the 1985–2019 average of 109,130 fish and the lowest harvest since the inception of the PST (Table 3). Harvests of sockeye salmon were well below average throughout the season (Figure 10). The cumulative sockeye salmon harvest prior to the initiation of the PSMP in Week 30 was 4,783 fish, or about 51% of the season's total sockeye salmon harvest. The preliminary estimate of the number of Nass River sockeye salmon harvested at Tree Point is 7,528 fish for the 2020 season. The final estimate of the number of Nass River sockeye salmon harvested in District 101, will be determined at the January 2022 PSC post season meeting.

Coho salmon harvests were below average throughout the season and the total harvest of 20,277 fish was 42% of average (Table 3; Figure 11). Pink salmon harvests were below average most of the season and the total harvest of 186,278 fish was 39% of average (Figure 12). Chum salmon harvests were also below average in most weeks of the fishery and the total harvest of 136,083 fish was 46% of average (Figure 13). Chinook salmon harvests were above average in most weeks of the season (Figure 14).

Table 3. Weekly salmon harvest and fishing effort in the Alaska District 101 commercial drift gillnet fishery, 2020.

Week	Start		Chinook	Sockeye	Coho	Pink	Chum	Boats	Hours
	Date								
26	6/21		348	1,469	221	228	7,862	25	96
27	6/28		519	1,940	574	2,405	11,083	26	96
28	7/5		304	705	821	8,635	12,684	31	96
29	7/12		200	669	1,253	15,887	20,041	33	96
30	7/19		297	1,866	1,324	36,136	33,555	36	96
31	7/26		87	1,421	932	73,002	23,760	39	96
32	8/2		14	319	1,255	21,559	8,195	32	120
33	8/9		10	146	554	6,943	4,531	21	48
34	8/16		6	292	1,038	10,422	5,146	26	48
35	8/23		8	340	3,232	9,490	6,144	29	96
36	8/30		6	170	4,382	1,543	2,203	23	96
37	9/6		7	8	2,637	23	574	22	96
38	9/13		6	3	2,054	5	305	19	96
Total			1,812	9,348	20,277	186,278	136,083	50	1,176
1985–2019 Avg.			1,479	109,130	48,042	481,877	294,895	105	1,377

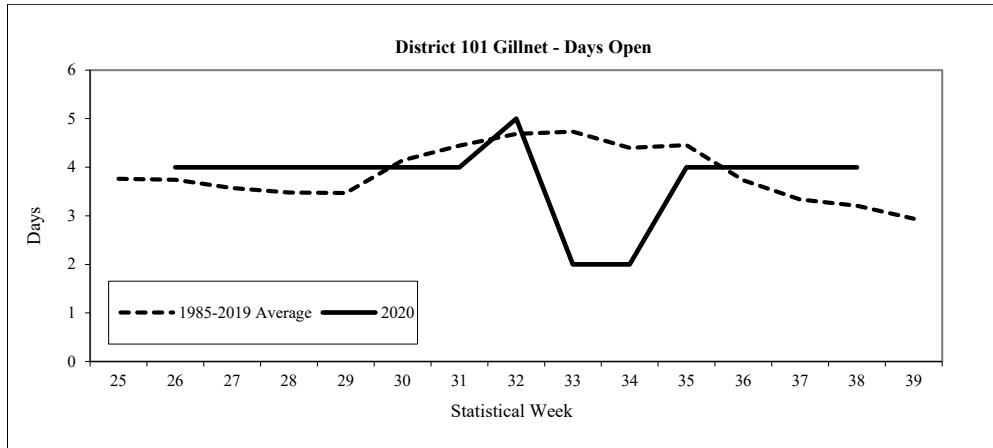


Figure 8. Days open by week in the District 101 drift gillnet fishery, 2020.

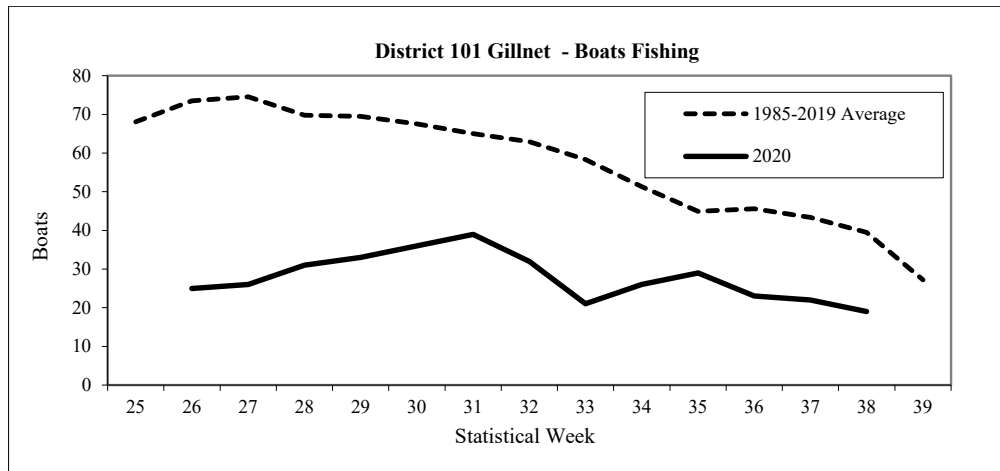


Figure 9. Number of boats fishing by week in the District 101 drift gillnet fishery, 2020.

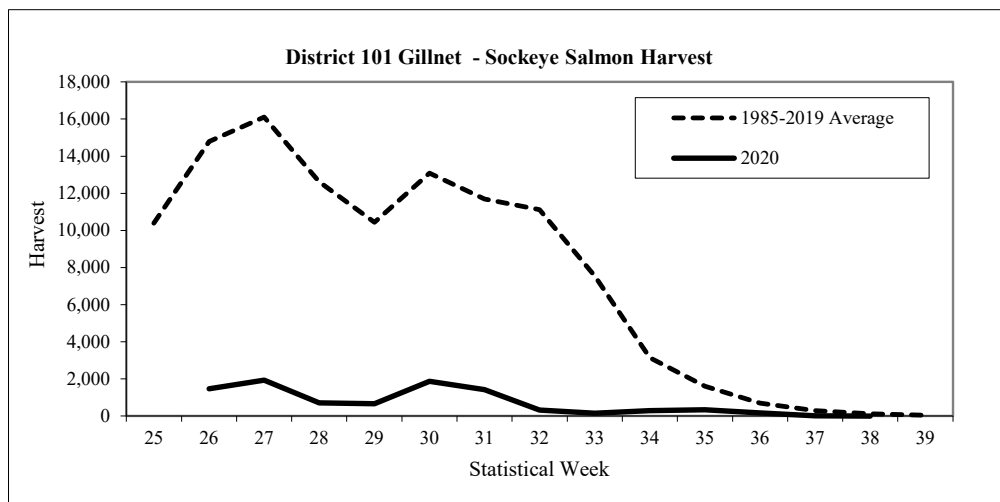


Figure 10. Sockeye salmon harvest by week in the District 101 drift gillnet fishery, 2020.

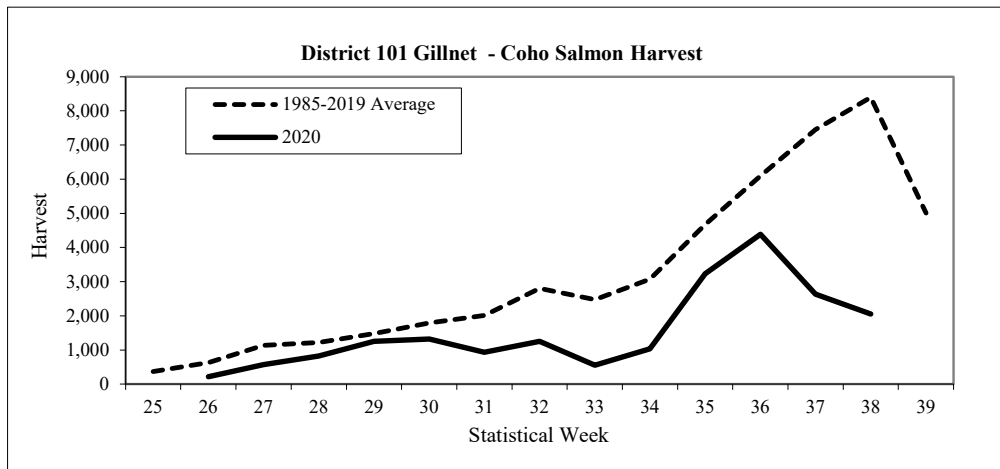


Figure 11. Coho salmon harvest by week in the District 101 drift gillnet fishery, 2020.

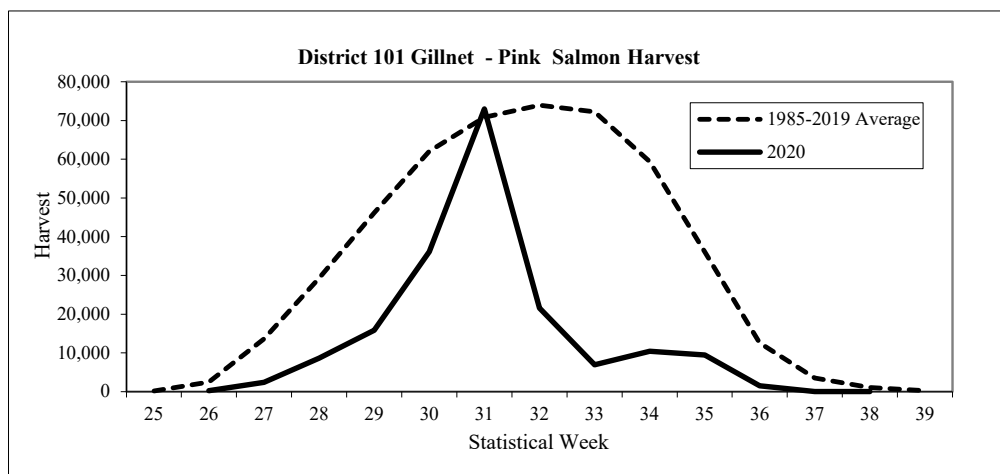


Figure 12. Pink salmon harvest by week in the District 101 drift gillnet fishery, 2020.

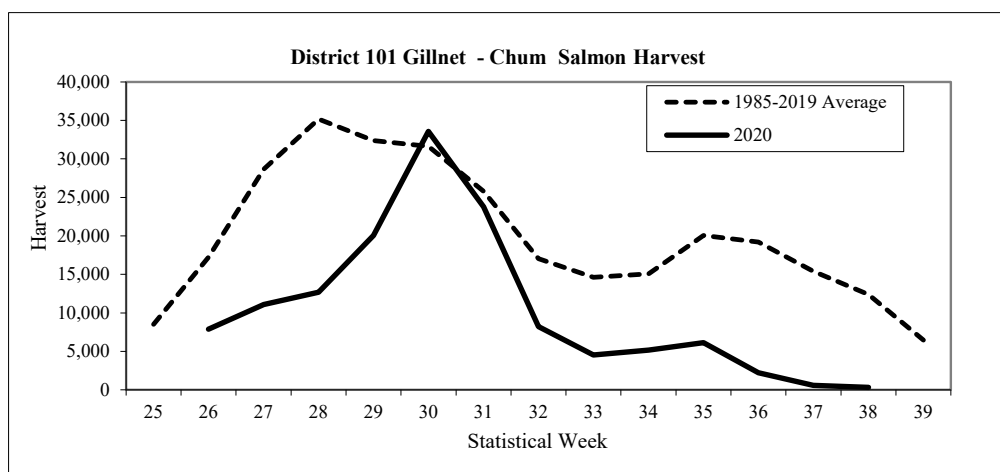




Figure 13. Chum salmon harvest by week in the District 101 drift gillnet fishery, 2020.

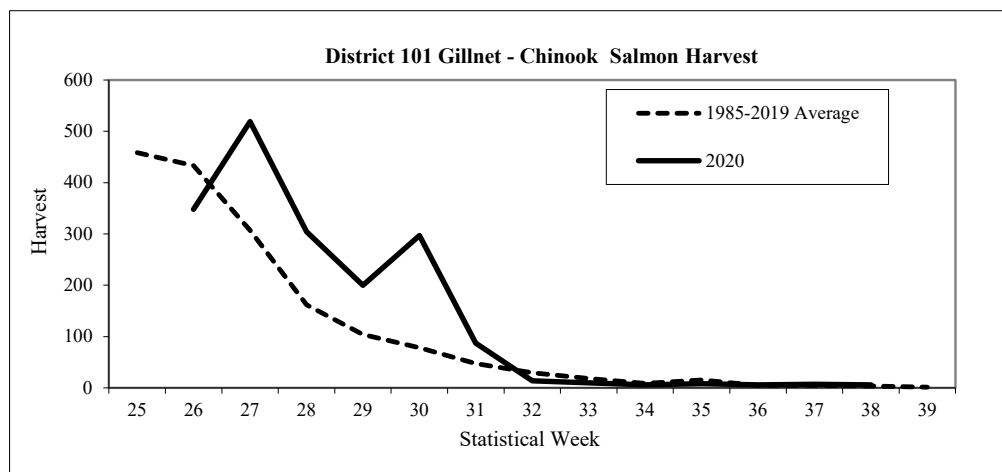


Figure 14. Chinook salmon harvest by week in the District 101 drift gillnet fishery, 2020.

#### Pink, Sockeye, and Chum Salmon Escapements

Escapements of pink salmon were generally good in southern Southeast Alaska (SEAK) and along the outer coast of northern SEAK, but poor to average throughout northern inside waters. The total 2020 SEAK pink salmon escapement index of 9.73 million index fish ranked 32<sup>nd</sup> 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 2020 (Table 4). On a finer scale, escapements were within management targets for 10 of 15 districts in the region and for 30 of the 46 pink salmon stock groups in SEAK. The Southern Southeast Subregion includes all of the area from Sumner Strait south to Dixon Entrance (Districts 101–108). The escapement index value of 5.7 million was within the escapement goal range of 3.0 to 8.0 million index fish.

Table 4. Southeast Alaska 2020 pink salmon escapement indices and biological escapement goals by subregion (in millions).

Subregion	2020 Pink	Biological Escapement Goal	
	Salmon Index	Lower Bound	Upper Bound
Southern Southeast	5.66	3.00	8.00
Northern Southeast Inside	2.29	2.50	6.00
Northern Southeast Outside	1.79	0.75	2.50
Total	9.73		

Sockeye salmon escapement levels throughout SEAK were mixed in 2020, and escapement lower bounds were met for 6 of the 12 sockeye salmon systems with formal escapement goals. The Hugh Smith Lake adult sockeye salmon escapement was 3,860 fish, 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 8,200 fish, which was below the sustainable escapement goal range of 55,000 to 120,000 fish.

For summer-run chum salmon, lower bound sustainable escapement goals were not met for two of the three subregions in SEAK. 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 SEAK, 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 below average at many index streams in southern SEAK, but the index of 70,000 in 2020 met the escapement goal (Figure 15).

Cholmondeley Sound is the only area in southern SEAK 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 30,000 fish was right at the lower bound of the sustainable escapement goal range of 30,000 to 48,000 index spawners (based on the aggregate peak survey to both streams; Figure 16).

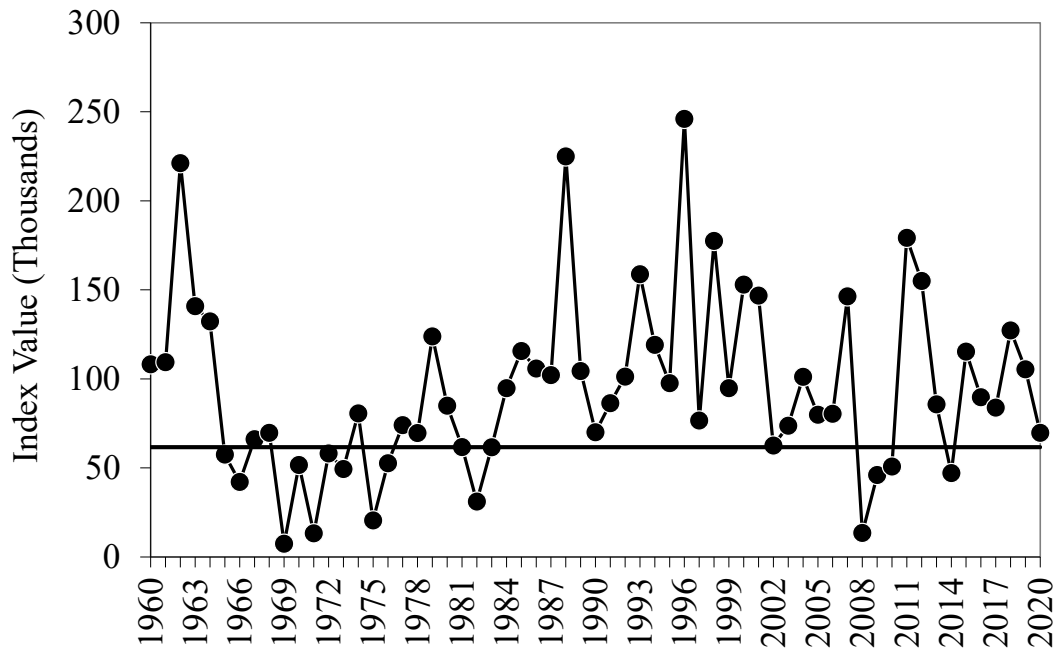


Figure 15. Observed escapement index value by year (solid circles) and the sustainable escapement goal threshold of 62,000 index spawners (horizontal line) for wild summer-run chum salmon in the Southern Southeast Subregion, 1960–2020.

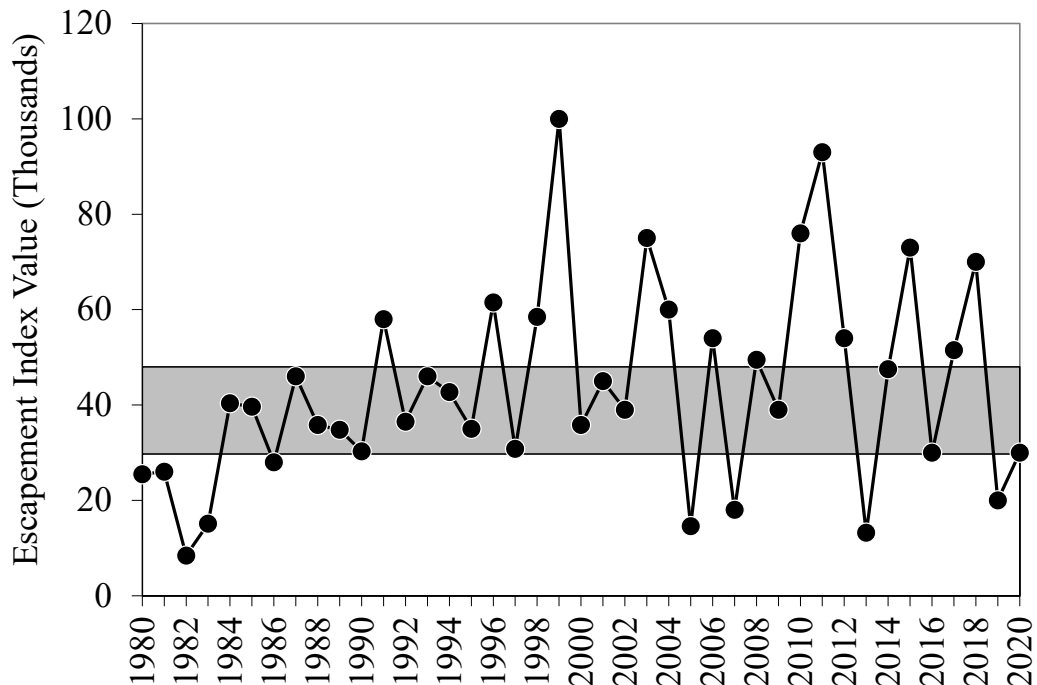


Figure 16. Observed escapement index value by year (solid circles) and the sustainable escapement goal range of 30,000 to 48,000 index spawners (shaded area) for Cholmondeley Sound fall-run chum salmon, 1980–2020.

## ***TRANSBOUNDARY AREA FISHERIES***

### Stikine River Area Fisheries

The 2020 preseason forecast for large Chinook salmon ( $\geq 660$  mm mid eye to tail fork length) returning to the Stikine River was approximately 13,400 fish, which did not allow for directed Chinook salmon fisheries in District 108. The standard mark-recapture program was not operated this year due to the low forecasted run and the desire by both countries to reduce mortality associated with the program. Inseason estimates produced by the Stikine Chinook Management Model (SCMM) indicated an escapement of 12,000 fish, which was below the lower end of the goal range of 14,000 to 28,000 fish. The preliminary escapement estimate of Stikine River large Chinook salmon is 9,753 fish, which is below the lower end of the goal range of 14,000 to 28,000 fish.

The 2020 preseason forecast for sockeye salmon returning to the Stikine River was 103,400 fish, which was below the 2010–2019 average of 114,700 fish. The 2020 forecast included approximately 30,000 wild Tahltan (29%), 34,500 enhanced Tahltan (33%), and 38,900 mainstem (38%) sockeye salmon. During the first half of the sockeye salmon management period, fishing periods in District 108, and to a lesser extent in District 106, were determined by the inseason abundance estimate of the Tahltan Lake run. Management actions during the second half of the sockeye salmon fishery became focused on the mainstem component of the Stikine River run in District 108, while returns to local area systems were the focus in District 106. Typically, Tahltan Lake sockeye salmon stocks exhibit peak run timing in District 106 and 108 fisheries during statistical week 26 (June 21–June 27). During an average Tahltan Lake run, significant numbers of sockeye salmon could be present as early as statistical week 24 (June 7–13) and as late as statistical week 31 (July 26–August 1). The 2020 runs of local area sockeye salmon stocks were below average.

Due to the poor performance of Chinook salmon stocks in SE Alaska, restrictions were implemented in the Districts 106 and 108 drift 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 two openings. In District 108, the initial opening was delayed until week 27. Additionally, time, area, and mesh restrictions were implemented through statistical week 29 (July 12–July 18). Estimated harvest of Stikine River large Chinook salmon by the District 108 drift gillnet fishery during the sockeye salmon directed fishery period (weeks 27–29) was 62 fish based on genetic stock identification (GSI). The District 108 Spring Troll hatchery access fishery was closed for 2020. Commercial trolling remained closed to Chinook salmon retention in District 108 until the second opening of the summer troll fishery. The U.S. harvest of Stikine River large Chinook salmon in all District 108 fisheries was estimated to be 161 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 21 (week 26) and the District 108 drift gillnet fishery opened Sunday, June 28 (week 27). Given the below average forecast of sockeye salmon runs returning to the Stikine River and local area stocks, fishing time was limited to two or three days throughout the season. Mesh and area restrictions were in place through week 29. The mesh restriction was lifted from District 106 in week 28, but mesh and area restrictions continued to be in place for District 108. By week 28, it became apparent that the mainstem portion of the Stikine River sockeye salmon run was coming in below average and open time in District 108 was limited to two days in weeks 28 and 29 before closing for two weeks.

during weeks 30 and 31. A total of seven days of fishing were allowed in District 108 during the 2020 sockeye salmon season. Open time in District 106 also experienced weekly reductions and was limited to two days per week in weeks 29 through 31 for McDonald Lake sockeye salmon conservation (Table 5 and Table 6). The preliminary postseason assessment for Stikine River sockeye salmon was 35,500 fish and included 11,600 wild Tahltan (23%), 15,100 enhanced Tahltan (24%), and 8,800 Mainstem (41%) fish.

Districts 106 and 108 were managed based on pink salmon abundance during the month of August, and in late August management focus switched to coho salmon and the fisheries continued to be open for two to three days weekly through the remainder of the season. The number of boats participating in the District 106 fishery was above average during July and below average in August and September (Figure 18). The seasonal number of permits fished was 82% of average (Table 5). The number of boats participating in the District 108 fishery was below average early in the season and near or above average from August through late September (Figure 25). The 82 permits fished was 67% of the average of 123 permits (Figure 25; Table 7).

During the 2020 season, 127,583 pink salmon, 11,314 sockeye salmon, 143,577 chum salmon, 43,850 coho salmon, and 1,182 Chinook salmon were harvested in the District 106 drift gillnet fishery (Table 5). Chinook salmon harvests were below average in most weeks from late June through late August (Figure 19); the harvest was comprised of 75% Alaska hatchery origin fish. Sockeye salmon harvests were well below average all season (Figure 20), and the total sockeye salmon harvest of 11,314 fish was 15% of the 2010–2019 average; 1,900 were estimated to be of Stikine River origin. Harvests of coho salmon were also below average throughout the season and the overall harvest of 43,850 coho salmon was 32% of the 2010–2019 average of 136,800 fish (Figure 21). Pink salmon harvests were also below average throughout the season (Figure 22), and the overall harvest of 127,583 fish was 38% of the 2010–2019 average. Chum salmon harvests were near average throughout the season and the overall harvest of 143,577 fish was 99% of average (Figure 23).

During the 2020 season, 11,799 pink salmon, 2,781 sockeye salmon, 53,678 chum salmon, 21,069 coho salmon, and 2,617 Chinook salmon were harvested in the District 108 drift gillnet fishery (Table 6). The harvest of Chinook salmon was below average in the first week of the fishery in week 27, and was near average for the remainder of the season in weeks the fishery was open (Figure 26). An estimated 161 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 gillnet sockeye salmon harvests were below average throughout the season (Figure 27) and the harvest of 2,781 fish was only 10% of the 2010–2019 average. An estimated 2,300 fish, or 81% of the harvest, were Stikine River sockeye salmon. The overall coho salmon harvest of 21,069 fish was also just below the recent 2010–2019 average of 24,200 fish (Table 6, Figure 28). Pink salmon harvests were below average throughout the season and the overall harvest was 27% of the 2010–2019 average (Figure 29). The overall harvest of 53,678 chum salmon was 40% of the 2010–2019 average (Figure 30).

Table 5. Weekly salmon harvest and fishing effort in the Alaskan District 106 commercial drift gillnet fisheries, 2020.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
26	21-Jun	91	449	190	109	2,594	32	2	64
27	28-Jun	575	2,045	1,006	3,824	15,388	45	3	135
28	5-Jul	156	1,732	1,161	4,174	11,787	54	2	108
29	12-Jul	159	1,268	1,511	7,858	26,872	58	2	116
30	19-Jul	60	1,573	1,391	9,993	15,597	71	2	142
31	26-Jul	76	1,740	2,068	33,461	24,892	78	2	156
32	2-Aug	14	643	890	15,083	7,205	51	2	102
33	9-Aug	9	679	2,001	24,430	11,804	40	3	120
34	16-Aug	12	759	2,878	20,310	7,279	53	2	106
35	23-Aug	5	327	3,573	6,981	2,950	45	2	90
36	30-Aug	2	74	7,393	1,199	5,190	39	3	117
37	6-Sep	14	21	11,892	158	6,989	50	3	150
38	13-Sep	5	4	6,996	3	4,558	48	3	144
39	20-Sep	4	0	900	0	472	19	2	38
Total		1,182	11,314	43,850	127,583	143,577	120	33	1,588
2010–2019 Average		2,229	73,426	136,756	332,448	144,769	147	47	2,648
2020 as % of Average		53%	15%	32%	38%	99%	82%	70%	60%

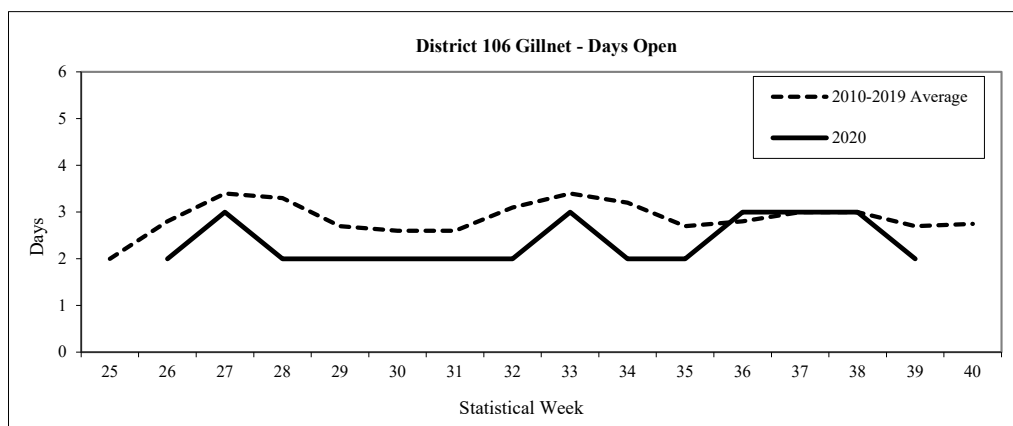


Figure 17. Days open by week in the District 106 drift gillnet fishery, 2020.

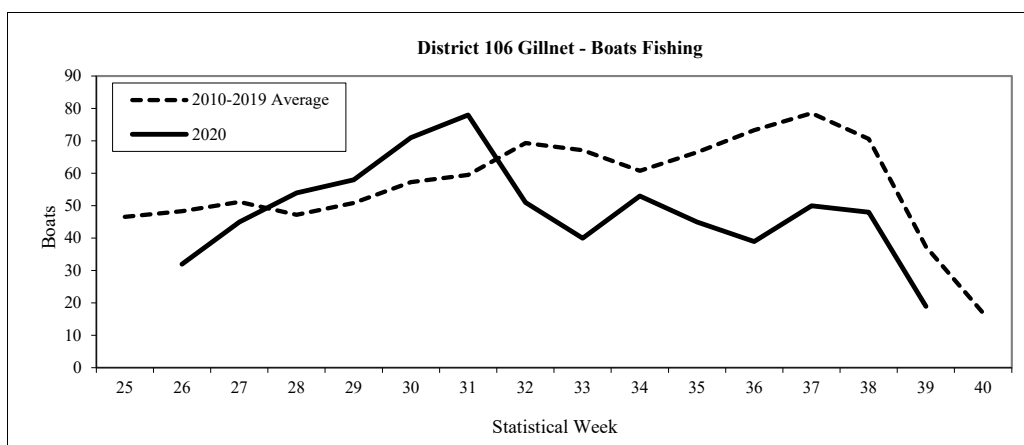


Figure 18. Number of boats fishing by week in the District 106 drift gillnet fishery, 2020.

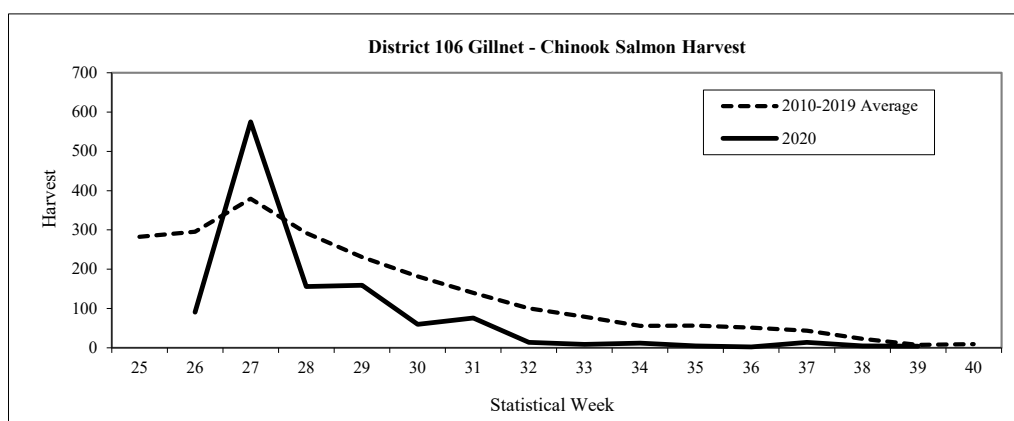


Figure 19. Chinook salmon harvest by week in the District 106 drift gillnet fishery, 2020.

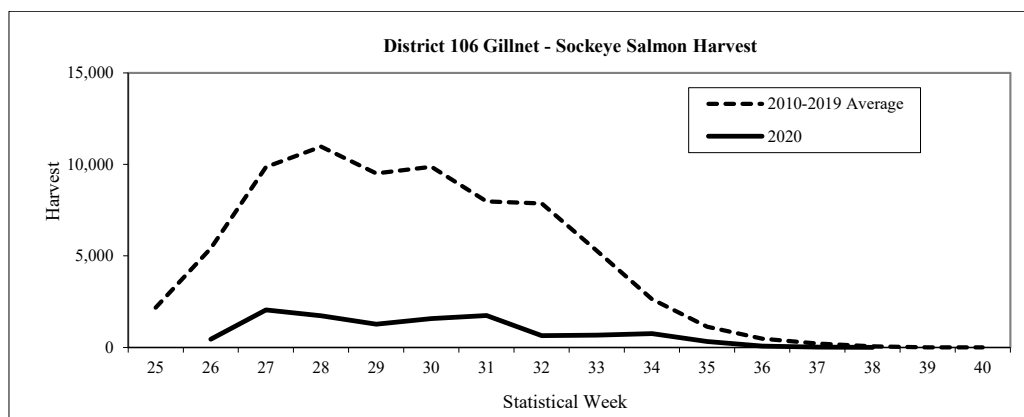


Figure 20. Sockeye salmon harvest by week in the District 106 drift gillnet fishery, 2020.

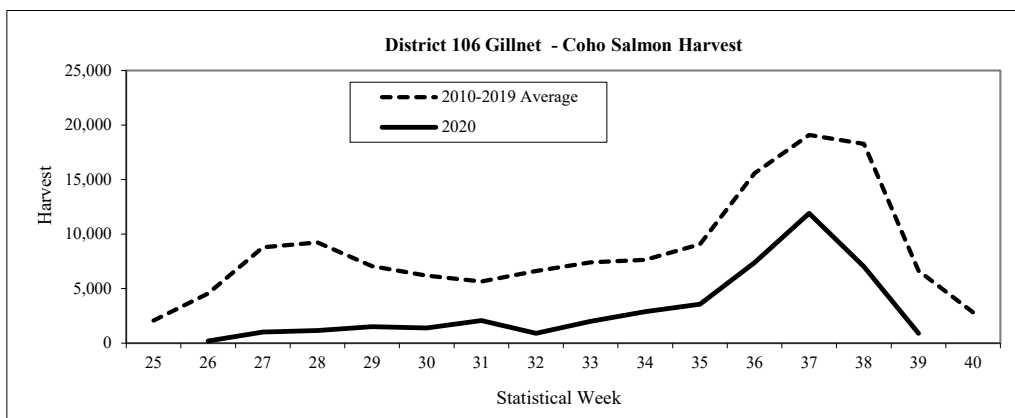


Figure 21. Coho salmon harvest by week in the District 106 drift gillnet fishery, 2020.

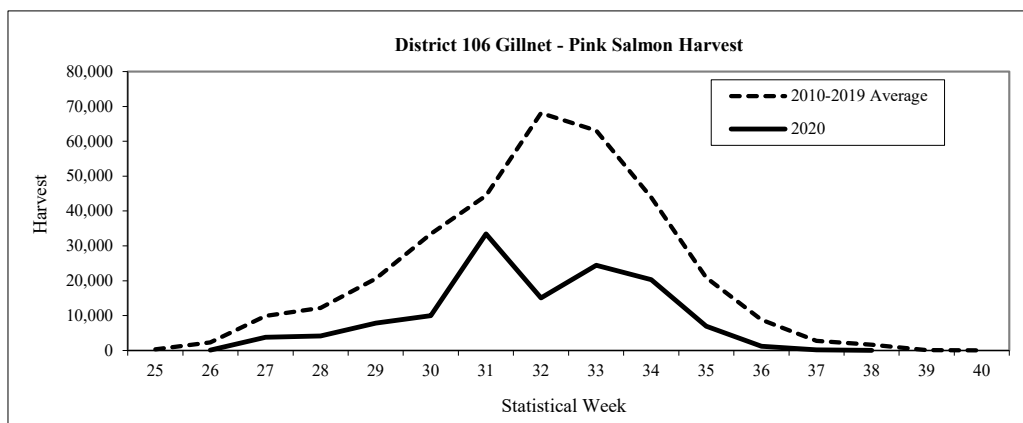


Figure 22. Pink salmon harvest by week in the District 106 drift gillnet fishery, 2020.

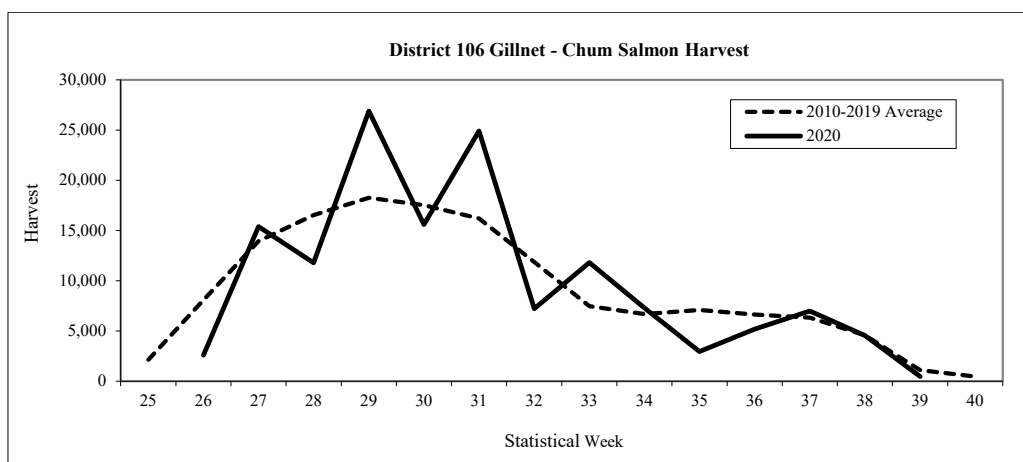


Figure 23. Chum salmon harvest by week in the District 106 drift gillnet fishery, 2020.



Table 6. Weekly salmon harvest and fishing effort in the Alaskan District 108 commercial drift gillnet fishery, 2020.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
27	28-Jun	770	877	26	72	1,658	24	3	72
28	5-Jul	1,028	761	13	214	1,725	28	2	56
29	12-Jul	656	717	22	1,157	3,553	18	2	36
30	Closed								
31	Closed								
32	2-Aug	92	143	270	4,252	22,277	42	2	84
33	9-Aug	20	162	631	4,552	17,036	47	3	141
34	16-Aug	4	44	631	906	3,207	24	2	48
35	23-Aug	17	44	1,100	505	1,508	23	2	46
36	30-Aug	4	31	4,716	131	1,368	35	3	105
37	6-Sep	10	2	8,484	7	757	37	3	111
38	13-Sep	16	0	4,544	3	528	34	3	102
39	20-Sep	0	0	632	0	61	17	2	34
Total		2,617	2,781	21,069	11,799	53,678	82	27	835
2010–2019 Average		6,914	26,627	24,154	43,659	135,016	123	48	1,622
2020 as % of Average		38%	10%	87%	27%	40%	67%	56%	51%

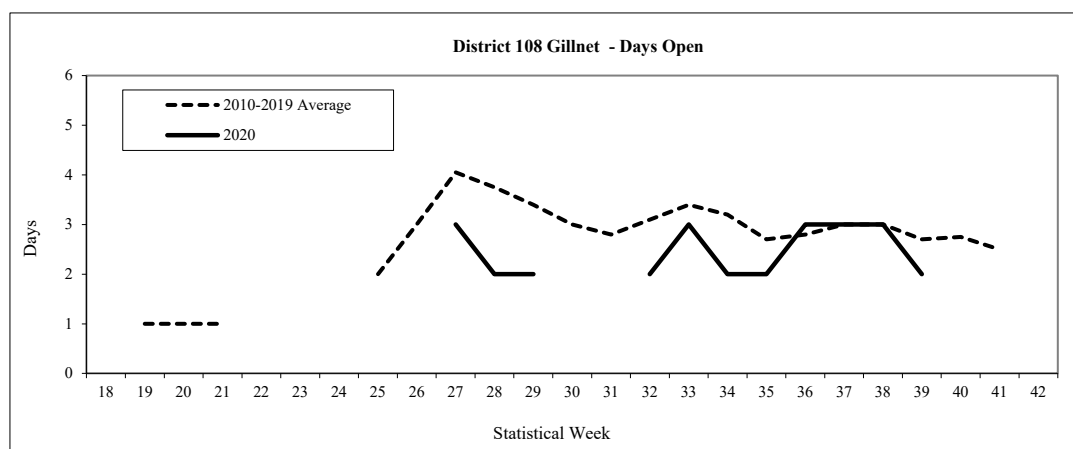


Figure 24. Days open by week in the District 108 drift gillnet fishery, 2020.

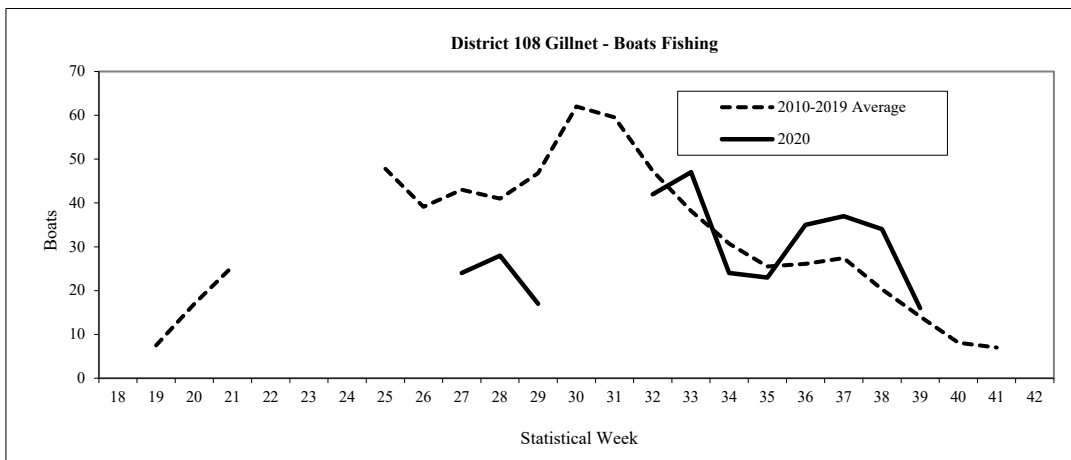


Figure 25. Number of boats fishing by week in the District 108 drift gillnet fishery, 2020.

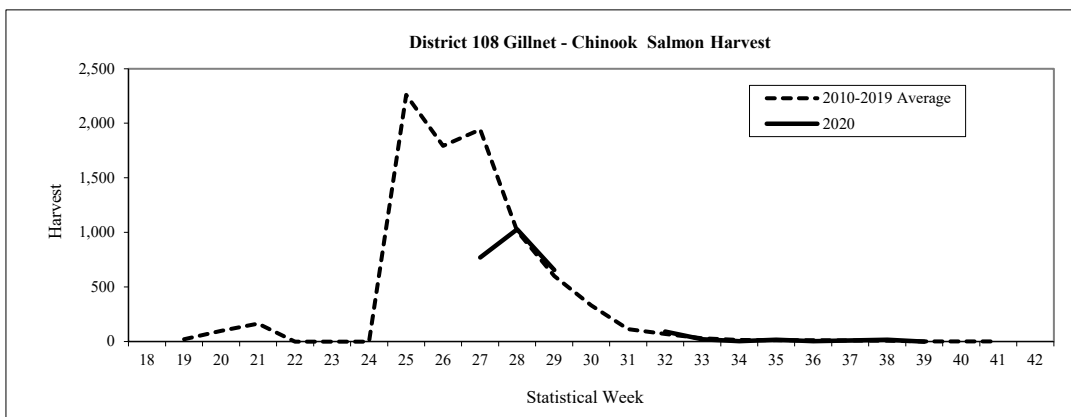


Figure 26. Chinook salmon harvest by week in the District 108 drift gillnet fishery, 2020.

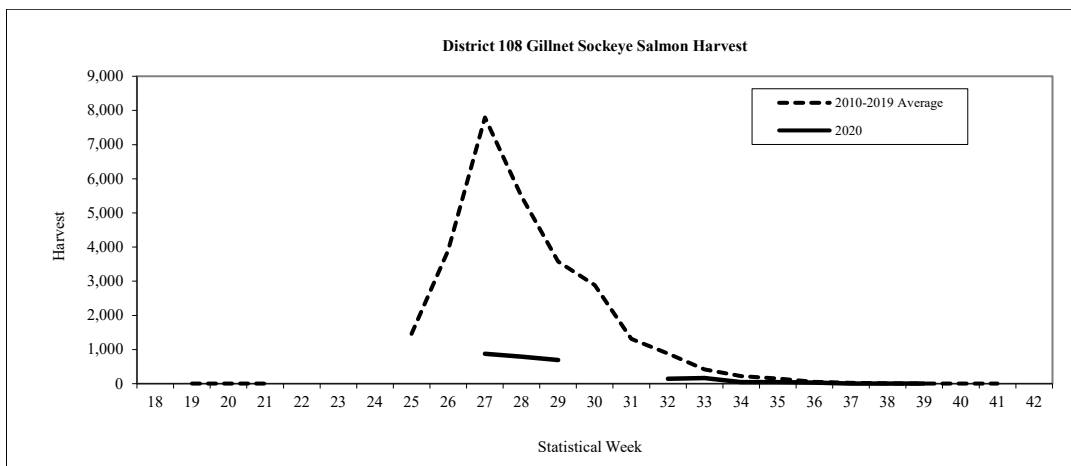


Figure 27. Sockeye salmon harvest by week in the District 108 drift gillnet fishery, 2020.

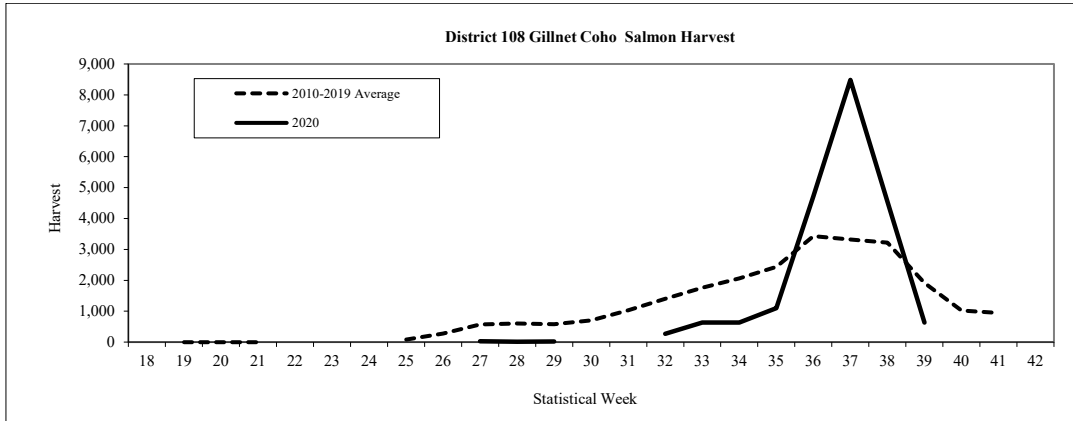


Figure 28. Coho salmon harvest by week in the District 108 drift gillnet fishery, 2020.

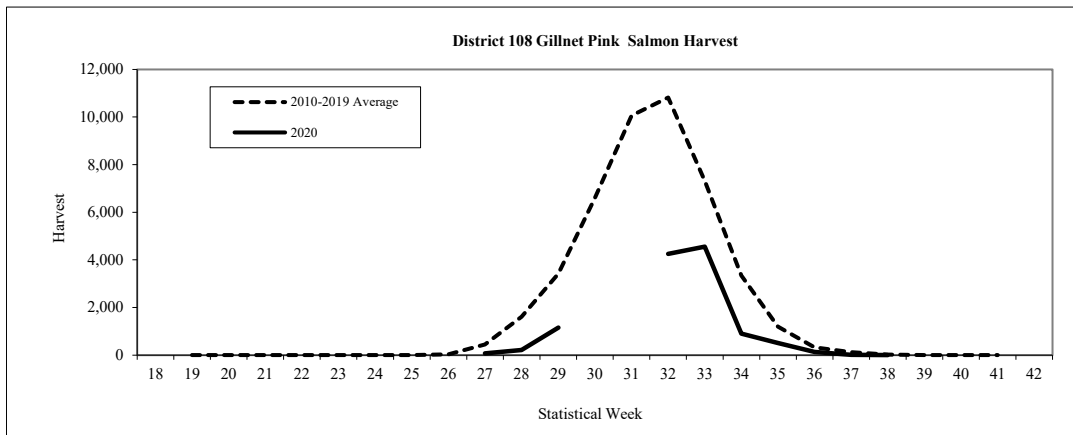


Figure 29. Pink salmon harvest by week in the District 108 drift gillnet fishery, 2020.

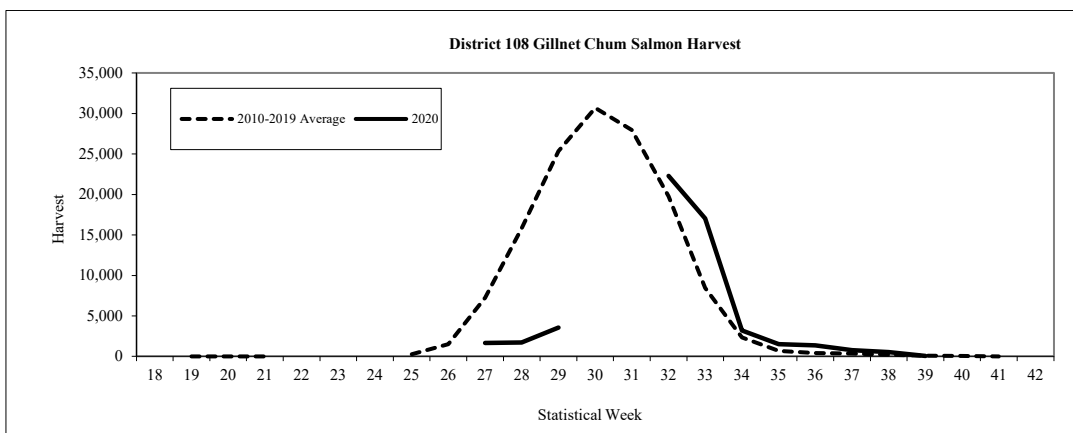


Figure 30. Chum salmon harvest by week in the District 108 drift gillnet fishery, 2020.

### 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 weeks 18 through 24 when there are sufficient fish surplus to escapement needs to provide for a fishery. From weeks 25 through 33 the fishery is managed for Taku River sockeye salmon, and from weeks 34 through 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 management objective of 25,500 fish. In years of high abundance, directed Chinook salmon fisheries can be implemented to harvest fish in excess of escapement needs. The 2020 pre-season terminal run forecast for the Taku River of 12,400 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 26–28) to minimize Chinook salmon harvest.

The original escapement goal range for Taku River sockeye salmon was 71,000 to 80,000 fish, with a management objective of 75,000 fish. This was established in 1985 based on the professional judgement of U.S. and Canadian biologists during initial PST negotiations to be used until a scientifically based goal was developed. Historically, the total allowable catch associated with this goal has been based on an inriver run size estimate inflated by not accounting for tag dropout rates that more recent radio telemetry studies have documented in the mark-recapture experiment. Concurrent with the adoption of an adjusted inriver run estimate to account for these dropouts, an interim escapement goal range and management objective was agreed to by the TBR Panel in February of 2019. This arrangement incorporated a 22% adjustment to the inseason inriver run estimates, and a corresponding interim escapement goal range of 55,000 to 62,000 fish with a management objective of 59,000 fish. A bilaterally approved MSY escapement goal range of 40,000 to 75,000 Taku River sockeye salmon with a management objective of 58,000 wild fish was adopted for the 2020 fishing season and the remainder of the Annex period. The 2020 Taku River wild sockeye salmon terminal run forecast of 139,000 fish, based on Canadian stock-recruit and sibling forecasts, was near the 2010–2019 average of 137,000 wild fish. DIPAC forecasted 226,000 enhanced sockeye salmon returning through District 111 waters to Snettisham Hatchery.

An escapement goal range of 50,000 to 90,000 Taku River coho salmon with a management objective of 70,000 fish was adopted in early 2015. New harvest sharing provisions between the U.S. District 111 drift gillnet fishery and the Canadian inriver fisheries are in place, specified in the PST, and the U.S. management intent in 2020 was to achieve the U.S. AC and management objective. The 2020 pre-season Taku River forecast was for an above average terminal run of 122,000 coho salmon, and DIPAC forecast a run of 40,000 enhanced coho salmon from releases in Gastineau Channel. DIPAC forecasted runs totaling 650,000 enhanced chum salmon returning to Gastineau Channel and Limestone Inlet, which was below the recent average.

The traditional drift gillnet fishery in District 111 began on Sunday, June 21, 2020 (week 26). The first three drift gillnet openings of the season in District 111 were for two days, and included

combinations of significant area restriction, 6-inch maximum mesh size restriction, and night closures, intended to minimize harvest of Taku River Chinook salmon. The number of boats fishing was less than half of average in each of the first three weeks. A minimal 1,678 sockeye salmon were harvested during these initial openings, and the chum salmon harvest of 24,666 fish was 11% of the average week 26–28 harvest for the district (Figures 34 and 37). A total of 736 Chinook salmon were harvested, which was near the average for those weeks (Figure 33).

Effort in the District 111 drift gillnet fishery remained below average throughout the season, with a peak of 92 boats fishing in week 30 (Figure 32). Harvests of sockeye salmon were below average throughout the season and the total harvest of 28,233 fish was 28% of average (Figure 34) and the lowest district total since 1968. Weekly chum salmon harvests were well below average and approximately 109,000 fish were harvested from mid-June to mid-August (Figure 37). The vast majority of the summer-run chum salmon harvest in District 111 consists of DIPAC hatchery fish returning to release sites in Gastineau Channel and Limestone Inlet. The Chinook salmon harvest of 1,094 fish was just below average (excluding pre-week 25 directed Chinook fisheries; Figure 33). Pink salmon harvests were below average throughout the season and the harvest of 65,353 fish was only 44% of average (Figure 36). The overall coho salmon harvest of 15,863 fish was well below average and the peak weekly harvest of 4,141 fish occurred in week 36 (Figure 35). Fall chum salmon harvests were also well below average from week 34 through 38 (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 Districts 111, 112, 115, and parts of Districts 113 and 114, from April 1 through June 14, resulted in minimal harvest of wild fish in the sport fishery. The GSI-based District 111 harvest estimates of Taku River large Chinook salmon during the accounting period is 189 fish in the drift gillnet fishery, 112 fish in the sport fishery, and an estimated 15 fish in the personal use fishery, for a total of 316 fish. Harvests of Taku River large Chinook salmon in these fisheries from week 30 onwards were minimal and resulted in a total harvest well below the U.S. base level catch of 3,500 fish. The preliminary escapement estimate of Taku River large Chinook salmon is approximately 15,593 fish, which is below the escapement goal range of 19,000 to 36,000 fish.

Peak harvests of sockeye salmon occurred in weeks 29 through 31 (mid-July to early August; Figure 34). The Speel Arm SHA was not opened in 2020 and the entrance to Port Snettisham was only opened late in the season for increased opportunity on coho salmon returns. The Speel Lake weir was not operated this season due to staffing concerns during the COVID-19 health emergency, so accurate enumeration of fish passing into Speel Lake was not possible although stream counts were conducted by DIPAC staff generally every three days. The minimum mesh size restriction south of Circle Point was not put in place this season due to a small fleet size and very little chance for a fishery to occur inside the Speel Arm SHA. DIPAC sockeye salmon returning to the Snettisham Hatchery contributed a minimum of 16,000 fish to the traditional District 111 harvest. The preliminary escapement estimate of Taku River sockeye salmon is 100,900 fish, which is above the escapement goal range of 40,000 to 75,000 fish.

The 2020 traditional District 111 coho salmon harvest was 45% of average (Figure 35). Approximately 53% of the coho salmon were harvested in Taku Inlet, which was well below the average of 82%, and 47% were harvested from Stephens Passage and Port Snettisham. Coho salmon stocks harvested in District 111 include returns to the Taku River, Port Snettisham,

Stephens Passage, and local Juneau area streams as well as Alaska hatcheries. This was the sixth year of full production for DIPAC's revitalized enhanced coho salmon program. Alaska hatchery (nearly entirely DIPAC) coho salmon first appeared in the District 111 harvest in week 33, and comprised substantial proportions of the harvest each remaining week of the fishery. Alaska hatchery coho salmon contributed 26% of the 2020 District 111 traditional drift gillnet harvest. The preliminary escapement estimate of Taku River coho salmon is 52,000 fish, which is near the lower end of the escapement goal range of 50,000 to 90,000 fish.

Pink salmon escapements were poor in the Northern Southeast Inside subregion of SEAK and the District 111 escapement index was approximately 54% of the lower end of the management target range. The 2020 District 111 traditional fishery chum salmon harvest of 109,516 fish was 21% of average and comprised almost entirely of summer run fish (Figure 37). The summer chum salmon run continues through mid-August (week 33) and is mostly comprised of domestic hatchery fish and small numbers of wild stocks. Chum salmon returning to DIPAC release sites in Gastineau Channel and Limestone Inlet contributed a major portion of the harvest, but quantitative contribution estimates are not available. Approximately 49% of the District 111 chum harvest was taken in Taku Inlet, and 51% in Stephens Passage. The harvest of 547 fall-run chum salmon (i.e. chum salmon caught after week 33) was 21% of average. Most of these fall-run chum salmon are probably wild fish of Taku and Whiting rivers origin.

Table 7. Weekly salmon harvest and fishing effort in the Alaskan District 111 traditional commercial drift gillnet fishery, 2020.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
26	21-Jun	268	201	2	6	689	23	2	46
27	28-Jun	284	808	4	65	11,245	33	2	66
28	5-Jul	184	669	13	744	12,732	42	2	84
29	12-Jul	192	6,529	138	10,991	46,702	62	4	248
30	19-Jul	88	10,170	564	18,333	22,050	92	3	276
31	26-Jul	29	4,617	742	12,849	7,979	55	2	110
32	2-Aug	31	2,282	528	13,053	6,342	53	2	106
33	9-Aug	3	1,168	510	5,833	1,230	20	3	60
34	17-Aug	5	1,353	1,863	3,018	398	25	3	75
35	23-Aug	2	394	3,200	452	75	33	3	99
36	30-Aug	6	38	4,141	9	59	22	4	88
37	6-Sep	0	4	3,176	0	12	25	2	50
38	13-Sep	2	0	982	0	3	13	1	13
Total		1,094	28,233	15,863	65,353	109,516	124	33	1,321
2010–2019 Average		1,258	101,668	35,080	147,140	531,140	194	52	2,895
2020 as % of Average		87%	28%	45%	44%	21%	64%	63%	46%

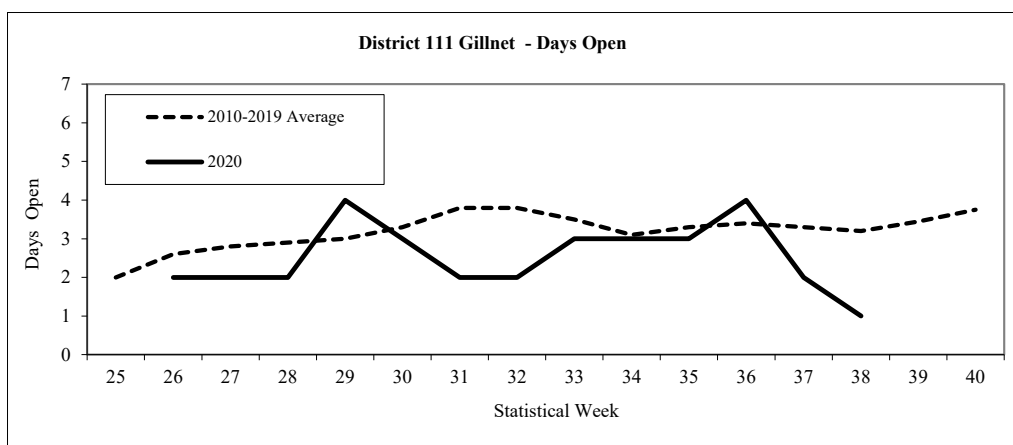


Figure 31. Days open by week in the District 111 drift gillnet fishery, 2020.

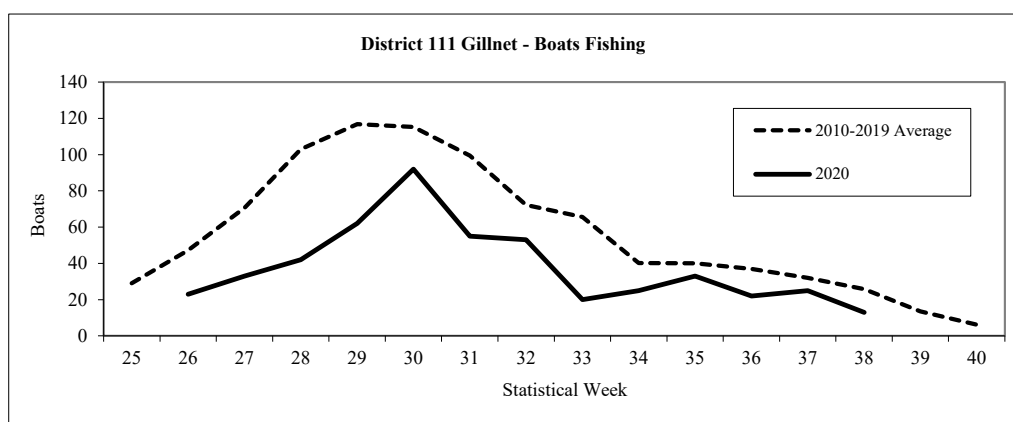


Figure 32. Number of boats fishing by week in the District 111 drift gillnet fishery, 2020.

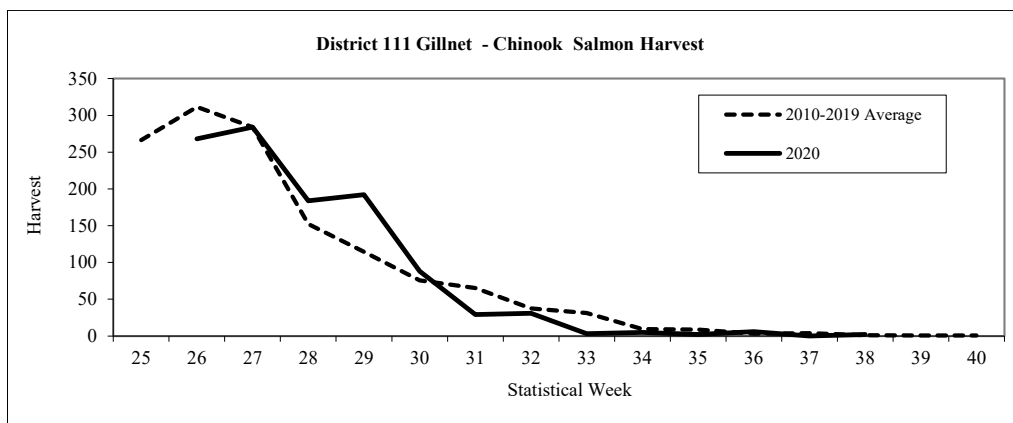


Figure 33. Chinook salmon harvest by week in the District 111 drift gillnet fishery, 2020.

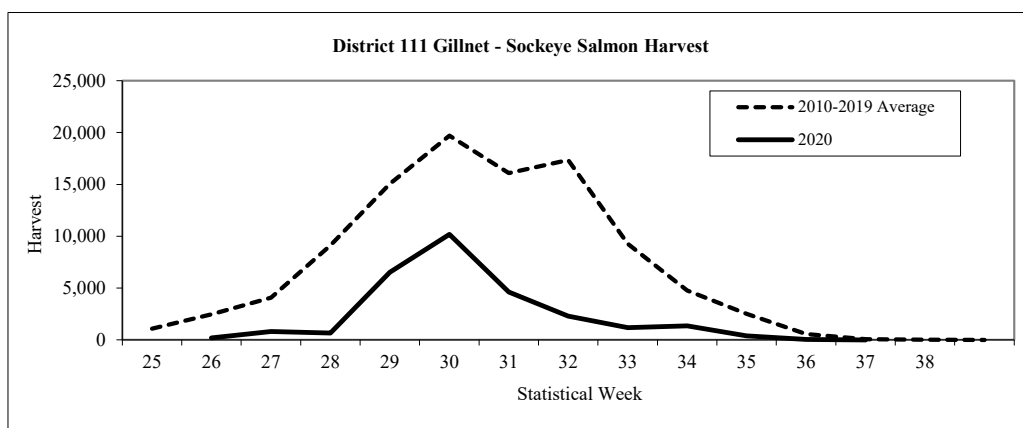


Figure 34. Sockeye salmon harvest by week in the District 111 drift gillnet fishery, 2020.

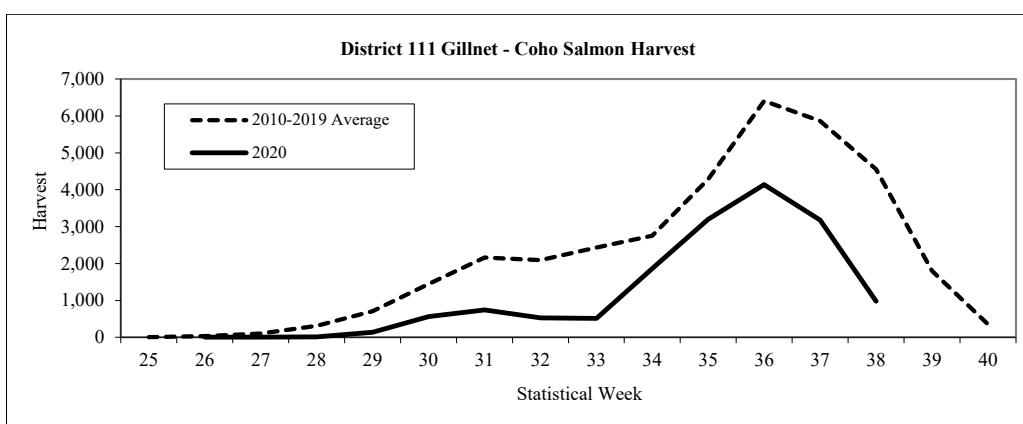


Figure 35. Coho salmon harvest by week in the District 111 drift gillnet fishery, 2020.

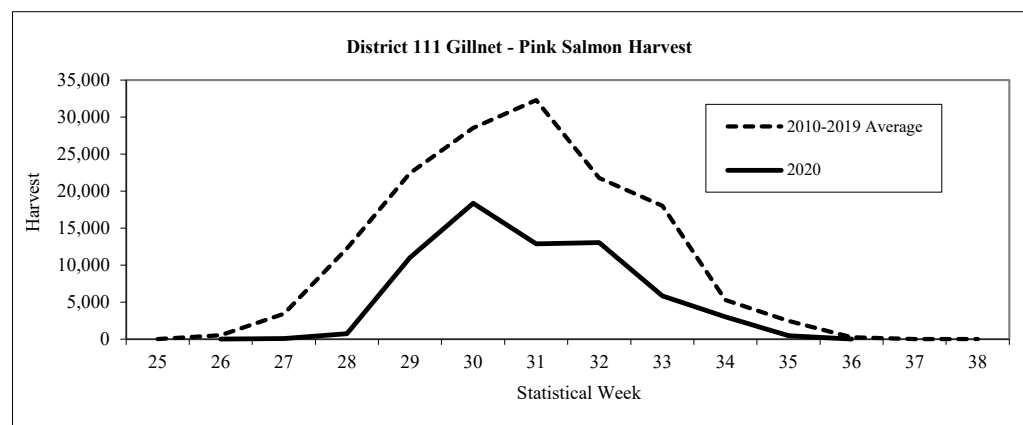


Figure 36. Pink salmon harvest by week in the District 111 drift gillnet fishery, 2020.



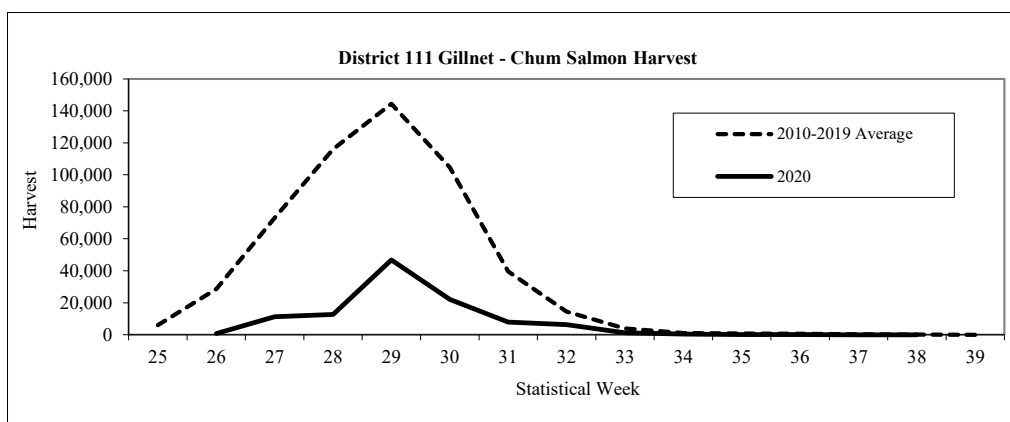


Figure 37. Chum salmon harvest by week in the District 111 drift gillnet fishery, 2020.

### Transboundary River Joint Enhancement

The transport of sockeye salmon fry from the Snettisham Hatchery facility back to Canadian lakes was completed on June 11, 2020. Approximately 4.57 million fry were released in Tahltan, Tatsamenie, and Trapper lakes in Canada. The overall green egg to fry survival for brood year (BY) 2019 releases was 78% (Table 8). After transporting BY19 fry back to their respective lakes, all TBR modules, incubators, and short-term fry rearing containers were broken down, cleaned, and disinfected prior to receiving green eggs from BY20 egg takes.

Brood year 2020 egg takes began on September 4 at Trapper Lake, September 10 at Tahltan Lake, and September 18 at Tatsamenie Lake. An estimated total of 3.1 million green eggs were collected from the three donor lakes. Tahltan Lake egg takes were completed on September 12 after collecting an estimated 502,200 eggs in 2 lots. Tatsamenie Lake egg takes were completed on October 7 after collecting 2.1 million eggs in 5 lots. Trapper Lake egg takes were completed on September 15<sup>th</sup> after collecting 537,000 eggs in 3 lots. DFO contractors collected adult sockeye salmon tissue samples on the spawning grounds and shipped them to the ADF&G Juneau Fish Pathology laboratory via Snettisham Hatchery per the 2019 PST Agreement.

Table 8. Summary of numbers and survival rates of brood year 2019 sockeye salmon fry released May and June 2020.

Brood stock	Release site	Number of trips	Survival rate to eyed stage	Survival rate to release	Number released
Tahltan	Tahltan Lk	6	80.1%	61.0%	2,685,000
Tatsamenie	Upper Tatsamenie Lk	3	73.6%	67.9%	1,411,600
Tatsamenie	Upper Tatsamenie Lk Extended Rearing	2	86.3%	85.1%	210,100
Trapper	Trapper Lake	1	68.6	64.7	263,200
Average/Totals		12	77.7%	64.1%	4,569,000

During the 2020 season, the ADF&G Thermal Mark Lab processed 7,456 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 12-week period. The laboratory provided estimates on hatchery contributions for 54 distinct sample collections. Estimates of the percentage contribution of hatchery

fish to commercial 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 River salmon stocks between Canada and the U.S. have not been specified, the 2019 PST Agreement 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 Alsek River Chinook salmon and for sockeye salmon 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 on the Alsek River is the Klukshu River weir, operated by DFO 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 Alsek River Chinook salmon, adopted in January 2018, is a range of 3,500 to 5,300 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). 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 commenced on June 8 with a 12-hour opener in 2020 and a 6-inch maximum mesh restriction was in effect through July 20 as a Chinook salmon conservation measure.

Preseason expectations were for below average Chinook and sockeye salmon runs in 2020. The overall Alsek River drainage sockeye salmon run was expected to be approximately 65,000 fish; which was below the 2010–2019 average run size of approximately 89,000 sockeye salmon. The preseason outlook for 2020 was based on a predicted run of 15,000 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 2020 run were 2015 and 2016. The Klukshu River escapements in 2015 and 2016 were 11,400 and 7,400 sockeye salmon respectively, which were both below the 2010–2019 average of 12,100 fish.

The 2020 Alsek River set gillnet fishery opened Sunday June 8 (week 24). The total number of individual permits fished during the season was 13, which was below the 2010–2019 average of 15 permits. The commercial fishery was opened for a total of 38 days which was below the 10-year average of 46 days. The overall effort in boat-days was 44% of the average due to low or no effort in many weeks late in the season (Table 9). Harvests of Chinook salmon through late June were below the 2010–2019 average. Harvests of sockeye salmon were below average throughout the season, and the total harvest of 2,518 fish was 19% of the 2010–2019 average of 13,509 fish (Table 9). There was no effort after late July. In the past several years there has been reduced fishing effort during the coho salmon season due to economic struggles and lack of pilots to transport fish to town. In 2020, no coho salmon were harvested (Table 9).

The Klukshu River weir count of 4,396 sockeye salmon was below the lower bound of the 7,500 to 11,000 fish escapement goal range. The Alsek River drainage estimate of 28,000 fish is within the escapement goal of 24,000 to 33,500 sockeye salmon. The Alsek River drainage escapement estimate of 5,330 Chinook salmon was above the escapement goal range of 3,500 to 5,300 fish.

Table 9. Weekly salmon harvest and fishing effort for the Alaska Alsek River commercial set gillnet fishery, 2020.

Statistical Week	Start Date	Catch					Effort		
		Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
24	8-Jun	83	163	0	0	0	11	0.5	6
25	14-Jun	57	306	0	0	0	10	1.0	10
26	21-Jun	31	406	0	0	0	11	1.0	11
27	28-Jun	11	686	0	0	0	10	1.0	10
28	5-Jul	0	567	0	0	0	10	1.0	10
29	12-Jul	0	247	0	0	0	10	1.0	10
30	19-Jul	0	109	0	0	0	8	1.0	8
31	26-Jul	0	34	0	0	0	4	1.0	4
32-42 <sup>a</sup>	2-Aug	0	0	0	0	0	0	31.0	0
Total		182	2,518	0	0	0	13	38	68
2010-2019 Average		354	13,509	829	0	4	15	46	154
2020 as % of Average		51%	19%	0%		0%	87%	83%	44%

<sup>a</sup>. Weeks 32-42 opened to fishing but not fished.

## ***SOUTHEAST ALASKA CHINOOK SALMON FISHERY***

### ***All Gear Harvest***

The SEAK Chinook salmon fishery is managed to stay within the annual all-gear PST total allowable catch limit determined by the SEAK early winter District 113 Troll fishery CPUE metric estimated from data collected in statistical weeks 41–48 and to meet escapement goals for 6 SEAK and TBR stocks. Management of the 2020 SEAK Chinook salmon fishery was configured based on a preseason winter power troll CPUE metric of 4.83 for the 2020 fishing season. This CPUE translated into an all-gear PST allowable catch limit of 205,165 Treaty Chinook salmon. Management plans established by the Alaska Board of Fisheries allocate the CPUE-based Treaty catch limit among gear types and prescribe management measures for both commercial and sport fisheries [5AAC 29.060(b) and 47.055].

Under provisions of regulatory actions plans to conserve Chilkat, King Salmon, and Unuk River stocks, as well as other SEAK and TBR wild Chinook salmon stocks, ADF&G was given direction by the Alaska Board of Fisheries, through emergency order authority, to take management actions necessary to reduce exploitation rates and pass as many SEAK and TBR Chinook salmon stocks to the spawning grounds for escapement as possible. The conservation measures for all gear types that were implemented during 2018 and 2019 continued for the 2020 season. The winter troll fishery closed early on March 15, spring troll fisheries were restricted to near terminal areas or areas on the outside coast, and in the summer troll fishery the primary corridors and waters directly adjacent to the terminus of the Unuk, Chilkat and Stikine rivers were closed to the retention of Chinook salmon. Retention of Chinook salmon in the purse seine fishery outside designated

terminal harvest areas was delayed until August 2. Drift gillnet fisheries in Districts 106 and 108 (near the mouth of the Stikine River) were delayed to the latter part of June. Drift gillnet fisheries in Districts 111 and 115 (near the mouths of the Taku and Chilkat Rivers) were subject to time and area restrictions through mid-July, with gear restrictions in place through early July. Openings in terminal harvest areas were delayed into June. Similarly, sport fisheries outside of terminal areas were delayed until mid-June or early July and were closed to nonresidents during the first half of August. In addition to these conservation measures, all fisheries were managed conservatively and monitored closely inseason to avoid exceeding the harvest level defined in the 2019 PST Agreement.

The total Chinook salmon harvest by all SEAK commercial fisheries was 199,688 fish and the sport fish harvest was 35,100 fish, for a total all-gear harvest of 234,788 fish (Table 10 and Table 11). This includes an all-gear harvest of 620 in the Annette Island Metlakatla Indian Community tribal fishery that is not directly managed by the State of Alaska. The all-gear harvest of Treaty Chinook salmon was 204,624 fish including 523 fish from the Metlakatla Indian Community tribal fishery. The 2020 all-gear Treaty harvest of 204,624 fish was below the CPUE-based harvest limit of 205,165 fish.

Table 10. Estimated all-gear Chinook salmon catch in 2020.

Gear	Total Harvest	AK Hatchery Harvest	Wild Terminal Exclusion	Alaska Hatchery Addon	Treaty Harvest
Troll	169,916	7,769	0	4,510	165,406
Sport	35,100	6,300	0	4,539	30,561
Drift Gillnet	12,629	10,613	0	9,671	2,958
Purse Seine	16,892	11,830	0	11,444	5,448
Set Gillnet	251	0	0	0	251
Total Net	29,772	22,443	0	21,115	8,657
<b>Total All Gear</b>	<b>234,788</b>	<b>36,512</b>	<b>0</b>	<b>30,164</b>	<b>204,624</b>

*Note: Annette Island Metlakatla Indian Community tribal harvest of 623 Chinook salmon are included of which 523 were Treaty fish. This includes a total tribal harvest of 91 troll, 288 drift gillnet, 241 purse seine fish, of which 91 troll, 191 drift gillnet, and 241 purse seine Treaty fish.*

*Note: Terminal area harvests are included.*

Table 11. Southeast Alaska Chinook salmon landed catch for aggregate abundance-based management fisheries of interest to the Pacific Salmon Commission (2013–2020). Values are in thousands of fish.

Year	Total Catch	Add-on and Exclusion Catch	Treaty Catch Limit <sup>1</sup>	Treaty Catch	Treaty Incidental Mortality	Treaty Total Mortality
2013	257.3	65.9	176.0	191.4	59.4	250.8
2014	492.5	57.3	439.4	435.2	50.9	486.1
2015	403.3	68.3	237.0	335.0	49.1	384.1
2016	387.0	36.1	355.6	350.9	51.0	401.9
2017	207.1	31.6	209.7	175.4	46.6	222.0
2018	164.7	37.0	144.5	127.8	31.2	159.0
2019 <sup>1</sup>	175.1	34.8	140.3	140.3	56.7	197.0

2020	234.8	30.2	205.2	204.6	39.1	243.7
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<sup>1</sup> 2009–2018 Treaty Harvest Limit determined by pre-season PSC Chinook Model AI  
2019–Present Treaty Harvest Limit determined by CPUE Model

### Troll Fishery

The accounting of Chinook salmon harvested by trollers begins with the winter fishery in October and ends with the summer fishery in September. 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 2019–2020 winter troll fishery was open from October 11, 2019 through March 15, 2020. To help reduce encounters of wild SEAK and TBR Chinook salmon, the winter season fishery closed from March 16 through April 30, prior to reaching the GHL. A total of 15,810 Chinook salmon were harvested. Of these, 1,167 fish (7%) were of Alaska hatchery origin, of which 689 fish counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 15,121 fish (Table 12).

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

In 2020, spring troll fisheries occurred between May 1 and June 30. To help reduce encounters of wild SEAK and TBR Chinook salmon during May and June, spring troll fisheries located in known wild Chinook salmon migration corridors did not open. A total of 17 spring troll fisheries opened, which is a 66% reduction from the number of areas opened prior to 2018 (when SEAK and TBR conservation measures began). The combined harvest for spring troll fisheries was 13,600 Chinook salmon, of which 3,414 fish (25%) were of Alaska hatchery origin and 1,939 fish counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 11,661 fish.

The 2020 summer troll fishery included two Chinook salmon retention periods, from July 1–6 and August 15 to September 8. On August 30, prior to the completion of the second retention period target harvest, ADF&G estimated 13,370 Chinook salmon remained on the SEAK annual all-gear Treaty catch limit. On August 31, a re-allocation of the remaining all-gear SEAK Treaty Chinook salmon to the troll fishery was authorized. The remaining Treaty allocation included unharvested fish from the commercial net fisheries and most notably the sport fishery, which was under its allocation largely due to travel restrictions associated with COVID-19. The additional fish provided another eight days of Chinook salmon retention and contributed to a total fishery length of 25 days. A total of 140,415 Chinook salmon were harvested during the summer fishery, of which 3,188 fish (2%) were of Alaska hatchery origin and 1,882 fish counted toward the Alaska hatchery add-on. The resulting Treaty Chinook salmon harvest was 138,533 fish.

The total harvest for all troll fisheries in the 2020 accounting year was 169,916 Chinook salmon, of which 165,406 fish were Treaty Chinook salmon. This includes a total harvest of 91 fish in the Annette Island Metlakatla Indian Community tribal troll fishery; all 91 were Treaty Chinook salmon.

Table 12. Troll fishery Chinook salmon harvest by season, 2020.

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	15,810	1,167	689	0	689	15,121
Spring Troll <sup>a</sup>	13,600	3,414	1,939	0	1,939	11,661
Summer Troll						
First Period <sup>b</sup>	71,494	763	450	0	450	71,044
Second Period	68,893	2,425	1,432	0	1,432	67,461
Total Summer	140,415	3,188	1,882	0	1,882	138,533
Total Traditional Troll	169,825	7,769	4,510	0	4,510	165,315
Annette Is. Troll	91	0	0	0	0	91
<b>Total Troll Harvest</b>	<b>169,916</b>	<b>7,769</b>	<b>4,510</b>	<b>0</b>	<b>4,510</b>	<b>165,406</b>

<sup>a</sup> Spring troll harvest includes all terminal and wild terminal exclusion harvests for year.

<sup>b</sup> Total summer harvest includes confiscated harvest for the year.

### Net Fisheries

A total of 12,629 Chinook salmon were harvested in the drift gillnet fisheries in 2020, of which 10,613 fish (84%) were of Alaska hatchery origin and 9,671 fish counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 2,958 fish (Table 10). This includes a harvest of 288 fish in the Metlakatla Indian Community tribal drift gillnet fishery of which 191 fish were Treaty Chinook salmon. A total of 16,892 Chinook salmon were harvested in the purse seine fisheries, of which 11,830 fish (70%) were of Alaska hatchery origin and 11,444 fish counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 5,448 fish. This includes a harvest of 241 fish in the Metlakatla Indian Community tribal purse seine fishery; all 241 fish were Treaty Chinook salmon. A total of 251 Chinook salmon were harvested in the set gillnet fisheries, none of which were of Alaska hatchery origin, resulting in a Treaty harvest of 251 fish (Table 10).

With the exception of directed gillnet harvests of Chinook salmon in SEAK terminal area regulatory Districts 108 and 111, as provided in the Transboundary Rivers chapter of the PST (Chapter 1), harvests of Chinook salmon in net fisheries are primarily incidental to the harvest of other species, and in 2020 only constituted a small fraction (<1.0%) of the total net harvest of all species.

### Sport Fishery

The SEAK Chinook salmon sport fishery is managed under the directives of the *Southeast Alaska King Salmon Management Plan* [5 AAC 47.055]. This plan prescribes management measures based upon the SEAK early winter troll CPUE metric and the harvest management plan adopted by the Alaska Board of Fisheries. In 2020, 37,879 Treaty Chinook salmon were allocated to the sport fishery. As directed by the *Southeast Alaska King Salmon Management Plan*, if restrictions are necessary to keep the sport fishery within its harvest allocation, nonresident anglers will be restricted first, and ADF&G shall only restrict resident anglers if nonresident angler restrictions are insufficient to keep the sport harvest within the sport harvest allocation.

The following regulations applied during the 2020 sport fishery as prescribed by the *Southeast Alaska King Salmon Management Plan*:

***Alaska Resident***

- The resident bag and possession limit was one Chinook salmon, 28 inches or greater in length.
- In those inside waters where the sport fishery for Chinook salmon was closed to retention during the spring and early summer (Juneau area, Petersburg/Wrangell area, Ketchikan area), when those waters reopened the resident bag and possession limit was two Chinook salmon 28 inches or greater in length through December 31, 2020.

***Nonresident***

- The nonresident bag and possession limit was one Chinook salmon, 28 inches or greater in length.
- From January 1 through June 30, a nonresident's annual catch limit was three Chinook salmon, 28 inches or greater in length.
- From July 1 through July 7, a nonresident's annual catch limit was two Chinook salmon, 28 inches or greater in length.
- From July 1 through December 31, a nonresident's annual catch limit was one Chinook salmon, 28 inches or greater in length, and any Chinook salmon 28 inches or greater in length harvested by a nonresident from January 1 through June 30 applied toward the one fish annual catch limit.

The sport fishery was monitored closely throughout the season to ensure it stayed below the Treaty catch limit. In early June, COVID-19 impacts were observed to significantly reduce Chinook salmon harvest levels, due to a reduction in nonresident angler effort. While continuing to closely monitor the sport fishery, including participation levels, ADF&G initiated a series of progressively liberalized regionwide regulations beginning in mid-June in an effort to achieve the sport harvest allocation. These more liberalized regulations included increases of bag and possession limits for resident anglers as well as increases in bag, possession and annual limits for nonresident anglers. Liberalized regionwide regulations were rescinded effective September 30, 2020. The 2020 sport fishery had an estimated total harvest of 35,100 Chinook salmon, of which 30,561 fish counted as Treaty harvest (Table 10).

***SOUTHEAST ALASKA COHO SALMON FISHERIES***

Attachment B of the 1999 PST specifies provisions for inseason conservation and information sharing for northern boundary coho salmon. In 2020, troll CPUE in Area 6 in the early weeks of the fishery averaged 14 coho/day, which was within the boundary area conservation trigger range of 15–22 coho/day. Notwithstanding the provisions for a boundary area closure, following an Alaska/Canada bilateral review of the Area 6 CPUE data, it was determined there was an insufficient number of landings sampled to provide an adequate indicator of abundance. Alternatively, other inseason sources of abundance were considered in the determination of the necessity of a boundary area closure. Given the above average coho salmon CPUE in the NBC A-B line troll pink salmon fishery and the Alaska District 101 Tree Point drift gillnet fishery during the time of the assessment, and considering the delay of the NBC directed troll coho salmon fishery from July 1 to August 1 and the reduced sport coho salmon harvest resulting from decreased guided angler trips following restrictive COVID-19 mandates, it was determined that additional boundary area restrictions were not warranted. The mid-July projection of regionwide total commercial



harvest of 1.37 million was greater than the 1.1 million trigger for an early regionwide troll closure, specified in Alaska Board of Fisheries regulations and in Attachment B.

The 2020 regionwide summer troll coho salmon fishery began by regulation on June 1 and continued in all waters of SEAK through September 20. The 2020 all-gear catch of coho salmon totaled 1.25 million fish, of which 1.04 million fish (87%) were taken in commercial fisheries (Table 13). The troll harvest of 750,700 coho salmon was 51% below the 2010–2019 average of 1.52 million fish and accounted for 72% of the commercial catch. Power troll wild coho salmon CPUEs were below the 2000–2019 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 2.91 million fish, 28% below the 20-year average. With pink salmon abundance down throughout much of SEAK in 2020, purse seine opportunities were reduced. Consequently, the purse seine coho salmon harvest of 78,700 fish was 74% below the 2010–2019 average, while the drift gillnet harvest of 130,500 fish was 77% below the 2010–2019 average. The set gillnet harvest of 81,700 fish in the Yakutat area was 40% below the 2010–2019 average, with 81% of the catch taken in the Situk-Ahrnklin Lagoon. A preliminary estimate of the SEAK sport catch (140,770 fish) is 45% below the 2010–2019 average (257,600 fish).

Wild production accounted for 787,000 fish (76%) in the commercial catch compared with a recent 2010–2019 average of 1.74 million fish (75% wild). The hatchery percentage of the commercial catch was 24%. Of the estimated hatchery contribution of 254,600 fish, over 99% originated from facilities in SEAK, with facilities on or near the outer coast accounting for an estimated 51% of the run while inside hatchery runs contributed to the remaining 49%.

Preliminary all-fishery coho salmon exploitation rate estimates were low for all three wild indicator stocks, at 20% for Auke Creek, 24% for Berners River, and 42% for Hugh Smith Lake. The all-fishery exploitation rate for the Hugh Smith Lake stock was below the long-term average of 61%. Most of the reduction in the all-fishery exploitation rate was driven by decreases in the troll fleet exploitation rate. The troll fishery exploitation rate on the Hugh Smith Lake stock (24%) was below the 25-year (1995–2019) average of 29%. Troll fishery exploitation rates on northern inside stocks were record lows, estimated at only 0% for Auke Creek and 5% for the Berners River compared with 25-year averages of 24% and 24%, respectively. While troll exploitation rates were well below average, drift gillnet exploitation rates were within ranges of previously observed values. Compared with 25-year averages, drift gillnet fisheries accounted for an estimated 19% of the Auke Creek return (average 8%), 19% of the Berners River return (average 21%), and 8% of the Hugh Smith Lake return (average 12%).

Escapement counts and estimates were below or within goals for most coho salmon stocks. The total escapement of 634 adult coho salmon to Hugh Smith Lake was within the biological escapement goal of 500–1,600 spawners. Coho salmon escapements were within the respective goal ranges for two northern Southeast inside stocks (Taku River and Montana Creek), and below the goal for Chilkat River, Berners River, Auke Creek, and Peterson Creek. The combined peak count of 8,610 coho salmon in the 14 surveyed streams in the Ketchikan area was below the 1987–2019 average (10,495) yet above the goal of 4,250–8,500 spawners. The combined peak count of spawners in five streams in the Sitka area (630 spawners) was approximately half of the long-term average yet within the escapement goal of 400–800 spawners.

Coho salmon stocks monitored for CWTs all experienced a decline in total adult production. For example, at Hugh Smith Lake the estimated total run size of 1,097 adults was the lowest on record, approximately 73% below the 1992–2019 average (4,042). This occurred despite a 2019 coho salmon smolt migration from Hugh Smith Lake that was only 5% below the long-term average. Overall production decline was caused by a preliminary Hugh Smith Lake coho salmon marine survival rate (3.5%) that was greatly below the long-term average (12.3%). The Hugh Smith Lake marine survival of coho salmon is the second lowest observed, similar to the record low of 2018 (3.0%).

Similar to Hugh Smith Lake, coho salmon marine survival (and associated adult total run estimates) for the northern inside stocks was below the long-term average. Smolt-to-adult survival rates of 5.7% for the Berners River and 6.8% for Auke Creek were much lower than the long-term (1990–2019) mean survival rates of 15% (Berners River) and 19% (Auke Creek). The 2020 total estimated adult coho salmon run size in the Berners River was 5,355, 80% below the 1992–2019 average (26,499). Marine survival for Northern inside coho salmon stocks has been trending lower in recent years: four of the lowest five years for marine survival have occurred in the past five years.

Table 13. Coho salmon harvest in Southeast Alaska by gear type (preliminary), 2020.

Gear Type	Harvest
Troll	750,700
Purse Seine	78,700
Drift Gillnet	130,500
Set Gillnet	81,700
Sport (marine and freshwater)	140,770
Total	1,182,370

### **III. PRELIMINARY 2020 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 2020 in the area north of Cape Falcon, Oregon and south of the U.S./Canada border. These fisheries were conducted under pre-season management plans that were consistent with Annex IV of the Pacific Salmon Treaty (PST 2019) including obligations defined within Chapter 3 for Chinook individual stock based management regimes (ISBM) and Chapter 5 for Southern Coho Management.

An overview of the Chinook (*Oncorhynchus tshawytscha*) and Coho (*Oncorhynchus kisutch*) salmon conservation challenges facing managers during the 2020 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 14) and Coho (Table 15). For perspective, landed catches for those fisheries since 2015 are also presented. Where available, preliminary estimates of the number of Chinook or Coho salmon released by anglers in 2020 mark-selective fisheries are also presented (Table 16). All estimates for the 2020 fisheries are preliminary and subject to change. Estimates of spawning escapements and abundance of Coho and Chinook stocks are not available at this time.

#### ***PRE-SEASON PLANNING***

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

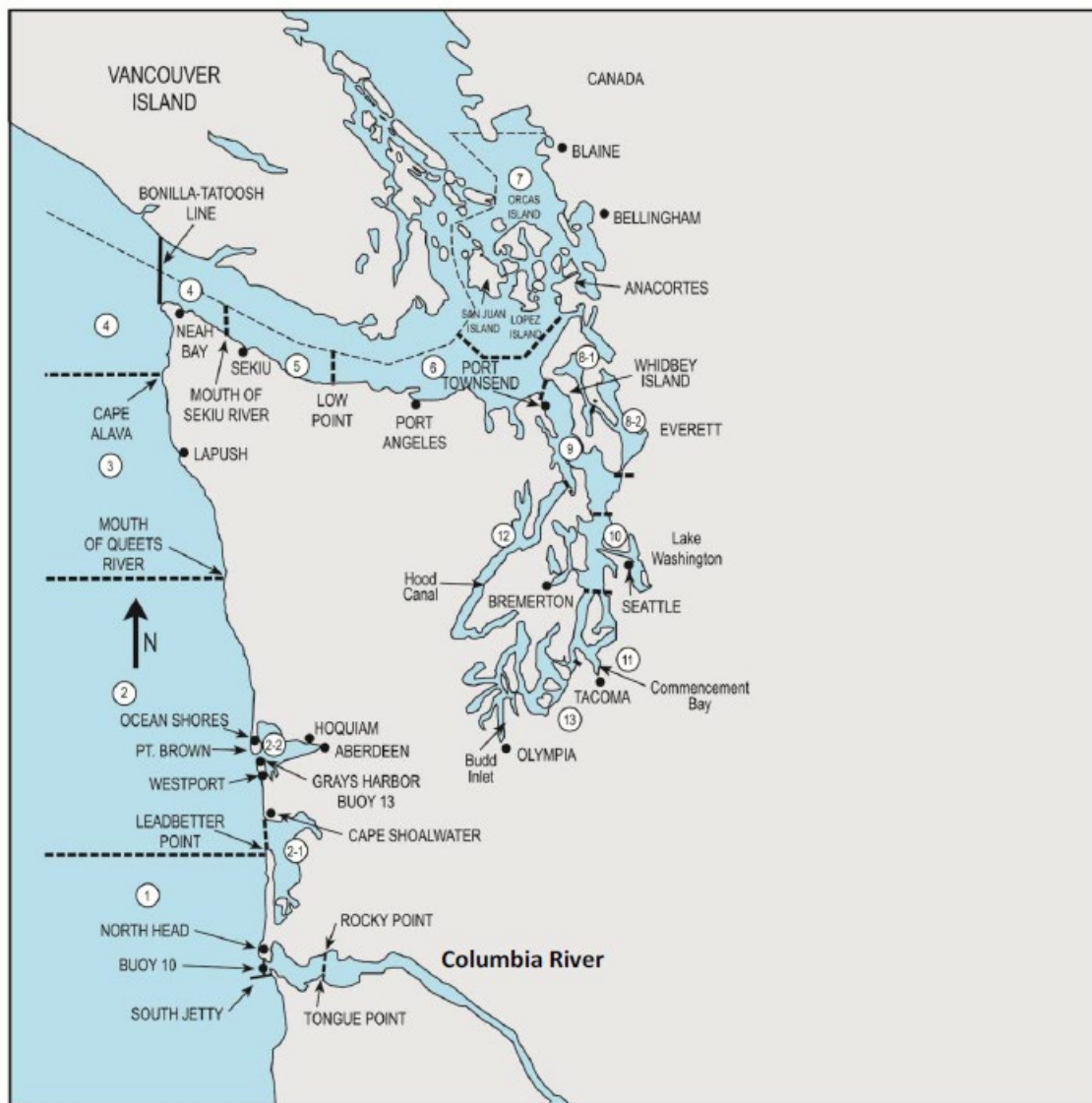


Figure 38. Map of Western Washington marine catch areas of the Washington coast (Areas 1 through 4) and Puget Sound (Areas 5 through 13) (WAC 220-22-030). Inside (Columbia River) fisheries reported in this document extend beyond the scope of this map.

### Chinook Salmon Management

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

Conservation obligations associated with the U.S. Endangered Species Act (ESA) for threatened and endangered Chinook salmon stocks originating from Puget Sound and the Columbia River have been more constraining to southern U.S. fisheries than PST obligations. Catch quotas for the 2020 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 2020, 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 Snohomish and Strait of Juan de Fuca MUs were forecasted to be in *low* abundance status. The Skagit, Stillaguamish, Hood Canal, Quillayute, Queets and Grays Harbor Coho MUs were predicted to be in *moderate* status, while the Hoh MU was 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 7.4% 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 2020.

<https://www.pfcouncil.org/documents/2020/04/2020-preseason-report-iii.pdf/>

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 2020 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 fall Chinook stocks in all fisheries.

### Non-Tribal Troll Fishery

Pre-season quota levels for the non-Tribal troll fisheries were 27,640 Chinook and 2,000 Coho with a clipped adipose fin, hereinafter referred to as marked. The preliminary estimate of non-Tribal harvest in the 2020 North of Falcon troll fishery is 12,000 Chinook (43% of the coast-wide quota) and 700 Coho (35% of the coast-wide non-Tribal troll quota). Trollers harvested 2,000 Chinook in the May 1 – June 30 fishery, and the remaining 10,000 Chinook were

harvested in the summer all-species fishery between July 1 and September 30. All Coho were harvested during the summer all-species fishery.

#### Tribal Troll Fishery

The Quinault, Quileute and Hoh Tribes opened their May-June Chinook Tribal Troll fisheries on May 1. The Makah Tribe did not open a Chinook fishery during this time period due to tribe-specific COVID-19 restrictions. The May-June Chinook Tribal Troll catch (31 fish) was the lowest harvest on record. The May-June fishery harvested 0.2% of the 17,500 Chinook sub-quota.

The Quinault, Quileute and Hoh Tribes opened their all-species Tribal Troll fisheries on July 1. Due to tribe-specific COVID-19 restrictions, the Makah Tribe had a delayed opening on July 24. The all-species portion of the fishery ran from July 1 through September 15. The fishery harvested 13.7% of the 17,500 Chinook sub-quota and 87% of the 16,500 Coho quota. Coho landings were highest in August accounting for 75% of the overall catch, followed by September at 20%. Chinook effort was highest in August, which accounted for approximately 70% of the Chinook landings during this time period. There were 182 landings during the all-species portion of the fishery.

Overall the Tribal Troll fishery harvested 7% of the 35,000 Chinook quota and 87% of the 16,500 Coho quota. The total ocean salmon harvest for the 2020 Tribal Troll fishery was 2,437 Chinook and 14,391 Coho across 185 total landings. The majority of the Tribal Troll catch was taken in Area 4, with smaller amounts taken in Areas 2, 3 and 4b.

#### Ocean Sport Fisheries

Pre-season quotas for the Washington coastal sport fishery (Ocean Areas 1 through 4) were 26,360 Chinook and 26,500 marked Coho. Preliminary total catch estimates for the ocean sport fisheries north of Cape Falcon were 7,600 Chinook (29% of the pre-season coast-wide quota) and 24,300 Coho (92% of the pre-season coast-wide sport quota). A description of the season structure and catches by management area follows.

#### Columbia Ocean Area (including Oregon)

All-species salmon sport fishing opened in Ocean Area 1 (Columbia Ocean Area) on June 20 with a pre-season quota of 13,250 marked Coho and a guideline of 7,000 Chinook. The fishery closed on July 26 upon attainment of the Coho quota. The catch estimates for Area 1 were 800 Chinook (12% of the guideline) and 12,900 Coho (97% of the quota). The Chinook minimum size limit was 22 inches and the Coho minimum size limit was 16 inches with a sub-area closure in the Columbia Control Zone. A preliminary overall legal-sized Coho mark rate of 67% was calculated from on-water data collection in this area.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 1 Coho mark-selective sport fishery, June 20 – July 26, 2020.			
Coho retained	Coho released	Total encounters	Mark %
12,900	6,400	19,300	67%

### Westport, Washington

Ocean Area 2 (Westport, WA) opened for all-species salmon sport fishing on June 20 with a pre-season quota of 9,800 marked Coho and a guideline of 12,700 Chinook. The fishery closed on its automatic closure date, September 30. The catch estimates for Area 2 were 4,800 Chinook (39% of the guideline) and 8,200 Coho (84% of the quota). The Chinook minimum size limit was 22 inches and the Coho minimum size limit was 16 inches with a sub-area closure in the Grays Harbor Control Zone beginning August 12. A preliminary overall legal-sized Coho mark rate of 43% was calculated from on-water data collection in this area.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 2 Coho non-retention sport fishery, June 20 – September 30, 2020.			
Coho retained	Coho released	Total encounters	Mark %
8,200	10,900	19,100	43%

### La Push, Washington

Ocean Area 3 (La Push, WA) opened for all-species salmon sport fishing on June 20 with a pre-season quota of 690 marked Coho and a guideline of 1,300 Chinook. The fishery closed on its automatic closure date, September 30. The port of La Push was closed to public access throughout the season due to health concerns associated with COVID-19; anglers could access Ocean Area 3 from the ports of Westport or Sekiu, but effort was minimal. The catch estimates for Area 3 were 20 Chinook (2% of the overall guideline of 1,200) and 200 Coho (46% of the revised quota of 462, after an in-season transfer of quota to Ocean Area 4). The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches. With low Coho encounters in Ocean Area 3, encounter data from dockside interviews were combined with those from Ocean Area 4, indicating a preliminary overall legal-sized Coho mark rate of 48%.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 3 Coho non-retention sport fishery, June 20 – September 30, 2020.			
Coho retained	Coho released	Total encounters	Mark %
200	200	400	48%

### Neah Bay, Washington

Ocean Area 4 (Neah Bay, WA) opened for all-species salmon sport fishing on June 20 with a pre-season quota of 2,760 marked Coho and a guideline of 5,600 Chinook. The fishery closed on August 7 upon attainment of the Coho quota. The port of Neah Bay was closed to public access throughout the season due to health concerns associated with COVID-19; anglers could access Ocean Area 4 from the port of Sekiu. The catch estimates for Area 4 were 1,900 Chinook (34% of the guideline) and 3,000 Coho (100% of the revised quota of 2988, after an in-season transfer of quota from Ocean Area 3). The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches. A preliminary overall legal-sized Coho mark rate of 48% was calculated from dockside interview data collection from this area and Ocean Area 3.

Preliminary estimates of Coho encounters (retained and released), in the Area 4 Coho non-retention sport fishery, June 20 – August 7, 2020.			
Coho retained	Coho released	Total encounters	Mark %
3,000	3,300	6,300	48%

## ***NORTH OF CAPE FALCON INSIDE FISHERIES***

### ***WASHINGTON COASTAL RIVER FISHERIES***

#### North Washington Coastal Rivers

Net and sport fisheries directed at salmon in this region were implemented based upon pre-season, Tribal-State agreements and subject to in-season adjustments. Tribal net harvest includes non-selective catch from the Sooes, Quillayute, Hoh, Queets, and Quinault Rivers. The 2020 Tribal net fisheries in north coastal rivers harvested an estimated 20,600 Chinook salmon and 38,300 Coho salmon through November 17, 2020.

Recreational fisheries conducted during 2020 in the Quillayute, Hoh and Queets River systems included mark-selective fisheries targeting hatchery Chinook and Coho in the Quillayute and Queets systems. The Hoh River was closed to fishing May 1 through September 15 and was non-selective when the fishery reopened from September 16 through November. Harvest or impact estimates for these fisheries are unavailable at this time.

#### Grays Harbor, Washington

Harvest numbers reported for Grays Harbor include catch from both the Humptulips and Chehalis Rivers through November 17, 2020. The non-selective Tribal net fisheries in Grays Harbor, and including fisheries in the Humptulips and Chehalis Rivers, harvested an estimated 3,700 Chinook salmon and 6,300 coho salmon. The non-Tribal commercial fishery in the northern portion of Grays Harbor near the Humptulips River (Area 2C) was not scheduled in 2020. There were 4 Chinook salmon (mark-selective) and 1,014 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 the winter/spring (January-June 15), summer (June 16-July) and fall (August-December) periods. All fisheries were constrained by impacts on ESA-listed stocks. Winter/spring fisheries were primarily constrained by impacts on ESA-listed upper Columbia River spring Chinook, Snake River spring/summer Chinook, and Cowlitz spring Chinook. Summer season fisheries were constrained by impacts to upper Columbia summer Chinook and ESA-listed sockeye. Fall fisheries were mainly constrained by impacts to ESA-listed Snake River fall Chinook and upriver summer steelhead. Additionally, careful in-season management to limit the fishery impacts on ESA-listed lower Columbia tule fall Chinook further limited Columbia River fall fisheries.

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 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 2002-16. As a result of guidance from the Oregon and Washington Fish and Wildlife commissions, winter/spring non-Tribal commercial salmon seasons have not occurred 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 for spring Chinook began in 2001. In 2020, fisheries were closed March 28 through May 4 due to COVID-19 concerns. The area below Bonneville Dam was open from January 1 – March 27, May 5, 7, 9, 13, May 15-17, and May 20 for hatchery Chinook retention. The area downstream of the Lewis River was closed to angling beginning March 1 due to Cowlitz/Lewis broodstock concerns. Catch estimates for this area totaled 1,462 hatchery adult spring Chinook kept and 743 non-adipose fin clipped Chinook released. From Bonneville Dam to the Washington-Oregon state line, Chinook retention was open May 5, 7, 9, 13, May 15-17, and May 20, with 529 hatchery adult spring Chinook kept and 162 non-adipose fin clipped Chinook released. The Snake River fishery structure included two specific catch areas open on a days-per-week rotation during May 5-22. Catch in the Snake River fishery totaled 326 hatchery adult spring Chinook and 59 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 Winter/Spring Columbia River mark-selective sport fishery.					
System	Area	Chinook Kept	Chinook Released	Total Handle	% Kept
Columbia River	Below Bonneville Dam	1,462	743	2,680	66%
Columbia River	Bonneville Dam to WA-OR state line	529	162	691	77%
Snake River	Washington waters	326	59	385	85%

#### **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 2020, the platform and hook-and-line fishery was open for subsistence fishing

throughout the winter/spring period. Commercial sales did not occur in 2020 Tribal fisheries during the spring management period. Harvest estimates from the combined ceremonial and subsistence fisheries totaled 4,368 upriver spring Chinook (includes harvest 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 summer management timeframe. Commercial fisheries during the summer timeframe did occur in off-channel areas (Select Areas) in the Columbia River estuary but are not reported in this document.

### **Sport**

Summer season mark-selective Chinook recreational fisheries were open July 4-31 from the Tongue Point-Rocky Point line near the mouth of the Columbia River upstream to Priest Rapids Dam. An estimated 1,191 and 140 summer Chinook were harvested, and 995 and 167 were released below and above Bonneville Dam, respectively. The fishery (mark-selective) above Priest Rapids Dam opened on July 4 and resulted in 4,686 Chinook kept and 1,695 released. In-river allocation agreements dictate that a substantial share of the non-treaty catch be provided for fisheries upstream of Priest Rapids Dam.

Preliminary estimated encounters of adult Summer Chinook in the Upper Columbia River mark-selective sport fishery.					
System	Area	Chinook Kept	Chinook Released	Total Handle	% Kept
Columbia River	Below Bonneville Dam	1,191	995	2,186	54%
Columbia River	Bonneville to Priest Rapids Dam	140	167	307	46%
Upper Columbia River	Above Priest Rapids Dam	4,686	1,695	6,381	73%

### **Tribal**

Summer season Tribal fisheries occurred from June 16 through July 31. Tribal mainstem fisheries are not mark-selective. Tribal fisheries are primarily conducted in the mainstem Columbia River from Bonneville Dam upstream to McNary Dam (Zone 6). Some additional harvest occurs just downstream of Bonneville Dam in platform and hook-and-line fisheries. There was a brief period of permit gillnet fisheries followed by five weekly commercial gillnet fishing periods conducted from June 22 – July 23. 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 7,929 Upper Columbia summer Chinook.

## Fall Fisheries

### **Non-Tribal Net**

Fall season mainstem fisheries are typically categorized into early and late fall seasons. The early fall season generally encompasses the month of August and in some years, early September, whereas the late fall season generally begins in mid-September and may continue through October. Time, area, and gear restrictions were in place for fall season commercial gillnet fisheries. Fall gillnet fisheries are non-MSF. No seine or pound net fisheries occurred due to ESA constraints. The early fall season consisted of six fishing periods during August 10-27 in commercial Zones 4-5 (Warrior Rock to Beacon Rock) and resulted in 16,612 Chinook and 348 Coho harvested. The late fall season consisted of 9 fishing period during September 15 through October 22 in the same area and resulted in 15,951 Chinook and 2,466 Coho harvested. Tangle net fisheries occurred during September 30-October 30 (14 periods) in commercial Zones 1-3 (mouth to Warrior Rock) and are MSF for Coho and non-MSF for Chinook and resulted in 911 Chinook and 4,992 marked Coho (1,576 unmarked Coho Salmon were released) being harvested; approximately 32% of the Coho catch in the tangle net fishery were jacks. Commercial fisheries during the fall timeframe did occur in off-channel areas (Select Areas) in the Columbia River estuary but are not reported in this document.

### **Sport**

Fall season recreational fisheries are mark-selective for Coho, and occasionally include 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 in 2020.

The Buoy 10 fishery opened August 14 and continued through December 31; Chinook retention was allowed August 14-27, September 5-6, September 11-13, and September 19 through December 31. Additional regulations for the Buoy 10 fishery included minimum size limits for Chinook (24-inches) and Coho (16-inches). 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 14,633 Chinook and 7,064 hatchery Coho kept. Released fish included 5,360 Chinook and 7,252 Coho.

The lower Columbia River (LCR) mainstem sport fishery from the West Puget Island line upstream to Bonneville Dam opened August 1-31, September 11-13 and September 19 – December 31. The area from the Rocky Point – Tongue Point line upstream West Puget Island was open August 14-27, September 11-13, and September 19 through December 31. Chinook retention from the Lewis River upstream to Bonneville Dam was allowed August 1-September 6 on a three days-per-week rotation, and September 11-13 and September 19-December 31. Unlike the Buoy 10 fishery, the LCR was not open to angling when Chinook retention was closed. The kept catch estimate for the LCR sport fishery included 19,677 adult Chinook (752 released) and 1,537 hatchery Coho (775 released).

The mainstem sport fishery from Bonneville Dam to the Highway 395 Bridge (near Pasco, Washington) was open August 1-September 8, September 11-13, and September 19-December

31. Adult catch estimates for the Bonneville to McNary area totaled 5,547 fall Chinook and 827 Coho Salmon. Additional fisheries occurred on the Columbia River upstream of McNary Dam, 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 Columbia River Fall Sport Fisheries					
System	Area	Chinook Kept	Chinook Released	Total Handle	% Kept
Columbia River	Buoy 10	14,633	5,360	19,993	73%
Columbia River	LCR Sport	19,677	752	20,429	96%
Columbia River	Bonneville-McNary	5,547	315	5,862	95%
System	Area	Coho Kept	Coho Released	Total Handle	% Kept
Columbia River	Buoy 10	7,064	7,252	14,316	49%
Columbia River	LCR Sport	1,537	775	2,312	66%
Columbia River	Bonneville-McNary	827	209	1,036	80%

### **Tribal**

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

The Tribal commercial gillnet fishery consisted of seven weekly fishing periods from August 24 through October 7. Preliminary harvest estimates for all fall season fisheries total 96,880 adult fall Chinook and 13,365 adult Coho; however, some additional fish may be landed in the ongoing platform fisheries. Harvest estimates reported herein do not include catch from 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, 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 2020 pre-season planning

included Mid-Hood Canal, Stillaguamish, and Nooksack Chinook. Strait of Juan de Fuca and Snohomish Coho were the primary Coho management units of concern for developing fisheries in the Strait of Juan de Fuca, San Juan Islands, and Puget Sound.

#### Strait of Juan de Fuca Sport

Marked Chinook retention was allowed for sport fishing in salmon management Area 5 and 6 from March 1 through March 25 when all fishing was closed due to COVID-19. 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 those areas. 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, 2020.			
Chinook retained	Chinook released	Total encounters	Mark % (legal size)
3,511	11,040	14,551	56.0%

A detailed report of this summer period sport fishery, including estimated catch, effort and other results of sampling and monitoring programs, will be available from the Washington Department of Fish and Wildlife in early 2021.

#### 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, 2019 – April 15, 2020), 700 Chinook and zero Coho were caught. In the summer Tribal troll fishery in Areas 5 and 6C only (June 1 – September 30, 2020), 100 Chinook and 100 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 2020 catch in the Strait of Juan de Fuca Tribal net fisheries (no non-Tribal net fisheries in the Strait of Juan de Fuca) are 8 Chinook and 1,400 Coho salmon.

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

Preliminary estimates of the 2020 catch in the San Juan Island net fishery directed at Sockeye, or Chum salmon totaled 2 Chinook and 715 Coho salmon in the non-Tribal fishery. Tribal fishery landings from this area for all gear types totaled 100 Chinook and 3,300 Coho.

#### San Juan Islands (Area 7) Sport

Marked Chinook retention was allowed in the entire Area 7 during the winter/spring season from February 1, 2020 through March 25, 2020 when all fisheries were closed due to COVID-19. 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, February 1 through March 25, 2020.			
Chinook retained	Chinook released	Total encounters	Mark % (legal size)
1,760	2,416	4,176	90.2%

During the summer season in Area 7, recreational anglers were allowed to retain Chinook from July 1 through July 31 and August 22-31. The southern Rosario Strait and eastern portions of Area 7 were closed from July 1 – September 30 to protect Puget Sound Chinook salmon. Additional sub-area closures are described in the 2019-20 Washington State Sport Fishing Rules Pamphlet. The table below presents estimated Chinook encounters (retained and released) and the legal-size mark rate in the Area 7 sport mark-selective fishery, from July 1-31 and August 22-31, 2020.

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 and August 22-31, 2020.			
Chinook retained	Chinook released	Total encounters	Mark % (legal size)
1,604	3,574	5,178	82.1%

#### 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 2019 – March 25, 2020) period, and in Areas 9, 10, 11, 12, and 13 during the summer (May – September 2020) period. Additionally, marked and unmarked Chinook retention was permitted in the Tulalip Bay (Area 8-2) from June 1 through September 2 (Fridays through noon Mondays), and from September 7 through September 29 (Saturdays and Sundays), and in Elliot Bay (Area 10) from August 2 through noon August 5.

Puget Sound Chinook mark-selective sport fisheries conducted in marine areas during 2019-2020.	
Areas	Season
8.1 & 8.2	Winter: February 1 – March 25, 2020.
9	Winter: February 1, 2020 – March 25, 2020. Summer: July 16 – August 15, 2020.
10	Winter: January 1, 2020 – March 25, 2020. Summer: July 16 – August 31, 2020; Sinclair Inlet: July 1 – September 30, 2020.
11	Winter: January 1, 2020 – March 25, 2020. Summer: July 1 – September 30, 2020.
12	Winter: October 1, 2019 – March 25, 2020. Summer: July 1 – September 30, 2020 (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 2021.

Mark-selective sport fisheries during 2020 directed at marked Coho were conducted in the following marine catch areas: Areas 5 and 6 from July 1 – September 30, Area 9 from July 16 – September 30 and in Area 13 from January 1 – December 31. Marked and unmarked Coho

retention was permitted in Area 7 during the months of July through September, Tulalip Bay from June 1 – September 2 (on Fridays through noon, Mondays only) as well as from September 7 – September 29 (Saturdays, Sundays), in Area 11 from July 1 – October 31; and in Area 12 from January 1 – March 25, 2020 in the whole area, as well as from August 1 – December 31, 2019 in the areas North of Ayock Point and from July 1 – October 31, 2020 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 2020. Chinook and Coho were also intercepted in fisheries directed at Chum salmon. A total of 25,700 Chinook and 104,000 Coho were landed in the Tribal marine net fisheries in Puget Sound (Areas 8-13 & 7B-D) during 2020. Non-Tribal net fishery landings from these areas totaled 9,286 Chinook and 2,785 Coho. 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 16,600 Chinook and 51,700 Coho during 2020.

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 2020.	
River	Season
Nooksack River	June 1 – 30, and September 1 - 30
Cascade River	June 1 – July 15
Skagit River	May 1 – May 31 from the highway 536 bridge; June 1 – July 15
Skykomish River	May 23 – July 31
Carbon River	September 1 – October 15
Puyallup River	August 15 – September 30
Nisqually River	July 1 – November 15
Chinook non-selective sport fisheries conducted in Puget Sound rivers during 2020.	
River	Season
Samish River	August 1 – September 13
Green River	September 1 – December 31

During the 2020 season there were mark-selective sport fisheries targeting hatchery Coho in the rivers of Puget Sound that have PSC Coho CWT exploitation rate indicator stocks or DIT groups on the Wallace River (Skykomish tributary) September 16 through November 30. A mark selective fishery was open on the Dungeness October 16 through November 30 and the Nisqually River from July 1 – November 15. Recreational non-selective Coho fisheries were

conducted on the Nooksack River, Skagit 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 14. Preliminary 2020 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.<sup>9/</sup>

	2020			Landed						
	Preseason <sup>5/</sup>									
Fisheries	Total Mortality <sup>1/</sup>	Landed <sup>2/</sup>	Preliminary Landed	2019	2018	2017	2016	2015	2014	2013
<b>OCEAN FISHERIES</b>										
<b>Commercial Troll</b>										
Neah Bay and La Push (areas 3,4,4B) <sup>3/</sup>	53,800	47,200	7,600	39,100	33,700	35,200	28,100	73,600	77,100	63,700
Columbia Ocean Area and Westport (area 1,2) <sup>4/</sup>	25,200	15,500	6,800	3,400	13,900	24,700	14,200	50,900	39,100	28,300
<b>Sport</b> (see text for quota information)										
Neah Bay (area 4)	6,300	5,600	1,900	3,900	3,000	7,300	3,300	8,500	5,900	6,200
La Push (area 3)	1,500	1,300	20	600	400	500	300	2,400	1,600	2,400
Westport (area 2)	13,800	12,500	4,800	2,400	4,900	6,600	8,400	19,100	23,500	13,700
Columbia Ocean Area (area 1) <sup>13/</sup>	8,000	7,000	800	4,000	2,300	7,600	6,000	12,200	11,300	8,500
<b>INSIDE FISHERIES</b>										
<b>Sport<sup>10/</sup></b>										
Strait of Juan de Fuca (area 5,6)	17,200	9,300	-	13,100	14,300	9,900	9,700	11,800	11,100	14,900
San Juan Islands (area 7)	2,900	1,600	-	6,400	7,300	11,300	6,200	8,600	9,200	9,500
Puget Sound Marine (area 8-13)	30,000	20,100	-	19,300	29,900	22,800	14,400	8,800	12,100	16,600
Puget Sound Rivers <sup>12/</sup>	13,100	12,600	-	9,800	13,300	18,500	8,600	11,100	11,800	19,600
North WA Coastal Rivers	-	-	-	1,900	1,600	1,600	600	2,200	1,200	2,700

Grays Harbor <sup>7/</sup>	2,400	2,000	-	1,700	3,700	2,700	2,800	3,400	1,200	3,800
Columbia River (Spring) <sup>6/</sup>	-	-	2,000	2,000	8,100	9,100	14,100	21,300	19,900	8,000
Columbia River (Summer) <sup>6/</sup>	-	-	1,200	-	1,100	3,800	3,600	5,000	2,300	2,100
Columbia River (Fall) (incl. Buoy 10) <sup>6/</sup>	-	-	39,700	22,000	22,400	60,400	48,700	91,300	63,000	74,500
<b>Commercial<sup>11/</sup></b>										
Strait of Juan de Fuca net and troll (area 4B,5,6C)	6,000	4,000	800	1,500	3,100	1,900	700	5,900	6,100	4,000
San Juan Islands (area 6,7, 7A)	8,300	8,300	100	3,600	3,900	2,600	100	4,800	6,900	3,800
Puget Sound Marine (8-13,7B-D)	39,000	38,300	34,900	72,700	70,600	90,600	55,800	33,100	28,400	70,100
Puget Sound Rivers <sup>12/</sup>	33,700	33,700	16,600	38,400	41,600	53,900	23,300	21,200	19,900	26,800
North WA Coastal Rivers	-	-	20,600	12,200	11,400	14,400	9,400	17,200	20,100	14,300
Grays Harbor (area 2A-2D) <sup>7/</sup>	1,100	1,000	3,700	2,400	2,700	3,700	2,100	10,500	5,100	2,900
Columbia River Net (Winter/Spring) <sup>8/</sup>	-	-	4,400	4,700	10,900	8,100	20,700	38,400	28,700	11,500
Columbia River Net (Summer) <sup>8/</sup>	-	-	7,900	5,600	9,500	16,300	23,500	41,700	22,100	15,300
Columbia River Net (Fall) <sup>8/</sup>	-	-	129,400	71,600	63,000	136,900	190,100	340,200	363,600	312,600

<sup>1/</sup> 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).

<sup>2/</sup> For the ocean fisheries, this column shows the Chinook troll and recreational quotas used for 2020 pre-season fishery planning as distributed by ocean area (Landing Quotas = Landed). See text for any in-season adjustments.

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

<sup>4/</sup> Includes Oregon troll catch in Area 1.

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

<sup>6/</sup> 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 5, 8, 24-25 in the current Joint Staff Report regarding spring and summer Chinook and tables 25-27 in the annual fall report.

<https://wdfw.wa.gov/fishing/management/columbia-river/reports>.

<sup>7/</sup> 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.

<sup>8/</sup> Mainstem retained catch only, includes tribal C&S and Commercial from all gear types and non-tribal (Columbia River mouth upstream to McNary Dam). Excludes Non-tribal Select Area commercial catches. Fall season does not include seine catch. Catch data from annual Joint Staff Reports. Winter and spring catch Tables 5 (Tribal) and 17 (non-Tribal). Summer catch is in Table 8 and 18. Fall catch from annual fall report Tables 21, 22, 23 and 29.

<https://wdfw.wa.gov/fishing/management/columbia-river/reports>.

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

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

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

<sup>12/</sup> 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).

Table 15. Preliminary 2020 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. <sup>6/</sup>

	2020			Landed						
	Preseason <sup>9/</sup>									
Fisheries	Total Mortality <sup>1/</sup>	Landed <sup>2/</sup>	Preliminary Landed	2019	2018	2017	2016	2015	2014	2013
<b>OCEAN FISHERIES</b>										
<b>Commercial Troll</b>										
Neah Bay and La Push (area 3,4,4B) <sup>3/</sup>	18,900	17,000	14300	55,100	11,400	13,300	-	4,100	60,100	48,500
Columbia Ocean Area and Westport (area 1,2) <sup>10/</sup>	3,900	1,500	800	5,900	1,300	1,800	-	4,800	19,000	5,400
<b>Sport (see text for quota information)</b>										
Neah Bay (area 4)	3,500	2,800	3,000	6,200	4,900	3,500	100	7,800	5,600	6,500
La Push (area 3)	900	700	200	1,800	1,000	1,750	-	600	4,600	2,800
Westport (area 2)	12,200	9,800	8,200	20,200	15,400	15,750	-	30,700	54,500	20,400
Columbia Ocean Area (area 1) <sup>12/</sup>	16,300	13,300	12,900	53,500	20,600	21,600	18,600	44,600	75,100	20,500
<b>INSIDE FISHERIES</b>										
<b>Sport <sup>7/</sup></b>										
Strait of Juan de Fuca (area 5,6)	19,300	16,200	-	29,600	28,000	4,800	100	62,000	63,000	41,300
San Juan Islands (area 7)	2,200	2,100	-	5,800	4,800	100	100	3,800	2,000	2,600
Puget Sound Marine (area 8-13)	52,200	46,100	-	44,600	50,100	31,400	4,900	76,900	59,200	72,100
Puget Sound Rivers	14,900	14,000	-	25,100	18,300	9,000	11,300	18,600	17,900	70,000
North WA Coastal Rivers	2,800	2,700	-	5,300	2,000	4,900	1,600	3,600	8,800	7,200
Grays Harbor <sup>5/</sup>	7,800	7,500	-	13,500	4,000	9,200	3,700	8,200	27,300	21,200

Columbia River Buoy 10 <sup>4/,11/</sup>	20,100	16,300	6500	22,800	6,800	18,800	9,200	36,900	57,700	7,600
<b>Commercial</b> <sup>8/</sup>										
Strait of Juan de Fuca net and troll (area 4B,5,6C)	2,500	2,400	1,500	600	5,000	1,200	700	1,700	2,300	2,700
San Juan Islands (area 6,7,7A)	7,900	5,200	4,000	1,900	3,900	3,400	4,100	4,000	19,800	19,400
Puget Sound Marine (area 8-13,7B-D)	87,900	86,000	106,800	47,400	124,600	134,400	210,900	28,800	108,400	168,500
Puget Sound Rivers	58,400	57,300	54,800	43,400	114,600	63,200	65,400	17,800	73,400	136,000
North WA Coastal Rivers	32,300	31,700	38,300	13,400	22,300	63,700	57,800	18,400	101,400	44,800
Grays Harbor (area 2A-2D) <sup>5/</sup>	13,700	13,500	7,300	10,200	9,800	12,700	3,200	14,700	80,100	30,400

<sup>1/</sup> 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).

<sup>2/</sup> For ocean fisheries this column shows the Coho troll and recreational quotas used for 2020 pre-season fishery planning as distributed by ocean area (Landing Quotas = Landed). See text for any in-season adjustments.

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

<sup>4/</sup> 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](http://wdfw.wa.gov/fishing/crc/staff_reports.html).

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

<sup>6/</sup> Includes catch from mark-selective fisheries where estimates are available.

<sup>7/</sup> Sport data for the most recent two years are preliminary. All data subject to change.

<sup>8/</sup> 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, Moclipis, and Ozette Rivers have been removed from landed catch.

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

<sup>10/</sup> Includes Oregon troll catch in Area 1.

<sup>11/</sup> For Buoy 10, see tables 25 in the annual fall report.

Table 16. 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	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
<b>Ocean Troll</b>												
Cape Flattery & Quillayute (Areas 3/4)	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Columbia R & Grays Harbor (Areas 1 & 2)	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
<b>Ocean Sport</b>												
Neah Bay (Area 4)	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
La Push (Area 3)	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Grays Harbor (Area 2)	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Col. R. (Leadbetter Pt. to Cape Falcon)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>Inside Fisheries</b>												
<b>Sport</b>												
Juan de Fuca (Areas 5 & 6)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
San Juan Islands (7)	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes
Puget Sound Sport (Areas 8-13 all year)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
North WA Coastal Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Grays Harbor (Areas 2-2)	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes
Willapa Bay (Area 2-1)	no	no	no	yes	no	yes	no	no	no	no	yes	no
Columbia River Buoy 10	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>Commercial</b>												
North WA Coastal Rivers	no	no	no	no	no	no	no	no	no	no	no	no
Grays Harbor (Areas 2A-2D)	no	no	no	no	no	no	no	no	no	yes	yes	yes
Willapa Bay (Area 2-1)	no	no	no	no	no	no	no	no	no	no	yes	no
Columbia River Net/ - Fall	yes	yes	no	no	no	yes	yes	yes	no	no	no	no
Strait of Juan de Fuca (Areas 4B/5/6C) Net & Troll	no	no	no	no	no	no	no	no	no	no	no	no

San Juan Islands (Areas 6, 7 & 7A)	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Marine (Areas 8 - 13)	no	no	no	no	yes	no	no	no	no	no	no	no	no
Puget Sound Rivers	no	no	no	no	no	no	no	no	no	no	no	no	no
<b>Selective Chinook</b>	<b>2020</b>	<b>2019</b>	<b>2018</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>	<b>2014</b>	<b>2013</b>	<b>2012</b>	<b>2011</b>	<b>2010</b>	<b>2009</b>	
<b>Ocean Troll</b>													
Cape Flattery & Quillayute (Areas 3/4/4B)	no	no	no	no	no	no	no	no	no	no	no	no	no
Columbia. R & Grays Harbor (Areas 1&2)	no	no	no	no	no	no	no	no	no	no	no	no	no
<b>Ocean Sport</b>													
Neah Bay (Area 4)	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	no
La Push (Area 3)	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	no
Grays Harbor/Westport (Area 2)	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no
Col. R./Ilwaco (Leadbetter Pt. to Cape Falcon)	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	no
<b>Inside Fisheries</b>													
<b>Sport</b>													
Juan de Fuca (Area 5&6)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
San Juan Islands (Area 7)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Sport (Areas 8-13)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
North WA Coastal Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Grays Harbor (Areas 2-2)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no
Columbia River Sport - Winter/Spring	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Columbia River Sport - Summer	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Columbia River Sport - Fall	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	no	no	no
Willapa Bay (Area 2-1)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>Commercial</b>													
North WA Coastal Rivers	no	no	no	no	no	no	no	no	no	no	no	no	no

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



## IV. PRELIMINARY REVIEW OF THE 2020 WASHINGTON CHUM SALMON FISHERIES OF INTEREST TO THE PACIFIC SALMON COMMISSION

This summary report provides a preliminary review of the 2020 U.S. Chum salmon (*Oncorhynchus keta*) fisheries conducted by Puget Sound salmon co-managers (Puget Sound Treaty fishing tribes and the State of Washington) in the Strait of Juan de Fuca (Salmon Management and Catch Reporting Areas 4B, 5 and 6C), the San Juan Islands and the Point Roberts area (Areas 7 and 7A) (Figure 39), conducted in compliance with provisions of Chapter 6 of Annex IV of the Pacific Salmon Treaty (PST 2019). The harvest and abundance information provided are based on preliminary data reported through November 17, 2020. These preliminary data are subject to correction and revision as additional information becomes available.

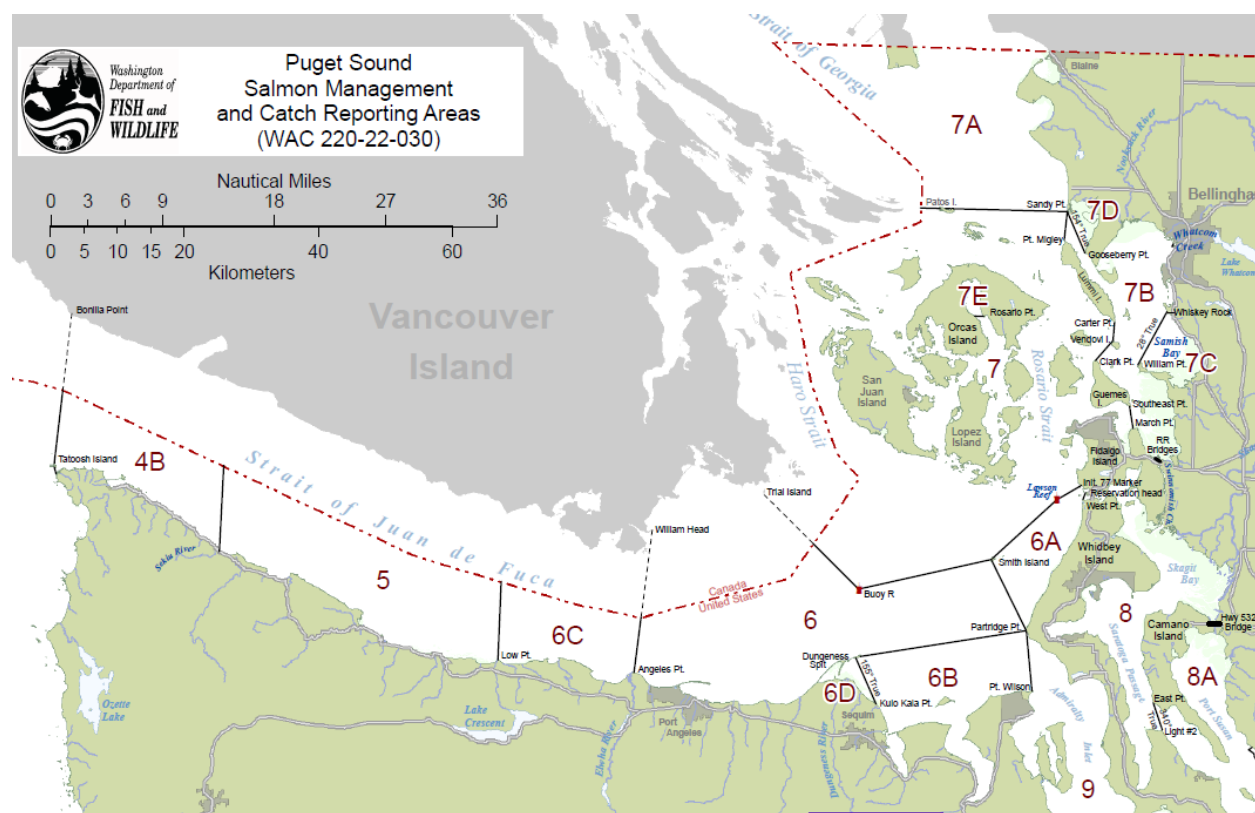


Figure 39. Puget Sound Salmon Management and Catch Reporting Areas with Chum salmon fisheries of interest to the Pacific Salmon Commission.

### MIXED STOCK FISHERIES

#### Areas 4B, 5 and 6C

As in recent years, the 2020 Chum salmon fishery in Areas 4B, 5 and 6C was restricted to very limited effort by Tribal fishers using gillnets. The fall Chum-directed salmon fishery opened the week of October 11, with a schedule of six days per week and continued through November 14. A total of 195 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 1,399 Coho, 4 Chinook, and zero Steelhead.

Table 18. Preliminary 2020 Chum salmon harvest report for Washington Salmon Catch Reporting Areas 4B, 5, and 6C.

<b>Areas 4B, 5, 6C</b>	
Tribal Gill Net Only	
Time Periods	GN
Through 9/19	0
9/20-9/26	0
9/27-10/3	0
10/4-10/10	0
10/11-10/17	48
10/18-10/24	59
10/25-10/31	36
11/1-11/7	40
11/8-11/14	12
Total	195

#### Areas 7 and 7A

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

On October 7, 2020 Canada notified the U.S. that the Inside Southern Chum aggregate was estimated to be above the critical threshold of 1.0 million. Following this notification, the U.S. initiated Area 7 and 7A commercial chum fisheries on October 10, which continued through November 10.

Paragraph 9 (d) states that Canada will provide an in-season estimate of Fraser River Chum salmon run size no later than October 22. If that estimate is below 1,050,000, then the U.S. will limit its fishery in Areas 7 and 7A to not exceed a catch of 20,000 additional Chum salmon from the day following notification. If the Fraser River chum run size estimate is between 1,050,000 and 1,600,000, the U.S catch ceiling remains at 125,000. If the Fraser River run size estimate is above 1,600,000, the U.S. catch ceiling is revised to 160,000.

On October 22, 2020, Canada notified the U.S. that the Fraser River chum run size was estimated to be 1,084,000. This estimate was above the 1,050,000 fish threshold but below the 1,600,000 fish threshold, allowing U.S. chum fisheries in Areas 7 and 7A to continue up to the catch ceiling of 125,000 fish. Areas 7 and 7A therefore remained open to commercial chum fisheries through the remainder of the Chum management period.

Non-Tribal reef net fisheries targeting Coho salmon were conducted following the end of Fraser Panel control on September 13 with chum and unmarked Chinook retention prohibited prior to October 1. Retention of unmarked Coho prior to October 1 was capped at 500 fish, per the NOF List of Agreed to Fisheries.

The total 2020 Chum salmon catch by all gears in Areas 6, 7, and 7A (reported through November 17) was 84,726 fish (Table 19). During the fall Chum salmon-directed fisheries in Areas 6, 7 and 7A, there was a reported by-catch of 3,778 Coho, 48 Chinook, and zero Steelhead (Table 19).

Table 19. Preliminary 2020 Chum salmon harvest report for Puget Sound Salmon Catch Reporting Areas 6, 7 and 7A. Bycatch numbers include both landed and estimated non-landed fish.

	Area 6		Area 7			Area 7A		Area 6,7,7A	
Time Periods	GN	PS	GN	RN	Area Total	PS	GN	Area Total	Total
Through 9/19					0			0	0
9/20-9/26					0			0	0
9/27-10/3				37	37			0	37
10/4-10/10				93	93			0	0
10/11-10/17		13,807	3,778	664	17,585	9,111	5,208	14,319	31,904
10/18-10/24		7,749	624		8,373	7,312	11,234	18,546	26,919
10/25-10/31		4,579	1,515		6,094	4,398	13,572	17,970	24,064
11/1-11/7		240	26		266	904	604	1,508	1,774
11/8-11/14							28	28	28
Total	0	26,375	5,943	37	32,355	21,725	30,646	52,371	84,726
Gear Type Abbreviations: GN=Gill Net; PS=Purse Seine; RN=Reef Net									
10/10- 11/17 By-catch		Coho: 3,778		Chinook: 48		Steelhead: 0			

## **PUGET SOUND TERMINAL AREA FISHERIES AND RUN STRENGTH**

Pre-season forecasts for Chum salmon returns to Puget Sound in 2020 predicted a fall Chum run size totaling approximately 1,066,000 fish, with 528,208 Chum predicted to return to Hood Canal and 309,573 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 below forecast. In-season run size estimates from the 2020 fall Chum fisheries in South Puget Sound and Hood Canal indicate that South Sound fall Chum is expected to return at around 87% of the pre-season forecast, while the in-season Hood Canal run size estimate is about two-thirds of that forecast. Terminal fisheries in mixed-stock marine areas were significantly restricted in 2020, particularly in Central and South Puget Sound. As of the date of this report, spawning escapement surveys are in progress for most Puget Sound stocks and therefore escapement estimates are not yet available. Early indications from these surveys suggest that some natural chum stocks may fail to meet escapement goals again this year. It is also now evident that a number of fall Chum hatchery programs throughout Puget Sound will likely not achieve their egg-take objectives for 2020.

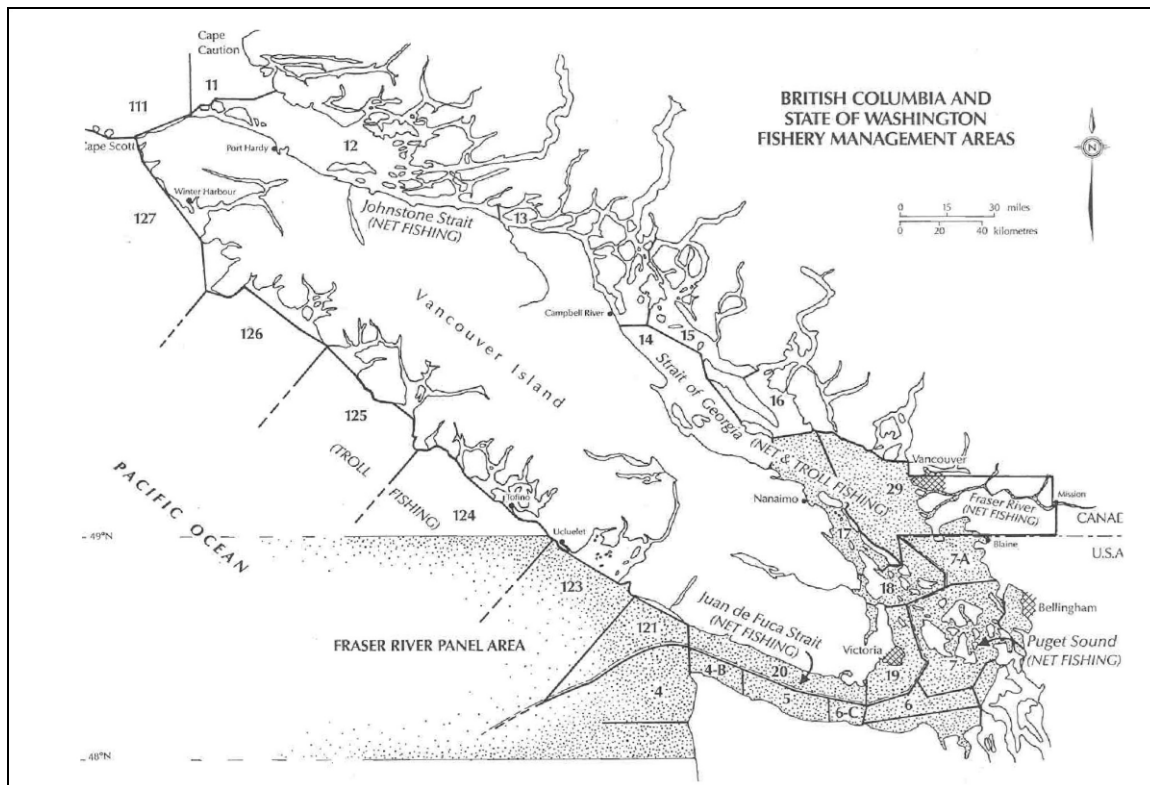
## ***REFERENCES***

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

### III. Preliminary Review of 2019 United States Fraser River Sockeye Fisheries

#### INTRODUCTION

The 2020 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 2020 U.S. Fraser River salmon fisheries as authorized by the Panel. Catch and abundance information presented is considered preliminary.



**Figure 1.** British Columbia and State of Washington Fishery Management Areas, 2020. 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 1 shows the 2020 pre-season sockeye forecasts based on the 50 percent probability level, which represent the mid-point of the range of possible run sizes for all runs. This is the lowest pre-season forecast in the Fraser River sockeye recorded history. Table 1 also provides the escapement goals for the sockeye run timing groups based on the pre-season forecasted abundance. The escapement goals for all runs can change in-season as the run size estimates are updated.

**Table 1.** 2020 pre-season Fraser River sockeye forecasts and escapement goals by run timing group.

	<b>Early Stuart</b>	<b>Early Summer</b>	<b>Summer</b>	<b>Lates</b>	<b>Total</b>
Forecast of Abundance	13,000	218,000	611,000	99,000	941,000
Escapement Goal	13,000	150,300	611,000	99,000	873,000

### 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 35%.

### 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 2 provides the pre-season projected MAs that were used for planning fisheries in 2020. 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 2.** 2020 pre-season proportional management adjustment (pMA) and corresponding proportional difference between estimates (pDBE<sup>1</sup>) for each run timing group.

<b>Early Stuart</b>		<b>Early Summer</b>		<b>Summer</b>		<b>Lates</b>	
pMA	pDBE	pMA	pDBE	pMA	pDBE	pMA	pDBE
0.69	-41%	0.52	-34%	0.16	-14%	0.41	-29%

<sup>1</sup> The aggregate Early Summer, Summer, and Late-Run pDBE is calculated using the component pDBEs weighted by the p50 run size forecasts.

### 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 predicting run size in-season. The following Area 20 50% dates (the dates when 50% of the run is forecasted to have passed through Area 20) were predicted pre-season for the major Fraser River sockeye run groups.

**Table 3.** 2020 Area 20 Projected 50% run timing dates.

<b>Run Timing Group</b>	<b>Area 20 50% Run Timing Date</b>
Early Stuart	July 4
Early Summer	July 24
Summer	July 31
Lates	August 6

### U.S. Total Allowable Catch (TAC)

Pre-season, there was no US TAC. The TAC available by sockeye run timing group is shown in Table 4.

**Table 4.** 2020 total U.S. total allowable catch (TAC) by run timing group<sup>1</sup>.

<b>Run Timing Group</b>	<b>Pre-season U.S. TAC</b>
Early Stuart	0
Early Summer	0
Summer	0
Lates	0
Total	0

<sup>1</sup> Based on Panel-approved final pre-season model run on July 19, 2016.

### 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 and meeting escapement objectives for less abundant run groups.

In 2020, the pre-season forecast of ~941,000 sockeye resulted in no available U.S. TAC.

## ***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 these in-season estimates that are critical to Fraser Panel management.

### Run Assessment

The final in-season total abundance estimate for sockeye in 2020 (Table 5) was 288,000, which was 31% of the pre-season forecast. This represents the lowest sockeye return to the Fraser River since record keeping began in 1893. Across the four run timing groups, three groups returned well below their preseason forecasts while one returned higher than forecast. The Early Stuart sockeye exceeded expectations and returned at 123% of preseason forecast but Early Summer run sockeye performed poorly with an in-season run size estimate at 32% of their pre-season forecast. The return of Summer-run sockeye was only 31% of the preseason forecast while Late-run sockeye performed even more poorly at 16% of forecast.

The 2020 Fraser sockeye run timing varied across run timing groups with Early Summer, Summer run and Late run sockeye arriving 9, 3, and 2 days early (July 15, 28, and Aug. 4 respectively; Table 6). Early Stuart run sockeye were two days later relative to preseason expectations.



**Table 5.** Comparison of 2020 pre-season vs. in-season abundance estimates for Fraser River sockeye salmon by run timing group.

<b>Run Timing Group</b>	<b>Pre-Season 50% Probability Forecast</b>	<b>In-Season Run Size Estimate</b>	<b>Comparison: In-Season / Pre-Season Forecast</b>
Early Stuart	13,000	16,000	123%
Early Summer	218,000	69,000	32%
Summer	611,000	187,000	31%
Lates	99,000	16,000	16%
<b>Total Sockeye</b>	<b>941,000</b>	<b>288,000</b>	<b>31%</b>

<sup>1</sup> As of September 21, 2020.

**Table 6.** Comparison of 2020 preliminary 50% run timing dates through Area 20 to in-season estimates.

<b>Run Timing Group</b>	<b>Pre-season 50% Run Timing Date</b>	<b>In-season 50% Run Timing Date</b>
Early Stuart	July 4	July 6
Early Summer	July 24	July 15
Summer	July 31	July 28
Lates	August 6	August 4

#### Season Description

The Fraser Panel met on every Tuesday and Friday between July 10 and September 1 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-season abundance estimates did not match pre-season expectations, so U.S. fisheries did not occur. In-river environmental conditions, including the Big Bar rockslide, were a major factor affecting management decisions in 2020.

U.S. fisheries remained closed for the season. Table 7 summarizes changes to run sizes made by the Fraser Panel during the 2020 season.

**Table 7.** Summary of changes to Fraser River sockeye run size estimates made by the Fraser Panel during the 2020 season.

<b>Meeting Date</b>	<b>Run Timing Group</b>	<b>Change Made</b>
July 28, 2020	Early Stuart	increased to 14,000
August 4, 2020	Early Summer	decreased to 72,000
	Summer	decreased to 311,000
August 7, 2020	Summer	decreased to 169,000
	Lates	decreased to 28,000
September 1, 2020	Early Stuart	increased to 16,000
	Summer	decreased to 191,000
	Lates	decreased to 14,000

## Harvest

U.S. harvest opportunities in 2020 were expected to be nil going into the season and in-season abundances estimates were continually downgraded from preseason expectations throughout the season with no sockeye available for U.S. TAC.

**Table 8.** Preliminary estimate of 2020 U.S. catches of Fraser River sockeye salmon in Panel area waters.

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

The 2020 Fraser sockeye season presented management and conservation challenges:

- Due to the Big Bar rockslide, in-river migration of Early Stuart and some Early Summer run stocks were impacted due to higher than average water discharge (46-62% greater than average during mid to late July).
- Approximately 100% of the Early Stuart, 32% of the Early Summer, and 66% of the Summer runs were expected to migrate past the Big Bar rockslide to reach spawning grounds
- By July 31<sup>st</sup>, sockeye started to arrive at the Big Bar slide area and passed with the assistance of the Whoosh system but little to none used the natural fishway passage.
- By August 7<sup>th</sup>, only 10% of the tagged sockeye in the slide area were observed passing Churn Creek, but still impacted by a discharge 38% greater than average.
- By August 19<sup>th</sup>, water discharge levels decreased and allowed sockeye to pass above the Big Bar slide area.
- The total sockeye salmon return was approximately 30% of the pre-season forecast, 91% below the historical cycle-line, and the lowest on record (~288,000), making the last 3 out of 5 years record breaking low returns.
- Over the last two decades, there has been a decline in Fraser sockeye survival (smolt to age 4 survival rate of less than 0.17% compared to long-term average of 7% in Chilko).



## Report of the Standing Committee on Finance and Administration

October 21, 2021

The Standing Committee on Finance and Administration met by teleconference on June 1, October 12, and October 19, 2021. The Committee addressed several issues and made recommendations for the Commission's consideration as noted below.

### Lessons Learned from COVID-19

The Committee reviewed the Lessons Learned from Covid-19 report from the Executive Secretary, which outlined the impact of the Covid-19 pandemic on the Commission and the PSC Secretariat operations. The Committee acknowledged the following main points of the report:

- The PSC meetings migrated entirely to virtual platforms, and the online meetings were generally well received, with higher attendance than the in-person meetings;
- The Fraser assessment program went largely uninterrupted, with minor issues regarding shipment constraints, which did not affect regulatory decisions;
- Treaty implementation was not severely affected in the short term, with the exception of certain issues, of which some were mitigated through the Parties' cooperative efforts;
- There were significant cost savings within PSC Secretariat as a result of reduced travel;

The Committee recognized that the virtual meeting format will continue to be used in certain circumstances due to its convenience and low cost. The Committee acknowledged the need for any future in-person meetings to include a virtual component to allow for participants' virtual attendance (hybrid model).

The Committee raised the question of which Commission/ Panel/ Committee meetings would benefit from in-person attendance versus online. It was agreed that the PSC Panels and Committees should be polled in order to gain a better understanding of their meeting needs and preferences. The Committee recommends that Panels and Committees include their plans for virtual/hybrid/in-person meetings in their annual work plans.

### National and Secretariat perspectives on January 2022 meeting week

The Committee acknowledged the current uncertainties with respect to travel restrictions, rates of infection, and other safety concerns, and discussed options for the January 2022 meeting. The Committee recommends that the January meeting, currently scheduled for Portland OR, instead be held in Vancouver BC. The Committee received assurance from Secretariat staff that the Hyatt Hotel in Vancouver would be able to host the meeting. There remain questions, however, about the number of delegates who would attend a Vancouver meeting and whether all PSC bodies would wish to meet in person. The Secretariat will survey the National Sections in order to make the necessary arrangements.

#### Draft policy on public participation at PSC meetings

The Committee reviewed the document “Discussion paper re: public access 9-23-21” prepared by the Executive Secretary, which outlines potential approaches to public participation in the PSC meetings and processes. The Committee acknowledged the need to adopt a policy regarding public participation and access to PSC public records, but recognized the need for more consultation on this issue within National Sections. The Committee decided to keep the issue as an open agenda item for future discussion.

#### Status of Test Fishing Revolving Fund

The Committee reviewed the document “Fund Statements Fraser River TFRF 2021 09 30” prepared by the Secretariat, which provided an estimate as to the balance in the Test Fishing Revolving Fund (TFRF) as of September 30, 2021. The Committee acknowledged that the TFRF was in better financial shape than originally anticipated due to higher-than-expected test fish sales.

#### Secretariat compensation

The Committee received reports from the Secretariat about a) reclassification of a staff member to a higher pay grade; and b) competitiveness of PSC salaries. Committee discussions are underway on both subjects, with plans to reconvene in late October or early November. In the interim, DFO and Secretariat personnel will gather additional background information to facilitate the conversation.



## Update from the Management Entities Work Group

Prepared for the PSC Fall Meeting

October 2021

### Background

The Commission formed the Management Entities Work Group (MEWG) in January 2021 to build on the successes of the February 2019 meeting with domestic agency officials and other key representatives. In February 2021, the Commission directed the group to explore options for engaging management entities and make recommendations to the Commission in October 2021. This report responds to that directive.

### Activities to date

The MEWG<sup>1</sup> met four times in 2021 and discussed mutually agreeable goals. Members decided to engage their respective countries' leadership on Panels and Technical Committees to determine a) reactions to the 2019 event; b) preferred means to follow up on 2019; c) communication problems or gaps in PST comprehension; and d) regional issues requiring PSC response.

To launch this effort, the MEWG crafted a survey of eight standardized questions for members to use when contacting Panel/Technical Committee leaders (attached). Designated MEWG members then used this survey in August/September 2021 to collect information.

Key responses are listed below:

- Those respondents who attended and recalled outcomes in 2019 said the event was a good step to improve communication within and outside the PSC on emerging issues. Meeting in person during that event allowed informal interactions about issues.
- Panel/Committee chairs generally have high-functioning communication/relationships for their respective body. However, many noted it is important to create and maintain channels of communication between Panel/Technical Committee leaders and Commissioners.
- The PSC is an enjoyable and functional forum to work in, but it will be important to break out of silos/narrow focus of particular Panel/Committee work.
- Relationships formed over time have improved understanding and trust within PSC bodies.
  - Many rely on informal mentorship of newcomers by veteran members; this can take years to get someone familiar with process/products/calendars.

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<sup>1</sup> Canada: Dean Allan and Andy Thomson; USA: Phil Anderson, Bill Templin, Jim Scott. Assisted by the Executive Secretary.

- Secretariat support for PSC bodies is generally good, and the regular orientation sessions are helpful. Background reading material would be welcome on the history/foundations of the PSC.
- Panel/Committee leaders would like more training on how to run effective meetings and processes.
- Climate change/salmon productivity changes are important cross-cutting issues that need further attention. The May 11 Southern Panel workshop on these topics was a good step, but future efforts should be coordinated region-wide.
- SFEC has ongoing concerns about the lack of adequate data on MSF's reported by entities.
- Efforts are needed to keep the policy and technical aspects contained within their respective bodies (panels vs. technical committees).

### **Next steps**

- The MEWG needs more time to assess COVID implications for future management entities meetings, and to assess the best format for those meetings.
- It could be useful to host a series of “focus groups” or workshops on particular topics that affect the PSC and management entities, perhaps as early as fall 2022.
- The MEWG will revisit these issues and report more fully in January 2022.



Fisheries and Oceans  
Canada

Pêches et Océans  
Canada

PSC(ES) 21-4 Attachment seven

# Pacific Salmon Strategy Initiative

## Coordinated Response to Pacific Salmon Decline

Pacific Salmon Commission – Fall Meeting  
October 20, 2021

Canada



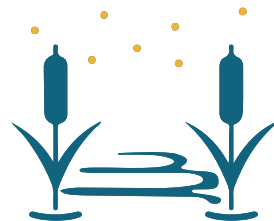
Pacific salmon populations are being negatively affected at every stage of their lifecycle, by a combination of factors:



Climate Change and Warming Waters



Acute one-time events  
(e.g., Big Bar Landslide)



Habitat Degradation



Land and Water Use Pressures



Pollution



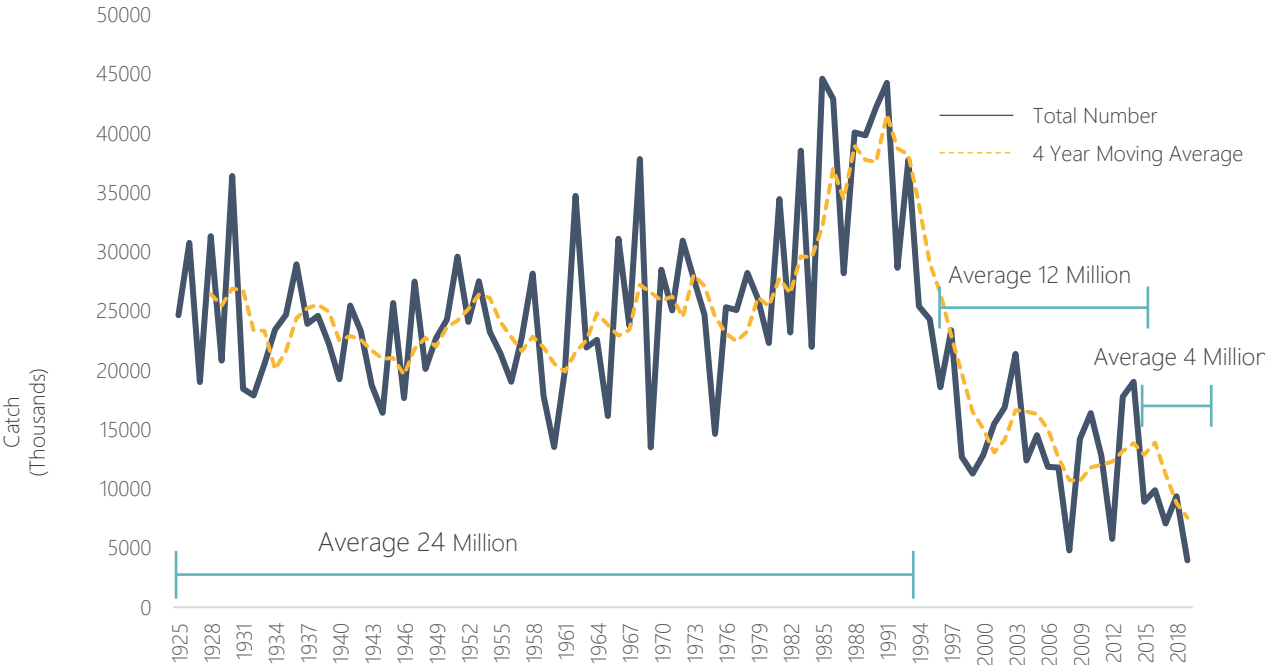
Illegal and unregulated fishing



# Time for a different approach

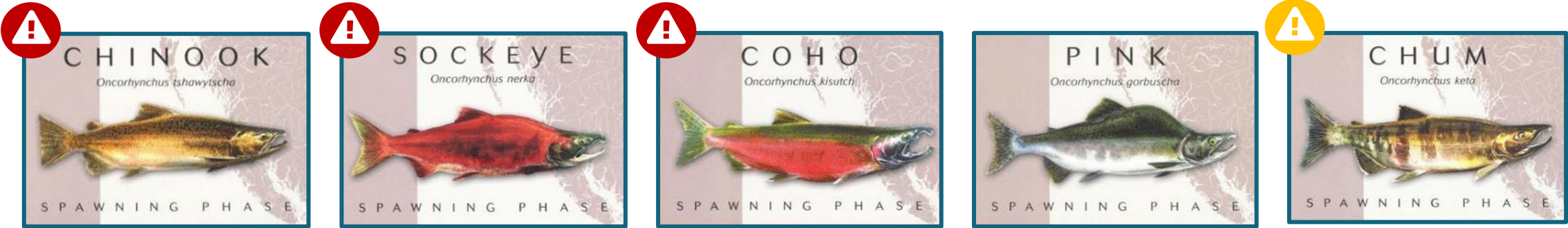
*Pacific salmon species are in decline in all areas, and urgent action is required to support conservation and sustainable fisheries.*

Area	Sockeye	Chinook	Coho	Pink Odd Year	Pink Even Year	Chum
Yukon	—	∨	—	—	—	—
Canada/ USA NW BC Transbo undary	∨	∨	∨	—	∨	—
Northern BC	∨	∨	—	—	—	—
Southern BC	∨	∨	∨	—	∨	∧



Canadian Pacific Salmon Catch

\*NPAFC Catch Statistics: North Pacific Anadromous Fish Commission (NPAFC). 2020. NPAFC Pacific salmonid catch statistics (updated 21 July 2020). North Pacific Anadromous Fish Commission, Vancouver. Accessed Month, Year. Available: <https://npafc.org>.



⚠ Pacific salmon species in trouble

# What is the Pacific Salmon Strategy Initiative?



Work in close collaboration with relevant ministers, as well as with First Nations, provincial and territorial authorities, fishing and stewardship organizations and implicated communities across the Pacific Region to bring forward a **Pacific Salmon Strategy** and deliver on our commitment to conserve and protect wild Pacific salmon and their habitats and ecosystems.

- Minister of Fisheries, Oceans and the Canadian Coast Guard  
Supplementary Mandate Letter

**Pacific Salmon Strategy Initiative**

## Departmental Priority

Budget 2021, released April 19<sup>th</sup>, proposes to provide an additional investment of **\$647.1 million over five years, starting immediately in 2021-22**, to Fisheries and Oceans Canada to stabilize and conserve wild Pacific salmon populations.

**This new investment will include:**

- Research, new hatchery facilities, and habitat restoration
- Creation of a Pacific Salmon Secretariat and Restoration Centre of Expertise
- Improved management of commercial and recreational fisheries
- Doubling the British Columbia Salmon Restoration and Innovation Fund (BCSRIF) with an additional \$100 million
- Further engagement with First Nations and fish harvesters

Pacific Salmon Strategy Initiative

# Federal Budget



**BUDGET**  
2021



## Indigenous Reconciliation

Strengthened positive relationships and collaboration with First Nations will help to achieve solutions and shared objectives



## Innovative Solutions

Effective alternatives to the status quo are needed to address current challenges and support conservation, as well as socio-cultural and economic outcomes.



## Prioritization

Identify priority Pacific salmon populations and work, delivered more clearly through an integrated, adaptive and systematic approach.



## Enhanced Transparency, Data, and Trust

Grounded in science and evidence-based decision making, facilitate and enable broad external buy-in and support towards desired salmon outcomes, in part through improved external structures



## Partnerships and Collaboration

Advance collaboration in delivery with Indigenous groups, provincial/territorial governments, international partners, industry stakeholders, and the general public.

### Pacific Salmon Strategy Initiative

# Horizontal Principles

Guided by specific principles, 5 unique themes link together the various components and is at the forefront of the Federal Response.

# Federal Response to Pacific Salmon declines

- Launched by the Minister of Fisheries and Oceans on June 8, 2021, the \$647-million Pacific Salmon Strategy Initiative (PSSI) aims to stem historic declines in key Pacific salmon stocks and rebuild these species to a sustainable level.
- The Initiative is built on these **four key pillars**:
  - Conservation and stewardship
  - Enhanced hatchery production
  - Harvest transformation
  - Integration and collaboration

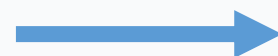






Pacific Salmon Strategy Initiative

# Implementation Framework



*Additional  
protection for stocks  
of conservation  
concern*

Long Term Commercial Fishery  
Conservation Closures and  
Mitigation Measures

*One component of a broader Pacific  
Salmon Strategy Initiative response.*

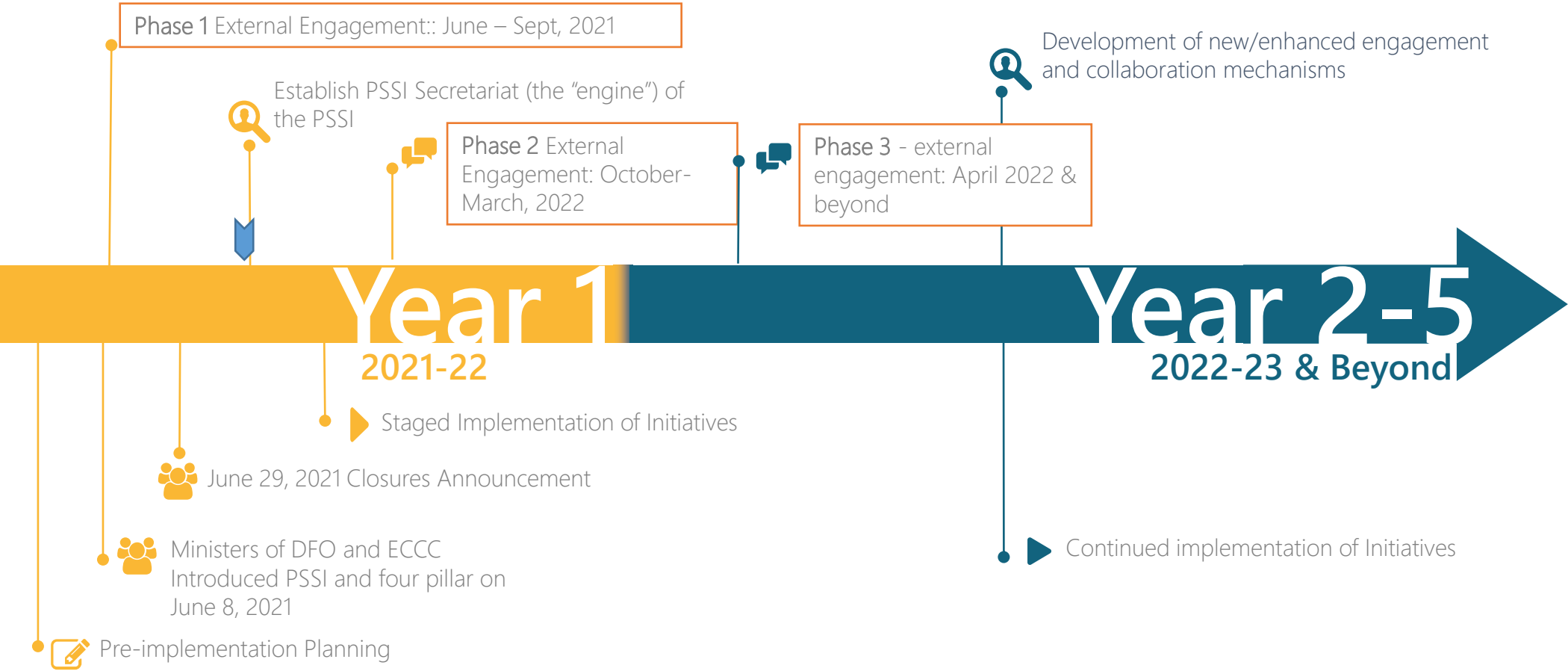


## 2021 Expected Outcomes

- Reduced impact of commercial fishery on stocks of conservation concern
- More salmon reaching the spawning grounds from:
  - reduced removals of weak stocks in mixed-stock fisheries targeting a given species
  - reduced by-catch and incidental mortality of weak stocks in fisheries targeting other salmon species
- Launch of new programming to mitigate impacts to harvesters

Pacific Salmon Strategy Initiative

# Timelines





# Next Steps on Engagement

- Phase 1 was early engagement. Focus was on identifying how First Nations, partners and key salmon stakeholders would **want to be engaged** and identifying potential early implementation ideas/challenges.

## Upcoming: Phase 2 (November 2021 - March 2022):

- Still being planned, initial ideas are to focus on steps for establishing and stabilizing ongoing collaborative processes.
- Potential areas of focus:
  - to provide for **deeper dive** and engagement on specific themes or aspects of the PSSI.
  - Identify key priorities that align with the emerging PSSI implementation framework.
  - To engage further on Pacific salmon **governance** across BC and Yukon, and how to enhance inter-jurisdictional **collaboration with a focus on Pacific salmon conservation and rebuilding.**



# Questions for Discussion

- *How should we engage Pacific Salmon Commission (PSC) on the PSSSI as it unfolds?*
- *Given the expected complexity and breadth of PSSSI, are there helpful lessons can you share from your experience with the PSC ?*



# Resources

For available information on the Pacific Salmon Strategy Initiative, please see:

- The June 8, 2021 news release introducing the PSSI <https://www.canada.ca/en/fisheries-oceans/news/2021/06/canada-launches-transformative-effort-to-save-pacific-salmon.html>
- PSSI backgrounder <https://www.canada.ca/en/fisheries-oceans/news/2021/06/pacific-salmon-strategy-initiative-pssi.html>
- Recording of the June 8, 2021 media event: [Federal government launches \\$647-million strategy to protect wild salmon populations – June 8, 2021 - YouTube](#)
- PSSI website <http://www.canada.ca/Pacific-Salmon-Strategy>.
- News Release - [Minister Jordan announces long-term commercial closures and Licence Retirement Program in effort to save Pacific Salmon](#) - Canada.ca





# Thank You

Further information on PSSI will be available on the DFO website:

<http://www.canada.ca/Pacific-Salmon-Strategy>

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**Pacific Salmon Strategy Initiative (PSSI) Contact:**

DFO.PAC.PSSIInitiative-  
InitiativeSSP.PAC.MPO@dfo-mpo.gc.ca

Chinook Interface Group Report to Pacific Salmon Commission  
19 and 21 Oct 2021

Chinook Interface Group Report to the Pacific Salmon Commission  
2021 PSC Fall Meeting

The CIG met twice during this week, October 19 1:30-3:30 pm AKDT and October 21 9-10:30 am AKDT. The following report includes CIG's recommendations for the Commission's consideration.

- 1) **Adoption of the Agenda:** Canada requested to withdraw attachment number 5 from the CIG briefing book associated with agenda item 6. More details will be provided by Canada regarding the Phillips River indicator stock in January.
  - CIG recommends withdrawing attachment 5 from the CIG briefing book.

- 2) **Annual PSC Chinook Model Calibration Update:** Attachment 1 of the CIG Briefing Book notes that the CTC provided the 2021 pre-season calibration (CLB2104) to the Commission on April 1, 2021.

Jon Carey (NOAA) noted items 3 and 4 in Attachment 1 of the CIG briefing book. Item number 3 reflects the issue of an error that was discovered in a program used to estimate the maturation rates used as input to the CTC model. This error has been fixed and a new 2020 pre-season calibration conducted (CLB2003). The effect of this new calibration was presented in Table B, Attachment 1.

Item #4 Attachment 1 identifies that there are concerns amongst some of the CTC members over the accuracy of the 2020 post-season Abundance Indices (AI) and associated Allowable Catches (AC) produced by CLB2104, potentially due to the ability of the model to handle significantly reduced catches due to access limitations resulting from the COVID-19 pandemic.

John Carlile (ADF&G) noted that there is also work of the CTC to consolidate the three programs that estimate maturation rates. The CTC has not identified any errors that would require updates to the calibration discussed in the April 2021 memo.

Commissioner Vincent-Lang reminded the group that the 2020 post-season AIs and the 2021 pre-season AIs would be investigated and may change the AIs if agreed within the CTC (Attachment 1).

- 3) **Calendar Year Exploitation Rate Working Group Update:** Rob Houtman (DFO) reviewed the conclusions and recommendations found in the CYER WG's Technical Report 46, A Review of Indirect Methods Used in Estimation of Chinook Salmon Exploitation Rates and Recommendations for Improvement. The report covers three topics of CWT exploitation rate analyses – proxy methods, terminal area adjustments, and fisheries without methods to estimate recoveries. Where possible, the CYER WG recommends prioritizing funding efforts to move to direct estimation of CWT recoveries, improve indirect methods to estimate recoveries, or develop bias correction factors when

recovery estimates do not reflect a complete census of recoveries. Additional work should focus on improving adjustments made to terminal exploitation rates through improving escapement estimates to meet CTC data standards and testing the assumption that CWT indicator stocks represent the escapement indicator stocks. Jim Scott (WDFW) noted that implementation of the recommendations would be a big bilateral step forward, especially with the update to Chinook chapter asking more of the CWT system. Commissioner Vincent-Lang thanked the work group and asked for a recommendation that will provide the most return. Mr. Scott noted a previous CYER WG report highlighting that, in general, investments in increased tagging resulted in more benefits than investments in sampling operations. He highlighted that each recommendation's value will depend on the stock, noting that the recommendations for stocks where terminal area adjustments are used will bring high return.

Mr. Scott provided the CIG with an update to the implementing mark-selective fishery (MSF) algorithms. The CYER WG will begin comparing MSF algorithms to simulated data later this year, then apply the algorithms to CWT indicator stocks beginning in Spring 2022. Discussions with SFEC will occur during Spring 2022 regarding logistics, sampling, tagging, and costs of implementing the recommended programs. The CYER WG anticipates discussing an MSF transition plan with the CIG during Summer 2022 and anticipates sending out a revised readiness questionnaire to management entities in Winter 2023.

- 4) Incidental Mortality Data Standards Assignments Update:** Laura Tessier (DFO) provided an update from the ad-hoc incidental mortality work group tasked with developing levels of precision and accuracy for the estimation of incidental mortality. Estimates of kept and released catch from 2009–2019 has been collected for fisheries, including estimates of variance where available. The work group is ranking each fishery, drafting a report, including an appendix with updates on estimating incidental mortality methodology since the CTC 2004 report was published. The work group will submit this report to the CTC by October 31 for review. Once complete, the work group will provide the report, literature review, and a glossary of terms to the CIG in November. The work group will be available for additional work assignments if this report does not sufficiently address the task as outlined in the Treaty.

- CIG recommends reviewing the incidental mortality report produced by the work group in November and adding it to the agenda for the January post-season meeting.

- 5) Data Request Proposal:** John Field presented an updated CTC data request form with language on agency proprietary data, as requested by the CIG in June 2021. Commissioner Vincent-Lang expressed concerns about releasing proprietary data and noted the PSC or the CTC should not be making decisions about releasing such data. Dr. Antonio Velez-Espino (DFO) noted that the data request form has helped with tracking requests and providing data that is not yet available publicly, such as electronic versions of tables or data underlying figures in published reports. There are very rare instances

where the CTC has proprietary data, as most data is anonymized by the CTC before analysis. Commissioner Riddell suggested agency staff are included on the emails responding to requests. Mr. Carlile noted that most analyses done by the CTC have rolled up data without proprietary information. Mr. Field suggested when sensitive data is requested, CTC members knowledgeable if the data includes proprietary information could be involved in handling.

- CIG recommends updating the language on proprietary information in the request form, as well as some editorial updates. The CIG does not require reviewing the request form again.

**6) Update on Phillips River Indicator Stock:** Canada requests withdrawing the attachment in the CIG briefing associated with this agenda item (attachment 5). They will provide more details and recommendations to the CIG at the January meeting. Commissioner Anderson highlighted a need to understand the process on adding or removing Attachment I stocks listed in the Treaty. Removal of stocks from Attachment I should not be a unilateral decision. Commissioner Reid noted that more analysis was needed to find a suitable replacement and to provide additional information to the CIG. Commissioner Vincent-Lang would like to see how the impacts of removing Phillips River indicator stock impacts the output of the PSC Chinook Model. Dr. Velez-Espino noted that three model stocks represent the Strait of Georgia, with multiple CWT indicators representing each model stock; removing Phillips should not produce a gap in stocks modelled for that region.

- CIG recommends addressing this item at the CIG meeting during the January post-season meeting.
- Canada will provide a revised discussion document which will include next steps for the Phillips River indicator stock prior to the January meeting.

**7) CTC Work Plan 2021/2022:** Mr. Carey summarized tasks and tentative meeting schedule in the Chinook Technical Committee's 2021/2022 work plan. The work plan is similar to 2020/2021 with the addition of a new task to develop an outline for the five-year review. Dr. Velez-Espino noted a change from two annual reports (catch and escapement, model calibration and exploitation rate analysis) to three annual reports (catch and escapement, model calibration, exploitation rate analysis), which speeds up the pace of production. An additional set of meetings were added in November to address COVID impacts to the ERA and Model.

- CIG recommends approving the 2021/2022 CTC workplan with the addition of the following task to be reviewed with the CIG at the post-season meeting in January and that the CIG revisit the CTC workplan relative to this task as needed:
  - Update the September 30, 2020 CTC document COVID-19 Impacts on Chapter 3 of the Pacific Salmon Treaty Implementation with any changes to previously reported 2020 activities and an initial review of 2021

COVID-related responses. Where changes were made to standard practices include detail about the normal practice and the deviation that was implemented.

- 8) **OWG Work Plan 2021/2022:** Bill Tweit (WDFW) provided an update on the tasks the Okanagan Chinook Working Group accomplished in their 2020/2021 work plan. Two analytical tasks were completed, and the OWG held four virtual workshops on bilateral supplementation planning, survival bottlenecks, Northern Pike, and escapement monitoring. There was good engagement from management entities attending the workshops and the virtual workshops provided a good compromise to meeting in person. Chuck Parken (DFO) provided an overview of tasks listed in the 2021/2022 work plan. Two analytical tasks of reporting escapement abundance and updating the ERA with CWT data will occur. An additional virtual workshop on a baseline productivity assessment will be held in April. The OWG intends to host an in person meeting to prepare a synthesis document of the five workshops for presentation to the CIG in October 2022. The OWG is interested in presenting three 20 minute presentations to the CIG on the workshops, aligning with the CIG's meeting schedule in January and February. Discussions from these presentations could help frame the synthesis document. Commissioner Oatman noted that it was good to see everyone working together and the connections between the two countries and individuals. Commissioner Riddell echoed Commissioner Oatman's comments, noting this was one of the most positive engagements he has been a part of. Commissioner Anderson was pleased with the work the group is doing to advance this stock to a productive state. Commissioner Vincent-Lang noted the group has accomplished a lot but had concerns about the 20 minute presentations to the CIG. He suggested to distill the three workshop presentations into one or two, given the CIG's full agenda. Mr. Tweit and Mr. Parken noted they can work within any time frame given for reporting on the workshops.
- 9) **Update on CTC Progress on Evaluating COVID impacts to the PSC Chinook Model:** (This item was discussed with item 7, above) Commissioner Anderson noted caucus discussions requesting an update of the table provided to the Commission in October 2020 on COVID impacts. Commissioner Vincent-Lang requested detailed documentation on deviations from standard practices (e.g., escapement or fishery sampling), as baseline data forms the background of ERA and Model, and it is critical to understand how infilling techniques will affect the outputs. He believes the CTC needs to spend time reviewing any changes to data methodologies and their impacts to have the best model for conservation and management. Commissioner Jones noted that the CTC made a commitment to review the COVID impacts deeper, and Dr. Velez-Espino highlighted the four additional days of meeting to review the impacts on the Model and ERA. Commissioner Anderson noted he was hesitant to not approve the CTC's work plan at this meeting and Commissioner Vincent-Lang was hesitant to approve the work plan without including a review of COVID impacts and was uncomfortable leaving the meeting without clear task prioritization to the CTC.

- See recommendation from agenda item 7.



**10) Mark-Selective Fisheries Fund Committee Update:** Tom Alpe (PSC Secretariat) provided an update of the Mark-Selective Fisheries Fund Committee. In its inaugural year, the fund has a spending cap of \$750,000 USD. A request for proposals was developed in spring 2020 and was open for submissions June 1–August 2. Six proposals were submitted totaling \$633,310 USD. The MSF Fund Committee recommends funding three of the proposals – new CWT sampling wands for NWIFC, increased Columbia River fishery sampling by WDFW, and mass marking of Sarita Chinook salmon by the Huu-ay-aht First Nation. Commissioner Vincent-Lang noted that ADF&G submitted a proposal to the Fund Committee, but intends to resubmit next year after addressing the technical issues noted by the Committee.

- CIG recommends supporting the Mark-Selective Fisheries Fund Committee's recommendations for funding three projects in its inaugural year.

#### **SUMMARY OF RECOMMENDATIONS:**

- 1) CIG recommends withdrawing attachment 5 from the CIG briefing book.
- 2) CIG recommends reviewing the incidental mortality report produced by the work group in November and adding it to the agenda for the January post-season meeting.
- 3) CIG recommends updating the language on proprietary information in the request form, as well as some editorial updates. The CIG does not require reviewing the request form again.
- 4) CIG recommends addressing this item at the CIG meeting during the January post-season meeting.
  - a. Canada will provide a revised discussion document which will include next steps for the Phillips River indicator stock prior to the January meeting.
- 5) CIG recommends approving the 2021/2022 CTC workplan with the addition of the following task to be reviewed with the CIG at the post-season meeting in January and that the CIG revisit the CTC workplan relative to this task as needed:
  - a. Update the September 30, 2020 CTC document COVID-19 Impacts on Chapter 3 of the Pacific Salmon Treaty Implementation with any changes to previously reported 2020 activities and an initial review of 2021 COVID-related responses. Where changes were made to standard practices include detail about the normal practice and the deviation that was implemented.
- 6) CIG recommends supporting the Mark-Selective Fisheries Fund Committee's recommendations for funding three projects in its inaugural year.

**PACIFIC SALMON COMMISSION WORK PLAN**  
**[2021-2022]**  
**October 4, 2021**

**Panel / Committee:**

The Okanagan Working Group (OWG) reports to the Pacific Salmon Commission.

**Date:** PSC Fall Meeting, October 18-22, 2021

**Update on Bi-lateral Tasks Assigned Under Current PSC Agreement:**

The Pacific Salmon Commission approved the following work plan tasks to the OWG in February 2021:

1. *Report historical and recent escapement abundance estimates of hatchery- and natural-origin summer Chinook in the U.S. and Canadian sections of the Okanagan River through 2020.*
  - ✓ Data through run year 2020 have been provided but not published in an OWG report.
2. *Conduct an exploitation rate analysis for Okanagan summer Chinook with CWT recovery data through 2019 and report the CWT statistics (e.g., mortality distribution tables, survival rates, maturation rates).*
  - ✓ Mortality distribution tables and CWT statistics have been updated through run year 2019, but not published in an OWG report.
3. *The Parties recognize the value of creating a baseline assessment of the current productivity and capacity of Okanagan River Summer Chinook against which to measure the benefits of future habitat restoration and enhancement actions. The workgroup will coordinate a management entity exploration of alternative approaches to create such a baseline assessment. Alternatives may include a monitoring program for juvenile production, an analysis of spawner and recruit data, the use of habitat-based production models, or other approaches as appropriate.*
  - No work was conducted on this task due to competing priorities. The work group expects the results of the workshops conducted over the last year to inform a virtual workshop about a productivity baseline proposed for April 2022.
4. *Organize a workshop with the management entities that could be involved in a bilateral supplementation program for Okanagan summer Chinook. Identify U.S. and Canadian supplementation objectives. Review the current supplementation circumstances relative to the objectives. Identify any issues and options to address the issues. Summarize the findings and any recommendations for the Commission.*
  - ✓ A virtual workshop was held on September 9, 2021. There were 32 participants from 8 management entities, with 8 presentations. The workshop identified U.S. and Canadian supplementation objectives, reviewed the current supplementation circumstances relative to the

objectives, and identified any issues and options to address the issues. A summary of the workshop should be available in early October for workshop participants. A presentation is planned for the CIG as part of the new Work Plan Task 5.

5. *A teleconference with the management entities and others will focus on the potential survival issues for juvenile and adult summer Chinook in the U.S. and Canadian sections of the Okanagan River. The current survival monitoring projects relative to these issues will be reviewed and examined to identify any gaps or modifications to existing study designs to learn about locations where the Okanagan summer Chinook may be experiencing poor survival. Findings and recommendations will be summarized for the Commission.*
  - ✓ A virtual workshop was held on July 14, 2021. The workshop had 32 participants from 10 management entities, with 14 presentations. The current survival monitoring projects relative to these issues were reviewed and examined to identify gaps or modifications to existing study designs to learn about locations where the Okanagan summer Chinook may be experiencing poor survival. A presentation is planned for the CIG as part of the new Work Plan Task 5. A brief summary is in the Work Plan Comments section.
6. *A teleconference with the management entities and others will review the current escapement monitoring programs that the management entities use for summer Chinook in the U.S. and Canadian sections of the Okanagan River. The current escapement estimates will be reviewed relative to the CTC bilateral data standards for Chinook escapement indicator stocks. Any new escapement methodologies will be communicated to the OWG and other for review and feedback on study design recommendations that could help the management entities achieve these CTC data standards and summarize them for the Commission.*
  - ✓ A virtual workshop was held December 17, 2020. There were 18 participants from 9 management entities, with 3 presentations. The current escapement estimates were reviewed relative to the CTC bilateral data standards for Chinook escapement indicator stocks. New escapement methodologies were communicated to the OWG and others for review and feedback on study design recommendations that could help the management entities achieve these CTC data standards and summarized them for the Commission. A presentation was provided to the CIG during the PSC Annual Meeting in February 2021. A brief summary is in the Work Plan Comments section.
7. *A teleconference with the management entities and others will focus on the potential invasion of Northern Pike into the Okanagan River. The monitoring and control programs currently happening in the Columbia River upstream of Grand Coulee Dam will be reviewed, and advice will be sought from the management entities and other experts about the steps and methods to prevent the spread of Northern Pike into the Okanagan River. The findings and recommendations will be summarized for the Commission.*

- ✓ A virtual workshop was held on April 21, 2021. The OWG was assisted by the Washington Invasive Species Council and the Washington Recreation and Conservation Office. There were 44 participants from 14 different entities, with 6 presentations. The current monitoring and control programs in the Columbia River upstream of Grand Coulee Dam were reviewed, and advice was sought from the management entities and other experts about the steps and methods to prevent the spread of Northern Pike into the Okanagan River. A presentation is planned for the CIG as part of the new Work Plan Task 5. A brief summary is in the Work Plan Comments section.

**Obstacles to Completing above Bi-lateral Tasks:**

The extent and duration of the circumstances associated with COVID-19 was not anticipated, however for the next year the OWG will use remote teleconferencing approach to complete the tasks as necessary.

**Outline of Other Panel / Committee Tasks or Emerging Issues:**

At the 2019 Fall Meeting, the Commission identified that it will maintain the ad hoc Bilateral Okanagan Chinook Work Group, which will a) not be constituted under Article II of the Treaty; but will nonetheless b) provide an annual work plan for the Commission (initially in January 2020, and ongoing at the October Fall Meeting).

The OWG work plan tasks for this year are to continue the two annual tasks originally assigned by the PSC, one task that was not completed from the previous work plan, and a new task to produce a synthesis report of OWG activities since its last technical report published on the PSC website.

1. *Report escapement abundance estimates of hatchery- and natural-origin summer Chinook in the U.S. and Canadian sections of the Okanagan River through run year 2021.*  
This task will add another year of data collected by the management entities to the current analysis by the OWG.
2. *Conduct an exploitation rate analysis for Okanagan summer Chinook with CWT recovery data through 2020 and report the CWT statistics (e.g., mortality distribution tables, survival rates, maturation rates).*  
This task will add another year of data to the current analysis by the OWG.
3. *The Parties recognize the value of creating a baseline assessment of the current productivity and capacity of Okanagan River Summer Chinook against which to measure the benefits of future habitat restoration and enhancement actions. The workgroup will coordinate a management entity exploration of alternative approaches to create such a baseline assessment. Alternatives may include a monitoring program for juvenile production, an analysis of spawner and recruit data, the use of habitat-based production models, or other approaches as appropriate.*  
A virtual workshop will be used identify and coordinate approaches in April 2022. This workshop will build on previous workshops hosted by the OWG.

4. *The OWG will develop a synthesis report to formally document hosted workshops, identify issues and impediments to Okanagan Chinook restoration, and recommended next steps.*

The OWG anticipates meeting in-person in June 2022 to develop the synthesis report. The report will be an excellent resource for those involved with Okanagan Chinook and it will have helpful contextual information to facilitate discussions about Okanagan Chinook restoration and management.

5. *The OWG will develop and provide short presentations to the CIG with summaries of the findings and recommendations from the 3 recent workshops (Northern Pike, Survival, and Bilateral Supplementation Program).*

The OWG anticipates providing these presentations to the CIG during November 2021 (Northern Pike-virtual meeting), January 2022 (Survival-PSC Post Season) and February 2022 (Bilateral Supplementation-PSC Annual). OWG participation is anticipated to be virtual unless the Post Season and Annual meetings are in person, and OWG members are present for other PSC panel and committee activities.

#### **Potential Issues for Commissioners, including enhancement activities reported under Article V:**

In-person meetings. Short virtual webinars will be used instead of in-person meetings, depending on the COVID-19 situation. Resources for the in-person synthesis report meeting could become an issue and the OWG requests that funding be provided by the national sections for travel and per diem costs.

Future role of OWG. The OWG intends to produce a synthesis report documenting work group activities, findings, and recommendations. Once complete, the Commission may want to discuss the need for an ongoing PSC role for in the restoration and management of Okanagan Chinook.

#### **Potential Issues for Committee on Scientific Cooperation**

None identified.

**Proposed Meeting Dates and Draft Agendas:**

<b>Meeting</b>	<b>Dates</b>	<b>Location</b>	<b>Meeting Objectives</b>
OWG-Task List Planning	Oct/Nov (TBD) 2021	Webinar	Outline more detailed plans to complete prioritized task(s) from Commission
OWG Northern Pike Update	Nov 2021	Webinar	Develop summary presentation for CIG on Northern Pike Workshop (Task 5)
OWG Survival Workshop Update	January 10-14 (PSC meeting)	Portland, OR	Develop summary presentation for CIG on Survival Workshop (Task 5)
Supplementation workshop Update	February 14-18 (PSC meeting)	Vancouver, BC	Develop summary presentation for CIG on Supplementation Workshop (Task 5)
CWT Exploitation Rate Analysis	March	email	Task 2 analysis conducted during Chinook Technical Committee's Exploitation Rate Analysis
Escapement Reporting	March	email	Task 1 reporting
Baseline assessment workshop	April	Webinar	1 day virtual workshop regarding baseline for productivity and capacity approaches (Task 3), OWG conference calls and email to summarize findings and next steps
OWG Synthesis Reporting	June 20-22	Penticton, BC	Develop synthesis report for Commission (Task 4)
PSC Fall Session	October 17-21	Vancouver, BC	OWG co-chairs attend and present synthesis report findings and recommendations to Commission

**Status of Technical or Annual Reports:**

The OWG has not developed a report of its activities in 2020/2021 but plans to develop a synthesis report in the next cycle, which the OWG envisions as a Commission Technical Report. The OWG has produced summaries for three of the technical workshops and a summary for the most recent workshop is anticipated to be available in October 2021.

**Comments:**

Summaries for 3 of the 4 virtual workshops conducted during the last year are below.

**Escapement**

The current escapement programs applied in Canada and the US do not currently meet the CTC data standards for escapement estimates. Canada has initiated a new escapement program that relies on a PIT tag mark-recapture methodology that has been designed to

achieve the CTC data standards. Several suggestions were provided to improve the quality of the US program, including ways to increase the accuracy of redd counts and the application of a transgenerational genetic mark-recapture methodology which has been used successfully by WDFW in Puget Sound and the Columbia River. The next steps involve discussion with CIG about funding options to improve the quality of the US escapement data to the CTC data standards, and implementing improvements to the US escapement program to achieve the CTC data standards.

### Northern Pike

The potential invasion of Northern Pike is a serious risk to the productivity, abundance and fisheries for Okanagan and other Columbia River Chinook stocks. Currently, Northern Pike are found in the Columbia River and tributaries upstream of Grand Coulee Dam to Keenleyside Dam near Castlegar, BC. Invasion can happen via natural movements and dispersal, and from illegal fish stocking. Several case studies were examined where the impacts of Northern Pike were severe to the Chinook resource and fisheries, and the costs of the suppression programs were not only high, but ongoing for an indeterminate period since eradication is rare. Several preventative measures were identified, but funding for monitoring and response planning programs are key gaps that need attention. A bilateral response plan will be invaluable for agencies to prepare for and coordinate actions for the suppression, eradication and to restrict the spread of Northern Pike in the Okanagan when they are detected. The plan should include approaches for communication, media messaging, and potential funding opportunities. The plan should identify the permits necessary for suppression, to limit dispersal, and for eradication. The plan may involve a gap analysis component to acquire information that would be helpful to improve the response plan.

### Survival

The survival of Okanagan Chinook in freshwater was examined at the egg-to-fry, juvenile rearing and smolt migration, and adult migration life stages. For each life stage, several factors were discussed that threaten survival, including habitat quality, the irrigation system, dam passage, predation and the effects of high water temperatures on Chinook behavior and survival. These factors were considered in terms of their geographic extent, persistence (i.e., temporal duration), and severity (i.e., mortality rate). Factors were weighted by their importance using the persistence and severity rankings from workshop participants, and geographic extent was applied as a multiplicative to the weight. Several knowledge gaps were identified along with suggestions for future investigations (i.e., studies on predation, sedimentation, and migration timing and delays). There were also several mitigation options identified to improve survival and Chinook abundance. In short, habitat restoration should be the highest priority to restore the Canadian Okanagan River to as natural of a state as practical (e.g., removal/modification of the antiquated VDS structures, reconnection with natural river channel, riparian restoration). There will be opportunities to restore and improve the habitat near the channelized sections in the Canadian Okanagan as the engineered channels have insufficient capacity for the river volumes modelled under climate change scenarios, and major modifications are necessary for water management.

**PACIFIC SALMON COMMISSION WORK PLAN**  
**2021 – 2022 Annual Cycle**

**Panel / Committee:** Calendar Year Exploitation Rate Workgroup (CYER WG)

**Date:** Presented at October 18-22, 2021 Fall Session

**Update on Bilateral Tasks Assigned Under 2019 PSC Agreement:**

The PSC approved the tasks proposed in the October 9, 2019 report “Collaborative Improvements of Estimates of Calendar Year Exploitation Rates”. Tasks 4a and 5a were previously completed. Progress on the remaining tasks in chronological order is summarized below:

***Recommendation 3b. Review Terminal Area Adjustments. Request that the CTC accelerate the completion of Appendix A, task 5 (documentation of methods used to adjust the CWT recoveries for the Robertson Creek, Quinsam River, Queets River, Salmon River, and Elk River CWT indicator stocks), recommend improvements, and identify any research necessary to verify assumptions.***

Target Completion Date: November 2020

Actual Completion Date: September 2021

Status Summary: The CTC will document current terminal area adjustment methods (documented in TCCHINOOK 21-05, published September 29, 2021) and the CYER WG will take the lead on recommending improvements and identifying research to verify assumptions (Technical Report 46 published September 21, 2021).

***Recommendation 3c. Indirect Methods Recommendations. Task a workgroup with providing recommendations on the application of indirect methods and identifying priority fisheries for the transition to direct estimation of CWT recoveries.***

Target Completion Date: December 31, 2020

Actual Completion Date: September 2021

Status Summary: The workgroup has completed a risk assessment framework to inform the identification of priority fisheries to transition to direct estimation of CWT recoveries and has compiled information for most fisheries where indirect methods are used or where estimates of CWT recoveries are lacking. The CYER WG has published their findings in the Indirect Methods report, published September 21, 2021 as Technical Report No. 46.

***Recommendation 5b. Evaluate Alternative MSF Estimation Methods. If significant differences in return rates are identified, request that the workgroup:***

- i) *Estimate the CYERs in ISBM fisheries for each CWT indicator stock in 2009-2015 using the methods described above or other methods developed*



*by the workgroup and provide a summary of the strengths and weaknesses of each approach.*

The CYER WG is addressing this task through two steps: 1) simulation analysis of alternative MSF estimation methods; and 2) application of MSF estimation methods to CWT indicator stocks.

***Step 1. Simulation Analysis of Alternative MSF Estimators***

Target Completion Date: September 30, 2020

Projected Completion Date: February 2022 PSC Meeting

Status Summary: The CYER WG is evaluating alternative MSF estimation methods by simulating CWT recoveries datasets and comparing the true values with the estimates from alternative methods. The CYER WG plans to accomplish this task by coding the MSF algorithms. Using the Data Generation Model (DGM), previously developed by a consultant for the Chinook Technical Committee, the CYER WG will simulate fishery scenarios and estimate CWT recoveries for analysis. The WG will compare the results of the MSF algorithm against the simulated recoveries and provide recommendations. Work was required to update code for the DGM and the MSF algorithms and progress was slowed due to the required updates.

***Step 2. Application of MSF Methods to CWT Indicator Stocks***

Target Completion Date: September 30, 2020

Projected Completion Date: September 2022 (delayed two years)

Status Summary: Completing this task will require the incorporation of the MSF estimation methods in the cohort analysis program used by the CTC for the annual exploitation rate analysis. The CTC is in the process of modernizing the cohort analysis computer code since much of it was written more than 30 years ago. To avoid incorporating MSF estimation methods into two computer programs (i.e., old and new cohort analysis), the CTC and CYER WG have prioritized the modernization of the cohort analysis program, which is ongoing within the CTC (REAM). When that is completed, the MSF methods developed through Step 1 will be added to the cohort analysis program and applied to the CWT indicator stocks.

***ii) Identify and contrast at a coarse scale (i.e., fisheries at a level of resolution similar to Table 2-3 in SFEC (19)-01) the changes in tagging, catch sampling, fishery monitoring, CWT sampling, information management, and analytical methods needed to implement the potential solutions evaluated in 5(b)(i).***

Target Completion Date: September 30, 2020

Projected Completion Date: June 2022

Status Summary: CYER WG work on this task will be initiated when the Simulation Analysis of Alternative MSF Estimators (5b(ii) Step 1) has been completed.

***Recommendation 5c. Develop MSF Transition Plan. Building upon the information from 5a and 5b, CIG discussions, and Commission direction, task a***

*workgroup with developing a transition plan for consideration by the Commission at the January 2021 meeting. The transition plan could include short- and long-term methods to estimate CYERs on natural-origin Chinook salmon, and a time schedule for implementation of recommended changes to tagging, sampling, fishery monitoring, information management, and analytical methods.*

Target Completion Date: January 2021

Projected Completion Date: October 2022

Status Summary: This is the primary task that the CYER WG anticipates undertaking in 2022. As discussed above, we now project that periodic (perhaps 3-5 in summer 2022) discussions with the CIG could be initiated in June 2022. Further discussion with the CIG is needed to identify what additional information might be needed and the preferred process to complete this task.

**Recommendation 1a. Conduct Readiness Questionnaire.** *Conduct a bilateral process similar to the CYER Readiness Questionnaire every two years to re-assess the CWT program, focus improvements, and target funding to priority improvements. Some refinements and additions to the questionnaire, such as an assessment of the quality of estimates of landed catch, encounters, and incidental mortality, will also help to further inform and drive improvements in the CWT program.*

Target Completion Date: Fall 2021

Projected Initiation Date: Fall 2022 (delayed two years)

Status Summary: The CYER WG recommends initiating this task in November 2022 for the WG to complete its work relative to mark-selective fisheries.

**Obstacles to Completing above Bi-lateral Tasks:**

None identified, although this is a challenging task. Competing priorities with the CTC could cause further delays in completing tasks.

**Outline of Other Panel / Committee Tasks or Emerging Issues:**

None identified.

**Potential Issues for Commissioners, including enhancement activities reported under Article V:**

Implementing improvements to tagging, sampling, and analytical methods to account for MSFs is critically important to assess compliance with the ISBM provisions of the updated Chinook Chapter. Although methods do not have to be identical across all fisheries, they must be coordinated and complementary to enable bilateral estimation of exploitation rates. Developing that complementary approach will likely be challenging.

**Potential Issues for Committee on Scientific Cooperation**

None identified.

**Proposed Meeting Dates and Draft Agendas:**

Meetings will be coordinated with the CTC and SFEC in order to maximize the efficiency of the work of the CYER WG. See Table 1 for proposed schedule.

**Status of Technical or Annual Reports:**

The CYER WG completed a review of indirect methods used to estimate Chinook exploitation rates in September 2021 (PSC Technical Report 46). The CYER WG anticipates completing reports on MSF Estimation Methods during 2022.

**Comments:**

None.

**Table 1. Proposed schedule of meetings for the CYER WG from November 2021 through October 2022.**

Dates	Location	Meeting Objectives
<b>2021</b>		
November 4	Webinar	<b>5b i) Step 1.</b> Plan preliminary simulations and discuss methods to evaluate performance of alternative MSF estimators for different stock migration and fishery patterns. – Completion deadline of February meeting.
<b>2022</b>		
January 10-14	PSC Post-Season Meeting (CIG) Portland	A. <b>3b.</b> Review CYER WG recommendations from the Indirect Methods Report (Tech Report No 46) and identify improvements and research necessary to verify terminal area adjustments. B. <b>5b i) Step 1.</b> Review results of simulations and performance of alternative MSF estimators; develop recommendations for MSF estimators – completion deadline of Annual meeting.
January 18, 20	Webinar	<b>5b i) Step 1.</b> Review progress in implementing MSF estimation methods and resolve technical questions – completion deadline of Annual meeting.
February 2, 4	Webinar (w/ SFEC)	A. <b>5b i) Step 1.</b> Finalize recommendations for MSF estimators – completion deadline of Annual meeting. B. <b>5b i) Step 2.</b> Identify data needs for implementing MSF methods.
February 14-18	PSC Annual Meeting (CIG) Vancouver	A. <b>5b i) Step 1.</b> Review CYER recommendations regarding performance of alternative MSF estimators. B. <b>5c.</b> Discuss proposed process to develop transition plan.
March 22	Webinar (w/ SFEC)	<b>5b ii).</b> Develop assessment of logistics and costs for implementing recommended MSF methods.
April 25-29 <sup>1</sup>	Webinar (w/ CTC)	<b>5b i) Step 2.</b> Begin incorporating MSF estimation methods into REAM, resolve technical questions, and identify data needs for exploitation rate analysis.
May 16-20 <sup>1</sup>	Olympia (w/ CTC and SFEC)	<b>5b i) Step 2.</b> Develop preliminary application of MSF to CWT indicator stocks.
June 1	Webinar (w/ CTC and SFEC)	<b>5b ii).</b> Finalize recommendations for implementing MSF methods based on logistics and costs; develop a suite of options for consideration.
June 14	Webinar (w/ CTC)	<b>5b i) Step 2.</b> Review preliminary application of MSF to CWT indicator stocks.
June	CIG Webinar	<b>5c. Develop MSF Transition Plan.</b> Discuss proposed alternatives for modifications to tagging, marking, and fishery sampling programs.
July	CIG Webinar	<b>5c. Develop MSF Transition Plan.</b> Review preliminary transition plan.
August	Webinar	<b>5b i) Step 2.</b> Review preliminary application of MSF to CWT indicator stocks.

September	CIG Webinar	<b>5c. Develop MSF Transition Plan.</b> Review preliminary transition plan.
September	Webinar	<b>5b i) Step 2.</b> Finalize application of MSF to CWT indicator stocks.

<sup>1</sup>Meetings in conjunction with CTC would require one day of in-person meeting or meeting via webinar.

**Table 2. Proposed schedule of work for the CYER WG from October 2021 through May 2023.**

Task	Subtask	With	2021			2022												2023				
			Oct.	Nov.	Dec.	Jan	Feb	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	March	April	May	
5bi1. Simulation Analysis of Alternative MSF Estimators	Code MSF Methods	-	→																			
	Simulate MSF Methods	-		→																		
	Statistically Compare MSF Methods	-				→																
	Phase 1 MSF Methods Recommendation	-					●															
5bi2. Simulation Analysis of Alternative MSF Estimators	Incorporate MSF Methods in REAM	CTC					→															
	Apply MSF Methods using REAM	CTC								→												
5bii. Identify changes in tagging, catch sampling, fishery monitoring, CWT sampling, information management, and analytical methods needed to implement the potential solutions evaluated in 5(b)(i).	Identify Data Needs for Phase 1 MSF Methods	SFEC					→															
	Assessment of Logistics and Cost	SFEC						→														
	Phase 2 MSF Methods Recommendation	SFEC and CTC										●										
5c. Develop MSF Transition Plan (with CIG)		CIG									→											
1a. Conduct Readiness Questionnaire	Develop Readiness Questionnaire	-														→						
	Agencies Respond to Questionnaire	-																→				
	Review Readiness Questionnaire Responses	-																			→	

October 2021

FINAL

## Mark Selective Fishery Fund Committee: summary of review of 2021 applications and recommendations to the Pacific Salmon Commission

The Mark Selective Fishery Fund Committee (Committee) met on September 15, 2021, to review proposals submitted to the fund in response to the Committee's 2021 Request for Proposals (RFP), which was open between May 31 and August 2, 2021. A copy of the RFP is provided at appendix 1. 7 of the Committee's 8 full members completed the review process, Dr. Brian Riddell was unable to participate. The Committee met a second time on October 6 to review answers to questions put to proponents and to finalize their recommendations to the Commission.

The Commission made up to USD \$750,000 available in this first funding round. Six proposals were submitted to the fund, in total requesting \$633,310 USD<sup>1</sup>. A simple summary of proposals and outcomes from the review process is provided below; a more detailed summary of the applications is also provided at appendix 2 together with the applications themselves.

#	Title	\$ Requested (USD)	Lead organization	Score	Recommendation
MSF-01-21	Coded Wire Tag Recovery Electronic Sampling Equipment for Treaty Tribes of Western Washington	\$161,700.00	Northwest Indian Fisheries Commission	8.7	Support
MSF-02-21	Side-by-Side Evaluation of Chinook Salmon and Steelhead Incidental Mortality Effects from Mark-Selective Pound Nets, Tangle Nets, and Gill Nets in Lower Columbia River Non-Tribal Fisheries	\$151,421.00	Wild Fish Conservancy	5.7	Do not support
MSF-03-21	Evaluation of the Feasibility of Implementing a Mark Select Fishery in the Southeast Alaska Chinook Salmon Sport Fishery	\$76,680.00	Alaska Department of Fish and Game	7.3	Do not support
MSF-04-21	WDFW Columbia River Fishery Sampling (Recreational and Commercial)	\$45,000.00	Washington Department of Fish and Wildlife	8.9	Support
MSF-05-21	Mass marking of San Juan River Hatchery Sea Pen Chinook, Brood Years 2021-2024	\$83,136.00	Pacheedaht First Nation	6.8	Do not support
MSF-06-21	Mass Marking of hatchery produced Sarita Chinook salmon	\$165,000.00	Huu-ay-aht First Nations Government	7.6	Support

The Committee recommends supporting 3 of the 6 projects submitted at a cost of USD \$371,700.

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<sup>1</sup> Proposals 5 and 6 are Canadian projects. CAD to USD exchange rate = 0.8

## Scoring process

Members scored proposals against pre-determined criteria that included an assessment of:

- Relevance to the RFP, significance of the stock and / or fishery to implementation of Chapter 3 of the PST, and the potential to improve estimates of incidental mortality or exploitation rates in mark selective fisheries (40% weight)
- The technical strength of the proposal, the team, and the overall feasibility and likelihood of success (40% weight)
- Cost effectiveness (20% weight)

Individual scores were combined to provide the overall score shown on page 1.

## Comments

### 1: Coded Wire Tag Recovery Electronic Sampling Equipment for Treaty Tribes of Western Washington

The Committee considered this to be a strong proposal in all areas assessed and recommends supporting this project.

### 2: Side-by-Side Evaluation of Chinook Salmon and Steelhead Incidental Mortality Effects from Mark-Selective Pound Nets, Tangle Nets, and Gill Nets in Lower Columbia River Non-Tribal Fisheries.

The Committee identified a number of concerns with this proposal:

- Pound net gear is illegal to use, and it is not clear that it will be legalized in future. The utility of studying the incidental mortality caused by gear that is not in use is unclear. Data about incidental mortality rates from pound nets is already available: while this project would study a modified pound net, it is unclear that the modification will have a significant effect on incidental mortality.
- Data are already available about incidental mortality rates in the small tangle net fishery considered by this proposal.
- The gillnet fishery in this area is a complete retention set-net fishery and studying release mortality rates is unlikely to result in data with a clear application for fisheries management.
- Steelhead projects are outside the scope for this fund.
- The letters of support provided for this proposal are over a year old and do not appear to directly relate to this specific proposal.

The Committee does not recommend supporting this project.

### 3: Evaluation of the Feasibility of Implementing a Mark Select Fishery in the Southeast Alaska Chinook Salmon Sport Fishery

The Committee considered this to be a worthwhile project, and would like to work with the proponent to address their concerns ahead of potentially reconsidering this proposal in future:

- The Committee considered that as written, the proposal was not sufficiently responsive to the specific themes identified in the Request for Proposals that was published for this fund.

- The Committee was unclear on the benefits to the PSC and Chapter 3 implementation from the proposed deliverables. The Committee recommends that any future proposal provide information on (1) expected mark rates in time and area strata, which are fundamental to any MSF and (2) expected stock composition where MSFs are potentially being considered.
- Given the amount of funding allocated towards a consultant, the Committee would prefer that the individual be identified ahead of time so that a full assessment of the individual's ability to successfully complete the work could be made, per the scoring criteria used by the Committee.

#### 4: WDFW Columbia River Fishery Sampling (Recreational and Commercial)

The Committee considered this to be a strong proposal in all areas assessed and did not identify any areas for modification of follow up with the proponents. The Committee recommends supporting this project.

#### 5: Mass marking of San Juan River Hatchery Sea Pen Chinook, Brood Years 2021-2024

The Committee considered that this has the potential to become a successful and worthwhile project, but identified several areas where the current proposal should be reconsidered and / or strengthened to maximise the project's likelihood of success:

- The Committee had some concern about the overall scope of the project, which has multiple components and considered that a more targeted approach would be more likely to succeed.
- The number of fish that would be tagged and released is relatively low in the context of a mark selective fishery, and as proposed, it is unclear that a sufficient number of tags could be recovered to provide data of sufficiently high quality.
- The stock that would be marked is not an escapement indicator stock for Chapter 3 / the Chinook Technical Committee.

The Committee recommends that this feedback be provided to the proponents and that the Commission invites the proponents to collaborate with the Chinook Technical Committee and the Mark Selective Fishery Fund Committee to prepare a modified proposal for resubmission and funding consideration in 2022.

#### 6: Mass Marking of hatchery produced Sarita Chinook salmon

The Committee considered that this proposal was strong overall, although there were some concerns that the overall scope of the project may be too ambitious. The Committee asked for further information about the size of the treatment groups (the number / proportion of fish being adipose fin clipped, and the number / proportion of fish being coded-wire tagged), and how this will be determined. The Committee was satisfied with the response submitted by the proponent and recommends that this proposal be supported.



## Request for Proposals for Mark Selective Fishery Management, 2021

**From: Mark Selective Fishery Fund Committee, June 1, 2021**

In the 2019 amendments to the Pacific Salmon Treaty, a Mark Selective Fishery (MSF) Fund (Fund) was established to assist fishery management agencies and partners with implementing MSFs in each country. The fund supports a competitive grant program to a) mass-mark or sample hatchery-produced Chinook salmon, b) estimate incidental mortality, and c) maintain and improve the ability to estimate exploitation rates on Chinook salmon indicator stocks encountered in mark selective fisheries. This work could include improvements and development of bilateral analytical tools.

The Fund has \$3.575M USD available for distribution. As the level and duration of contributions to the Fund are uncertain, one-time equipment purchases or short-term (duration of  $\leq 3$  years) studies may be more feasible than supporting ongoing annual programs. A Mark Selective Fishery Fund Committee has been established to review proposals and develop prioritized funding recommendations to the Pacific Salmon Commission (PSC).

A spending limit of \$750,000 USD has been established for the 2021 funding round. The Terms of Reference for the MSF Fund provide that 50% of the funding allocated each year shall be available to Canada and 50% to the US, unless otherwise determined by the Commission. The MSF Fund Committee will review proposals this August and report its recommendations to the Commission at the October PSC Meeting, at which point the Commission will determine which projects to support.

**Proposals are to be submitted no later than midnight (PST) on Monday, August 2nd, 2021 via email to [markselectivefund@psc.org](mailto:markselectivefund@psc.org).** Proposals not adhering to the specified format or received after the cut-off time will not be considered, without exception.

Questions regarding this Request for Proposals should be referred to the Restoration and Enhancement Funds Manager at the Pacific Salmon Commission, Mr. Tom Alpe: [alpe@psc.org](mailto:alpe@psc.org) / 604-331-8619.

### MSF Fund Committee Members

Canadian Members	U.S. Members
Dr. Rob Houtman	Ms. Danielle Evenson
Mr. Janvier Doire	Dr. Kristen Ryding
Mr. Laurie Milligan	Ms. Marianne McClure
Dr. Brian Riddell	Mr. Craig Bowhay
Mr. Wilf Luedke (alternate)	
Dr. Catarina Wor (alternate)	

### **Themes for Proposals:**

The MSF Fund Committee is seeking proposals responsive to the following thematic areas. Proposals should be focused on improvements to the management of mark selective fisheries and be directly relevant to implementing Chinook provisions of the Pacific Salmon Treaty. Successful proposals will assist eligible organizations with equipment and operations, as needed, to:

1. Mass-mark hatchery produced Chinook salmon to create conditions that support MSFs,
2. Improve estimates of incidental mortality, including improved released catch estimates and improved incidental mortality rate estimates,
3. Maintain and improve the ability to estimate exploitation rates on Chinook salmon indicator stocks that are encountered in MSFs, including improvements and development of bilateral analytical tools to address any of the themes above.

### **Application details and administrative considerations:**

- **Eligibility to apply:** Applications are welcomed from government agencies, Tribal/First Nation entities, multi-jurisdictional commissions, and private and academic institutions involved in activities relating to implementation of the Pacific Salmon Treaty or responsibilities for MSF management.
- **Project Timing & Duration:** Projects should start between November 2021 and October 2022. Proposals should be designed for completion within 3 years of the project start date.
- **Proposal Format:** Proposals must utilize the format specified in Appendix A (using Calibri 11pt font) and should consist of no more than **seven pages**, not including the budget form or any letters of support. Proposals should be submitted in MS Word format.
- **Budget:** Applications must include a detailed project budget; this must be provided using the form provided alongside this Request for Proposals. If indirect / overhead costs exceed 20% of the total project budget, separate justification must also be provided (e.g., a copy of your organization's indirect cost rate policy – this is not included in the 7-page application limit).
- **Application review process:** The MSF Fund Committee will review project proposals using the assessment criteria provided at Appendix B and make recommendations to the Commission at its October meeting, at which stage the Commission will select projects to support. Proponents will be notified of the outcome of their application promptly thereafter.
- **Reporting:** A written progress report will be required each December for the duration that the project is active; concise project summaries will be published in the applicable PSC report series. A final written report and a full statement of financial expenditures will be due to the PSC within 90 days of project completion.
- **Award Type:** Funding will be provided as a grant administered through a grant agreement with the Pacific Salmon Commission.

## APPENDIX A: REQUIRED FORMAT FOR PROPOSALS SUBMITTED TO THE MSF FUND COMMITTEE.

General. Proposals submitted are not to exceed seven pages in total. This limit does not include the attachments listed at the end of this appendix. Do not leave out any section; if the section does not apply, simply write “Not applicable”.

### Cover Page

Provide a cover page that contains at least the following information:

1. Project Title.
2. Performance Period (start and end date), e.g., July 1, 2021 to June 30, 2022.
3. Funding Requested (specify whether costs are in \$ USD or CAD).
4. The name of your organization / affiliation.
5. Principal Investigators(s) with contact information (telephone number, postal address, email address).
6. Person responsible for grant administration (telephone number, postal address, email address).
7. Identification of the project as either:
  - a. A new project.
  - b. A project previously funded by the MSF Fund Committee (provide the year of initial funding).

### Body of Proposal

Abstract. Provide a short summary (<500 words) describing the proposed project and its significance for Mark Selective Fisheries and assessment of Chinook salmon fisheries under the Pacific Salmon Treaty.

Project Objectives. Provide a concise statement of project objectives that address the themes identified above, and why the proposed project is important for improving the management of Mark Selective Fisheries. If the proposed work has been previously funded by the MSF Fund Committee, summarize accomplishments to date in relation to project objectives and incremental value of this project.

Experience and Expertise of Key Project Personnel. Identify key project personnel, the nature and extent of their role in implementation, and summarize their relevant qualifications. (Detailed resumes are not required). If any component of the proposal will be provided by others, identify these persons, the nature of their involvement, and their relevant qualifications.

Methodology and Project Design. Methods, sample design, and techniques for conducting the project. Provide adequate detail so reviewers have a full appreciation of how the project is to be conducted and can thus provide an adequate technical review of the proposal. If an objective involves statistical estimation or experimentation, detail statistical methodology for analysis and show that expected sample sizes are adequate to meet study objectives. If an objective involves

developing a tool, such as a conceptual or computer model, provide a schedule of benchmarks for completion of usable products, progressing to the final product.

Relationships to related projects. Describe partnerships and actions/activities that should be considered as contingencies or requirements for successful completion of the proposed project. Indicate the status of these partnerships, ongoing activities, partnership capabilities, and available information concerning critical project dependencies.

Benefits. Describe the benefits and relevance to implementation of the Chinook Chapter of the Pacific Salmon Treaty.

Permitting. Identify any required permits, those already obtained, and the timing and potential impediments to securing necessary permits to conduct the project.

Risks. Describe any risks to successful project completion or continuation and how these will be mitigated.

Timeline. Provide the proposed starting and ending dates for the project tasks, including the preparation of progress reports and final reports. Progress summary reports are required by December 15 annually. A final written report and a full accounting of financial expenditures is due within 90 days of project completion.

Date	Milestone

Attachments:

1. Project budget form (you must use the form published alongside this Request for Proposals)
2. Letters of support (if appropriate)
3. Justification of indirect costs (if >20% of the overall project budget)

APPENDIX B: MARK SELECTIVE FISHERY FUND PROPOSAL RANKING CRITERIA

Mark Selective Fishery Fund: Proposal Ranking Criteria	
<b>1. Relationship and Significance to RFP</b>	
<ul style="list-style-type: none"> <li>How relevant is the proposal to the themes listed in the RFP?</li> <li>How significant is the indicator stock and/or fishery to implementation of Ch. 3?</li> <li>How significant is the potential improvement to the accuracy or precision of estimates of incidental mortality or exploitation rates in MSF?</li> </ul>	
<b>Score:</b>	40%
<b>2. Technical Approach and Feasibility</b>	
<p>Are the project <b>Objectives</b> clearly stated?</p> <p>Do the proponents possess the <b>Expertise</b> to provide a reasonable expectation of success?</p> <p><b>Methodology &amp; Design</b></p> <ul style="list-style-type: none"> <li>Are the proposal's technical methods consistent with best available science?</li> <li>Are the proposed methods consistent with analyses, recommendations, and bilateral data standards developed by the Ad-hoc Workgroup on Calendar Year Exploitation Rates, Selective Fishery Evaluation Committee, and Chinook Technical Committee?</li> <li>Is project completion dependent on the funding or completion of related projects? Are there interdependency risks?</li> <li>If permits are required, have they been obtained, or is it shown they can be?</li> </ul> <p><b>Interpretation of Results</b></p> <ul style="list-style-type: none"> <li>Are the measures of project success clearly identified and readily measurable?</li> <li>Are the statistical methods and sampling described appropriate to obtain objectives?</li> </ul>	
<b>Score:</b>	40%
<b>3. Cost Effectiveness</b>	
<ul style="list-style-type: none"> <li>Are costs justified given the expected benefits of the project?</li> <li>Is this a cost-effective approach for meeting project objectives?</li> <li>For multi-year projects, has the project been effective in achieving objectives?</li> <li>When will useful results be obtained?</li> <li>Is there cost-sharing, in-kind matching, or joint funding for the project?</li> </ul>	
<b>Score:</b>	20%

# APPENDIX 2

## Mark Selective Fishery Fund: summary of 2021 applications.

Project ID	Project Title	Start Date	End Date	Currency	\$ Requested (USD)	\$ Requested (CAD)	Lead organization	Other organizations	Lead Proponent	Other proponents
MSF-01-21	Coded Wire Tag Recovery Electronic Sampling Equipment for Treaty Tribes of Western Washington	01-Jul-21	30-Jun-22	USD	\$161,700.00		Northwest Indian Fisheries Commission		Ken Phillipson	
MSF-02-21	Side-by-Side Evaluation of Chinook Salmon and Steelhead Incidental Mortality Effects from Mark-Selective Pound Nets, Tangle Nets, and Gill Nets in Lower Columbia River Non-Tribal Fisheries	01-Nov-21	31-Oct-24	USD	\$151,421.00		Wild Fish Conservancy		Adrian Tuohy	Nick Gayeski, John Skalski
MSF-03-21	Evaluation of the Feasibility of Implementing a Mark Select Fishery in the Southeast Alaska Chinook Salmon Sport Fishery	01-Nov-21	28-Feb-23	USD	\$76,680.00		ADF&G		Jeff Nichols	
MSF-04-21	WDFW Columbia River Fishery Sampling (Recreational and Commercial)	01-Jan-22	31-Dec-22	USD	\$45,000.00		Washington Department of Fish and Wildlife	Pacific States Marine Fisheries Commission; Washington Department of Fish and Wildlife	Beth Deacy	Ken Keller, Ryan Lothrop
MSF-05-21	Mass marking of San Juan River Hatchery Sea Pen Chinook, Brood Years 2021-2024	01-Jan-22	31-Dec-25	CAD		\$83,136.00	Pacheedaht First Nation		Helen Jones	
MSF-06-21	Mass Marking of hatchery produced Sarita Chinook salmon	01-Nov-21	30-Jun-24	CAD		\$165,000.00	Huu-ay-aht First Nations Government	LGL Ltd; DFO Port Alberni (Nitinat)	Christine Gruman	Bob Bocking, Rob Brouwer, Caroline
Subtotals					\$434,801.00	\$248,136.00				
\$ Requested USD (0.8 XR)					<b>\$633,309.80</b>					

**Coded Wire Tag Recovery Electronic Sampling Equipment for Treaty Tribes of Western Washington**

A New Project Proposal for Chinook Mark Selective Fisheries Management Funding FY 2021

July 1 2021 through June 30 2022

Submitted by Northwest Indian Fisheries Commission – On Behalf of the Treaty Tribes of Western Washington

Total Funding Requested \$161,700 USD

Ken Phillipson

Principal Investigator

Enhancement Data Coordinator

Northwest Indian Fisheries Commission

6730 Martin Way East

Olympia, WA 98499

[kenp@nwifc.org](mailto:kenp@nwifc.org)

360-485-3101

Lucy Yanez

Grant Administrator

Contract Specialist

Northwest Indian Fisheries Commission

6730 Martin Way East

Olympia, WA 98499

[lyanez@nwifc.org](mailto:lyanez@nwifc.org)

360-438-1180

**Abstract:** This proposal is for the purchase of 42 hand-held T-wands for tribal coded-wire tag (CWT) sampling programs. The requested electronic tag detection (ETD) equipment was based on a survey of tribal staff associated with CWT sampling, and the equipment will be distributed to the CWT sampling programs of the treaty tribes of Western Washington. T-wands incorporate the latest technology and have improved detection capabilities over the older blue wands, which are no longer serviced by the manufacturer. This equipment will be used to supplement and replace the aging wands and meet current sampling needs. The equipment is prioritized for use in sampling Chinook fisheries, stream surveys and hatchery escapement. By using the new detectors to replace the older blue wands, the Chinook detection rates of tribal sampled fisheries and escapement will be at the highest possible level.

**Background:** The treaty tribes of Western Washington operate over 40 salmon hatcheries, net pens, and rearing ponds. Chinook are reared and released from 20 of these facilities. These rely heavily on CWT studies for management and research. The tribes are also primary participants in the PST CWT Exploitation Rate Indicator stock program. At their hatcheries, the tribes currently maintain seven Chinook CWT indicator stocks, of which four are double index tagged (DIT). There are also several tribal hatchery recovery programs for ESA listed stocks. These recovery programs often rely on tagging fish without an adipose clip to avoid MSF impacts. Additionally, the tribes annually mark and CWT dozens of groups for survival, evaluation, and contribution studies.

The use of adipose fin mass-marking for implementing mark-selective fisheries necessitates the use of electronic tag detection (ETD) equipment to recover coded-wire tags. The tribes operate CWT sampling programs for commercial fisheries, subsistence fisheries, spawning ground surveys, and hatchery returns. ETD is the only method to recover CWTs in our various fisheries. Annually, over 60,000 Chinook are sampled in these tribal sampling programs, resulting in over 10,000 CWT recoveries. Some of these Chinook are currently sampled with dated detection devices. The tribal hatchery escapement sampling goal is 100%. Most CWTs recovered on streams and in commercial fisheries are expanded to represent unsampled fish. Reliable and accurate detections are essential for all CWT studies and associated stock assessment programs. To maintain the highest tag detection accuracy, we believe we should convert to using T-wands exclusively for Chinook sampling.

Handheld wand detectors have been the best tool for field samplers conducting CWT sampling on small groups of fish. There are older model “blue wands” and newer “T-wands”. T-wands have a deeper detection range and therefore can have a higher and quicker detection rate for large Chinook. The older blue wands must be rubbed both on the snout and inside the mouth (“mouth wandling”) to ensure proper detection in all Chinook 60 cm and larger. The wands that the tribes currently use include many of the older blue wands, and some of these wands were purchased prior to the better blue wand upgrade in 2005. Because of the age of many of these wands, and their required use of mouth wandling, their sampling efficiency and detection capabilities for larger Chinook may be less than optimal. In addition, blue wands are no longer sold or repaired by the manufacturer. Our goal is to phase these blue wands out of Chinook sampling and replace them with the newer T-wands.



Mouth wanding of carcasses using the blue wands present unique challenges for the sampling crews. T-wands do not require the time consuming and physically demanding mouth wanding. The reports from the sampling of commercial and subsistence fisheries with newer wands are encouraging. They are reliable, and the detection rates are outstanding. Samplers appreciate that they no longer need to lift the entire Chinook to mouth wand. This heavy lifting has caused physical problems for some samplers, resulting in reduced sampling effort. Our personnel will greatly benefit from replacing blue wands and using T-wands for all Chinook sampling.

Last year the Northwest Indian Fisheries Commission allocated \$10,000 toward electronic detection equipment repairs for the tribes. Many older wands were serviced, however many of these broken wands were deemed unrepairable, and decommissioned. Repairing blue wands is no longer an option and they need to be phased out. This project will benefit the tribes by increasing the number and performance of functioning wands available to tribal commercial, escapement, and hatchery samplers. The new T-wands will be repaired and serviced over time using existing funding through the Northwest Indian Fisheries Commission.

**Project objectives:** 1) To increase the number and quality of wands in use for tribal CWT Chinook sampling, and 2) Improve the efficiency and detectability of CWT recovery in adult Chinook and eliminate the need for mouth wanding. We are proposing to purchase and distribute 42 T-wands for sampling by the treaty tribes of Western Washington at a total cost of \$161,700 USD.

#### **Experience and Expertise of Key Project Personnel:**

Ken Phillipson

Enhancement Data Coordinator

Ken has 35 years of professional fisheries biology experience specializing in CWT application, recovery, and data reporting. He has conducted extensive field testing of various electronic sampling devices, and currently maintains inventory and coordinates repairs for tribal electronic sampling equipment as part of his varied duties.

**Methodology and Project Design:** As co-managers of Western Washington fisheries, the treaty tribes are responsible for sampling their fisheries. The tribes also conduct escapement sampling in stream surveys and sample 100% of Chinook returns to their hatcheries. These recoveries are used by management agencies to estimate a myriad of fishery parameters including survival, contribution, exploitation rates, and escapement estimates. All sampling is conducted using electronic detectors. This proposal will increase and improve the tribal inventory of T-wands to meet their sampling needs. To determine the number and type of ETD equipment need for tribal Chinook sampling programs we conducted a survey of tribal staff associated with their CWT sampling programs. This survey was conducted in July of 2021 and the results were used for this proposal. It is imperative that the tribal samplers have wands with the highest possible detection rates, like their counterparts at other agencies.

The requested T-wands will be prioritized for sampling Chinook. Replacing older wands with newer T-wands will also result in more efficient sampling, allowing for increased sampling rates.

**Timeline:** We intend to distribute all the equipment as soon as it is available. We would hope that would occur in November 2021. We expect that the wands would be used thereafter for many years.

Date	Milestone
November 2021	Purchase, inventory, and distribute equipment
December 15 2021	Submit progress or final report

**Budget:** The Northwest Indian Fisheries Commission will distribute all the equipment to the Treaty Tribes of Western Washington. All labor, shipping costs, inventory, distribution, future maintenance, and travel related expenses will be absorbed by the Northwest Indian Fisheries Commission. We are asking for 42 T-wands, at a price of \$3,850 USD apiece USD for a total amount requested of \$161,700 USD.

#### Budget Summary

	Requested	Contributed	Total
Labor	\$ -	\$ 5418	\$ 5418
Equipment	\$ -	\$ -	\$ -
Travel	\$ -	\$ 400	\$ 400
Materials and Supplies	\$ 161,700.00 <sup>1</sup>	\$ 600	\$ 162,300
Contracts	\$ -	\$ -	\$ -
Other	\$ -	\$ -	\$ -
Total Direct Costs	\$ 161,700.00	\$ 6,418	\$ 168,118
Indirect Costs	NA	\$ -	\$ -
Total Costs	\$ 161,700.00	\$ 6,418	\$ 168,118

<sup>1</sup>Hand-held T-wands will be purchased from Northwest Marine Technology at a price of \$3850.00 apiece. They will be distributed to the Treaty Tribes of Western Washington for sampling the Chinook escapement and fisheries as soon as available, and in future years.

# Project Budget Form: Mark Selective Fisheries Fund

MSF-01-21

**Name of Project:** Coded Wire Tag Recovery Electronic Sampling Equipment for Treaty Tribes of Western Wa

## ELIGIBLE COSTS

### Labour

#### Wages & Salaries

Position	# of crew	# of work days	hrs per day	rate per hour	Total (PSC + In-kind + cash)	In-Kind & Cash	MSF Fund Amount
Adminstration of equipment						5,418	
Person Days (# of crew x work days)				sub total			

#### Labour - Employer Costs (rate % = 'Labour Employer Costs' Subtotal / 'Wages & Salaries' Subtotal)

rate	0%	sub total			
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#### Subcontractors & Consultants

	# of crew	# of work days	hrs per day	rate per hour		
Insurance if applicable				rate	0%	
				sub total		

#### Volunteer Labour

	# of crew	# of work days	hrs per day			
Skilled						
Un-skilled						
Insurance if applicable				rate	0%	
				sub total		

**Total Labour Costs**

	5,418	
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#### Site / Project Costs

**Provide details in the space below  
(use an additional page if needed )**

Travel (do not include to & from work)	Delivery of equipment and project presentation		400	
Small Tools & Equipment	Travel containers for equipment		600	
Site Supplies & Materials	Provide details here			
Equipment Rental	Provide details here			
Work & Safety Gear	Provide details here			
Repairs & Maintenace	Provide details here			
Permits	Provide details here			
Technical Monitoring	Provide details here			
Other site costs	Provide details here			
<b>Total Site / Project Costs</b>			1,000	

## ELIGIBLE COSTS

## BUDGET

OTHER  
FUNDINGCONTRIBUTION  
FUNDING**Training (e.g Swiftwater, bear aware, electrofishing, etc).**

				Total (PSC + In-kind + cash)
Name of course	# of crew	# of days		
<b>Total Training Costs</b>				

In-Kind & Cash	PSC Amount

**Administrative Costs**

Office space; including utilities, etc.	Provide details here	
Office supplies	Provide details here	
Telephone & Long Distance	Provide details here	
Photocopies & printing	Provide details here	
Insurance	Provide details here	
Indirect/overhead costs	Provide details here	NA
(If the PSC contribution to Indirect costs exceeds 20% of the total PSC grant you will be required to submit back-up documentation justifying the expense).		
Other overhead costs (give details)		
<b>Total Administrative Costs</b>		

	NA

**Capital Costs / Assets**

**Provide details in the space below  
(use an additional page if needed )**

Assets are things of value that have an initial cost of \$250 CAN or more and which can be readily misappropriated for personal use or gain or which are not, or will not be, fully consumed during the term of the project.

42 T-Wands	Purchased form Northwest Marine Technology	161,700
Asset	Provide details here	
Asset	Provide details here	
Asset	Provide details here	
<b>Total Capital Costs</b>		161,700

	161,700

**Project Total Costs** **161,700**

6,418	161,700
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**Budget Summary**

(PSC + in-kind + cash)

<b>Total Labour Costs</b>	5,418
<b>Total Site / Project Costs</b>	1,000
<b>Total Training Costs</b>	
<b>Total Overhead Costs</b>	
<b>Total Capital Costs</b>	161,700
<b>Project Total</b>	168,118
<b>Requested Total</b>	<b>161,700</b>

**Side-by-Side Evaluation of Chinook Salmon and Steelhead Incidental Mortality Effects from Mark-Selective Pound Nets, Tangle Nets, and Gill Nets in Lower Columbia River Non-Tribal Fisheries**

Wild Fish Conservancy

Principal Investigators:

Dr. Nick Gayeski (425-788-1167; PO Box 402, Duvall, WA, 98019; [nick@wildfishconservancy.org](mailto:nick@wildfishconservancy.org)),  
Dr. John Skalski (206-440-5895; 1325 4<sup>th</sup> Ave, Suite 1515, Seattle, WA 98101; [jrskalski@comcast.net](mailto:jrskalski@comcast.net)),  
Adrian Tuohy (253-709-9364; PO Box 402 Duvall, WA, 98019; [adrian@wildfishconservancy.org](mailto:adrian@wildfishconservancy.org)).

Performance Period: November 1, 2021 to October 31, 2024.

Funding Requested: \$151,421 USD.

Primary Contact for Grant Administration:

Adrian Tuohy (253-709-9364; PO Box 402 Duvall, WA, 98019; [adrian@wildfishconservancy.org](mailto:adrian@wildfishconservancy.org)).

Identification of the Project:

a. new project.

**Abstract:** Various Chinook stocks of the Columbia Basin are managed under the Pacific Salmon Treaty (PST), including the Upriver Brights (HAN, URB), Lewis (LRW), Coweeman (CWF), and Mid-Columbia Summer (SUM) stocks (PSC 2020). Many of these stocks are listed under the US Endangered Species Act (ESA) and are supplemented by hatchery production, necessitating use of low-impact mark-selective fishing gear to minimize hatchery genetic introgression and fishery bycatch mortality that may limit achievement of ESA recovery objectives. Encouraged by promising incidental mortality research for experimental pound nets (Tuohy et al. 2019, 2020) and responding to policy directives for harvest and hatchery reform (WFWC 2009, 2013, 2015, 2020), the Director of the WA Department of Fish and Wildlife (WDFW) recently announced the oncoming legalization of pound nets for mark-selective fishing in the lower Columbia River (WDFW 2021). This legalization process will implement a mark-selective commercial fishery for Chinook and Coho in summer and fall seasons to reduce the percentage of hatchery-origin spawners while minimizing incidental mortality of ESA-listed fishes. With designation of this new fishery anticipated between fall 2021-2022, there is a considerable management need to fill data gaps for both incidental mortality and exploitation rates associated with the modified pound net gear (which has recently undergone engineering advancements to further reduce incidental mortality; Tuohy et al. 2020). To this end, a paired-mark-recapture research project will be conducted to evaluate the most recent pound net technology at various established sites in the Columbia River; research will occur alongside tangle net and gill net gears that have not been studied for post-release incidental mortality effects to critical ESA-listed bycatch stocks in the Columbia River (NMFS 2018), and therefore, may be contributing to overharvest and overages of impact limits. Allowing for effective and unbiased comparison between commercial gears, each fishing tool will be studied within the same season and location for bycatch encounters, fish capture / release conditions, and immediate incidental mortality. Two limiting bycatch stocks—wild Chinook and Steelhead—will be Passive Integrated Transponder (PIT)-tagged and released from each gear, enabling precise and unbiased estimation and comparison of post-release incidental mortality over a 400 km migration through a paired release-recapture approach. Research results will inform management of WDFW’s emerging commercial fishery for the recently modified pound net gear and may update approved mortality rates for both tangle and gill nets, as encouraged by the National Marine Fisheries Service (2018). Given the effectiveness of PIT-tag infrastructure in the Columbia River and advantages of the study region for mark-recapture research, results of this project may be used broadly by Parties of the PST to advance salmonid recovery and management of pound net, tangle net, and gill net fisheries in other regions of the US Pacific Northwest and Canada where precise and unbiased estimation of incidental mortality may be more challenging.

**Project Objectives:** Effective management of salmon fisheries and evaluation of impacts to ESA-listed fishes depends on unbiased and precise estimates of released catch and incidental fishery mortality rates. To fill critical gaps in knowledge and provide for science-based management of mark-selective and conventional commercial gears in lower Columbia River summer / fall season Chinook fisheries, a paired release-recapture mortality study will be conducted for modified pound nets, alongside conventional tangle net and gill net gears. Specifically, our project has the following objectives:

- 1) Provide the first available estimates of Chinook and Steelhead incidental mortality and standard error for the recently modified pound net design through assessment of fish capture / release conditions, immediate mortality rates, post-release mortality rates, and bycatch encounters.
- 2) Estimate Chinook and Steelhead post-release incidental mortality rates and standard error for tangle net and gill net gear, for which post-release mortality data currently do not exist for summer and fall season fisheries in the lower Columbia River (NMFS 2018).
- 3) Allow for unbiased, data-driven comparison of incidental mortality rates and standard error amongst gear-types through the presence of consistently collected incidental mortality data.
- 4) Improve understanding of pound net exploitation through assessment of multiple pound net sites.

This project will estimate incidental mortality effects from modified pound nets, tangle nets, and gill nets through a consistent means within the same fishing season and location. Two limiting bycatch stocks—wild Chinook and Steelhead—will be PIT-tagged and released from each gear, enabling precise and unbiased estimation and comparison of direct and indirect post-release incidental mortality over a 400 km migration through a pair of Cormack (1964) single release-recapture models. Mortality rate and standard error estimates will inform management of WDFW’s emerging commercial fishery for alternative gear and may be used by the US v. OR Technical Advisory Committee (TAC) to update interim incidental mortality rates for the recently modified pound net gear. This study will further provide TAC the first available datasets for tangle and gill net post-release incidental mortality effects during fall season fisheries, as encouraged by NMFS (2018), to improve management of ESA-listed stocks.

#### **Experience and Expertise of Key Project Personnel:**

##### *Dr. Nick Gayeski (Ph.D., Systems Ecology), Wild Fish Conservancy, Senior Ecologist/Statistician*

Dr. Gayeski earned a Masters in Philosophy from the University of Washington (UW) in 1975 and received his PhD in Systems Ecology from the University of Montana in 2015. His Ph.D. research focused on estimating the historic abundance of Pacific Northwest salmon and steelhead populations in the late 19th and early 20th centuries. Dr. Gayeski will play a lead role in data analysis and reporting. He has co-lead study design and analysis of pound net research since 2017 and has authored multiple publications regarding pound net incidental mortality investigations (Tuohy et al. 2019; Gayeski et al. 2020).

##### *Adrian Tuohy (M.S., Fishery Sciences), Wild Fish Conservancy, Biologist/Project Manager*

Mr. Tuohy earned a BA degree in Economics from Whitman College in 2011, followed by a BS and MS in Aquatic and Fishery Sciences from the UW in 2015 and 2018, respectively. He joined WFC in 2013 and helped to develop the organization’s mark-selective fishing research program. Mr. Tuohy’s research at WFC and UW has been focused on evaluating incidental mortality from commercial gears in the Columbia River. As WFC’s project manager for mark-selective gear research, Mr. Tuohy has led pound net engineering, deployment, operation, research, and analysis since 2016 and has authored multiple peer-reviewed publications on pound net incidental mortality (Tuohy 2018; Tuohy et al. 2019, 2020). He will maintain his project management role for this research investigation.

##### *Dr. John Skalski (Ph.D, Biometry), University of WA, Professor of Aquatic and Fishery Sciences*

Dr. Skalski is a fish and wildlife biometrician and co-founder of Columbia Basin Research (CBR), which has led the field in developing advanced statistical capabilities and software that improve the precision, cost effectiveness, and interpretation of large-scale demographic studies of mobile species. Dr. Skalski has a distinguished record of public service, having designed experiments and developed sampling protocols for state, federal, and First Nation governmental studies. He is a professor emeritus at UW and continues to advise students, including project manager, Adrian Tuohy. Since 2017, Dr. Skalski has contributed to pound net research study design, analysis, and publication (Tuohy et al. 2019, 2020). He will continue to contribute to final study plans, analyses, reports, and publications for this investigation.

#### **Methodology and Project Design:**

*Study Location and Timeframe* - Research will occur in Zone 2 of the lower Columbia River non-tribal fishery, with all gear operations and tagging occurring within a 3 km radius of recently modified pound nets sites located between rkm 55-70. This study region has been selected due to the fixed location of pound net operations in Zone 2, and to enable the first side-by-side, unbiased comparison of post-release incidental mortality effects for fishing gears commonly used within summer and fall season non-tribal salmon fisheries of the lower Columbia River between Zones 1-5 (ODFW and WDFW 2020). Modified pound nets will be operated in the lower river (partially funded by WA RCO award #20-1370),

with tangle and gill net operations occurring in the near vicinity. Paired, side-by-side operations will ensure that environmental / ecological factors are properly controlled for, enabling relative post-release incidental mortality effects to be compared for the first time in a defensible manner.

Commercial gear operations will occur within two periods when fishing with each gear commonly occurs for gill nets, tangle nets, and pound nets in the lower Columbia River (ODFW and WDFW 2020). These periods are defined as follows: a) Summer and b) Fall. The Summer research period will occur between ~15 August and 21 September when gill net and pound net operations commonly occur to enable investigation of gill nets relative to pound nets over the peak of the Chinook and Steelhead migration in the lower river. The Fall research period will occur between ~22 September and 31 October, primarily for investigation of tangle nets relative to pound nets, and secondly, for gill nets relative to pound nets and tangle nets, when these gears commonly operate for Coho and Chinook (with Steelhead as the primary bycatch stock). For each seasonal research period, it must be noted that gill and tangle nets will be operated simultaneously with pound nets operations; this method will allow us to analyze change in the treatment fishing gear effect on incidental mortality with changing environmental conditions.

*Field Protocol: Gear Operations and Fish Capture* - Four commercial fishers will be contracted to operate two modified pound nets, one gill net, and one tangle net 4-days a week throughout both research periods. Three observers will be present on each operation for data recording, research fish handling, and tagging. Observers will note set times and soak periods for each gear as specified in Tuohy et al. (2020) for pound nets and Vander Haegen et al. (2004) for gill / tangle nets. Observers will also record the date, set number, water / air temperatures, and presence of marine mammals (Tuohy et al. 2020).

Captured fishes will be removed from each gear by fishers through standard operational procedures (detailed in Tuohy et al. 2020, Vander Haegen et al. 2004) and brailled using a rubberized net into holding tanks on each gill / tangle net vessel or pound net dock. Holding tanks will be consistent in dimensions between gears and filled half full with river water circulated by 16 gallons of water per minute using a trash / wash down pump. The number of fishes in a holding tank will never exceed two salmonids, and both water temperature and dissolved oxygen will be closely monitored in all tanks.

Within a holding tank, fishes will be noted for their means of capture (pound net, gill net, or tangle net) and capture conditions (per WDFW's standardized 1-5 fish condition scale; Cox et al. 2019). The catch will be enumerated, measured (FL), and identified by species and adipose fin mark status. Fish showing no signs of life at capture or release from a gear will be considered an immediate mortality. Non-lethal 1 mm caudal fin genetic samples will be secured from all Chinook and Steelhead encountered for genetic population assignment. Furthermore, all salmonids will be scanned for PIT-tags with a Biomark HPR Lite reader and tag data recorded through P4 software (PTAGIS 2019). After all data are collected, live salmonids will be quickly brailled for release to resume the upriver migration (unless criteria are met for inclusion in the mark-recapture study described below). Fish will be captured and released through this means over each research day. These methods will enable assessment of the following metrics within the final report: genetic stock-composition, stock-specific bycatch encounters, target stock encounters, capture conditions, and immediate survival for each gear-type.

*Mark Release-Recapture Experiment for Steelhead and Chinook* - For the paired mark release-recapture study, all adult Chinook (> 570 mm) and steelhead (> 500 mm) encountered with the commercial pound net, gill net, or tangle net and documented through the standardized field protocol will be PIT-tagged with a 12.5-mm, 134.2-kHz, full-duplex PIT tag using a MK-25 Rapid Implant Gun (Biomark). These treatment group fishes will then be scanned to record PIT-tag information, after which they will be brailled for release and upriver detection at mainstem dam PIT-tag arrays. Generally speaking, detection rates for each treatment group to mainstem dam arrays can be compared to accurately and precisely



determine the relative treatment effect of the gill net and tangle net to the pound net (which should have a post-release survival rate near 100%; Tuohy et al. 2019, 2020). In essence, the pound net can function as a control group to isolate the gill/tangle net treatment effect on bycatch survival.

Beyond the relative treatment group comparison described above, a separate control group of Chinook and Steelhead unexposed to commercial operations (and previously PIT-tagged as juveniles in Upper Columbia or Snake River tributaries) will be passively detected between mid-August and November 2021 at the lower Columbia River PD-7 array PIT tag detection site, located adjacent to the study region at rkm 70. Above Bonneville Dam, the PD-7 control group sample will be pooled with additional Chinook and Steelhead previously PIT-tagged as juveniles in Upper Columbia or Snake River tributaries and passively detected as adults at Bonneville. In analysis, detections of these control group fishes may be compared to that of treatment group fishes to estimate the relative treatment effect on post-release survival. This paired release-recapture method is consistent with recommendations by US v. OR TAC (NMFS 2020). However, using this control group, we would expect relative survival results to be negatively biased as fishes previously tagged as juveniles are not handled/tagged in the adult life-stage; since only the treatment groups are handled/tagged in the adult life-stage, only the treatment groups will be subject to this added research mortality effect. Therefore, relative survival results analyzed through this method should be considered conservative.

Post-Release Survival Analysis - A pair of Cormack (1964) single release-recapture models will be used to estimate relative survival of treatment groups of Chinook and Steelhead to the control group ( $\tau = S_{\text{Treatment}}/S_{\text{Control}}$ )—as well as each conventional treatment group (gill net and tangle net) relative to the pound net treatment group ( $\tau = S_{\text{Conventional.Treatment}}/S_{\text{Pound.Treatment}}$ )—in upriver reaches between the study location (rkm 55-70), Bonneville Dam (rkm 234), The Dalles Dam (rkm 309), and McNary Dam (rkm 470). Above McNary, we will estimate the joint probability of survival and detection to upper basin arrays.

The joint likelihood model for the tag analysis is described in detail in Tuohy et al. (2019) and is known as the complete capture history protocol by Burnham et al. (1987:112–125). With four mainstem upstream detection sites, the control and treatment releases will each produce  $2^4 = 16$  unique capture histories described in their respective likelihoods. While reach survival of the control group will be parameterized by  $S_i$  ( $i = 1, \dots, 3$ ), reach survival of treatment groups will be parameterized by  $S_i * \tau_i$  ( $i = 1, \dots, 3$ ) in the joint likelihood model. In so doing, near and far field effects of each commercial gear on survival of captured and released Chinook and Steelhead ( $\tau_i$ ) can be directly estimated from the model ( $\tau_i = S_{i.\text{Treatment}}/S_{i.\text{Control}}$ ; alternatively,  $\tau = S_{\text{Conventional.Treatment}}/S_{\text{Pound.Treatment}}$  may be a preferred). Immediate survival ( $\tau_0$ ) from capture to the time of release from the gear will be observed directly. Cumulative relative survival from release to McNary Dam will be estimated by the product  $\tau_0 * \tau_1 * \tau_2 * \tau_3$ .

Detection histories for control and treatment groups will be downloaded from the PIT-tag Information System (PTAGIS). The data will be uploaded to Program USER (User Specified Estimation Routine) to calculate maximum likelihood estimates of reach survival,  $SE$ , and 95% profile likelihood confidence intervals (Skalski and Millsaugh 2006). Likelihood ratio tests will be performed to identify the most parsimonious models for describing the capture process ( $\alpha = 0.05$ , two-tailed).

Coupling sample sizes targeted in the relative treatment analysis (Pound Net: 1000 Chinook, 300 steelhead; Gill Net and Tangle Net: 800 Chinook, 150 steelhead for each gear) with projected detection rates at McNary Dam (Gayeski et al. 2020; Vander Haegen et al. 2004), we expect standard error ( $SE$ ) for survival estimates to McNary Dam to be  $SE = 0.04 - 0.05$  for steelhead and  $SE = 0.05 - 0.07$  for Chinook, depending on the gear-type. Alternatively, results to Bonneville may be preferred, increasing precision of the relative treatment analysis to  $SE = 0.03 - 0.04$  for steelhead and  $SE = 0.04 - 0.05$  for Chinook. This

level of precision is similar to that achieved by Tuohy et al. (2019, 2020), for which the data were used by TAC to develop interim pound net mortality rates for the prototype design. Mortality rates with this level of precision will be considered a success. Currently, there are no data available for gill and tangle net post-release mortality in summer / fall seasons for Steelhead or Chinook (NMFS 2018); therefore, this study will significantly improve the precision / accuracy of incidental mortality rate estimates and allow for the first statistical comparisons of mortality estimates and *SE* amongst gear-types.

For this study, it must be noted that genetic stock assignment techniques will be used to ensure the model assumption of equivalent stock composition is achieved between control and treatment groups (Tuohy et al. 2019; NMFS 2020). In comparative analysis to the PD-7 / Bonneville Dam control group, only Chinook and steelhead that assign to Snake River / Upper Columbia populations through parent-based tagging and genetic stock identification will be used. Since PD-7 control group fishes are tagged as juveniles in Upper Columbia or Snake River tributaries, this genetic strategy will eliminate potential biases that may result from non-detections of tagged treatment group fishes destined for lower basin tributaries and hatcheries below Bonneville Dam where effective PIT-tag arrays are unavailable (NMFS 2020). However, for comparison of gill and tangle net treatment groups to the pound net treatment group ( $\tau_i = S_{\text{Conventional.Treatment}}/S_{\text{Pound.Treatment}}$ ), all tagged fishes will be used in the relative survival analysis as the law of large numbers, random sampling, side-by-side operations, and simultaneous tagging should ensure equivalent stock-composition between treatment groups. Despite the high likelihood of equivalence, we will test for genetic population assignment homogeneity between gill net, tangle net, and pound net treatment groups at the  $\alpha \leq 0.05$  significance level (Tuohy et al. 2019).

**Relationships to Related Projects:** This project builds upon previous pound net research conducted in the Columbia River to develop, engineer, and evaluate the performance of the gear for mark-selective fishing (Tuohy et al. 2019, 2020). Incidental mortality data collected in prior fish trap research projects for the prototype gear design were reviewed by the US v. OR TAC to inform interim mortality rates for WDFW's Emerging Commercial Fishery (NMFS 2020). As stated by TAC, the committee will consider new data as it becomes available to inform final incidental mortality rates for the modified gear design (NMFS 2020). As recommended by various representatives of TAC, this project functions to evaluate the recently modified passive pound net design in multiple river locations through a means recommended by TAC representatives to provide a more robust dataset for post-release incidental mortality and bycatch encounters (see WDFW letter). Following recommendations by NMFS (2018), the project further functions to fill data gaps for gill and tangle nets, for which no post-release incidental mortality data have been collected for critical limiting bycatch stocks in summer / fall season fisheries (NMFS 2018). Assuming TAC incorporates the latest available science, this project should result in TAC review to update mortality rates for management of pound nets, as well as tangle and gill nets.

**Benefits:** This project will fill critical gaps in knowledge regarding incidental mortality effects from modified pound nets, gill nets, and tangle nets, and will provide for science-based evaluation of mark-selective and conventional fisheries impacting Chinook and other salmonid stocks managed under the PST. At present, additional incidental mortality data collection for modified pound nets has been encouraged to inform final mortality rates used for management of WDFW's emerging mark-selective fishery (see WDFW letter). Furthermore, no Chinook or Steelhead post-release mortality study has ever been conducted for gill and tangle nets for summer / fall season fisheries. Lacking data for these gears and measures of post-release mortality precision and accuracy, current estimates of wild Chinook and Steelhead incidental mortality may be incorrect, affecting subsequent modeling of ESA-impacts.

Our project will inform management of pound net fisheries that have considerable potential to reduce fishery impacts on natural spawning salmon for recovery while providing opportunities to harvest

abundant hatchery origin fish (thereby, addressing deleterious hatchery effects). It may help develop sustainable fishing opportunities that contribute social, economic, and cultural benefits to the Parties. Furthermore, our project will fill gaps in knowledge for gill and tangle net fisheries and allow for the first unbiased comparisons of gear-specific incidental mortality effects to inform fishery implementation and allocation decisions by management. Given the effectiveness of PIT-tag infrastructure in the Columbia River and advantages of the study region for mark-recapture, results of this project may be used broadly to improve management of pound net, tangle net, and gill net fisheries in other regions where estimation of incidental mortality effects may be more challenging. Ultimately, this work will advance management of incidental fishing mortality effects and exploitation to ensure impact levels are not exceeded in U.S. and Canadian pound net, gill net, and tangle net fisheries.

**Permitting:** The following permits are secured for pound net deployment: County Land Use Development Permit, ODSL Removal-Fill Permit, ODSL Special Use Permit, Section 106 National Historic Preservation Act Consultation, USACE Section 408 Permit, USACE Section 10 Permit.

As for scientific research coverage for fish collection/tagging activities, the following permits must be secured before fish collection begins in August 2023 or 2024: WDFW Scientific Collection Permit, ODFW Scientific Take Permit, and the Federal ESA Incidental Take Permit.

Scientific research coverage for fish collection and tagging activities will require agreement from the Parties of US v. OR TAC to provide an avenue to federal permitting for the research. This will require considerable time for review and negotiations between the Parties of US v. OR TAC. Given the three-year window of this grant, there should be sufficient time to determine the pathway to the Federal ESA Incidental Take Permit through meetings and discussions with WDFW, ODFW, and NMFS.

**Risks:** Risks to successful project completion are low salmonid returns to the Columbia River Basin and limitation of available ESA research impacts for fish collection/tagging activities. Given the three-year window to conduct the research through the Mark Selective Fishing Fund, we may strategically pursue a favorable salmonid return year, thereby, selecting a study period with greater available ESA research impacts. Moving forward, we will work with representatives of US v. OR TAC to revise final study plans (if need be) to advance the research and the permitting process for Incidental Take Coverage.

Date	Project Timeline / Milestones
11/1/2021	Effective start date for Mark Selective Fishing Fund
11/30/2021	Submit state/federal applications for incidental take permits
12/15/2021	Submit progress report
1/30/2022	Conduct permitting meeting with WDFW, ODFW, and NMFS and discuss next steps
6/30/2022	Confirm permitting plans and discuss study design with WDFW, ODFW, and NMFS
12/1/2022	Conduct study design meeting with WDFW, ODFW, and NMFS representatives of TAC
12/15/2022	Submit progress report with final study plan details
6/30/2023	Secure research fish collection permits from WDFW, ODFW, and NMFS
8/1/2023	Initiate MSF Fund research along with WA RCO pound net research (matching funds)
10/31/2023	Complete field research; initiate data analysis process
12/15/2023	Submit progress report including preliminary project results to WDFW/ODFW/NMFS
10/31/2024	End date for Mark Selective Fishing Fund
12/15/2024	Submit progress report incorporating feedback from WDFW/ODFW/NMFS
1/30/2025	Submit final report to PSC, WDFW, ODFW, NMFS, and US v. OR TAC

# Project Budget Form: Mark Selective Fisheries Fund

MSF-02-21

Name of Project: Side-by-Side Evaluation of Chinook Salmon and Steelhead Incidental Mortality Effects from

## ELIGIBLE COSTS

### Labour

#### Wages & Salaries

Position	# of crew	# of work days	hrs per day	rate per hour	Total (PSC + In-kind + cash)
PI	2	12.5	8	40	8,000
Project Manager	1	40	8	32	10,240
Biologist	4	40	10	28	44,800
Technician	8	40	10	18	57,600
Bookkeeper	1	24	2	30	1,440
Person Days (# of crew x work days)		2,504		sub total	122,080

### TOTAL PROJECT BUDGET

### OTHER FUNDING

Match from WA RCO,

### MSF FUND GRANT AMOUNT

In-Kind & Cash	MSF Fund Amount
-	8,000
2,560	7,680
22,400	22,400
28,800	28,800
720	720
54,480	67,600

### Labour - Employer Costs (rate % = 'Labour Employer Costs' Subtotal / 'Wages & Salaries' Subtotal)

rate	35%	sub total	42,728
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19,068	23,660
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Subcontractors & Consultants	# of crew	# of work days	hrs per day	rate per hour	
Contracted Fisher	4	40	10	30	48,000
Insurance if applicable	rate	0%			
				sub total	48,000

24,000	24,000
24,000	24,000

Volunteer Labour	# of crew	# of work days	hrs per day		
Skilled					
Un-skilled					
Insurance if applicable	rate	0%			
				sub total	


### Total Labour Costs

212,808

97,548

115,260

### Site / Project Costs

Provide details in the space below  
(use an additional page if needed)

Travel (do not include to & from work)	(12 round trips from Seattle to Cathlamet) x (2 vehicles)	4,838
Lodging	(1 cabin per crew) x (4 crews) x (32 nights) x (\$120/cabin)	15,360
Food	(4 crews) x (32 days) x (\$100/crew-day)	12,800
Small Tools & Equipment	(4 Totes, \$350/tote) + (Hose, \$150) + (4 Pumps, \$220/p)	2,730
Site Supplies & Materials	(3200 PIT-tags) x (\$2.66/tag)	8,512
Equipment Rental	N/A	
Work & Safety Gear	PFDs (4 total) x (\$68/PFD)	272
Repairs & Maintenance	Boat Maintenance (oil change top and bottom, fuel filter,	800
Permits	Two Scientific Collection Permits for WA and OR (\$150/	300
Technical Monitoring	N/A	
Boat Fuel	(150 gallons) x (3.99/gallon)	599
Total Site / Project Costs		46,211

2,419	2,419
7,680	7,680
6,400	6,400
1,365	1,365
4,256	4,256
	272
	800
	300
	599
22,120	24,091

## ELIGIBLE COSTS

## BUDGET

OTHER  
FUNDINGCONTRIBUTION  
FUNDING**Training (e.g Swiftwater, bear aware, electrofishing, etc).**

Name of course	# of crew	# of days	Total (PSC + In-kind + cash)
PIT-Tag Training	12	2	5,120
<b>Total Training Costs</b>			<b>5,120</b>

In-Kind & Cash	PSC Amount
2,560	2,560
2,560	2,560

**Administrative Costs**

Office space; including utilities, etc.	N/A	
Office supplies	Pencils, pens	50
Telephone & Long Distance	N/A	
Photocopies & printing	Rite-in-the-rain paper and printing	200
Insurance	Washington USLH-Maritime Workers Compensation	2,500
Indirect/overhead costs	10% of Wages and Salaries	12,208
(If the PSC contribution to Indirect costs exceeds 20% of the total PSC grant you will be required to submit back-up documentation justifying the expense).		
Other overhead costs (give details)		
<b>Total Administrative Costs</b>		<b>14,958</b>

	50
	200
	2,500
5,448	6,760
5,448	9,510

**Capital Costs / Assets**

**Provide details in the space below  
(use an additional page if needed )**

Assets are things of value that have an initial cost of \$250 CAN or more and which can be readily misappropriated for personal use or gain or which are not, or will not be, fully consumed during the term of the project.

Asset	N/A	-
Asset	N/A	
Asset	N/A	
Asset	N/A	
<b>Total Capital Costs</b>		<b>-</b>

-	-
-	-

**Project Total Costs** 279,097

127,676 151,421

**Budget Summary**  
 (PSC + in-kind + cash)

**Note that match funding has been fully secured for pound net operation**

**Total Labour Costs**  
**Total Site / Project Costs**  
**Total Training Costs**  
**Total Overhead Costs**  
**Total Capital Costs**

212,808
46,211
5,120
14,958
-
<b>Project Total</b> 279,097



30 April 2021

Kurt Beardslee  
Executive Director  
Wild Fish Conservancy  
P.O. box 402  
Duvall, WA 98109

Dear Kurt,

I am pleased to write this letter of support and collaboration for the Wild Fish Conservancy's (WFC) proposal to advance fish trap research in Washington State. This project will fill remaining data gaps for management and help fishers implement sustainable salmon fishing methods while improving monitoring of our region's coastal ecosystems.

Beginning in 2017, I advised the Principle Investigator (PI) for this project, Adrian Tuohy, with his studies at the University of Washington, School of Aquatic and Fishery Sciences. The research Mr. Tuohy has led at WFC for the Columbia River fish trap project shows enormous potential to improve the sustainability of our State's commercial salmon fisheries, reducing commercial bycatch mortality of threatened wild salmon while expanding selective fishing opportunities in the region for hatchery-origin fish. Since the completion of his Master's degree and thesis in 2018, I have co-authored peer-reviewed and published papers with the PI regarding this promising fishing tool. Moving forward, I will continue to collaborate as co-PI for the proposed research investigations to more broadly realize the benefits of the fish trap gear for industry and management across watersheds of Western Washington.

As Professor Emeritus at the University of Washington, I retain the ability to advise graduate students at the University. Beyond my collaborative contributions to this project's study design, analysis, and publication components will co-advise Adrian Tuohy in his studies at the University of Washington.

To date, many wild salmon recovery efforts have fallen-short, in part, due to conventional harvest and hatchery practices that directly and indirectly impact the abundance and diversity of threatened wild salmon populations. As a result, fisheries remain severely constrained throughout the region, damaging the resilience of coastal economies. This fisheries research, outreach, and stakeholder engagement project will help to identify and implement a partial solution to this harvest and hatchery management problem. Integrating fish population monitoring and selective harvest with salmon traps in Washington State watersheds, we may ensure that marine resources are well-understood, ESA-listed stocks are protected and restored, fisheries are sustainable and economically prosperous, harvest and hatchery programs are responsibly managed, and coastal communities are resilient. Thank you for your continuing efforts to help achieve these conservation and economic goals.

Sincerely,

A handwritten signature in black ink, appearing to read "John R. Skalski".

John R. Skalski  
Professor Emeritus



State of Washington  
DEPARTMENT OF FISH AND WILDLIFE

Mailing Address: P.O. Box 43200, Olympia, WA 98504-3200 • (360) 902-2200 • TDD (360) 902-2207  
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia, WA

July 28, 2020

Kurt Beardslee  
Executive Director  
Wild Fish Conservancy  
Post Office Box 402  
Duvall, WA 98109

Dear Kurt:

Washington Department Fish and Wildlife (WDFW) strongly supports Wild Fish Conservancy's (WFC) proposed research of modified fish traps for mark-selective harvest of salmon and bycatch mortality reduction.

We believe that additional research of mark-selective commercial fishing gears may help identify a means to reduce the percentage of hatchery-origin spawners (pHOS) in the Columbia River basin and reduce fishery, genetic, and ecological threats to Endangered Species Act (ESA)-listed wild salmonid populations from hatchery production. This is important for ensuring that hatchery production actions intended to increase prey availability for Southern Resident Killer Whales (SRKW) are consistent with sustainable fisheries and ESA recovery plans for wild salmonids.

Prior research of fish traps has shown that the gear has significant potential to reduce fishery bycatch mortality rates, and the WDFW submitted a fall season gear mortality rate proposal to the *United States v. Oregon* Technical Advisory Committee (TAC) upon initiating a permanent rule-making process to potentially legalize fish traps for commercial mark-selective harvest of salmon. TAC is responsible for developing, analyzing, and reviewing fishery data pertinent to the *United States v. Oregon* Management Agreement and to develop reports and technical recommendations regarding fishery harvest management within the Columbia River basin. Last March, TAC approved interim fish trap bycatch mortality rates of 6% for steelhead, 7% for Chinook salmon, and 9% for coho salmon.

At present, all fish trap research has focused on a single prototype design in one location within the Cathlamet Channel, lower Columbia River, WA. Recent pilot research of a modified passive fish trap design has shown potential to further reduce bycatch mortality rates for released salmonids, and WDFW support additional research of this modified design in new river locations due to current limitations of the data, with further investigations of the following metrics for steelhead, Chinook salmon, and coho salmon: immediate bycatch survival, post-release bycatch

Kurt Beardslee

July 28, 2020

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survival, physical capture and release conditions of fishes, migration delay effects, and stock-composition.

WDFW support specific study designs to investigate bycatch mortality effects for each salmonid species encountered in fish trap commercial gear in the lower Columbia River. WDFW will work with WFC and partners in developing final study plans for mark-recapture and net pen holding bycatch mortality studies. We will further contribute to data analysis and reporting efforts, and given sufficient data, will submit a request to review data and methodologies by TAC to further improve the mortality rate for the modified fish trap gear.

At present, gill nets and tangle nets are the only commercial gear legal for use in the lower Columbia River, although other gears can be used under 'emerging commercial fishery rule', and the addition of new alternatives may help rebuild the productivity of weak fish runs in the face of proposed hatchery production increases for recovery of SRKW. WFC and partners proposed research will help fill critical data gaps for mark-selective gear that are fundamentally important to addressing the fishery, genetic, and ecological risks of hatchery production to wild salmonid recovery. Thank you for your continuing efforts to help achieve these conservation goals.

Sincerely,



Kelly Susewind  
Director





State of Washington  
**DEPARTMENT OF FISH AND WILDLIFE**

Mailing Address: P.O. Box 43200, Olympia, WA 98504-3200 • (360) 902-2200 • TDD (360) 902-2207  
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia, WA

June 8, 2020

Kurt Beardslee  
Executive Director  
Wild Fish Conservancy  
Post Office Box 402  
Duvall, WA 98109

Dear Kurt:

The Washington Department of Fish and Wildlife (WDFW) strongly supports the development, testing, and implementation of commercial fishing gear for mark-selective harvest of salmon. Successful implementation of gears that are mark selective and can be demonstrated to have low mortality rates for released fish will help maintain the economic viability of commercial fishers in Washington and provide quality, locally harvested seafood to consumers. Allowing harvest of abundant hatchery-origin salmon, while minimizing impacts on wild stocks of conservation concern, is consistent with WDFW policies on hatchery management, fishery reform and with the Columbia Basin salmon management policy.

We support Wild Fish Conservancy's (WFC) efforts to seek funding to conduct further research to estimate post-release mortality rates for pound net traps located on the lower Columbia River, and to continue their efforts to develop new handling methods to further reduce mortality of released fish. The U.S. v. Oregon Technical Advisory Committee, which is comprised of scientists working for Columbia Basin tribal, state and federal fisheries agencies and which establishes harvest gear mortality rates, has requested multiple years of mark-recapture and/or net pen holding studies in order to accurately determine mortality rates for pound net traps, and has expressed interest in methods to further reduce mortality rates. WFC proposes to continue conducting this work and to assess capture efficiency for targeted stocks and bycatch encounters in lower Columbia River pound net traps through construction and evaluation of a modified trap design at a new location that will support new methods for reducing handling of released fish. Installation and testing of a pound net at a second location will aid fishery managers in determining suitability for broader implementation of pound net traps as a viable gear for mark-selective harvest of hatchery-origin salmon. WDFW will continue to work collaboratively with WFC through testing and development of the trap, providing assistance through the permitting process, and review of study plans and reports. Disposition of the Washington State Recreation and Conservation Office (RCO) funded trap will be determined by RCO guidelines and WDFW at the conclusion of the research efforts with the objective of maximizing benefits to commercial fishing and local communities.

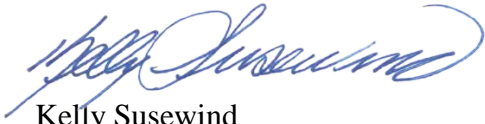
Kurt Beardslee

June 8, 2020

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WDFW initiated a rule-making process to determine whether to implement pound net trap as a legal gear for commercial harvest of salmon, forming an Alternative Gear Advisory Board in late 2019. Several meetings of this Advisory Board have taken place and have recommended further testing and development of the modified trap design and location. At present, gillnets and tangle nets are the only commercial gear legal for use in the Columbia and the addition of new alternatives is critical to advance the conservation and recovery of wild salmon and steelhead and support the economic well-being and stability of the fishing industry. Thank you for your continuing efforts to help achieve these conservation and economic goals.

Sincerely,



Kelly Susewind  
Director

cc: Oregon Department of Fish and Wildlife:  
Curt Melcher  
Washington Department of Fish and Wildlife:  
Kessina Lee  
Bill Tweit  
Ryan Lothrop  
Lisa Harlan

## References

- Burnham, K., Anderson, D., White, G., Brownie, C., and K. Pollock. 1987. Design and analysis of fish survival experiments based on release-recapture data. American Fisheries Society, Monograph 5. Bethesda, MD. 437 pp.
- Cormack, R. 1964. Estimates of survival from the sighting of marked animals. *Biometrics* 51: 429–438.
- Cox, B., Wadsworth, T., and J. Holowatz. 2019. Short-term survival of fall Chinook and coho salmon captured by purse seines in the lower Columbia River, 2017: A holding study. Washington Department of Fish and Wildlife. Olympia, WA.
- Gayeski, N. J., Tuohy, A. M., and A. T. Jorgenson. 2020. Evaluation of pound nets as stock-selective fishing tools in the Lower Columbia Sub-basin. Final report to the National Oceanic and Atmospheric Administration (NOAA) Bycatch Reduction Engineering Program (BREP). Seattle, WA.
- Hudson, D. 1971. Interval estimation from the likelihood function. *Journal of the Royal Statistical Society, Series B*, 33:256–262
- Kalbfleisch, J., and D. Sprott. 1970. Application of likelihood methods to models involving large numbers of parameters (with discussion). *Journal of the Royal Statistical Society, Service B.*, 32:175–208
- NMFS. 2018. Release Mortality rates for fall season non-treaty commercial gillnet and tangle net gear. Memorandum: Jeromy Jording (NMFS) to Stuart Ellis (U.S. v. OR TAC). Olympia, WA.
- NMFS. 2020. Recommended release mortality rates for pound gear. Memorandum: Jeromy Jording (NMFS) to Stuart Ellis (U.S. v. OR TAC). Olympia, WA.
- ODFW and WDFW. 2020. Joint staff report: stock status and fisheries for fall Chinook Salmon, Coho Salmon, Chum Salmon, Summer Steelhead, and White Sturgeon. Joint Columbia River Management Staff; Washington Department of Fish and Wildlife and Oregon Department of Fish and Wildlife. Portland, OR.
- PSC (Pacific Salmon Commission). 2020. Treaty Between the Government of Canada and the Government of the United States of America Concerning Pacific Salmon. PSC. [www.psc.org/publications/pacific-salmon-treaty](http://www.psc.org/publications/pacific-salmon-treaty)
- Seber, G. A. F. 1982. On the estimation of animal abundance and related parameters. 2nd. ed. Charles Griffin and Sons, Ltd., London. 654 pp.
- Skalski, J. R. and J. J. Millspaugh. 2006. Application of multidimensional change-in-ratio methods using program USER. *Wildlife Society Bulletin* 34:433–439.
- Tuohy, A. 2018. Post-release survival of Chinook salmon and steelhead trout from an experimental commercial fish trap in the lower Columbia River, WA. Master's Thesis. University of WA. Seattle, WA.
- Tuohy, A. M., J. R. Skalski, and N. J. Gayeski. 2019. Survival of salmonids from an experimental commercial fish trap. *Fisheries* 44: 423 – 432.
- Tuohy, A. M., J. R. Skalski, and A. T. Jorgenson. 2020. Modified commercial fish trap to help eliminate salmonid bycatch mortality. *North American Journal of Fisheries Management* 40: 1239–1251.

Tuohy, A. M. 2020. Short and long-term post-release survival of Coho Salmon captured with a passive fish trap in the lower Columbia River, WA. Wild Fish Conservancy. Duvall, Washington.

Vander Haegen, G., C. Ashbrook, and J. Dixon. 2004. Survival of spring Chinook Salmon captured and released in a selective commercial fishery using gill nets and tangle nets. Fisheries Research 68:123–133.

WDFW (Washington Department of Fish and Wildlife). 2014. Lower Columbia River alternative commercial fishing gear mortality study: 2011 and 2012. WDFW, Olympia.

WDFW. 2021. Three alternative commercial fishing gears designated for ‘emerging commercial fishery’ status on the Columbia River. Olympia, WA. <https://wdfw.wa.gov/news/three-alternative-commercial-fishing-gears-designated-emerging-commercial-fishery-status>

WFWC (Washington Fish and Wildlife Commission). 2009. Washington Fish and Wildlife Commission hatchery and fishery reform policy decision. Policy number C-3619. Olympia, Washington.

WFWC. 2013. Columbia River Basin salmon management policy decision. Policy number C-3620. Olympia, Washington.

WFWC. 2015. Willapa Bay salmon management policy decision. Policy number C-3622. Olympia, Washington.

WFWC. 2020. Columbia River Basin salmon fishery management policy decision - revision. Policy number C-3620. Olympia, Washington.

**Project Title:**

*Evaluation of the Feasibility of Implementing a Mark Select Fishery in the  
Southeast Alaska Chinook Salmon Sport Fishery*

**Performance Period (start and end date):**

November 1, 2021 through February 28, 2023

**Funding Requested (specify whether costs are in \$ USD or CAD):**

\$76,680 (USD)

**The name of your organization / affiliation:**

Alaska Department of Fish and Game, Division of Sport Fish / State of Alaska

**Principal Investigators(s) with contact information (telephone number, postal address, email address):**

Jeff Nichols

ADF&G, Division of Sport Fish – Douglas Regional Office

P.O. Box 110024

Douglas, AK 99811-0024

PH: (907) 465-8576

email: [jeff.nichols@alaska.gov](mailto:jeff.nichols@alaska.gov)

**Person responsible for grant administration (telephone number, postal address, email address):**

Sydnee McGinley/Jaye Edwards

ADF&G, Division of Sport Fish – Headquarters Office

P.O. Box 115526

Douglas, AK 99811-5526

PH: (907) 465-6188

email: [sydnee.mcginley@alaska.gov](mailto:sydnee.mcginley@alaska.gov)

**Identification of the project as either: a. A new project; or b. A project previously funded by the MSF Fund Committee (provide the year of initial funding):**

*a—A new project*

**Abstract:** Provide a short summary (<500 words) describing the proposed project and its significance for Mark Selective Fisheries and assessment of Chinook salmon fisheries under the Pacific Salmon Treaty.

The Alaska Department of Fish and Game (ADF&G) manages the Southeast Alaska (SEAK) sport aggregate abundance-based management (AABM) Chinook salmon fishery according to the Pacific Salmon Treaty (PST) and domestic policies which share the same overarching principles of meeting escapement goals and providing sustainable levels of harvest opportunity consistent with the sustained yield principle. Conservative management measures have been in place for 5 years in SEAK waters to provide protection to SEAK wild Chinook stocks that have been experiencing poor productivity, limiting harvest opportunity for all user groups. Two automated fish tagging trailers have recently been procured that will substantially increase marking rates (adipose fin clips) from status quo levels of around 10% up to 100% at several SEAK hatcheries. SEAK sport fishery stakeholders are interested in evaluating the feasibility of a mark selective fishery (MSF) to take advantage of Alaska-produced hatchery fish to a greater extent, especially during years when fishing opportunity is restricted to protect SEAK wild stocks. Although MSFs have been implemented in other management areas under the geographic scope of the PST, the implications of an MSF occurring in SEAK, specifically the SEAK sport Chinook salmon fishery, are not well understood. This project would fund an evaluation of the feasibility of implementing an MSF in the SEAK sport fishery within the constraints and mandates of the PST and domestic management plans. This evaluation will be fundamentally collaborative, soliciting and incorporating input from stakeholders and ADF&G management and research staff.

**Project Objectives:** Provide a concise statement of project objectives that address the themes identified above, and why the proposed project is important for improving the management of Mark Selective Fisheries. If the proposed work has been previously funded by the MSF Fund Committee, summarize accomplishments to date in relation to project objectives and incremental value of this project.

The proposed project will assess the feasibility of implementing an MSF in the SEAK sport Chinook salmon fishery. To accomplish this objective, information on existing MSFs, current ADF&G Chinook management, research, and assessment programs, SEAK Chinook salmon sport fishery characteristics, and SEAK enhancement operations will be synthesized. A quantitative and qualitative cost-benefit analysis of MSF implementation under different scenarios will inform recommendations to ADF&G, hatchery operators, and stakeholder groups in the context of domestic and international salmon management regimes.

The assessment will specifically evaluate components of each of the three themes identified by the MSF Fund Committee, including: hatchery marking approaches, fishery catch and mortality estimation, and wild stock assessment programs of indicator stocks.

Facilitated meetings with stakeholder groups and ADF&G management and research staff will occur in each phase of the evaluation. Stakeholder feedback and ADF&G staff input will be critical to ensuring the real-world applicability of the assessment to fishery managers and researchers, PNP hatchery operators, and fishing industry groups. The final format of the evaluation will be a written report delivered to the ADF&G. The final report will also be presented to stakeholder groups to promote a unified and consistent understanding of the challenges and opportunities present for MSF implementation in SEAK sport Chinook salmon sport fisheries.

**Experience and Expertise of Key Project Personnel.** Identify key project personnel, the nature and extent of their role in implementation, and summarize their relevant qualifications. (Detailed resumes are not required). If any component of the proposal will be provided by others, identify these persons, the nature of their involvement, and their relevant qualifications.

Jeff Nichols (Regional Research Coordinator—Southeast Region, ADF&G, Division of Sport Fish) has over 15 years of experience providing technical guidance on the regions' salmonid fishery monitoring and stock assessment projects and is a member of the Chinook Technical Committee. Mr. Nichols has overseen all aspects of fishery research projects during his tenure, including project design, budget control, staffing, and reporting. Mr. Nichols also has demonstrated experience coordinating with external contractors, facilitators, and stakeholder panels. Mr. Nichols will provide project oversight and coordination.

Randy Peterson (Biometrician—ADF&G, Division of Sport Fish) has 7 years – 3 with sport fish division, 4 with the division of commercial fisheries – of experience providing biometric advice on fishery and stock assessment projects in SEAK and is a member of the Chinook Technical Committee. Mr. Peterson will provide datasets and evaluations germane to CWT analyses as well as ensuring a department biometric review is completed for the final report and synthesis.

Matt Catterson (Regional Enhancement and Access Coordinator—Southeast Region, ADF&G, Division of Sport Fish) has over 10 years of experience conducting fisheries research projects in SEAK, including 6 years as a sport fishery manager, and currently coordinates the ADF&G Sport Fish SEAK enhancement program, which requires direct communication and engagement with SEAK hatchery operators.

Bob Chadwick (Regional Management Coordinator—Southeast Region, ADF&G, Division of Sport Fish) has over 20 years of experience overseeing sport fisheries management in SEAK in the context of domestic and international salmon management regimes. Mr. Chadwick will be integral to all phases of this project ensuring aspects of management are represented consistent with the mission of the ADF&G, Division of Sport Fish.

**Methodology and Project Design.** Methods, sample design, and techniques for conducting the project. Provide adequate detail so reviewers have a full appreciation of how the project is to be conducted and can thus provide an adequate technical review of the proposal. If an objective involves statistical estimation or experimentation, detail statistical methodology for analysis and show that expected sample sizes are adequate to meet study objectives. If an objective involves developing a tool, such as a conceptual or computer model, provide a schedule of benchmarks for completion of usable products, progressing to the final product.

### *Overview*

Mark selective fisheries have been hotly debated in the PST arena as many such fisheries lack the infrastructure to collect the data necessary for evaluating stock-specific impacts in an MSF. To avoid shortcomings of MSFs conducted elsewhere and to leverage the experience gained previously, consistent with responsible management under the PST, ADF&G intends to evaluate feasibility before implementing an MSF. Our feasibility assessment will use a phased approach: in the first phase, a literature review and assessment of existing programs will be conducted, and in the second phase, results from the first will be used to conduct a cost-benefit analysis. Most of the work will be completed by an external contractor. This contractor will be expected to work with ADF&G to further refine specific project objectives, conduct the necessary research, participate and engage in staff and stakeholder meetings, and write reports. The staff and stakeholder meetings will serve as a forum to discuss how an MSF may be implemented in SEAK, as well as identify potential costs and benefits to the region. Each phase of our feasibility assessment will conclude with an ADF&G Special Publication report, which will be distinct from the requisite interim and final reporting required by the Mark Selective Fishery Fund.

*Phase I*

Phase I will begin by securing services from an external contractor with expertise in MSFs and sport fisheries. The contractor will work closely with ADF&G staff on all aspects of this project. The project will begin with a literature review which will summarize a spectrum of MSFs prosecuted within the geographical scope of the PST and include details on how these fisheries are typically planned for, managed, and assessed in-season, and evaluated post-season.

Phase I will include a staff workshop to provide regional staff an opportunity to meet with the contractor to discuss results from the literature review, the existing SEAK sport fishery, and its assessment projects. A program review will follow, examining how MSF implementation may affect facets of the SEAK sport fishery, including management, assessment, and enhancement.

A management framework review will examine both domestic and international obligations, regulatory complexity, public outreach and education, compliance, additional MSF reporting obligations (e.g., SFEC 2004), and potential unintended consequences. The Board of Fisheries process, ADF&G's regulatory framework involving and requiring public participation will need to be incorporated in the review.

The assessment program review will examine potential impacts to fishery and stock assessment programs. Current fishery assessment programs include marine creel (Jaenicke et al. 2019), statewide harvest survey (SWHS; Romberg et al. 2020), charter/guided logbook (Powers et al. 2015), and occasional area-specific creel projects (e.g., Yakutat and Haines area creels; Catterson et al. 2018, Chapell and Power 2015). Given potential additional data needs that MSF pose (i.e., double index tag sampling), this program review may also include the SEAK commercial port sampling program (Reynolds-Manney et al. 2020). Current SEAK stock assessment programs that will be reviewed include both hatchery and wild CWT indicator stocks, which occur throughout the region.

The review of the SEAK enhancement programs will summarize current and anticipated levels of mass marking of Chinook salmon production in SEAK, including an examination of magnitude and composition of releases that occur throughout the region.

Upon completion of the program assessment a draft publication summarizing phase I of the project will be prepared. This draft will be disseminated to stakeholders at four workshops that will be held around the region. The goal of these workshops is to communicate phase I results and provide stakeholders with an opportunity to evaluate information on potential MSF implementation and provide feedback. Feedback from these workshops will be synthesized and incorporated into a final report.

*Phase II*

Phase II will begin with a second staff workshop held in Juneau. The contractor will meet with ADF&G staff to develop a framework to be used in the cost-benefit analysis. This cost-benefit analysis will utilize results from phase I to evaluate MSF implementation under a range of fishery and stock status scenarios with a continued focus on management, research/assessment, and enhancement.

The cost-benefit analysis will identify under what scenarios an MSF would provide additional fishing opportunity, while meeting wild stock conservation objectives. Potential costs will be estimated and are expected to vary depending on the implementation scenario. Results of Phase II will be documented in a final report.



**Relationships to related projects.** Describe partnerships and actions/activities that should be considered as contingencies or requirements for successful completion of the proposed project. Indicate the status of these partnerships, ongoing activities, partnership capabilities, and available information concerning critical project dependencies.

This project is a collaborative undertaking between ADF&G and stakeholder groups that is assisted through employment of an external contractor. As such, the successful completion of this study will depend on substantive stakeholder involvement and contribution during each phase of the evaluation. Relevant stakeholder groups include SEAK charter fishing industry and resident sport fishing angler groups, SEAK aquaculture associations, and PNP hatchery operators. The adoption of 100% marking strategies by some hatchery operators in the region has already occurred.

**Benefits.** Describe the benefits and relevance to implementation of the Chinook Chapter of the Pacific Salmon Treaty.

Fundamentally, detailed planning of an MSF far in advance of an MSF occurring will help ensure that any such MSF is consistent with Chapter 3, subparagraph 4(g)(i) of the 2019 PST Agreement– that “*MSFs for Chinook shall be conducted in a manner that selectively reduces impacts on naturally spawning salmon relative to hatchery-origin salmon.*” A chronic issue identified by SFEC, the CTC, and the CYER Workgroup is the inability to estimate stock-specific impacts resulting from MSFs. Should an MSF occur in the SEAK sport fishery, this analysis will help identify potential data gaps or improvements to monitoring of the SEAK sport Chinook salmon fishery catch per subparagraph 4(g)(iii) to support the analytics required to successfully implement Chapter 3 of the 2019 PST Agreement, specifically.

**Permitting.** Identify any required permits, those already obtained, and the timing and potential impediments to securing necessary permits to conduct the project.

None

**Risks.** Describe any risks to successful project completion or continuation and how these will be mitigated.

A potential risk to the success of this project is the negative impacts of not fully considering and incorporating input from core stakeholder groups. Without stakeholder involvement and buy-in to the assessment, the resulting recommendations will lack credibility and real-world applicability. This risk will be mitigated by providing opportunities for stakeholder feedback at locally held meetings during the project.

**Timeline.** Provide the proposed starting and ending dates for the project tasks, including the preparation of progress reports and final reports. Progress summary reports are required by December 15 annually. A final written report and a full accounting of financial expenditures is due within 90 days of project completion.

Date	Task
<i>Phase I</i>	
November, 2021	ADF&G administrative/procurement process begins to secure services of external contractor
December 15, 2021	Submit Progress Summary Report
February, 2022	External contractor service agreement in place; work begins
February – March, 2022	Literature review
April, 2022	Staff workshop
April – May, 2022	Program assessment and draft phase I report
May – October, 2022	Stakeholder workshops
October 15, 2022	Phase I report
<i>Phase II</i>	
November, 2022	Staff workshop
December 15, 2022	Submit Progress Summary Report
December 31, 2022	Cost-benefit analysis
January 31, 2023	Final report from contractor to ADF&G for review
February 28, 2023	Final report from ADF&G to Mark Selective Fishery Fund Committee; project concludes

**Attachments:**

1. Project budget form (you must use the form published alongside this Request for Proposals)
2. Letters of support
  - a. See the attached letter of support from the Southeast Alaska Guides Association (SEAGO)
3. Justification of indirect costs (if >20% of the overall project budget)
  - a. Not Applicable

**References Cited.**

- Catterson, M. R., and J. Huang. 2018. Operational Plan: Situk River Chinook salmon creel survey, 2018 and 2019. Alaska Department of Fish and Game, Regional Operational Plan No. ROP.SF.1J.2018.05, Anchorage.
- Chadwick, R. E., J. L. Lum, E. L. Jones, and J. V. Nichols. 2017. Overview of the sport fisheries for king salmon in Southeast Alaska through 2017: a report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Special Publication No. 17-15, Anchorage.
- Chapell, R. S., and S. J. H. Power. 2015. Haines marine boat sport fishery creel survey and Skagway marine boat sport fishery harvest sampling, 2015. Alaska Department of Fish and Game, Division of Sport Fish, Regional Operational Plan No. SF.1J.2015.10, Anchorage.
- Jaenicke, M., D. Tersteeg, and J. Huang. 2019. Operational Plan: Southeast Alaska marine boat sport fishery harvest studies, 2019. Alaska Department of Fish and Game, Regional Operational Plan SF.1J.2019.05, Anchorage.
- Powers, B. 2015. Alaska Department of Fish and Game statewide saltwater guided sport fishing logbook reporting program, 2015-2017. Alaska Department of Fish and Game, Division of Sport Fish, Regional Operational Plan ROP.SF.4A.2015.02, Anchorage.

- Reynolds-Manney, A. M, J. A. Jones, J. R. Rice, and J. C. Walker. 2020. Operational Plan: Southeast Alaska and Yakutat salmon commercial port sampling 2020–2023. Alaska Department of Fish and Game, Regional Operational Plan ROP.CF.1J.2020.04, Douglas.
- Romberg, W. J., I. Rafferty, and M. Martz. 2020. Alaska Statewide Sport Fish Harvest Survey, 2019. Alaska Department of Fish and Game, Division of Sport Fish, Regional Operational Plan ROP.SF.4A.2020.01, Anchorage.
- SFEC 2004. Understanding of the Pacific Salmon Commission concerning Mass Marking and Selective Fisheries February 2004 Policy Statement and Terms of Reference. Pacific Salmon Commission. URL: <https://www.psc.org/download/194/sfec-templates/10865/sfec-mou-and-tor-feb-2004.pdf>
- Wilson, L. 2021. Alaska salmon fisheries enhancement annual report 2020. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 5J21-01, Juneau.

Project Budget Form: Mark Selective Fisheries Fund

MSF-03-21

Name of Project: Evaluation of the Feasibility of Implementing a Mark Select Fishery in the Southeast Alaska Chinook Salmon Sport Fishery

ELIGIBLE COSTS

Labour  
Wages & Salaries

						TOTAL PROJECT BUDGET	OTHER FUNDING	MSF FUND GRANT AMOUNT
Position	# of crew	# of work days	hrs per day	rate per hour		Total (PSC + In-kind + cash)	In-Kind & Cash	MSF Fund Amount
Fishery Biologist IV, Nichols		22	8	\$	53.25	9,372	9,372	
Fishery Biologist IV, Chadwick		14	8	\$	55.25	6,188	6,188	
Fishery Biologist III, Catterson		14	8	\$	36.92	4,135	4,135	
Fishery Biologist III, Jaenicke		4	8	\$	50.58	1,619	1,619	
Research Analyst 2, Tersteeg		4	8	\$	41.33	1,323	1,323	
Fishery Biologist III, Teske		4	8	\$	40.62	1,300	1,300	
Fishery Biologist III, Scwhanke		4	8	\$	44.41	1,421	1,421	
Fishery Biologist III, Fowler		4	8	\$	39.94	1,278	1,278	
Fishery Biologist III, Tydingco		4	8	\$	48.38	1,548	1,548	
Fishery Biologist III, Chappell		4	8	\$	44.41	1,421	1,421	
Fishery Biologist III, Pawluk		4	8	\$	43.04	1,377	1,377	
Fishery Biologist III, Reppert		4	8	\$	41.52	1,329	1,329	
Fishery Coordinator, Lum		4	8	\$	62.51	2,000	2,000	
Biometrician III, Peterson		14	8	\$	44.05	4,934	4,934	
Biometrician III, Huang		4	8	\$	46.48	1,487	1,487	
Fishery Scientist I, Evenson		4	8	\$	56.49	1,808	1,808	
Division Operations Manager, Taube		4	8	\$	64.24	2,056	2,056	
Fishery Coordinator, Jones		4	8	\$	63.56	2,034	2,034	
Fishery Biology III, Richards		4	8	\$	43.30	1,386	1,386	
Fishery Biology III, Hagerman		4	8	\$	44.71	1,431	1,431	
Person Days (# of crew x work days)		128		sub total		49,445	49,445	

Labour - Employer Costs (rate % = 'Labour Employer Costs' Subtotal / 'Wages & Salaries' Subtotal)

rate		sub total			
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Subcontractors & Consultants

	# of crew	# of work days	hrs per day	rate per hour		
Consultant		87	8	80	55,680	55,680
Insurance if applicable	rate	0%				
					55,680	55,680

Volunteer Labour

	# of crew	# of work days	hrs per day			
Skilled						
Un-skilled						
Insurance if applicable	rate	0%				

Total Labour Costs

105,125	49,445	55,680
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Site / Project Costs

Provide details in the space below  
(use an additional page if needed )

Travel - consultant	Two staff workshops and four stake holder workshops held in SEAK. Not assuming the contractor will be	9,000		9,000
Travel - ADF&G staff	Travel for two regional staff members not based in Juneau to attend staff workshops, with the anticipated	4,000		4,000
Travel - ADF&G staff	Travel for two regional staff members to attend stakeholder workshops, with the anticipated cost of each	8,000		8,000
Site Supplies & Materials	Provide details here			
Equipment Rental	Provide details here			
Work & Safety Gear	Provide details here			
Repairs & Maintenance	Provide details here			
Permits	Provide details here			
Technical Monitoring	Provide details here			
Other site costs	Provide details here			
Total Site / Project Costs		21,000	-	21,000

## ELIGIBLE COSTS

## BUDGET

OTHER  
FUNDINGCONTRIBUTION  
FUNDING**Training (e.g Swiftwater, bear aware, electrofishing, etc).**

				Total (PSC + In-kind + cash)	In-Kind & Cash	PSC Amount
Name of course	# of crew	# of days				
<b>Total Training Costs</b>						

**Administrative Costs**

Office space; including utilities, etc.	Provide details here			
Office supplies	Provide details here			
Telephone & Long Distance	Provide details here			
Photocopies & printing	Provide details here			
Insurance	Provide details here			
Indirect/overhead costs	24.82% (see attached for explanation of indirect costs)			-
(If the PSC contribution to Indirect costs exceeds 20% of the total PSC grant you will be required to submit back-up documentation justifying the expense).				
Other overhead costs (give details)				
<b>Total Administrative Costs</b>				-

**Capital Costs / Assets**

**Provide details in the space below  
(use an additional page if needed )**

Assets are things of value that have an initial cost of \$250 CAN or more and which can be readily misappropriated for personal use or gain or which are not, or will not be, fully consumed during the term of the project.

Asset	Provide details here			
Asset	Provide details here			
Asset	Provide details here			
Asset	Provide details here			
<b>Total Capital Costs</b>				

**Project Total Costs**

126,125

49,445

76,680

**Budget Summary**

(PSC + in-kind + cash)

<b>Total Labour Costs</b>	105,125
<b>Total Site / Project Costs</b>	21,000
<b>Total Training Costs</b>	-
<b>Total Overhead Costs</b>	-
<b>Total Capital Costs</b>	-
<b>Project Total</b>	126,125

Table X. Budget summary

	Requested	Contributed	Total
Labor	0	49,445	49,445
Equipment	0	0	0
Travel <sup>1</sup>	21,000	0	21,000
Materials & Supplies	0	0	0
Contracts	55,680	0	55,680
Other	0	0	0
Total Direct Costs	76,680	49,445	126,125
Indirect costs (24.82% of direct costs)	0	0	0
Total Costs	76,680	49,445	126,125



July 28, 2021

Mark Select Fishery Fund

Fund Selection Committee:

Southeast Alaska Guides Organization (SEAGO) represents a number of Southeast Alaska guides, resorts and lodges, and sport fish anglers. We value the resource we depend on to provide fishing opportunities for sport fishing anglers and work to ensure the industry's longevity and responsible use of the resource.

During the last Pacific Salmon Treaty negotiation, there was tremendous pressure put on all parties to continue to reduce harvest on US ESA-listed and Canada SARA-listed stocks. As part of those discussions, Alaska's treaty team agreed to reductions in overall harvest, coupled with some financial resources that would mitigate the impacts of the cuts. Some of those mitigation monies were set aside for the purchase of marking trailers, which would allow Alaska hatchery operators to mass mark their production, making it easier to determine whether a fish encountered in the wild was wild or hatchery origin.

Mark-select fisheries are used in many fisheries in Washington and Oregon as a way to continue to provide fishing opportunities for anglers in areas where managers are trying to reduce the impact on wild stocks, particularly those that are managed under strict conservation provisions. On its face, this method of fishing appears to protect both angler opportunity and the passage of wild stock brood.

Because MSF have never been utilized as a conservation tool in the SE Alaska fishery, there are many questions that would need to be resolved to determine if this approach would be beneficial, protect opportunity, and achieve the desired conservation affect. These questions include what kind of mark rate is necessary to prosecute a MSF in the sport fishery, what data exists to determine release mortality of non-clipped fish, what might management measures look like, among others. There are also potential domestic Alaska allocation impacts that would need to be fleshed out so that all parties understand the impact of and sport fish MSF on all gear groups and the Alaska All-Gear Quota.

We are interested in gathering more data to inform future decisions related to a sport fish MSF in SE Alaska. We support the Alaska Department of Fish & Game's grant application, which would help us gather additional information that is necessary in determining a) if a SE Alaska sport fish MSF is even viable; and b) if so, what the mechanics could look like. The data gathered could very well be invaluable in adding an additional tool to the Department's toolbox to assist them in meeting their mandates to provide access to these fish while also ensuring their perpetuity.

We appreciate the Committee's consideration of the ADF&G grant and are optimistic the Committee will look on the grant application favorably. We look forward to reviewing the data collected as part of the grant and using it to enhance SE sport fishery management.

Regards,

A handwritten signature in black ink, appearing to read 'Forrest Braden', with a stylized 'F' and 'B'.

Forrest Braden

Executive Director



**Request for Proposals for Mark Selective Fishery Management, 2021**

**PROJECT TITLE:**

WDFW Columbia River Fishery Sampling (Recreational and Commercial)

**PERFORMANCE PERIOD:**

January 1– December 31, 2022

**FUNDING REQUESTED:**

\$45,000 USD

**REQUESTING AGENCY:**

Washington Department of Fish and Wildlife (WDFW) & Pacific States Marine Fisheries Commission (PSMFC)

**PRINCIPAL INVESTIGATOR(S) WITH CONTACT INFORMATION:**

Beth Deacy, Columbia River Fishery Sampling Coordinator (WDFW)  
(360) 600-7069  
5525 S 11th Street  
Ridgefield, WA 98642  
[Bethany.Deacy@dfw.wa.gov](mailto:Bethany.Deacy@dfw.wa.gov)

Ken Keller, Columbia River Fishery Biologist (PSMFC)  
(360) 280-6445  
5525 S 11th Street  
Ridgefield, WA 98642  
[Ken.Keller@dfw.wa.gov](mailto:Ken.Keller@dfw.wa.gov)

Ryan Lothrop, Columbia River Fishery Manager (WDFW)  
(360) 701-3602  
1111 Washington St. SE  
Olympia, WA 98501  
[Ryan.Lothrop@dfw.wa.gov](mailto:Ryan.Lothrop@dfw.wa.gov)

**PERSON RESPONSIBLE FOR THE GRANT ADMINISTRATION:**

Pam Kahut, Contract Specialist (PSMFC; primary)  
(503) 595-3100  
205 SE Spokane, Ste 100  
Portland, OR 97202  
[PKahut@psmfc.org](mailto:PKahut@psmfc.org)

Theresa Walker, WDFW Contracts Specialist (WDFW; alternate)  
(360) 902-2439  
1111 Washington St. SE  
Olympia, WA 98501  
[Theresa.walker@dfw.wa.gov](mailto:Theresa.walker@dfw.wa.gov)

**PROJECT STATUS**

New MSF Fund Committee Project.

**Abstract:**

This project proposes to maintain and enhance the Coded Wire Tag (CWT) electronic sampling rates in the Columbia River mainstem mark-selective (MSF) recreational and commercial salmon fisheries during the 2022 season. The costs of conducting fisheries monitoring in the Columbia River are substantial and are borne by a variety of funding sources including WDFW license and landing fees, federal Mitchell Act, Pacific Salmon Treaty, Bonneville Power Administration mitigation funds, Pacific Coast Salmon Recovery funds and other sources. Significant increases to personnel costs with continued flat-lined funding does not allow for adequate staffing to meet needs during peak sampling months which would result in a lower sample rate of CWT and associated fishery metrics and biological sampling data. The project proposal funding will provide for one half of a month of supervisory staff time and six months of seasonal sampler time, out of a total seasonal staffing need of 123 sampler months during the contract period. This will provide the support needed to maintain the desired sampling rate by strata and allow for all retained salmon to be electronically CWT sampled in existing fisheries.

**Project Objectives:**

- Objective 1: Meet or exceed the current sampling rate targets for CWTs from Chinook and Coho Salmon from MSF commercial and recreational fisheries (spring, summer, and fall seasons) in the Columbia River by strata.
- Objective 2: Electronically CWT sample all retained fish.
- Objective 3: Increase accuracy/precision of preseason, in-season, and post season estimates of catch and effort.

Each of these objectives have largely met the annual sampling goals, but increased personnel costs and flat funding levels have made it more challenging in recent years to meet the desired sampling rates by strata. Achieving sampling goals for future years appears less certain. Objective 2 was recently instituted due to ODFW securing additional PSC funding to sample the OR side of the river, and WDFW absorbed the additional workload with no additional resources.

**Relationship and Significance to Identified Research Themes:**

The intent of this project proposal is aligned with #2 and #3: 'Improve estimates of incidental mortality, including improved released catch estimates and improved incidental mortality rate estimates'; 'Maintain and improve the ability to estimate exploitation rates on Chinook salmon indicator stocks that are encountered in MSFs, including improvements and development of bilateral analytical tools to address any of the themes above'. Without the support of this funding, the project will be challenged to maintain the level of sampler months needed to maintain sufficient sampling rate targets by strata, electronically CWT sample all retained fish, and improve accuracy/precision of exploitation rates and catch and effort estimates.

PSC Chinook Salmon Indicator/Double Index Tag (DIT) stocks encountered in this project proposal include: Willamette Spring, Lewis River Spring, Columbia Summers, Cowlitz Tule, Spring Creek Tule, Little White Salmon Hatchery, Lewis River Wild, Lower River Hatchery, Mid-Columbia Brights, Lyons Ferry Fingerling, Lyons Ferry Yearling, Hanford Wild, and Priest Rapids Hatchery. PSC Coho Salmon Indicator/DIT stocks encountered in this project proposal include: Lewis River, Eagle Creek, Sandy River, Bonneville/Tanner Cr., Youngs Bay Net Pens, and Willard NFH.

**Experience and Expertise of Key Project Personnel:**

Beth Deacy is the Columbia River Fisheries Sampling coordinator (WDFW) who oversees sampling efforts on commercial, tribal, sport, and research/test fisheries on the lower Columbia River. She has over 10 years of experience coordinating and leading field sampling surveys monitoring fish populations with both state and federal agencies. She routinely collaborates with other state, federal, and non-government agencies regarding monitoring plans, and has past experiencing overseeing and implementing field surveys for spawning and nursery ground usage and monitoring fish populations that are considered economically important to stakeholders.

Ken Keller is the lead biologist (PSMFC) for adult salmon population monitoring below Bonneville Dam, sport sampling coordination, commercial sampling, tribal sampling, spawning ground surveys, and Genetic Stock Identification (GSI) coordination. He has over 34 years of fisheries research and over 30 years of experience on the Columbia River involving salmon, steelhead, sturgeon, smelt, shad and lamprey, hatchery sampling, tribal and commercial fisheries sampling and monitoring juvenile and adult salmon populations. Work experience includes implementing, monitoring and supervising projects estimating fall Chinook and chum populations below Bonneville Dam, leading Parental Based Tagging (PBT) and GSI sampling for spring, summer and fall Chinook, sockeye and steelhead. He is also involved in data analysis, summarization, and reporting.

Ryan Lothrop is the fishery manager and policy coordinator in charge of implementing fisheries and supervising the harvest unit within the Columbia River Management Unit (WDFW). Ryan coordinates fishery management and sampling activities with *U.S. vs. OR* co-managers and jointly manages concurrent waters of the Columbia River from Buoy 10 upstream to the OR/WA state-line upstream of McNary Dam. He has worked for WDFW for 8 years in various aspects of salmon fishery management from Puget Sound to the Columbia River, and is a committee member of the Selective Fishery Evaluation Committee for PSC.

**Methodology and Project Design:****Methods Overview:**

Monitoring and evaluation activities occur throughout the year in the Columbia River to assess the stock status of salmon and steelhead returns and to monitor fishery effort, catch, and impacts to fish stocks listed under the federal Endangered Species Act (ESA). Fishery sampling is conducted by staff from WDFW, the Oregon Department of Fish and Wildlife (ODFW), and PSMFC with ODFW housing the CWT sampling data for ultimate reporting to PSMFC's Regional Mark Processing Center. Mainstem commercial (tribal and non-tribal) and recreational fisheries in the Columbia River are sampled from January through December to estimate total effort and catch (kept plus release) of spring-run Chinook Salmon (January-June 15), summer-run Chinook Salmon (June 16-July), fall-run Chinook Salmon (August-December), Coho Salmon (August-December), winter steelhead (November-April), summer steelhead (May-October), sturgeon, and other game and food fish.

WDFW (and ODFW) annually propose MSFs for non-tribal commercial and recreational fisheries through the PSC's Selective Fishery Evaluation Committee and implements MSFs at differing levels per the annual salmon season setting process (Pacific Fishery Management Council, North of Falcon and Columbia River Compact). Recreational fisheries are MSF during spring/summer seasons and mixed MSF/non-MSF during fall seasons; Coho fisheries are largely MSF during the

fall and periodically fall Chinook are MSF. Non-tribal commercial seasons are MSF during spring seasons, non-MSF during summer, and mixed MSF/non-MSF during fall seasons; Coho fisheries are largely MSF (tangle net) and periodically fall Chinook are MSF (i.e., purse/beach seine). Tribal fisheries are non-MSF. The peak fishery sampling months where staff are sampling multiple fisheries simultaneously occur April-June and August-October.

The primary fishery sampling goal is to collect representative and unbiased samples using systematic or stratified sampling methods and electronically CWT sample all retained fish so that the fisheries can be planned and managed in accordance to associated management agreements.

Recreational Sampling:

The Lower Columbia River (LCR) recreational fishery sampling area extends 146 miles downstream from Bonneville Dam to Buoy 10, which is the legal boundary of the Pacific Ocean. Recreational fisheries continue above Bonneville Dam to the OR/WA state-line above McNary Dam. Salmon fisheries occurring from Buoy 10 upstream to a line projected from Tongue Point (Oregon) to Rocky Point (Washington) are estimated separately from the LCR fishery but use Columbia River sampling staff in coordination with Ocean Salmon sampling crews, and sampling efforts are shared between ODFW and WDFW. Oregon samples the recreational fishery above Bonneville Dam.

The Columbia River program is designed to estimate angler effort and catch for boat and bank fisheries from Bonneville Dam to the Pacific Ocean. Species for which estimates of catch and effort are made include spring-run Chinook Salmon (February-June 15), summer-run Chinook Salmon (June 16-July), fall-run Chinook Coho salmon (August-October), winter steelhead (February-April), summer steelhead (May-October), cutthroat, sturgeon, and shad.

The LCR is divided into ten recreational sampling sections. Each river section represents a distinct segment of the sampling area and estimates of total effort and catch are made separately for each river section. This procedure allows for stratified sampling of each river section to account for variability in effort, catch rates, and stock composition of the catch.

Personnel conduct random angler interviews at boat ramps and bank areas to determine catch rates for each species by angler type and per angler hour. Additional interviews conducted via on-the-water boat surveys may also be used, generally when effort is low and intercepting returning anglers at boat ramps is not practical. Sampling is stratified by river section, angler type (salmonid, sturgeon, shad, or gamefish), method (boat or bank), state (Columbia River - Oregon or Washington), and trip type (complete or incomplete). Catch rates for incomplete angler trips are extrapolated from expected quit times provided by the angler. Angler interviews are conducted regularly throughout each week/month to account for variability in catch rates.

ODFW conducts weekly aerial counts of all boat and bank anglers in each section of the LCR (primarily Tongue Point to Bonneville Dam) each month during February through October, and trailer counts are used for above Bonneville. Aerial counts are made on both, weekdays and weekends and expanded to account for angler trips commencing after or ending prior to the aerial count.

Catch estimates are produced weekly and monthly for each river section and angling method using a computer program which combines estimates of total effort with the observed catch rate of each species kept or released in each section. Catch data is applied to effort estimates obtained via aerial counts to develop catch estimates.

Salmonids encountered in the sampling program are examined for biological information including species, fork length, scales, DNA, CWTs, PIT tags and fin clips, which may indicate the fish's origin (hatchery or wild). All (fin-clipped and unclipped) salmon are scanned for a CWT and PIT tags. Scales and CWT are collected from salmonids for age and stock composition analyses.

#### Commercial Sampling

Similar to what was described in recreational sampling, commercial fishing areas for the LCR extend from the Bonneville dam downstream to the mouth of the river at a point designated just before the Buoy 10 area. There are 5 commercial fishing "zones" through this region. Above Bonneville dam there are an additional 4 distinct sections apart of what is known as "zone 6" which encompasses tribal commercial fisheries operating in this area between the Bonneville Dam and the McNary Dam. The tribal commercial fisheries are sampled by tribal and WDFW/PSMFC staff.

Sampling for commercial fisheries occurs at fish buyer facilities after fish are delivered by fishermen. All fish are separated by which zone they were captured in and sampled based on a predetermined rate that can be used to represent total catch. Sampling rate is determined based on recent numbers of fish caught and needs to meet CWT sampling rates by strata.

Salmonids encountered in the sampling program are examined for biological information including species, fork length, scales, DNA, CWTs, PIT tags and fin clips, which may indicate the fish's origin (hatchery or wild). All (fin-clipped and unclipped) salmon are scanned for a CWT and PIT tags. Scales and CWT are collected from salmonids for age and stock composition analyses.

**Relationships to Related Projects:** All staff will follow the current sampling protocol and data recording methods so data is compatible with WDFW, PSMFC, ODFW and tribal staff in order to ensure that fishery impacts to Columbia River stocks can be estimated accurately.

#### **Permitting:**

There are no special permits required for the work that is proposed in this project.

#### **Duration:**

The sampling duties associated with this project begin during the spring Chinook Salmon fisheries in 2022 and continue through the summer and fall Chinook and Coho Salmon fisheries. Other existing funds would support the vast majority of sampling efforts during the duration of this project proposal.

#### **Reporting:**

Fishery estimates will be incorporated for in-season management, run reconstruction (post-season), and annual PSC fishery reports. Catch estimates along with CWT recovery data will be provided to PSMFC for upload onto the Regional Mark Processing Center (RMPC) by January,

following the sampling seasons. A progress report will be provided each December during the duration of funding, and a final report, with financial expenditures, will be provided within 90 days of project completion.

**Timeline:**

- January (or ~1-2 months prior to each spring/summer/fall season): Hire and train seasonal staff for fishery sampling.
- January-December 2022:
  - Sampling of MSF LCR recreational seasons.
  - Sampling of MSF commercial catch.
- December 2022 (or sooner): Submit progress report progress report.
- March 30, 2023 (or sooner): Submit final report and finances.

**Proposed Budget Summary 2022. Budget details attached in Appendix A.**

	Requested (US\$)	Contributed	Total
<b>A) Labor</b>	\$31,120	\$612,368	\$643,488
<b>B) Equipment (itemize)</b>			
<b>C) Travel</b>	\$4,080	\$62,902	\$66,982
<b>D) Materials, Supplies &amp; Services</b>	\$5,100	\$11,571	\$16,671
<b>E) Contractual Services</b>	\$0	\$0	\$0
<b>F) Total Direct Costs (A-E)</b>	\$40,300	\$686,841	\$727,141
<b>G) Indirect Costs (11.66% of A-D)</b>	\$4,700	\$77,613	\$82,313
<b>H) Total Costs (F plus G)</b>	\$45,000	\$764,454	\$809,454

**Anticipated Future Funding Needs:**

The anticipated overall funding of this project would be the same as currently listed for future funding cycles with annual inflationary increase in cost ~3% for each subsequent year.

# Project Budget Form

MSF-04-21

Page 1 of 2

Name of Project: 2022 WDFW Columbia River Fishery Sampling (Recreational and Commerical)

## ELIGIBLE COSTS

### Labor Wages & Salaries

Position	# of crew	# of work days	hrs per day	rate per hour	Total (In-kind & cash + PSC Amount )	In-Kind & Cash	LOA GRANT AMOUNT LOA Amount
Fishery Biologist II	1	11	8	35.40	3,115		3,115
Fisheries Technician 1	2	70	8	17.40	19,488		19,488
					-		
					-		
					-		
Person Days (# of crew x work days)		76		sub total	22,603		22,603

### Labor - Employer Costs ( percent of wages subtotal amount )

rate	0%	sub total			
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### Subcontractors & Consultants

# of crew	# of work days	hrs per day	rate per hour		
Insurance if applicable	rate	0%			
			sub total		

### Volunteer Labor

# of crew	# of work days	hrs per day			
Skilled					
Un-skilled					
Insurance if applicable	rate	0%			
			sub total		

### Total Labor Costs

22,603

22,603

### Site / Project Costs

Provide details in the space below  
(use an additional page if needed )

Travel (do not include to & from work)	GSA vehicle lease + mileage + POV	4,081		4,081
Small Tools & Equipment				
Site Supplies & Materials				
Equipment Rental				
Work & Safety Gear	Life vest, waders, wading boots, rain gear	3,600		3,600
Repairs & Maintenance	Vehicle maintenance	1,500		1,500
Permits				
Technical Monitoring				
Other site costs				
	Total Site / Project Costs	9,181		9,181

## ELIGIBLE COSTS

## BUDGET

OTHER  
FUNDINGCONTRIBUTION  
FUNDING

Training (e.g Swiftwater, bear aware, electrofishing, etc).				Total (PSC + In-kind + cash)	In-Kind & Cash	LOA Amount
Name of course	# of crew	# of days				
Total Training Costs						

## Overhead / Indirect Costs

Office space; including utilities, etc.				
Insurance	L&I maritime, benefits	8,407		8,407
Office supplies	Pencils, pens, paper, electronic storage devices	-		
Telephone & long Distance				
Photocopies & printing				
Indirect/overhead costs		4,700		4,700
(If the PSC contribution to Indirect costs exceeds 20% of the total LOA grant you will be required to submit back-up documentation justifying the expense).				
Other overhead costs				
Total Overhead Costs		13,107		13,107

## Capital Costs / Assets

Provide details in the space below  
(use an additional page if needed )

Assets are things of value that have an initial cost of \$250 or more and which can be readily misappropriated for personal use or gain or which are not, or will not be, fully consumed during the term of the project.

Total Capital Costs				
Project Total Costs		44,891		44,891

## Budget Summary

(PSC + in-kind + cash)

Total Labor Costs	22,603
Total Site / Project Costs	9,181
Total Training Costs	-
Total Overhead Costs	13,107
Total Capital Costs	-
Project Total	44,891



## Pacific States Marine Fisheries Commission

## 2022 WDFW Columbia River Fishery Sampling (Recreational and Commercial)

Contract Period: January 1, 2022 - December 31, 2022

Personal Services	Unit		Salary	Balanced Cost
<b>Ridgefield</b> <sup>1</sup>				
Fishery Biologist 2	0.5	Months	\$6,158	\$3,079.18
Fisheries Technician 1 (temp)	6.5	Months	\$3,020.00	\$19,630.00
<b>Total</b>	7.0	Months		<b>\$22,709</b>
<b>Benefits</b>				
SSI, workmen's compensation, unemployment, pension contributions <sup>2</sup>				
<b>Ridgefield</b>				
Fishery Biologist 2	0.5	Months	25%	\$769.80
Fisheries Technician 1 (temp)	6.5	Months	11%	\$2,159.30
Medical and dental premiums <sup>3</sup>				
<b>Ridgefield</b>				
Fishery Biologist 2	0.5	Months	\$1,016.00	\$508
Fisheries Technician 1 (temp)	6.5	Months	\$516.00	\$3,354.00
L&I Maritime Insurance <sup>4</sup>				\$1,616.00
<b>Total Benefits</b>				<b>\$8,407</b>
<b>Travel</b>				
POV Mileage Travel <sup>5</sup>	300	Miles	\$0.560	\$168.00
Per Diem Travel <sup>5</sup>	0	Days	\$55	\$0.00
Lodging Travel <sup>5</sup>	0	Nights	\$96	\$0.00
GSA Vehicle Monthly Charge <sup>6</sup>	5	Months	\$275	\$1,375.00
GSA Vehicle Mileage Charge <sup>7</sup>	8,460	Miles	\$0.30	\$2,538.00
<b>Total Travel</b>				<b>\$4,081</b>
<b>General Operation and Maintenance</b>				
Boat O&M <sup>8</sup>	0	Months	\$325	\$0.00
Repairs <sup>9</sup>	3	Months	\$500	\$1,500.00
Insurance <sup>10</sup>	0	Annual	\$900	\$0.00
Training <sup>11</sup>				\$0.00
<b>Total O&amp;M</b>				<b>\$1,500</b>

<b>Supplies</b>				
Field Supplies <sup>12</sup>				\$3,600.00
Office Supplies <sup>13</sup>				\$0.00
<b>Total Supplies</b>				<b>\$3,600.00</b>
<b>Total General O&amp;M</b>				<b>\$9,181.00</b>
<b>Total Direct Costs</b>				<b>\$40,297.28</b>
<b>Overhead Rate <sup>15</sup></b>	11.66%			<b>\$4,698.66</b>
<b>Grand Total Costs</b>				<b>\$44,995.94</b>

**Budget Detail**Notes:

- 1/ PSMFC staff
- 2/ Benefits are 11% for seasonal staff and 25% for full year staff.
- 3/ Seasonal staff: \$516; full year employees: \$1,016.
- 4/ Effective July, 2021, Labor and Industries Maritime Surcharge (24.25% of wages while working in boats, figure is best estimate) - liability insurance for on-water risk.
- 5/ Lodging, per diem and personal vehicle mileage. CONUS rates. Travel cost to LOA workshop
- 6/ Vehicle rent - up to 4 GSA vehicles for 3 months.
- 7/ GSA vehicle miles estimated.
- 8/ Boat fuel and license fees covered.
- 9/ Vehicle repairs. Average \$500 per month.
- 10/ Annual boat insurance.
- 11/ First Aid/CPR, WDFW Motorboat Boat Operator Courses, Access/Excel classes.
- 12/ Sampling supplies: Sampling vest, knives and sheaths, measuring tapes and boards, raingear, boots, tweezers, batteries, gloves, life jacket, etc.
- 13/ General office supplies (printer ink, paper, pencils, pens, computer file storage devices, etc.).
- 14/ Effective July 1, 2021, Administrative Rate 11.66%.

Project Title. Mass marking of San Juan River Hatchery Sea Pen Chinook, Brood Years 2021-2024.

1. **Project Title.** Mass marking of San Juan River Hatchery Sea Pen Chinook, Brood Years 2021-2024.
2. **Performance Period (start and end date), e.g., July 1, 2021 to June 30, 2022.** January 1, 2022 – December 31, 2025 (a 4-year cycle for the chinook salmon starting with the 2021 brood year and ending with the 2024 brood year; and marking in spring 2025).
3. **Funding Requested (specify whether costs are in \$ USD or CAD).** \$CAD.  
 Per year cost requested through MSF Fund = **\$27,712**  
 x 4 years (1 Chinook cycle) = **\$110,848**. Up to the committee to decide on the duration; we recognize the MSF committee indicated 3-year limit (x 3 years total cost would be \$83,136).
4. **The name of your organization / affiliation.** Pacheedaht First Nation.
5. **Principal Investigators(s) with contact information (telephone number, postal address, email address).**  
 Helen Jones, 250.647.5521 ext 205, Box 170, Port Renfrew, BC V0S 1K0, research@pacheedaht.ca
6. **Person responsible for grant administration (telephone number, postal address, email address).** Helen Jones, 250.647.5521 ext 205, Box 170, Port Renfrew, BC V0S 1K0, research@pacheedaht.ca
7. **Identification of the project as either: a. A new project. b. A project previously funded by the MSF Fund Committee (provide the year of initial funding).** A. New Project

## Body of Proposal

**Abstract.** Provide a short summary describing the proposed project and its significance for Mark Selective Fisheries and assessment of Chinook salmon fisheries under the Pacific Salmon Treaty.

- This project consists of contractor costs for adipose clipping and CWT approximately 40,000 hatchery chinook from the San Juan hatchery sea pen program; and CWT only (no Ad Clip) another 40,000 of the river release. Total marking is 40,000 Ad Clip plus CWT and 40,000 CWT only.
- The immediate objective is to assess differential return to the San Juan River system of these two groups and assess marine survival and near terminal exploitation rate (ER) between a sea pen program and river releases. In the longer term, Pacheedaht along with the San Juan River Salmon Enhancement Society, local fishers and DFO will use the information to balance hatchery production and marking rates to best meet the needs of conservation (spawners), Pacheedaht needs in the terminal fishery, and the desire of the recreational fishery to provide Mark Selective Fishery opportunity. The output from this work will inform the future level of mass marking of San Juan River chinook salmon for MSF.
- Sampling returns will be conducted using wands to detect CWT in the creel survey program, at the existing counting/brood stock fence in the San Juan River, in the Pacheedaht fishery. In total over 25% of the return is expected to be sampled.
- The data analysis and reporting will be conducted by DFO and Pacheedaht biologists using methods outlined in SFEC DIT review and the Chinook Technical Committee.
- The adclip marked fish would be subject to existing MSF in the US portion of Juan de Fuca as well as proposed MSF in the Canadian portions of the Strait of Juan de Fuca and along the west coast Vancouver Island.

Project Title. Mass marking of San Juan River Hatchery Sea Pen Chinook, Brood Years 2021-2024.

- While MSF were not initiated in 2021, the Pacheedaht First Nation supports the movement to MSF within Juan de Fuca and the benefits MSF can provide in terms of increased returns of San Juan River chinook to meet Pacheedaht First Nation needs.
- San Juan hatchery is on the San Juan River near Port Renfrew in the Strait of Juan de Fuca. Juan de Fuca is the area in Canada most likely to initiate MSF.

**Project Objectives. Provide a concise statement of project objectives that address the themes identified above, and why the proposed project is important for improving the management of Mark Selective Fisheries. If the proposed work has been previously funded by the MSF Fund Committee, summarize accomplishments to date in relation to project objectives and incremental value of this project.**

- The immediate objective is to assess differential return to the San Juan River system of these two groups and assess marine survival and near terminal exploitation rate (ER) between a sea pen program and river releases. In the longer term, Pacheedaht along with the San Juan River Salmon Enhancement Society, local fishers and DFO will use the information to balance hatchery production and marking rates to best meet the needs of conservation (spawners), Pacheedaht needs in the terminal fishery, and the desire of the recreational fishery to provide Mark Selective Fishery opportunity.
- Pacheedaht also have the objective of managing genetic diversity of chinook salmon returns to the San Juan watershed through management of Proportion Natural Influence (PNI) including pNOB and pHOS. This marking program will assist in this objective.

**Experience and Expertise of Key Project Personnel. Identify key project personnel, the nature and extent of their role in implementation, and summarize their relevant qualifications. (Detailed resumes are not required). If any component of the proposal will be provided by others, identify these persons, the nature of their involvement, and their relevant qualifications**

- The work will have oversight by DFO Community Advisor, the manager at the San Juan River Hatchery, and the Pacheedaht First Nation Fisheries Manager. The ad clipping and CWT marking will be conducted by a contractor approved by DFO. The following 2 contractors were approved for use in our area in 2021.
  1. GaleForce Biological
  2. Rockfish Biological
- Pacheedaht First Nation: Helen Jones will be responsible for project management, coordination, and will oversee the budget. Ms. Jones has 26 years of experience in project management and fisheries assessments. She is responsible for coordinating and implementing Pacheedaht First Nation fisheries programs. Dave Burt will subcontract to the Pacheedaht First Nation and will provide support with analysis and reporting of project results. Dave Burt has over 30 years of experience as a fisheries biologist including work with DFO, BC Hydro, forest companies, and consulting companies. For the past 20 years Mr. Burt has run a fisheries consulting company, D. Burt and Associates.

Project Title. Mass marking of San Juan River Hatchery Sea Pen Chinook, Brood Years 2021-2024.

- San Juan River Hatchery Manager: Direct and In-kind support of marking. Lisa Margetish and Shane Bruinsma will undertake direct coordination of the marking with DFO oversight provided by Melissa Nottingham (Community Advisor). Lisa Margetish and Shane Bruinsma, who have been co-managing the 4 Mile Creek Hatchery under the umbrella of the 4 Mile Creek Enhancement Society (formerly the San Juan Enhancement Society). The hatchery is located on 4 Mile Creek which is a tributary of Renfrew Creek, which in turn is a tributary of the San Juan River.
- DFO Community Advisor: Melissa Nottingham 10+ years of experience providing support to Community Hatcheries. Also supported by DFO Salmon Enhancement Program support biologists.
- DFO Science Stock Assessment biologist: Karin Mathias. DFO biologist with 15+ years of experience in salmon assessments, including fishery monitoring, hatchery sampling, data recording and management, analysis of CWT, and reporting results.

**Methodology and Project Design. Methods, sample design, and techniques for conducting the project. Provide adequate detail so reviewers have a full appreciation of how the project is to be conducted and can thus provide an adequate technical review of the proposal. If an objective involves statistical estimation or experimentation, detail statistical methodology for analysis and show that expected sample sizes are adequate to meet study objectives. If an objective involves developing a tool, such as a conceptual or computer model, provide a schedule of benchmarks for completion of usable products, progressing to the final product.**

- The project consists of marking approximately 80,000 hatchery chinook salmon by contractors approved by DFO. This is the relatively simple part of the project which Pacheedaht will coordinate with DFO and the manager at the San Juan River Hatchery.
- DFO has indicated that 40,000 release of marked chinook should provide results with a CV of 10%. The sampling programs are well established and expect to provide unbiased results with a sample rate which should approach 25% from the recreational fishery creel survey, guide and other volunteer samplers, broodstock capture, and Pacheedaht First Nation fishery sampling.
- Expected returns and samples:
  - The 40,000 release x 2% survival smolt to adult = 800 returns. Note that Robertson Creek Hatchery chinook average smolt to adult survival is 5%. Sea pens along the WCVI almost always have higher survival rates than river releases. Consequently, the estimated returns are likely conservative.
  - Age at maturity is .2 age 3, .55 age 4, .25 age 5 for WCVI hatchery chinook; yielding 160, 440, 200 adults respectively.
  - Average ocean ER = 40% applied equally to each age group yields 480 terminal return of 96, 264, 120 age 3, 4, 5 respectively.
  - 25% sample rate for each age group = 24, 66, 30 annual samples for each age 3,4,5 respectively or 120 total samples once all ages are represented. Both the river release and the sea pen group are expected to have similar samples.
- All other components of the project are well developed and ongoing; costs are in-kind. The San Juan River Hatchery has an overall production objective of 500,000 chinook of which 40,000 is proposed to be marked and transferred to a sea pen in San Juan Bay. The sea pen is operated and supported annually

Project Title. Mass marking of San Juan River Hatchery Sea Pen Chinook, Brood Years 2021-2024.

by recreational anglers, the Pacific Salmon Foundation, and DFO. Pacheedaht will work partners such as DFO, the San Juan River Hatchery staff, and local anglers to ensure marking and sampling is conducted. DFO will provide detailed sampling protocols and will coordinate sampling of the recreational fishery through a creel survey plus volunteer Avid Angler and guide sampling of both kept and released fish. All hatchery production will have an internal mark using Parental Based Tagging and otolith thermal mark. This will allow more accurate expansion to total production of the river release group, based on ratios of CWT to hatchery returns, by age, based on both DNA/PBT and thermal mark results in the sample.

- Analysis will be conducted by DFO Science biologists who have expertise in assessment of fisheries and stock returns using tools such as CWT, DNA, and thermal marks.

**Relationships to related projects. Describe partnerships and actions/activities that should be considered as contingencies or requirements for successful completion of the proposed project.**

- Collaboration between various groups is good and steadily improving. Having Pacheedaht come to the local round table with funding for marking from this MSF fund will likely improve the level of collaboration.
- In 2021 Pacheedaht First Nation signed an 8-year memorandum of understanding with the PSC for the implementation of conservation test fisheries within Area 20 PSC panel waters.

**Indicate the status of these partnerships, ongoing activities, partnership capabilities, and available information concerning critical project dependencies.**

- Pacheedaht is working well with the San Juan Hatchery and the local sport fishing advisory committee.

**Benefits. Describe the benefits and relevance to implementation of the Chinook Chapter of the Pacific Salmon Treaty.**

- Improves monitoring and assessment of chinook returns to the San Juan River, which is a PSC Chinook Technical Committee escapement indicator system.
- Improves general monitoring and sampling of the fishery and river returns, with the resulting improvement of precision in fishery catch and escapement estimates.
- Provides differential mortality of adclip+CWT and CWT only (DIT) return groups.

**Permitting. Identify any required permits, those already obtained, and the timing and potential impediments to securing necessary permits to conduct the project. *Not required.***

**Risks. Describe any risks to successful project completion or continuation and how these will be mitigated.**

- The ability to secure sufficient broodstock each fall to support the production objectives. Pacheedaht members and local sport fishers will also help brood stock if required.
- The ability to secure marking contractors which are in demand. Pacheedaht will work with DFO biological support to secure and schedule contractors for marking.

**Timeline. Provide the proposed starting and ending dates for the project tasks, including the preparation of progress reports and final reports. Progress summary reports are required by December 15 annually. A final written report and a full accounting of financial expenditures is due within 90 days of project completion.**

Project Title. Mass marking of San Juan River Hatchery Sea Pen Chinook, Brood Years 2021-2024.

### Date and Milestone

Fall 2021: Secure broodstock and hatchery production (in kind). Secure services of and schedule for contractor to conduct marking in spring 2022.

Spring 2022. Marking. Release, and marking reports go into the DFO Mark Recover Program database and into the RMIS system.

Fall 2023. Starting in the fall of 2023 these chinook will return as jacks and continue to return in subsequent years as age 3 in 2024, age 4 in 2025, age 5 in 2026, and age 6 in 2027. Sampling of fisheries, brood stock, and spawners will occur in each of these years.

Completion of marking of this cycle in spring 2025.

### Attachments:

1. Project budget form (you must use the form published alongside this Request for Proposals). See attached budget form.

	Cost / fish	Seapen fish	Seapen Costs \$		River release	River marking costs \$	Total
Total release		40,000			460,000		
adclip only labor	0.16	-	\$ -				
adclip+CWT labor	0.2	40,000	\$ 8,000				\$ 8,000
CWT only	0.14		\$ -		40,000	\$ 5,600	\$ 5,600
CWT	0.102	40,000	\$ 4,080		40,000	\$ 4,080	\$ 8,160
Total marking cost			\$ 12,080			\$ 9,680	\$ 21,760
Coordination/ reporting							\$ 5,952
					Cost per year		\$ 27,712

2. Letters of support (if appropriate)

3. Justification of indirect costs (if >20% of the overall project budget)

Project Title. Mass marking of San Juan River Hatchery Sea Pen Chinook, Brood Years 2021-2024.

Project Budget Form: Mark Selective Fisheries Fund									
Name of Project:		Mass marking of San Juan River Hatchery sea pen chinook.							
ELIGIBLE COSTS							TOTAL PROJECT BUDGET	OTHER FUNDING	MSF FUND GRANT AMOUNT
Labour									
Wages & Salaries									
Position	# of crew	# of work days	hrs per day	rate per hour	Total (PSC + In-kind + cash)	In-Kind & Cash	MSF Fund Amount		
Helen Jone, Pacheedaht lead					2,552	1,000	1,552		
Lisa Margetish and Shane Bruinsma , San Juan Hatchery					2,600	1,000	1,600		
Melissa Nottingham, DFO SEP					1,000	1,000			
Karin Mathias, DFO Science					1,000	1,000			
Person Days (# of crew x work days)				sub total	7,152	4,000	3,152		
Labour - Employer Costs (rate % = 'Labour Employer Costs' Subtotal / 'Wages & Salaries' Subtotal)									
	rate	0%		sub total	7,152	4,000	3,152		
		# of work days	hrs per day	rate per hour					
Subcontractors & Consultants		# of crew	days	hrs per day	hour				
Marking crew	2				13,600		13,600		
Dave Burt, Burt and Associates	1	5	8	\$70	2,800		2,800		
Insurance if applicable	rate	0%							
				sub total	16,400	-	16,400		
		# of work days	hrs per day						
Volunteer Labour		# of crew	days	hrs per day					
Brood stock capture support by community					1,000	1,000			
Insurance if applicable	rate	0%							
				sub total	1,000	1,000			
Total Labour Costs					24,552	5,000	19,552		
Site / Project Costs		Provide details in the space below (use an additional page if needed )							
Travel (do not include to & from work)	Provide details here								
Small Tools & Equipment	Provide details here								
Site Supplies & Materials	CWT at \$.102/fish x 80,000				8,160		8,160		
Equipment Rental	Provide details here								
Work & Safety Gear	Provide details here								
Repairs & Maintenance	Provide details here								
Permits	Provide details here								
Technical Monitoring	Provide details here								
Other site costs	Provide details here								
Total Site / Project Costs					8,160		8,160		
Project Total Costs per year					32,712	5,000	27,712		
Project Total Costs over 4 years					130,848	20,000	110,848		
Projected Total Costs over 3 years					98,136	15,000	83,136		
Budget Summary (PSC + in-kind + cash)									
Total Labour Costs		24,552							
Total Site / Project Costs		8,160							
Total Training Costs		-							
Total Overhead Costs		-							
Total Capital Costs		-							
Project Total		32,712		per year					
		130,848		over 4 years = 1 cycle					





## Cover Page

**Project Title:** Mass Marking of hatchery produced Sarita Chinook salmon

**Performance Period:** November 1, 2021 to June 30, 2024.

**Funding Requested:**

Year 1	\$50,000 CAD
Year 2	\$57,500 CAD
Year 3	\$57,500 CAD
<b>TOTAL ALL YEARS</b>	<b>\$165,000 CAD</b>

**Applicant Organization:** Huu-ay-aht First Nations Government

Huu-ay-aht First Nations is a self-governing modern treaty Nation located on the West Coast of Vancouver Island in Barkley Sound.

**Principal Investigators:**

Name	Position	Affiliation	Address	Phone	Email
**Christine Gruman, M.R.M	Lands and Resources Specialist	Huu-ay-aht First Nations Government	170 Nookemus Road, Anacela, BC  Mailing Address: 4644 Adelaide Street, Port Alberni, BC V9Y 6N4	(250)7283414	<a href="mailto:Christine.g@huuayaht.org">Christine.g@huuayaht.org</a>
Robert Bocking, M.R.M	Program Lead for Huu-ay-aht Watershed Renewal Program	LGL Limited	9768 Second Street, Sidney, BC V8L 3Y8	(250)8886153	<a href="mailto:bbocking@lgl.com">bbocking@lgl.com</a>
Rob Brouwer / Caroline Cherry	Nitinat Hatchery Manager	Fisheries and Oceans Canada	Mailing address: PO Box 369 Port Alberni BC V9Y 7M8	(250)7453321  (250)7453322	<a href="mailto:Robert.Brouwer@dfo-mpo.gc.ca">Robert.Brouwer@dfo-mpo.gc.ca</a>  <a href="mailto:Caroline.Cherry@dfo-mpo.gc.ca">Caroline.Cherry@dfo-mpo.gc.ca</a>

\*\* Ms. Gruman will be responsible for grant administration.

This project has not been previously funded by the MSFF.



## Proposal

### Abstract

The Huu-ay-aht First Nations (HFN) have ongoing watershed-scale restoration initiatives aimed at restoring and revitalizing the Sarita, Pachena and Sugsaw watersheds to improve salmon stock viability (<https://huuayaht.org/watershed-renewal-project/>). This includes both in-river and riparian research and rehabilitation initiatives, extensive upland efforts to curtail impacts from past and present forestry-related activity, improving fish passage, rehabilitating estuary environments, and a collaborative focus on responsible hatchery enhancement with DFO. Together, these efforts have the potential to improve salmon populations. The HFN has made extensive investment (>\$500k per year since 2017).

This proposal is to request funding support for ongoing mass marking of hatchery produced Sarita River Chinook salmon which has been funded by Huu-ay-aht First Nations since 2017 brood year. This work is part of a joint pilot effort by HFN and DFO to increase returns of Chinook salmon to the Sarita River by improving survivability under optimum rearing strategies at the Nitinat Hatchery (New and Brouwer, 2015), enhancing habitat for natural spawners, increasing the proportion natural index (PNI) over time to maintain a viable natural spawning population, and to facilitate mark selective fisheries in terminal areas in the future.

Table 1 shows the marking history of Sarita Chinook salmon since 2014 brood year. Prior to HFN initiating marking with the 2017 brood, there had not previously been marking of this population. Without HFN funding, this pilot program would not exist.

Table 1. Brood year releases and marking for hatchery produced Sarita Chinook salmon.

Brood Year	Brood Year Release Information				
	Total Released	# Clipped & CWT	# Clipped	# Not Clipped	% Marked
2014	138,790	0	0	138,790	0.0%
2015	337,242	0	0	337,242	0.0%
2016	385,333	0	0	385,333	0.0%
2017	510,458	199,494	1,018	309,946	39.3%
2018	304,165	199,916	104,249	0	100.0%
2019	489,499	98,713	95,435	295,351 <sup>1</sup>	39.7%
2020	292,674	195,717	96,957	0	100.0%

<sup>1</sup> The goal for the 2019 brood was to mark all releases but the COVID-19 pandemic prevented this.

Continued mass marking of the releases for brood years 2021, 2022, and 2023 will enable the completion of one full brood cycle (Sarita Chinook are between 3 and 6 years of age) and will consist of all fish being adipose fin clipped plus a percentage of those being coded-wire tagged (CWT). Exact proportions of CWT versus adipose fin clipping only will be determined each year



based on the total number of Chinook surviving to release, research objectives, and available funds. However, all fry released will be marked at least with an adipose clip.

Each year, DFO and HFN staff conduct broodstock collections and escapement enumerations in September and October. HFN staff involvement in broodstock collections has been funded by HFN each year and will be entirely funded again in 2021. As part of this proposal, HFN is requesting a modest amount of funding to support HFN staff participating in broodstock collections and biological sampling (age, genetics, size, etc.).

HFN is also fully funding and implementing a natural smolt enumeration program each year on the Sarita and has generated good estimates of the production from natural spawners since the 2018 brood year (Burns 2018, Burns et al. 2019, Roias et al 2021).

This project will make a significant contribution to our understanding of how mark selective fisheries might be implemented and enhanced through collaborative efforts by DFO and a BC First Nation. The results of this research will have applicability to other salmon populations in the Pacific Northwest.

### Project Objectives

The pilot mass marking program for hatchery produced Sarita Chinook salmon is necessary to achieve the following objectives:

1. Research and evaluate different rearing strategies that will improve survival, size and age at return to fisheries and escapement;
2. Enable the use of predominantly natural origin broodstock for hatchery production;
3. Increase the proportion natural index (PNI) for Chinook returning to the Sarita River from the current level of 0.12 to 0.5 through selective removals of hatchery fish in terminal fisheries (i.e., Huu-ay-aht First Nation Treaty fishery in lower river);
4. Adapt hatchery production goals over time and in step with habitat restoration successes by the HFN Watershed Renewal Program;
5. Enable a viable and sustainable mark selective fishery on Sarita Chinook salmon in the future; and
6. Provide marine survival estimates for Sarita Chinook salmon.

Not only will this project address the mark selective fishery goals of the MSFF but it will also provide valuable research on ways to enhance production and monitor for natural versus hatchery production.

### Experience and Expertise of Key Project Personnel

The three principal investigators named in this proposal have extensive experience in fisheries management and hatchery production and are intimately familiar with the objectives of this project since they have been implementing the project for multiple years. Ms. Gruman will



administer the grant on behalf of Huu-ay-aht First Nations and will also support communications and staffing as required. Mr. Bocking, with over 30 years of fisheries management and assessment experience in BC will provide technical support in his capacity as lead for the HFN Watershed Renewal Program and will facilitate the marking contractor as he has done since 2018. Mr. Brouwer and Caroline Cherry of Nitinat hatchery will oversee all hatchery related activities including marking and broodstock collection and sampling. The principal investigators will be ably supported by numerous DFO, HFN and LGL staff, most of which will be provided in kind (not listed in budget as too numerous). These include accomplished biologist and fisheries technicians for which names and credentials can be provided upon request.

### Methodology and Project Design

There are two primary activities associated with this project and funding request. Each are described below.

#### *Marking of Hatchery Produced Sarita Chinook*

Standard marking procedures will be followed by a qualified contractor that the Nitinat hatchery has used for many years and will adhere to all CWT protocols. Marking will consist of both adipose clipping (all releases) and CWT of a subset of the releases (to be determined each year as described above). Marking will occur in late March and April of 2022, 2023, and 2024.

#### *Broodstock Collection and Sampling*

Broodstock collection and sampling will follow protocols established by the Nitinat hatchery and will occur in September/October of 2022, 2023 and 2024.

#### *Analysis*

Analysis requirements and approaches for each of the six objectives of the pilot mass marking program will vary and are briefly described below. Please note that all analyses will be conducted 'in kind' and no funds are being requested for any of the analyses listed here.

Objective	Lead	Analyses
1. Research and evaluate different rearing strategies that will improve survival, size and age at return to fisheries and escapement	DFO	Standard statistical methods to evaluate treatments
2. Enable the use of predominantly natural origin broodstock for hatchery production	DFO	Annual accounting of PNI
3. Increase the proportion natural index (PNI) for Chinook returning to the Sarita River from the current level of 0.12 to 0.5 through selective removals of hatchery fish in terminal fisheries	HFN (fishery) and DFO (broodstock)	Annual accounting of removals for broodstock and terminal fisheries
4. Adapt hatchery production goals over time and in step with habitat restoration successes by the HFN Watershed Renewal Program	HFN and DFO	Variable and connected to broader HFN Watershed Renewal objectives
5. Enable a viable and sustainable mark selective fishery on Sarita Chinook salmon in the future	HFN	Annual accounting
6. Provide marine survival estimates for Sarita Chinook salmon	DFO	CWT analyses through DFO mark recovery program



### Relationships to related projects

The pilot project for mass marking of Sarita Chinook salmon is a partnership between DFO and Huu-ay-aht First Nations. The parties have been working together for decades to enhance Sarita Chinook and with the onset of the HFN Watershed Renewal Program (<https://huuayaht.org/watershed-renewal-project/>), marking of Sarita Chinook commenced with the 2017 brood. HFN is committed to enhancing and mass marking Sarita Chinook but is seeking some financial relief for this commitment through this grant application. DFO is committed to working with HFN on meeting the objectives as described in this proposal.

### Benefits

Chinook salmon stocks, including Sarita, originating from the West Coast of Vancouver Island (WCVI) contribute significantly to the ocean harvests in fisheries in Southeast Alaska and northern British Columbia, as well as being of prime importance to near-shore fisheries along the WCVI itself.

The results of this pilot mass marking project for Sarita Chinook will support current and future fishery management measures that are to be implemented under the Pacific Salmon Treaty and which are intended to be appropriate for recovering, sustaining, and protecting Chinook salmon stocks in Canada and the U.S. and are responsive to changes in productivity of Chinook salmon stocks associated with environmental conditions (PST, Article IV, Chapter 3, paragraph 1(b)).

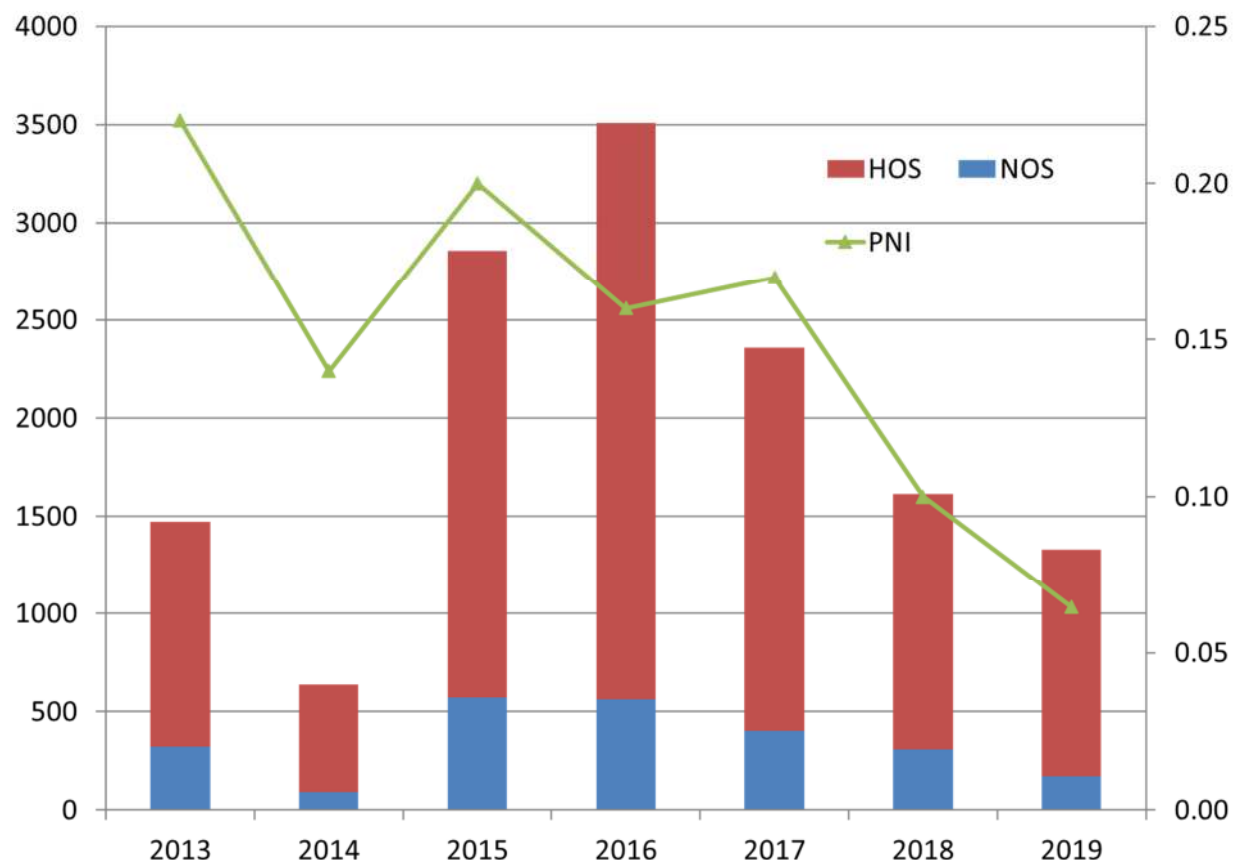
Recent year escapements of WCVI Chinook natural populations remain low including Sarita where the PNI is currently 0.12 (Figure 1). Mass marking is required to be able successfully move the PNI towards 0.5 and to evaluate hatchery strategies to optimize production and hence fishery benefits. This project is striving to improve the biological diversity of Sarita Chinook salmon and will improve the abundance, productivity, genetic diversity, and spatial structure of the population over time (PST, Article IV, Chapter 3, paragraph 2(a)(vi)).

The project will also assist fishery management of WCVI Chinook to foster healthy and abundant Chinook stocks by contributing to the restoration and rebuilding of depressed natural stocks while providing opportunities to harvest sustainably abundant natural stocks as well as abundant hatchery produced fish (PST, Article IV, Chapter 3, paragraph 1(d) (i)).

In addition, lessons learned from this mass marking / mark selective terminal fishery will inform harvest levels and other fishery management approaches used to target healthy natural and hatchery stocks while constraining impacts on depressed natural stocks, including various spatial and temporal fishery shaping measures that are bilaterally coordinated as necessary (PST, Article IV, Chapter 3, paragraph 1(f)).

Finally, the project outcomes will support the development of analytical procedures for mark selective fisheries and may result in a more fulsome implementation of a terminal mark selective fishery on Sarita Chinook which would be implemented consistent with PST Article IV, Chapter 3, paragraph 4(g) regarding Marked Selective Fisheries.

Figure 1. Sarita Chinook spawner abundance, 2013 -2014. HOS = hatchery produced, NOS = natural adult produced.



### Permitting

There are no permitting requirements specific to the activities that would be funded by this grant.

### Risks

The primary risk to this project is complete loss or partial loss of the targeted release for Sarita Chinook. The production goal is 500,000 Chinook fry at release but sometimes this is exceeded or not reached. The Nitinat hatchery strives for exceptional egg to fry survival and has numerous procedures in place to mitigate losses. There are potential financial implications if fewer than expected fry are available for marking or if more than expected are available. HFN is committed to ensuring 100% marking and will make up any financial shortfalls. Should less funds be required for marking that were provided by this grant, then HFN will return those funds to MSFF.



## Timeline

Project Activity	Start Date	End Date	Progress report
Marking of Sarita Chinook releases	End of March in each of 2022, 23, 24	End of April in each of 2022, 23, 24	30 June in each of 2022, 23, 24
Broodstock/terminal fishery sampling	September in each of 2022, 23, 24	November in each of 2022, 23, 24	Final report – see milestone table below

Date	Milestone
Dec 15 2022	Report on Mass Marking of releases from 2021 Brood Year
Dec 15 2023	Report on Mass Marking or releases from 2022 Brood Year and Broodstock/Fishery sampling
Dec 15 2024	Report on Mass Marking of releases from 2023 Brood Year and Broodstock/Fishery sampling

## Citations:

- Burns, C. W. 2018. Sarita and Pachena watersheds: 2018 Sarita River Chinook Salmon outmigration assessment. LGL Report EA3716B34. Prepared for Huu ay aht First Nations, Anacla, BC, by LGL Limited, Sidney, BC.
- Burns, C. W., D. Robichaud, E. Plate, and B. Bocking. 2019. Sarita and Pachena watersheds: 2019 Sarita River Chinook Salmon outmigration assessment. LGL Report EA3716B34. Prepared for Huu ay aht First Nations, Anacla, BC, by LGL Limited, Sidney, BC.
- Pacific Salmon Treaty. 2019. Treaty Between the Government of Canada and the Government of the United States of America Concerning Pacific Salmon. Pacific Salmon Commission.
- New, D. and R. Brouwer. 2015. Nitinat Chinook Salmon rearing methods 2005–2014. Unpublished report. Department of Fisheries and Oceans Canada, Nitinat, BC.
- Roiias, S. M., D. Robichaud, C. Burns, E. Plate, and B. Bocking. 2021. 2020 Sarita River Chinook Salmon outmigration assessment. LGL Report EA3716B 34. Prepared for Huu ay aht First Nations, Anacla, BC, by LGL Limited, Sidney, BC.

## Attachments:

1. Project budgets for 3 years

# Project Budget Form: Mark Selective Fisheries Fund

MSF-06-21

Name of Project: Mass Marking of hatchery produced Sarita Chinook salmon, Nov 2021 - June 2022

## ELIGIBLE COSTS

### Labour

#### Wages & Salaries

						TOTAL PROJECT BUDGET	OTHER FUNDING	MSF FUND GRANT AMOUNT
Position	# of crew	# of work days	hrs per day	rate per hour	Total (PSC + In-kind + cash)		In-Kind & Cash	MSF Fund Amount
					-		-	-
Person Days (# of crew x work days)		-		sub total	-		-	-

#### Labour - Employer Costs (rate % = 'Labour Employer Costs' Subtotal / 'Wages & Salaries' Subtotal)

rate	0%	sub total	-	-	-
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#### Subcontractors & Consultants

	# of crew	# of work days	hrs per day	rate per hour		
					-	-
					-	-
Insurance if applicable	rate	0%		sub total	-	-

#### Volunteer Labour

	# of crew	# of work days	hrs per day		
Skilled					
Un-skilled					
Insurance if applicable	rate	0%		sub total	-

Total Labour Costs

-	-	-
---	---	---

#### Site / Project Costs

Provide details in the space below  
(use an additional page if needed )

Travel (do not include to & from work)	Provide details here	-		
Small Tools & Equipment	Provide details here	-		
Site Supplies & Materials	Provide details here	-		
Equipment Rental	Provide details here	-		
Work & Safety Gear	Provide details here	-		
Repairs & Maintenance	Provide details here	-		
Permits	Provide details here	-		
Technical Monitoring	Provide details here	-		
Other site costs	CWT Marking Services	70,000	20,000	50,000
Total Site / Project Costs		70,000	20,000	50,000



	Total		In-kind	MSF
<b>Total Labour Costs</b>	-		-	-
<b>Total Site / Project Costs</b>	70,000		20,000	50,000
<b>Total Training Costs</b>	-		-	-
<b>Total Overhead Costs</b>	-		-	-
<b>Total Capital Costs</b>	-		-	-
<b>Project Total</b>	70,000		20,000	<b>50,000</b>

# Project Budget Form: Mark Selective Fisheries Fund

MSF-06-21

Name of Project: Mass Marking of hatchery produced Sarita Chinook salmon, Nov 2022 - June 2023

## ELIGIBLE COSTS

### Labour

#### Wages & Salaries

						TOTAL PROJECT BUDGET	OTHER FUNDING	MSF FUND GRANT AMOUNT
Position	# of crew	# of work days	hrs per day	rate per hour	Total (PSC + In-kind + cash)		In-Kind & Cash	MSF Fund Amount
HFN Field Crew (broodstock sampling)	3	10	10	50	15,000		7,500	7,500
Person Days (# of crew x work days)		10		sub total	15,000		7,500	7,500

#### Labour - Employer Costs (rate % = 'Labour Employer Costs' Subtotal / 'Wages & Salaries' Subtotal)

rate	0%	sub total	-	-	-
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#### Subcontractors & Consultants

	# of crew	# of work days	hrs per day	rate per hour			
Insurance if applicable	rate	0%					
				sub total	-	-	-

#### Volunteer Labour

	# of crew	# of work days	hrs per day				
Skilled							
Un-skilled							
Insurance if applicable	rate	0%					
				sub total	-	-	-

#### Total Labour Costs

15,000

7,500

7,500

#### Site / Project Costs

Provide details in the space below (use an additional page if needed)

Travel (do not include to & from work)	Provide details here	-		
Small Tools & Equipment	Provide details here	-		
Site Supplies & Materials	Provide details here	-		
Equipment Rental	Provide details here	-		
Work & Safety Gear	Provide details here	-		
Repairs & Maintenance	Provide details here	-		
Permits	Provide details here	-		
Technical Monitoring	Provide details here	-		
Other site costs	CWT Marking Services	70,000	20,000	50,000
Total Site / Project Costs		70,000	20,000	50,000

## CONTRIBUTION FUNDING

In-Kind & Cash	PSC Amount
-	-

-	-

-	-

27,500	57,500
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	Total		In-kind	MSF
	15,000		7,500	7,500
	70,000		20,000	50,000
	-		-	-
	-		-	-
	-		-	-
<b>Project Total</b>	<b>85,000</b>		<b>27,500</b>	<b>57,500</b>

MSF-06-21

Project Budget Form: Mark Selective Fisheries Fund

Name of Project:

Mass Marking of hatchery produced Sarita Chinook salmon, Nov 2023 - June 2024

ELIGIBLE COSTS

Labour

Wages & Salaries

						TOTAL PROJECT BUDGET	OTHER FUNDING	MSF FUND GRANT AMOUNT
Position	# of crew	# of work days	hrs per day	rate per hour	Total (PSC + In-kind + cash)		In-Kind & Cash	MSF Fund Amount
HFN Field Crew (broodstock sampling)	3	10	10	50	15,000		7,500	7,500
Person Days (# of crew x work days)		10		sub total	15,000		7,500	7,500

Labour - Employer Costs (rate % = 'Labour Employer Costs' Subtotal / 'Wages & Salaries' Subtotal)

rate	0%	sub total	-	-	-
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Subcontractors & Consultants	# of crew	# of work days	hrs per day	rate per hour			
Insurance if applicable	rate	0%					
				sub total	-	-	-

Volunteer Labour	# of crew	# of work days	hrs per day				
Skilled							
Un-skilled							
Insurance if applicable	rate	0%					
				sub total	-	-	-

Total Labour Costs	15,000	7,500	7,500
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Site / Project Costs

Provide details in the space below (use an additional page if needed )

Travel (do not include to & from work)	Provide details here	-		
Small Tools & Equipment	Provide details here	-		
Site Supplies & Materials	Provide details here	-		
Equipment Rental	Provide details here	-		
Work & Safety Gear	Provide details here	-		
Repairs & Maintenace	Provide details here	-		
Permits	Provide details here	-		
Technical Monitoring	Provide details here	-		
Other site costs	CWT Marking Services	70,000	20,000	50,000
	Total Site / Project Costs	70,000	20,000	50,000

## CONTRIBUTION FUNDING

In-Kind & Cash	PSC Amount
-	-

-	-

-	-

27,500	57,500
--------	--------

	Total		In-kind	MSF
	15,000		7,500	7,500
	70,000		20,000	50,000
	-		-	-
	-		-	-
	-		-	-
<b>Project Total</b>	<b>85,000</b>		<b>27,500</b>	<b>57,500</b>

# Project Budget Form: Mark Selective Fisheries Fund

MSF-06-21

Name of Project: Sarita River Chinook Mark Selective Fishery Pilot, 2021 - 2024

## ELIGIBLE COSTS

### Labour

#### Wages & Salaries

Position	# of crew	# of work days	hrs per day	rate per hour	Total (PSC + In-kind + cash)	In-Kind & Cash	MSF Fund Amount
HFN Field Crew (broodstock sampling)	3	20	10	50	30,000	15,000	15,000
Person Days (# of crew x work days)		20		sub total	30,000	15,000	15,000

### Labour - Employer Costs (rate % = 'Labour Employer Costs' Subtotal / 'Wages & Salaries' Subtotal)

rate	0%	sub total	-	-	-
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### Subcontractors & Consultants

	# of crew	# of work days	hrs per day	rate per hour		
					-	-
					-	-
Insurance if applicable	rate	0%				
				sub total	-	-

### Volunteer Labour

	# of crew	# of work days	hrs per day		
Skilled					
Un-skilled					
Insurance if applicable	rate	0%			
				sub total	-

### Total Labour Costs

30,000

15,000

15,000

### Site / Project Costs

Provide details in the space below  
(use an additional page if needed)

Travel (do not include to & from work)	Provide details here	-		
Small Tools & Equipment	Provide details here	-		
Site Supplies & Materials	Provide details here	-		
Equipment Rental	Provide details here	-		
Work & Safety Gear	Provide details here	-		
Repairs & Maintenance	Provide details here	-		
Permits	Provide details here	-		
Technical Monitoring	Provide details here	-		
Other site costs	CWT Marking Services	210,000	60,000	150,000
	Total Site / Project Costs	210,000	60,000	150,000

	Total		In-kind	MSF
<b>Total Labour Costs</b>	30,000		15,000	15,000
<b>Total Site / Project Costs</b>	210,000		60,000	150,000
<b>Total Training Costs</b>	-		-	-
<b>Total Overhead Costs</b>	-		-	-
<b>Total Capital Costs</b>	-		-	-
<b>Project Total</b>	<b>240,000</b>		<b>75,000</b>	<b>165,000</b>

## **PACIFIC SALMON COMMISSION WORK PLAN, 2021–2022**

### **Panel / Committee**

- *Transboundary Panel (reporting to the Pacific Salmon Commission)*
- *Transboundary Technical Committee (reporting to the Transboundary Panel)*
- *Enhancement Sub-Committee (Reporting to the Transboundary Panel and Transboundary Technical Committee)*

**Meeting Dates** *For review at the Commissioners Meeting Fall Session on October 18–22, 2021 (Webinar), with updates provided at the Executive Session and reporting presented at the Post Season Meeting on January 10–14, 2022 (Portland, OR) and the Annual Meeting on February 14–18, 2022 (Vancouver, BC).*

### **Update on Bi-lateral Tasks Assigned Under the Current Agreement**

#### ***1) Review Pacific Salmon Treaty - Chapter 1 Implementation Plan activities (update on Transboundary Panel and Transboundary Technical Committee tasks).***

At the Pacific Salmon Commission's 2019 Post-Season meeting (January 2020), the Commission endorsed the Transboundary Rivers Chapter Implementation Plan (for the 2019 to 2028 Annex period). The Transboundary Panel will review Implementation Plan Activities, associated timelines, and anticipated outcomes to determine if additional efforts are required to achieve stated objectives or if any amendments are proposed. Transboundary Panel Co-Chairs will report on progress achieved to date and identify any recommended changes or proposed adjustments.

#### ***2) Review and Implement Abundance-Based Management Fishery Regimes.***

Under Chapter 1, abundance-based fishery management regimes are in place for: Taku River Chinook, sockeye, and coho salmon; and Stikine River Chinook and sockeye salmon. The Agreement calls for development and implementation of abundance-based fishery management regimes for Stikine River coho salmon and Alsek River Chinook and sockeye salmon. The agreement also calls for the periodic review and updating existing escapement goals as necessary. The Transboundary Panel will receive post-season reports, pre-season outlooks, receive presentations on proposed management strategies, and recommendations on stock assessment for transboundary salmon stocks from the Transboundary Technical Committee.

#### ***3) Continue existing and expand joint enhancement programs designed to produce 100,000 enhanced sockeye salmon returning to (each) the Taku and Stikine rivers.***

The Parties renewed efforts are focusing on expanding sockeye salmon enhancement programs in both the Taku and Stikine Rivers. In the recent decade enhanced production has contributed approximately 5,000 and 31,000 fish per year to existing fisheries in the Taku and Stikine Rivers, respectively. Directed near-term efforts are focused on expansion of existing Taku River programs (Tatsamenie, Trapper, and King Salmon Lakes) as well as exploring new project developments on mainstem stocks for both rivers and in the Iskut River drainage on the Stikine River. The Transboundary Panel will develop a Stikine Enhancement Production Plan (SEPP) and a Taku Enhancement Production Plan (TEPP) for the coming year (2022), for presentation at the Pacific



Salmon Commission Annual meeting in February 2022. The Transboundary Panel will also receive the final report on the 2019 Stikine Enhancement Production Plan results which will confirm: 1. planned egg-take (2020 TEPP); 2. actual egg-take (2020); 3. fry release completed (2021); 4. actual egg-take (2021), including reference to planned egg take; and 5. enhanced adults that returned in 2021 (resulting from 2016 and 2017 SEPP). As assigned by the Transboundary Panel in February 2021, the Transboundary Enhancement Sub-Committee Co-Chairs will confirm procedures and protocols for determining bilateral in-season adjustments to Transboundary Sockeye Enhancement Projection Plans.

#### ***4) Harvest sharing performance.***

Pursuant to Paragraph 4, Chapter 1, of the Pacific Salmon Treaty, the Transboundary Panel completes an annual review of catch and escapement performance (overage/underage) for treaty-defined stocks and fisheries. New for the 2021 season, the report will include specific information on unharvested “surplus” Allowable Catch of Taku River sockeye salmon and the outcome of fishery management measures implemented to achieve the Klukshu River sockeye objective. The review is intended to identify any occurrences of harvest overage or underage, and in cases where situations exist, enable the respective Party to develop and present proposed actions in response for implementation in the upcoming season. The Paragraph 4 review is completed by the Transboundary Panel with results and any associated recommendations presented to commissioners at the Pacific Salmon Commission Annual Meeting in February 2022.

#### ***5) Assessment (Test) fisheries.***

Pursuant to Paragraph 2, Chapter 1, of the Pacific Salmon Treaty, the Transboundary Panel may recommend implementation of assessment fisheries to facilitate determination of in-season abundance of a transboundary salmon stock(s). Based on a proposal(s) from the Transboundary Technical Committee, the Transboundary Panel will consider a recommendation regarding implementation of a bilateral test fishery(s) for the coming season. A recommendation will be presented to commissioners at the Pacific Salmon Commission Annual in February 2022.

### **Obstacles to Completing above Bi-lateral Tasks**

- 1) Limitation's on conducting bilateral or unilateral field and stock assessment projects resulting from public health measures or operational constraints associated with COVID-19 measures.***
- 2) The Parties shall improve procedures for coordinated and cooperative management of the fisheries on transboundary river stocks.***

With the renewal of Chapter 1 effective 2019, the Transboundary Panel has initiated work through the Transboundary Technical Committee to advance development of an abundance-based management regime for Stikine River coho salmon. To achieve scientific relevance, several years of data collection and associated analysis will be required to identify either an interim or a biologically based spawning escapement goal. Exploratory assessment programs were implemented in 2019 with the intent to continue to refine and focus specific efforts in 2020. Technical challenges remain in determining viable abundance estimate programs that will provide reliable information on adult coho salmon returns to the Stikine River. The development of an abundance-based harvest sharing arrangement is contingent on establishing a method to estimate annual escapements and ultimately develop a spawning escapement

goal. The Transboundary Panel will receive a presentation on the status of the assessment program development which will identify progress and any anticipated challenges.

Similarly, the Panel has initiated work through the Transboundary Technical Committee on the Alsek River for Chinook and sockeye salmon. An operational plan is currently in draft form, major capital expenditures include a new boat and motor, ATV, and gillnets. Special use permits for landing helicopters and fixed-wing aircraft at the airstrip in Glacier Bay National Park (GBNP) have been approved. Permits for a cabin located in the lower river are already in place; a permit for a wall tent platform and set net and tagging operations about 6 miles upriver are in draft form and staff are consulting with the GBNP on specifics and final submission will occur later this fall. Spawning escapement goals will be reviewed, and a reliable and fiscally realistic inseason assessment program will in theory be developed in the lower Alsek River. The Transboundary Panel will receive an update on the status of the assessment program development which will identify progress and any anticipated challenges.

The Transboundary Panel will continue to explore enhancement program initiatives that progress towards achieving bilateral sockeye salmon objectives (100,000 annually) in both the Taku and Stikine rivers. Identification of suitable enhancement project sites and achieving requisite (domestic) Canadian endorsements and approvals have hampered progress. Focused efforts are currently underway to advance Trapper Lake (Taku) and explore mainstem (Stikine) enhancement project development.

#### **Outline of Other Panel / Committee Tasks or Emerging Issues**

In February 2017 the Northern Panel tasked a sub-committee of the Northern Boundary Technical Committee (northern coho sub-committee) to produce a report on the state of knowledge on the status of northern coho salmon stocks in advance of the 2020 season. As coho salmon originating from the Transboundary Rivers are a significant component of the northern coho salmon stock “aggregate”, Canadian technical representatives from the Transboundary Technical committee have participated as members of the northern coho sub-committee to facilitate completion of the report. Presentation of final reporting to Commissioners is anticipated to occur at the October 2021 PSC session.

#### **Potential Issues for Commissioners, including enhancement activities reported under Article V**

Securing required Canadian (domestic) endorsements and regulatory approvals have precluded achieving the 100,000 enhanced sockeye salmon production objective in both the Taku and Stikine River systems. On the Taku River, the harvest share for the Canadian fishery was reduced by 12% below the full allocation for the 2019 season (Chapter 1, section 3.(b),(I)). On the Stikine River, the harvest share for the Canadian fishery was reduced by 3% (Chapter 1, section 3.(a),(C),(vii)). Beginning in 2024, continued failure to achieve the 100,000 enhanced production objective will result in additional harvest share reductions for the Canadian fishery in the Stikine River and will limit the harvest share for the Canadian fishery in the Taku River to well below the harvest share allocation available at the 100,000 enhanced sockeye salmon production level. In 2019, the last adult returns from Tuya Lake enhancement contributed to fisheries. In Tahltan Lake, recent declines in wild sockeye salmon egg to smolt survival rates have constrained enhanced sockeye salmon egg-takes and resulting fry releases to meet the 1:1 (enhanced to wild) Treaty guideline for smolt leaving the lake. In future years, lower production will result in declines in of enhanced sockeye salmon production in the Stikine River.

## **Potential Issues for Committee on Scientific Cooperation**

*None*

## **Proposed Meeting Dates and Draft Agendas**

### **Transboundary Panel**

1. Pacific Salmon Commission 2022 Post-Season Meeting (January 10 to 14, 2022)

**Duration:** 4 days

**Location:** Portland, Oregon

**Section Meetings:** Monday January 10

**Bilateral Sessions:** Tuesday January 11 to Thursday January 13

**Attendance:** Full Panel membership and supporting Transboundary Technical and Enhancement Sub-Committee representatives (up to 30 total) – *Note some virtual participation possible.*

### **Draft Agenda:**

- Review 2021 U.S. and Canadian fisheries in the Taku, Stikine and Alsek rivers, terminal abundance, and spawning escapements. (new for 2022) Reporting will include a graphic comparison between the most recent (10 year) pre-season forecasts and actual post-season run size by watershed / stock
- Summary of juvenile Chinook and coho salmon coded wire tagging on the Taku and Stikine rivers
- Salmon passage in 2021 past the Stikine (Tahltan) River landslide and update on passage remediation efforts
- Salmon passage in 2021 past the Taku (mainstem) River landslide
- Review Taku and Stikine Rivers enhanced sockeye salmon production in 2021
- Review overage/underage fishery and escapement performance in 2021 (Ch. 1, Para. 4) – (new for 2022) Reporting to include specific information on unharvested “surplus” AC of Taku River sockeye salmon and the outcome of US fishery management measures implemented to achieve the Klukshu River sockeye MSY objective + 3,000.
- Presentation of enhanced sockeye salmon fry releases in the Taku and Stikine rivers completed in 2021 (i.e., presentation of SEPP and TEPP results)
- Report on egg-takes and enhancement activities that took place in 2021
- Update on status of Alsek River sockeye and Chinook salmon stock assessment program development
- Update on status of Stikine River coho salmon stock assessment program development
- Update on Stikine River sockeye salmon biological escapement goal and assessment program review
- Presentation on recommended (%) incidental mortality rates for Transboundary terminal (marine) and in-river Chinook salmon fisheries and proposed approach for applying rates to annual biological (production and escapement) and fishery (Base Level Catch or Allowable Catch) accounting.
- Review of preliminary SEPP and TEPP programs proposed for 2022
- Presentation of procedures and protocols for determining bilateral in-season adjustments to Transboundary Sockeye Enhancement Projection Plans

2. Pacific Salmon Commission 2022 Annual Meeting (February 14 to 18, 2022)

**Duration:** 4 days

**Location:** Vancouver, British Columbia

**Section Meetings:** Monday, February 14

**Bilateral Sessions:** Tuesday February 15 and Thursday February 17

**Attendance:** Full Panel membership and selected Transboundary Technical and Enhancement Sub-Committee representatives (up to 30 total) – *Note some virtual participation possible.*

**Draft Agenda:**

- Presentation of bilateral 2022 Stikine, Taku and Alsek rivers salmon outlooks
- Fishery management strategies and actions proposed for 2022 season
- Development of bilateral recommendations for assessment fisheries in 2022
- Final review of 2022 SEPP and TEPP and associated recommendations
- Northern Endowment Fund – projects under consideration for funding in the transboundary rivers geographic area (2022)
- Action items or reporting on tasks assigned at 2021 post-season meeting

*Note – Transboundary Panel Co-Chairs report to Commissioners on Friday, February 18*

**Transboundary Technical Committee and Enhancement Sub-Committee**

1. Fall Post-Season (December 6-7, 2021)

**Duration:** 2 days

**Location:** Webinar

**Attendance:** Full committee meeting with up to 13 U.S. and 13 Canadian TTC members in attendance

**Draft Agenda:**

- Finalize 2021 preliminary post-season report including:
  - Review Canadian and U.S. fisheries (i.e., catches, management actions, PST compliance): Stikine, Taku, and Alsek Rivers
  - Stock assessment projects: juvenile coded wire tag, mark-recapture, Chinook, coho, and sockeye salmon radio-telemetry studies, Nahlin River DIDSON project, aerial surveys, tag recoveries, genetic stock identification baseline development and analysis, weir counts, assessment fisheries, wild and enhanced components in the Taku and Stikine rivers, catch sampling results, and spawning ground sampling
  - Escapements: Stikine: drainage-wide Chinook salmon and Tahltan Lake and mainstem sockeye salmon; Taku: drainage-wide Chinook, sockeye, and coho salmon; Alsek: drainage-wide and Klukshu River Chinook and sockeye salmon
- Taku and Stikine rivers 2022 Chinook salmon forecasts
- Stikine (Tahltan) River telemetry and landslide and remediation update
- Taku (mainstem) River telemetry and landslide update
- Alsek River Chinook and sockeye salmon assessment development
- Stikine River coho salmon assessment development
- Taku River sockeye salmon stock assessment update
- Sockeye salmon enhancement projects and programs:
  - Review of 2021 activities (proposed/planned)
  - 2022 SEPP and TEPP development (draft)
  - Enhancement planning: 2022 egg-takes and releases from 2020 egg-takes

- Confirm procedures and protocols for determining bilateral in-season adjustments to Transboundary Sockeye Enhancement Projection Plans and develop panel presentation.
  - Review overage/underage fishery performance and escapement spreadsheet
  - Review and finalize catch and escapement report(s)
  - Discuss Northern Endowment Fund projects in the transboundary rivers area
  - Report publication schedule
2. Winter Preseason (late February/early March 2022)  
**Location:** Webinar or in-person in Seattle, WA (*to be confirmed in January 2022*)  
**Attendance:** Full committee meeting with up to 13 U.S. TTC and 13 Canadian TTC members in attendance  
**Draft Agenda:**
- 2022 stock assessment program planning – Stikine, Taku, Alsek rivers
  - Run outlooks (Chinook, sockeye, and coho salmon) – Stikine, Taku, Alsek rivers
  - Preliminary fishery management plans 2022
  - Genetic baseline update and sampling plan 2022
  - Enhancement sub-committee sockeye salmon enhancement programs and projects (planning for 2022) including hatchery activities, egg-take goals, assessment studies, data summary updates and 2022 management plan
3. Spring Management (March 2022)  
**Location:** Webinar  
**Attendance:** Limited attendance (lead managers with some research support)  
**Draft Agenda:**
- Transboundary Technical Committee Management Plan 2022
    - U.S. management plans and activities
    - Canadian management plans and activities
    - Joint activities
  - SEPP and TEPP
  - Follow-up and final publication.

## Status of Reports

### Transboundary:

- “*Final Estimates of Transboundary River Salmon Production, Harvest and Escapement and a Review of Joint Enhancement Activities in 2021*” – January 2022
- “*Salmon Management and Enhancement Plans for the Stikine, Taku, and Alsek Rivers, 2022*” – April 2022

## Pacific Salmon Treaty – Chapter 1 Implementation Plan

### Report to PSC Commissioners - January 17, 2019 – **Status Update September 2021**

*The renewal of Chapter 1 of the Pacific Salmon Treaty effective in January 2019 includes a number of new and renewed commitments to improve assessment, management, and enhancement of Canadian-origin Transboundary Chinook, sockeye and coho salmon stocks. The implementation plan is provided below.*

Activity	Timeline	Anticipated Process and Outcome	STATUS UPDATE September 2021
<b>Paragraph 2. &amp; Paragraph 3(c).</b> Develop and implement an abundance-based management regime for Chinook and sockeye salmon in the Alsek River. Design and implement Alsek Chinook and sockeye salmon adult assessment programs that can be used for active fishery management.	Initiate stock assessments in 2020 provided funding is secured from the agencies and/or the NEF.	The intent is to provide the Parties with the scientific basis to manage Alsek River Chinook and sockeye salmon based on abundance and therefore provide appropriate spawning escapements and allow fishers to harvest surplus production.	Funding secured (PSC Northern Fund + Parties). Initiation of (experimental) stock assessment project activities planned for 2022.
<b>Paragraph 2.</b> Develop and implement abundance-based management regime for coho salmon in the Stikine River. <b>Paragraph 3(a)(ii).</b> Assessment programs need to be further developed before a biologically based escapement goal can be established. The design and implementation of a Stikine River coho salmon adult assessment program that can be used for active fishery management is needed.	Initiate program development in 2019 with refinement in 2020 and for the duration of the annex period. Review of progress concerning this obligation in 2024 is required.	The outcome is to provide the Parties with the scientific basis to manage Stikine River coho salmon based on abundance. Intent is to provide appropriate spawning escapements and allow fishers to harvest surplus production.	Experimental stock assessment project activities completed in 2019 and 2021. Continued stock assessment project development planned for 2022 and 2023.
<b>Paragraph 3(a)(i)(a &amp; b).</b> Continue the abundance based management program for Stikine River sockeye salmon.	Maintain existing annual approach.	Meet escapement goals for Tahltan Lake and river stocks of sockeye salmon while allowing fishers to harvest surplus production.	Implemented 2019 – ongoing (annual) activities. Biological Escapement Goal review initiated in 2020 (Targeting February 2023 completion/recommendation).

Activity	Timeline	Anticipated Process and Outcome	STATUS UPDATE September 2021
<b>Paragraph 3(a)(i)(c).</b> Expand and initiate new bilateral sockeye salmon enhancement programs in the Canadian portion of the Stikine River watershed.	Initiate new sockeye salmon enhancement program(s) by 2024.	Annually produce 100,000 enhanced sockeye salmon returning to the Stikine River watershed. Canada to identify suitable sockeye fry release or rearing locations.	Initial exploratory evaluation activities underway. Limited progress to date.
<b>Paragraph 3(a)(iii).</b> Continue the abundance based management regime for Stikine River Chinook salmon. Expand/improve the CWT and GSI programs used to implement the existing program.	CWT expansion to be initiated in 2019 and continue for duration of annex period. Conversion of GSI program from microsatellites to SNPs initiated in 2019.	Increase CWT tag rates for Stikine River Chinook salmon to achieve CTC indicator stock standards. Improvement of accuracy and decrease in cost of GSI program by conversion to a SNP based approach.	Implemented 2019 – Expansion of Chinook CWT underway (contingent on annual smolt abundance. Ongoing (annual) activities.
<b>Paragraph 3(b)(i).</b> Deliver an abundance based management program for Taku River sockeye salmon.	Annual delivery of abundance based assessment and management program.	Intent is to meet escapement goal for Taku sockeye salmon while allowing fishers to harvest surplus production.	Implemented 2019 – ongoing (annual) activities.
<b>Paragraph 3(b)(i)(b).</b> Complete bilateral review of Taku River sockeye salmon MSY escapement goal.	Complete in advance of 2020 fishing season.	The Parties to establish a bilaterally approved MSY escapement goal for Taku River sockeye salmon to be implemented in 2020 and for the remainder of the annex period.	Completed June 2020. Implemented.
<b>Paragraph 3(b)(i)(c).</b> Complete bilateral review of joint Taku River sockeye salmon assessment program.	Complete in advance of 2020 fishing season.	The Parties to receive and implement recommendations to improve the bilateral Taku River sockeye salmon assessment program prior to the start of the 2020 fishing season.	Completed February 2020. Implemented – ongoing (annual) activities.
<b>Paragraph 3(b)(i)(h).</b> Expand and initiate new bilateral sockeye salmon enhancement programs within the Taku River watershed.	Initiate sockeye salmon enhancement expansions and new programs as soon as practical (post 2019).	Annually produce 100,000 enhanced sockeye salmon returning to the Taku River watershed.	Exploratory project activities initiated in 2019. Annual activities completed 2019, 2020, 2021 (ongoing).

Activity	Timeline	Anticipated Process and Outcome	STATUS UPDATE September 2021
<b><u>Paragraph 3(b)(ii).</u></b> Implement a Taku River coho salmon abundance based management smolt and adult assessment program.	Initiate program implementation in 2019 and continue for duration of annex period.	Implement annual coho smolt tagging and adult terminal abundance estimate program on the Taku River.	Implemented 2019 – ongoing (annual) activities.
<b><u>Paragraph 3(b)(iii).</u></b> Continue the abundance based management program for Taku River Chinook salmon. Expand/improve the CWT and GSI programs used to implement the existing program.	CWT expansion to be initiated in 2019 and continue for duration of annex period. Conversion of GSI program from microsatellites to SNPs initiated in 2019.	Increase CWT tag rates for Taku River Chinook salmon to achieve CTC indicator stock standards. Improvement of accuracy and decrease in cost of GSI program by conversion to a SNP based approach.	Implemented 2019 – Expansion of Chinook CWT underway (contingent on annual smolt abundance. Ongoing (annual) activities.
<b><u>Paragraph 4.</u></b> Continue to evaluate accountability measures associated with Chapter One.	Maintain annual process.	Intent is to provide annual accountability measures of performance of Chapter One provisions.	Implemented 2019 – Completed by Transboundary Panel annually, supported by Transboundary Technical Committee. Ongoing (annual) activities.
<b><u>Paragraph 5.</u></b> Review of Chapter to determine if renewal or renegotiation is requested by the Parties.	2024 PSC annual meeting.	Identify each parties interests pertaining to renewal or renegotiation of Chapter 1 following 5 years of implementation of current annex.	To be completed in 2024.



**PACIFIC SALMON COMMISSION WORK PLAN**  
**2021-2022**

**Panel / Committee:**

Northern Panel (reporting to the Pacific Salmon Commission)

Northern Boundary Technical Committee (NBTC; reporting to the Northern Panel)

**Date:**

For review at the Executive Session of the Commissioners on October 18 to 22, 2021 (Webinar), with updates provided at the Executive Session and reporting presented at the Post-Season Meeting on January 10 to 14, 2022 (Portland) and the Annual Meeting on February 14 to 18, 2022 (Vancouver).

**Update on Bilateral Tasks Assigned Under Current PSC Agreement:**

- 1) *Review progress of Canada's comprehensive escapement goal analysis for Nass and Skeena river sockeye salmon.*

A comprehensive escapement goal review of Skeena and Nass sockeye is underway. A draft review of source data has been prepared and reviewed by Independent Reviewers on behalf of Canada and the U.S. The project leads have prepared an analysis plan for developing biological benchmarks (at the stock and aggregate level), which has been submitted and approved by both Independent reviewers. The project leads will present the draft data review (2021 Review of Spawner and Recruit Data for Sockeye Salmon from the Skeena and Nass Basins, British Columbia) and independent reviewer recommendations made to date to the Panel and Committee at the January 2022 Post Season Meeting, and discuss the upcoming CSAS review of escapement goal analyses (February 2022), including independent reviewer participation. Final independent review to take place in March 2022 followed by a Canadian domestic consultative process, to be completed in advance of January 2023 Post Season Meeting.

- 2) *Review progress of U.S. District 104 pink salmon harvest pattern analysis.*

The Chapter 2 Joint Implementation Workplan states that the U.S. should have the pink salmon harvest pattern analysis report completed and submitted to the independent contractors for review by July 2021. The U.S. submitted a final report to the Commission in April that they approved in May. The report has been published as a PSC report.

- 3) *Review of the Northern Boundary Sockeye Run Reconstruction Model*

The Committee was tasked with reviewing the sockeye run reconstruction model and providing recommendations to the Northern Panel, at or before the January 2022 Commission post-season meeting, regarding the creation of a simpler run reconstruction model, if needed. While this review was completed and signed off by

both Panel Co-Chairs prior to the January 2020 session, an update on any additional work or analysis will be provided during the January 2022 session.

*4) Chapter 2 Evaluation of Performance:*

Under the renewed provisions within Chapter 2, it is stated that “the Parties shall complete a review of the results of the implementation of this Chapter by the Commission post-season meeting in January 2022. The review shall identify management actions taken to support the conservation of Nass River and Skeena River sockeye, to evaluate the consistency of those actions with the obligations of this Chapter and outline, if feasible, the benefit of those actions for Nass River and Skeena River sockeye.” Much of this review will be informed from the results of the assignments listed above. As such, it is expected that the review of Chapter 2 performance will begin during the January 2022 Post Season Review meeting and will be completed by February 2023 Annual Meeting.

**Obstacles to Completing above Bi-lateral Tasks:**

None.

**Outline of Other Panel / Committee Tasks or Emerging Issues:**

In February 2017 the Northern Panel tasked a sub-committee of the NBTC (Northern Coho Sub-Committee) to produce a report on the state of knowledge on the status of northern coho salmon stocks in advance of the 2020 season. A final report for this assignment was not available at the 2020 postseason meeting as planned; instead, the U.S. presented a final report to the Commission in April 2020 that they approved in May and subsequently published as a PSC report. A Canadian report, which will be reviewed in October 2021 will also be published as a PSC report.

**Potential Issues for Commissioners, including enhancement activities reported under Article V:**

None.

**Potential Issues for Committee on Scientific Cooperation**

The Panel is currently developing a bilateral draft of the template provided by the CSC for Nass and Skeena River sockeye salmon that documents when and how environmental variability is considered in management.

**Proposed Meeting Dates and Draft Agendas:**

**Pacific Salmon Commission 2022 Post Season Meeting (January 10 to 14, 2022)**

**Location: Portland**

Northern Panel

Travel: Monday, January 10

Section Meetings: Tuesday, January 11

Bilateral Sessions: Wednesday, January 12 to noon Thursday January 13

Attendance: Full Panel membership and selected supporting NBTC representatives (~30 total).

Draft Agenda for bilateral sessions:

- Post season reports from both Canada and the U.S. regarding the 2021 salmon season
  - Review Northern Boundary Area fisheries for 2021 and compliance with provisions of the 2019 PST Agreement
  - Review and approve NBTC's update of the 2020 allowable and actual harvests of sockeye salmon, as specified in Annex IV, Chapter 2
  - Review preliminary 2021 allowable and actual harvests of sockeye salmon and final 2021 allowable and actual harvests of pink salmon
- Review progress of Canada's comprehensive escapement goal analyses for Nass and Skeena river sockeye salmon with a focused presentation on the Technical Data Report and associated feedback received from the Canadian and US Independent reviewers.
- Review Coho reports and discuss next steps for updating the Coho triggers as described in Chapter 7.

#### Northern Boundary Technical Committee

Meeting times: Tuesday, January 11

Attendance: Full Northern Boundary Technical Committee membership

Draft Agenda for NBTC meeting:

- Finalize the 2020 Boundary Area sockeye salmon and 2021 pink salmon run reconstructions, update the cumulative Annual Allowable Harvest sharing agreements, and submit to the Northern Panel for approval.
- Present a preliminary 2021 Boundary Area sockeye salmon run reconstruction and final pink salmon run reconstruction.

#### **Pacific Salmon Commission 2022 Annual Meeting (February 14 to 18, 2022)**

**Location: Webinar**

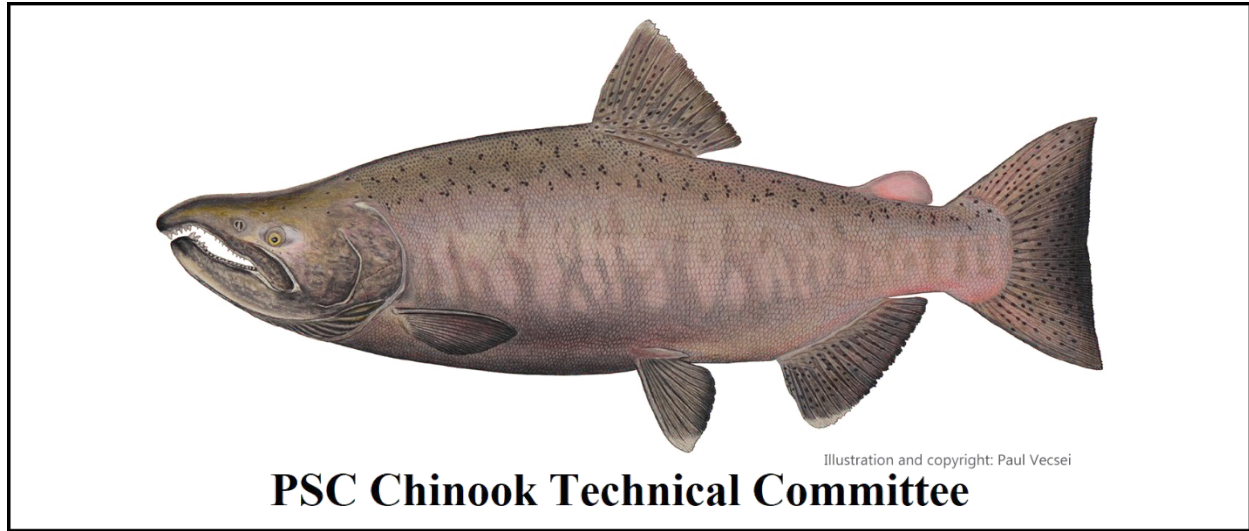
This meeting will occur only if needed as determined appropriate by the Panel in January at the post-season meeting.

#### **Status of Technical or Annual Reports:**

The Canadian section of the 2019 and 2020 NBTC Annual Reports are overdue and final reports cannot be completed until those sections are provided. These sections will be provided by November 2021. A draft of the Alaska and Canadian section of the NBTC Annual Report for 2021 fisheries is expected to be available for the January 2021 meeting.

#### **Comments:**

None.



**CHINOOK TECHNICAL COMMITTEE WORK PLAN  
2021-2022**

**Panel / Committee:** The Chinook Technical Committee (CTC) reports to the Pacific Salmon Commission.

**Date:** October 18-22, 2021

**Update on Bilateral Tasks Assigned Under Current PSC Agreement:**

**CTC Work Plan Tasks Assigned for 2021**

✓	Completed	—	Delayed (pending materials from other groups)
✗	In progress	■	No progress

***1. Legacy Annual Tasks***

✓	2019 Calibration and Exploitation Rate Analysis (CLB&ERA) report – <i>Published February 4, 2021.</i>
✓	2020 Model Calibration (CLB) report and 2020 Exploitation Rate Analysis (ERA) report – <i>Calibration report published August 17, 2021. ERA report published September 29, 2021.</i>
✓	2021 Chinook Exploitation Rate Analysis (ERA) – <i>Completed February 17–March 8, 2021 (extended due to remote work)</i>
✓	2021 Chinook Model calibration – <i>Completed March 10–April 1, 2021 (extended due to remote work)</i>
✓	2021 Catch and Escapement (C&E) report – <i>Published June 30, 2021</i>
✗	2021 Calibration and Exploitation Rate Analysis reports – <i>Initial tasking occurred in September 2021.</i>

## 2. New Annual Tasks

■	Report stock-specific MSF impacts, starting 2021 – <i>Pending development and implementation of MSF algorithms. Awaiting CYER WG direction.</i>
■	Summarize CEII and CWT&R programs, starting 2020 – <i>Deferred; CWT&amp;R and CEII programs are in the process of being seeded with money. No formal meetings of the membership committee have occurred.</i>
✓	Report on IMs – <i>Completed; the CTC reported on IMs in the 2021 C&amp;E report (published June 30).</i>
✓	Report data underlying the hatchery add-on calculations – <i>Completed; the CTC provided a summary of information used to determine the allowable exclusion or hatchery add-on in the 2021 C&amp;E report (published June 30).</i>

## 3. Ad Hoc Tasks

⚡	Restructuring of annual reports – <i>In Progress; the CTC has (1) restructured existing annual reports to align with new reporting requirements specified in the 2019 PST Agreement and, where necessary, the new structure of the Phase II Chinook Model. This also involved splitting the existing ERA &amp; Model Calibration report into two separate reports: a Chinook Model Calibration report and an Exploitation Rate Analysis report. The CTC is working to (2) develop a new summary annual report; and (3) automate generation of tables and figures where possible to increase the efficiency of report production and reduce the time consumed each year by the CTC. The CTC has formed workgroups to address these tasks. This may require additional resources in the near term to meet CTC obligations under the new PST Agreement.</i>
⚡	Documentation of Phase II base period calibration (BPC) of the PSC Chinook Model – <i>In progress. Volume 1 (fisheries) was published on June 3, 2021. Volume 2 (stocks) is nearing completion, anticipated October 1, and Volume 3 (Model parameters and BPC assessment) is in development.</i>
⚡	Standards for Incidental Mortality (IM) data – <i>In progress; data collection is complete for assessment of data standards. A literature review was delivered in December 2020. A report on the standards will be provided to the CIG in late October 2021.</i>
■	Develop and implement MSF algorithms in the annual ERA – <i>In progress; The CYER WG is actively working on developing the MSF algorithms, with multiple CTC members involved in the process. Anticipated completion on MSF algorithms by the CYER WG is January 2022. Work by the CTC can begin after that to implement in the annual ERA.</i>
■	<p>Implementation of CYERs – <i>Pending; in coordination with the CYER workgroup and SFEC.</i></p> <ul style="list-style-type: none"> <li>- Develop data standards for the application of CYER as a metric – <i>In progress.</i></li> <li>- Describe any adjustments of terminal fishery impacts for exploitation rate indicator stocks – <i>Terminal impacts are reported in the 2020 ERA report and will be reported on in subsequent annual ERA reports.</i></li> </ul>

	<ul style="list-style-type: none"> <li>- Develop procedures to adjust CYERs for MSFs by 2021. Add to annual report – <i>Delayed. Anticipated inclusion in the 2022 ERA report.</i></li> <li>- Additionally, the CYER workgroup submitted a report to the CIG on September 12, 2019 that contained several recommendations that will require CTC involvement – <i>Pending Commission direction.</i></li> </ul>
■	Evaluate alternative metrics for individual stock based management (ISBM) – <i>Scheduled to begin in 2021, contingent on successful implementation of CYER metric.</i>
✓	Escapement goals presented for review and acceptance will be evaluated by the CTC – <i>Proposed escapement goals for Skagit River Spring Chinook and Skagit River Summer/Fall Chinook were brought forward in September 2020 and requests for more information were returned to the proposers.</i>

## **CTC Work Plan Tasks Proposed for 2022** – see Appendix I – CTC Implementation Plan

### ***1. Legacy Annual Tasks***

- 2021 Model Calibration report – *Initial tasking began in September 2021.*
- 2021 Exploitation Rate Analysis report – *Initial tasking began in September 2021.*
- 2022 Chinook ERA – *Planned for in-person meeting in February 2022.*
- 2022 Chinook Model calibration – *Planned for in-person meeting in March 2022.*
- 2022 Catch and Escapement (C&E) report – *Anticipated completion in June 2022.*
- 2022 Model Calibration report (CLB) – *Anticipated initiation in June 2022.*
- 2022 Exploitation Rate Analysis (ERA) report – *Anticipated initiation in June 2022.*

### ***2. New Annual Tasks***

- Report stock-specific MSF impacts, starting 2022 – *MSF algorithm development is ongoing with the CYER WG. Once completed, MSF impacts will be reported on in the 2022 ERA report.*
- Summarize CEII and CWT&R programs, starting 2022 – *Deferred; CEII and CWT&R programs have been seeded, but membership committee has not formally met yet.*
- Report on IMs – *Planned for June 2022; the CTC will report on IMs in the annual C&E report, and if necessary, evaluate the causes of significant changes in rates or patterns.*
- Report data underlying the hatchery add-on calculations – *Planned for June 2022; the CTC will provide a summary of information used to determine the allowable exclusion or hatchery add-on in the annual C&E report.*

### ***3. Ad Hoc Tasks***

- Restructuring of annual reports – *In Progress; the CTC is working to (1) develop a new summary annual report for the Commission by October 2022; and (2) automate*

*generation of tables and figures where possible to increase the efficiency of report production and reduce the time consumed each year by the CTC. The CTC has formed workgroups to address these tasks. This may require additional resources in the near term to meet CTC obligations under the new PST Agreement.*

- Documentation of Phase II base period calibration (BPC) of the PSC Chinook Model – *In progress.*
- Standards for IM data – *In progress; literature review completed in December 2020. Development of standards is planned for completion in October 2021. At the June 2021 CIG meeting, the CTC was directed to focus on fisheries that have quantitative estimates of incidental mortality and to prioritize work on a fishery matrix to understand the level of uncertainty associated with fisheries.*
- Develop and implement MSF algorithms in the annual ERA – *In progress; The CYER WG is actively working on developing the MSF algorithms, with multiple CTC members involved in the process. Anticipated completion on MSF algorithms by the CYER WG is January 2022. Work by the CTC can begin after that to implement in the annual ERA.*
- Implementation of CYERs – *Pending; in coordination with the CYER workgroup and SFEC.*
  - o Develop data standards for the application of CYER as a metric – *In progress.*
  - o Describe any adjustments of terminal fishery impacts for exploitation rate indicator stocks –*Terminal impacts are reported in the 2020 ERA report and will be reported on in subsequent annual ERA reports.*
  - o Develop procedures to adjust CYERs for MSFs by 2021. Add to annual report – *Delayed. Anticipated inclusion in the 2022 ERA report.*
  - o Additionally, the CYER workgroup submitted a report to the CIG on September 12, 2019 that contained several recommendations that will require CTC involvement – *Pending Commission direction.*
- Evaluate alternative metrics for individual stock based management (ISBM) – *Scheduled to begin in 2022, contingent on successful implementation of CYER metric. Work on this task can occur using the DGM after the development of MSF algorithms.*
- Escapement goals presented for review and acceptance will be evaluated by the CTC – *The CTC will be available to review any escapement goals that are brought forward.*
- Begin outline for five-year review – *Scheduled to begin drafting outline at June 2022 meeting. The review should evaluate the effectiveness of harvest reduction measures that are taken for AABM and ISBM fisheries, and include stock status (including spawners, productivity, and abundance indices) and fishery performance (including catches, incidental mortality, and fishery indices such as fishery harvest rates). Due to CIG January 2023.*
- Update the September 30, 2020 CTC document COVID-19 Impacts on Chapter 3 of the Pacific Salmon Treaty Implementation with any changes to previously reported 2020 activities and an initial review of 2021 COVID-related responses. Where changes were

made to standard practices include detail about the normal practice and the deviation that was implemented.

### **Obstacles to Completing above Bilateral Tasks:**

#### ***Loss of Experienced Membership***

The CTC is still recovering from the effects of many retirements and departures of long-standing members with substantial institutional knowledge. While the CTC continues to be comprised of talented members, there is a concern for loss of institutional knowledge and expertise. Some CTC members have moved onto roles with additional opportunities. These losses are anticipated to delay some annual tasks and anticipated tasks within the new Agreement. On a positive note, the CTC has gained several skilled new members.

#### ***COVID-19 Impacts***

The inability to meet in person since February of 2020 has not halted progress on CTC tasks but has impacted timelines and efficiency. In particular, the ERA and Model Calibration processes took nearly two weeks longer than when meeting in person.

#### ***Time Constraints***

As in previous years, the primary obstacle is the amount of time and effort required to complete the large number of tasks assigned to the CTC under the 2019 Agreement and the technical complexity of those tasks. Although the formation of smaller CTC workgroups to address individual assignments creates some efficiency, the necessity of assigning CTC members to multiple workgroups creates bottlenecks.

#### ***Funding Constraints***

Prior to COVID-19 travel restrictions, meeting costs have had the potential to impact the CTC's ability to complete the ERA, PSC Chinook Model calibration, and annual reporting and anticipated tasks within the new agreement. Assuming travel resumes during this cycle, the CTC has opted to host a few meetings virtually.

#### ***Policy Issues***

The CTC anticipates new policy issues may emerge due to the implementation of the 2019 PST Agreement.

### **Outline of Other Panel / Committee Tasks or Emerging Issues:**

None identified.

### **Potential Issues for Commissioners, including enhancement activities reported under Article V:**

#### ***Succession Planning and Training***

2021 marks another year with retirements of senior CTC members and more departures are expected in 2022. A transition plan to train new CTC members and transfer knowledge and expertise is needed to maintain understanding of the PST management framework for Chinook salmon and of the tools used to implement it. To address this, the CTC is developing an



orientation package to distribute to new CTC members. Severe time constraints imposed by ongoing work often interfere with this important activity. Succession planning is another task that needs to be an explicit element of the CTC work plan. Early identification of retirements or members moving to different committees could be helpful for CTC succession planning and hiring staff to meet the specific goal of supporting the CTC or other technical committees and formalizing the on-boarding process.

The CTC has identified some activities to improve transfer of knowledge and responsibilities to new CTC members. These would contribute to succession planning and are outlined below:

1. Improve documentation of the incomplete or outdated quantitative methods, data, and computer programs employed by the CTC.
  - The CTC Coordinator has helped document methods and created an online repository for many of the older documents.
2. Look for training opportunities that could improve the functioning of the CTC and increase the value of in-person meetings.
  - *Recommendation:* A workshop on version control software (e.g., GitLab) would be useful training for committee members.

### ***Improving Efficiency***

1. *Meeting Management & Coordination:* In 2020, the Commission provided the CTC with funds to hire a Technical Committee Coordinator (Jessica Gill) and this position has proven to be a positive addition to the CTC. The assistance with agenda development, meeting scheduling, meeting minutes, document distribution, and tracking of work products and action items has greatly improved the efficiency of the CTC and has helped mitigate the impacts from the lack of in-person meetings due to COVID-19.
2. Increase the efficiency of report production and reduce the time consumed each year by the CTC.
  - The CTC is exploring ways to streamline and automate annual reports, by building on recent Coho Technical Committee (CoTC) experience and new server capacity made available by the PSC.
  - Agency support for additional training opportunities in new tools (e.g., R, R-Markdown, and Shiny) would be beneficial. NWIFC hosted a workshop on R which proved useful for their staff and others that attended.
3. Complete projects currently underway that are aimed at greatly increasing efficiencies in annual work and in carrying out special investigations (i.e., ERA, modelling tools, and R package ForecastR).
  - Support provided by the Commission through dedicated assistance by Mark McMillan has provided significant improvements to the CTC CWT database and data systems.

### ***Development of a Research and Development Team***

Given the changing environment and duration of the PST, the modeling approaches used by the CTC need to be continuously tested, updated and new methods (such as management strategy evaluation) may need to be developed. Ideally, the CTC would like to find time for some members to explore and test new techniques to improve the current methods. This research effort

is necessary to ensure better understanding of Chinook populations and that management outcomes are based on the best available science and technology.

### *Development of New Tools*

The model currently used by the CTC was initially developed in the early 1980s and relies on base period data that is over 40 years old, though has experienced data updates with the recent Base Period Calibration. Chinook populations are experiencing changes in life history parameters, stock distributions, productivity, and increased environmental variability resulting in degraded performance of the current model. Some of the recently appointed CTC members bring with them skills with innovative analytical tools and applications that could potentially improve the management of Chinook fisheries. The CTC will encourage the development and evaluation of alternative tools and management strategies that may offer better performance than the current management regime.

### ***Documentation***

Due to tight timelines for producing yearly analyses and reports, the CTC has been remiss in the past in adequately documenting new computer programs and analyses as well as changes to existing programs and analyses. This has slowed the progress of developing new tools and techniques due to the necessity of retracing our steps to identify the current algorithms in use. The CTC will endeavor to make documentation a higher priority moving forward, and has been able to document more items with the addition of the CTC Coordinator position. Version control software, the development of a software protocols document, and the use of Markdown to document model adjustments has helped the CTC increase the documentation of analyses and programs.

### **Potential Issues for Committee on Scientific Cooperation**

The CSC and CoTC held a workshop on using environmental indicators to inform salmon management on May 11, 2021. Many CTC members were in attendance and found the presentations informative. The CTC looks forward to future efforts and workshops on this topic. However, there is uncertainty regarding the ability to contribute based on competing priorities and the CTC notes the following:

1. Recent studies and presentations at workshops have provided evidence of various types of demographic changes in Chinook populations such as declining mean size at age, increasing mean maturation rates, and even decreasing fecundity at age in females. A review of the accumulating evidence for these types of population level changes, the geographic extent of such changes, the occurrence of discernible trends, the possible causal factors such as long-term environmental changes and their influence on output from management models would be helpful to the CTC. The ability of the Chinook Model to generate accurate abundance forecasts is tied to algorithms that generate age compositions of fish vulnerable, by size, in fisheries. It is crucial to understand whether historical methods can no longer be expected to work as they once did and whether alternative methods must be developed or new approaches to generating inputs to forecasting procedures are needed.

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

### **Proposed Meeting Dates and Draft Agendas:**

COVID-19 has impacted travel policies throughout the region. The CTC anticipates needing flexibility for travel arrangements throughout this cycle. Additional CTC meetings may be required, depending on the number and scope of additional tasks assigned.

<b>Meeting</b>	<b>Dates</b>	<b>Location</b>	<b>Meeting Objectives</b>
<b>2021</b>			
CTC Bilateral	Sept 20-24	Webinar	CLB&ERA report; Work plan; Finalize IM Standards report
<del>CTC-AWG/CYER/SFEC</del>	<del>Oct 4-8</del>	<del>Webinar</del>	<del>MSFs, coding Coshak in R</del>
PSC Fall Session	Oct 18-22	Webinar	
CTC-AWG	Nov 8-9	Webinar	COVID-19 Impacts to ERA and Model
CTC-AWG	Nov 10	Webinar	CAMP workshop
CTC-AWG	Nov 22-23	Webinar	COVID-19 Impacts to ERA and Model
US CTC LOA	Dec 2-3	Portland, OR	
<b>2022</b>			
PSC Post-season	Jan 10-14	Vancouver, BC <sup>2</sup>	
PSC Annual	Feb 14-18	Vancouver, BC	
CTC-AWG	Feb 19-25 <sup>1</sup>	Vancouver, BC	ERA in person + working half days on weekend
CTC-AWG	Mar 14-18 <sup>1</sup>	Seattle, WA	Model Calibration in person
CTC Bilateral	Apr 25-29	Webinar	Annual reports; summary reports/automation
<i>CTC-TBD</i>	May 16-20	<i>Olympia, WA</i>	Model and ERA improvement
CTC Bilateral	Jun 6-10	Bend, OR	Annual reports; 5-year review outline
CTC Bilateral	Sept 19-23	Webinar	Workplan development; annual reports
CTC Bilateral	Oct 3-7	Kelowna, BC	5-year review outline; summary reports/automation;
PSC Fall Session	Oct 17-21	Vancouver, BC	

<sup>1</sup> In the event COVID-19 restrictions result in changes to in-person meetings in 2022, the ERA and the Model Calibration will need additional days to complete the task.

<sup>2</sup> The PSC Post-season meeting was moved from Portland, OR to Vancouver, BC at the PSC Fall Session on October 20, 2021.

**Status of Technical or Annual Reports:**

The 2021 C&E report is complete. The 2019 CLB&ERA report is complete. The 2020 CLB report is complete. The 2020 ERA report is under review. Work on the 2021 CLB and 2021 ERA reports will begin in September 2021. Obstacles to completing annual reports in a timely manner include workloads, competing priorities, working remotely because of COVID-19, and changeover in CTC membership. An additional obstacle for 2020 ERA and CLB reports is the need to incorporate new reporting requirements associated with the 2019 PST Agreement.

**Comments:**

The CTC has assessed tasks listed in Appendix A of Annex IV, Chapter 3 of the recently completed 2019 PST Agreement to assess timelines and workload. The updated CTC Implementation Plan (Appendix I) represents the CTC's understanding of the timeline for completion of the CTC tasks identified in Appendix A.

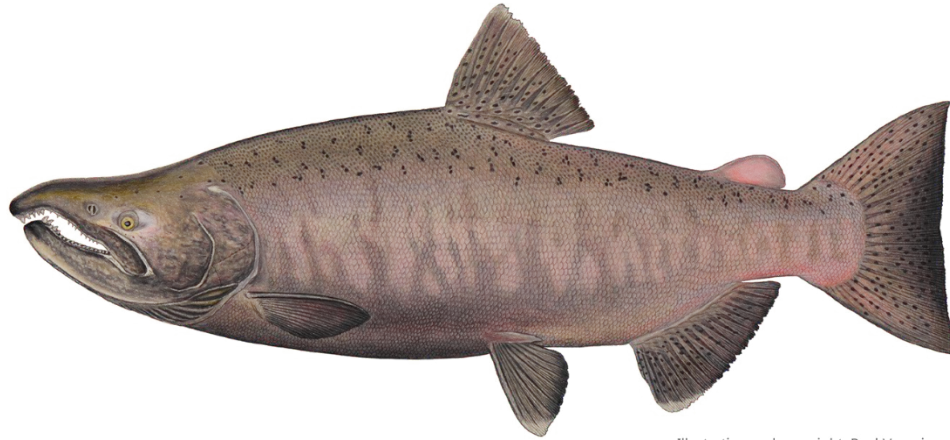


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## PSC Chinook Technical Committee

### APPENDIX I – CHAPTER 3 IMPLEMENTATION PLAN 2019-2028

The CTC has organized the Chapter 3 Appendix A tasks into four categories: legacy annual tasks, new annual tasks, ad hoc tasks, and conditional tasks. A 10-year plan is also provided.

#### **1. Legacy Annual Tasks**

The CTC will discuss changes to the structure of annual reports to reflect new obligations in the 2019 PST Agreement. We will also strive to reduce the size of annual reports, improve readability, and explore strategies to expedite production.

App A	Task	Timelines	
		Original	Proposed Changes
9	Report fishery performance at Annual Meeting	Feb	
1(h), 8, 6	Provide annual calibration, post-season abundance indices (AIs), pre-season comparisons, and catch deviations for aggregate abundance based management (AABM) fisheries	1 Apr	
1(b), 3(a), 3(b)	Report on catches, terminal exclusions, hatchery add-ons, harvest rate indices (HRIs), IMs, and ERs	June	
4, 11	Evaluate ISBM fishery performance, and starting in 2023, CYER average, and overages		
1(c)	Report escapements and evaluate stock status		

## 2. New Annual Tasks

App A	Task	Timelines	
		Original	Proposed Change
1(g)	Report stock-specific MSF impacts, starting 2020	May	2022
1(i)	Summarize CEII and CWT&R programs, starting 2020	June	2022
3(c)	Describe the causes of significant changes in IMs	June	
7	Report data underlying the hatchery add-on calculations	June	

## 3. Ad Hoc Tasks

App A	Task	Timelines	
		Original	Proposed Change
14	Complete BPC Phase II by February 2019	Feb 2019	Complete
2	Standards for IM data by February 2020	Feb 2020	Oct 2021
5	Complete Data Generation Model	2020	Complete
5	Evaluate alternative metrics for ISBM	2021	2022
	<i>Investigate and implement MSF algorithms in the annual ERA<sup>1*</sup></i>	2020	2022
	<i>Evaluate representativeness of CWT indicator stocks of wild/hatchery stocks they are intended to represent*</i>	TBD	
5	Procedures to adjust CYERS for MSFs by 2021 <sup>1</sup> . Add to Annual Report.	2021	2022
5	Describe adjustments of terminal fishery impacts for ER stocks <sup>1</sup>	2021	
13	Draft outline for 5-year review by January 2023	Jan 2023	
14	Complete BPC Phase III	2023	
1(e)	Recommend standards for the minimum assessment program required to effectively implement Chapter 3	TBD	
1(f)	Recommend research 3(c), 7, and associated costs, to improve implementation of Chapter	TBD	

\* Work plan tasks not included in App. A.

<sup>1</sup> In Progress (in conjunction with the CYER workgroup and SFEC)

## 4. Conditional Tasks

App A	Task
11(b)	If ISBM overage, provide plan to improve performance in meeting objectives
10(b)	If AABM overage, provide plan to improve performance in meeting objectives
1(a)	Identify concerns with Chapter or effectiveness of actions in reaching objectives, as requested
1(d)	Evaluate, review or recommend escapement objectives; as requested
12	Up to two review(s) of CPUE based approach, if requested

**Ten-Year Implementation Plan:**

The CTC has made a preliminary assessment of tasks listed in Appendix A of Annex IV, Chapter 3 of the 2019 PST Agreement to assess timelines and workload. The table following on the next page is the CTC's understanding of the timeline for completion of CTC tasks identified in Appendix A. Items in red indicate that the task has been delayed, and yellow items indicate potential delay.

App A	Task	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
9	Report to PSC at Annual meeting on (a) AABM management error, (b) AABM model error and performance, (c) recommendations for minimizing deviations between pre- and post-season fishery limits, and (d) status towards achieving stock-specific management objectives.	Feb	Feb	Feb	Feb	Feb	Feb	Feb	Feb	Feb	Feb
1 (h)	Provide annual calibrations of the Chinook Model with pre-season and post-season abundance indexes by April 1 of each year.	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr
8	Provide the first post-season AI estimates for AABM fisheries using the Chinook Model and compare (a) CPUE-based tiers for SEAK and (b) AIs for NBC and WCVI AABM fisheries.	X	X	X	X	X	X	X	X	X	X
6	Determine annually if deviations have occurred between the observed catches and both the pre-season and post-season allowable catches for the SEAK, NBC, and WCVI AABM Treaty Chinook catches.	X	X	X	X	X	X	X	X	X	X
1 (b)	Report annually on catches, terminal exclusions, hatchery add-ons, harvest rate indices, estimates of incidental mortality, and exploitation rates that apply best available information to account for MSF impacts for all Chinook fisheries and stocks harvested within the Treaty area.	X	X	X	X	X	X	X	X	X	X
1 (c)	Report annually on naturally spawning Chinook stocks in relation to the agreed MSY or other agreed biologically-based escapement objectives, rebuilding exploitation rate objectives, or other metrics and evaluate trends in the status of stocks and report on progress in the rebuilding of naturally spawning Chinook stocks.	X	X	X	X	X	X	X	X	X	X
1 (g)	Annual report on stock-specific MSF impacts.		X	X	X	X	X	X	X	X	X
1 (i)	Annual summary of CEII and CWT&R programs.		X	X	X	X	X	X	X	X	X
3 (a)	An evaluation of estimates of encounters and incidental mortalities in all fisheries subject to this Treaty.	X	X	X	X	X	X	X	X	X	X
3 (b)	Post-season estimates of incidental mortality that includes incidental mortality from MSF, and total mortality.	X	X	X	X	X	X	X	X	X	X



App A	Task	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
3 (c)	Description of the causes (if identifiable) of significant changes in rates or patterns of incidental mortalities in fisheries relative to paragraph 4(a) and 4(f) of this Chapter for AABM fisheries (1999-2016) and paragraph 5 of this Chapter for ISBM fisheries (1999-2015).	X	X	X	X	X	X	X	X	X	X
4	Evaluate the ISBM fishery performance relative to the obligations set forth in paragraph 5 of this Chapter and report annually to the Commission.	X	X	X	X	X	X	X	X	X	X
7	Provide detailed information concerning any catches of Chinook associated with paragraphs 6(i) and 6(j), and a summary of information used to determine the allowable exclusion or hatchery add-on, in the annual catch and escapement report.	X	X	X	X	X	X	X	X	X	X
11	For ISBM fisheries, the CTC shall annually compute and report metrics described in paragraph 5 (a) ;and	X	X	X	X	X	X	X	X	X	X
	Provide 3-year running avg for CYERs and evaluate performance (by 2023).				TBD	X	X	X	X	X	X
11 (b)	If ISBM overage, shall provide to the Commission a plan to improve the performance of pre-season, in-season and other management tools so that the deviations between the CYERs and the CYER limits are narrowed to a maximum level of 10% when limits apply (Attachment I).				TBD	TBD	TBD	TBD	TBD	TBD	TBD
10 (b)	If AABM fisheries have overages for 2 consecutive years, the CTC shall recommend to the Commission a plan to improve the performance of pre-season, in-season and other management tools so that the deviations between catches and post-season fishery limits to AABM fisheries are narrowed to a maximum level of 10%.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
14	Complete BPC Phase II by February 2019.	Feb									
14	Complete BPC Phase III by 2023.	X	X	X	X	X					
2	Standards for the desired level of precision and accuracy of data required to estimate IM.			X	X						
5	Complete the Data Generation Model.		X								
	Complete evaluation of alternative metrics for the evaluation of ISBM fisheries.			X	X						

App A	Task	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
	Develop data standards for the application of CYER as metric			X	X						
	Description of procedures used to adjust CYERS in order to capture MSFs (by 2021). Add to Annual Report.			X	X						
	Describe any adjustments of terminal fishery impacts for the exploitation rate indicator stock.			X	X						
13	By January 2023, develop a draft outline for a five-year review to evaluate the effectiveness of harvest reduction measures that are taken for AABM and ISBM fisheries.				X						
1 (a)(i)	Upon request, ID concerns with consistency in Chapter.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1 (a)(ii)	Upon request, ID concerns on the effectiveness of the actions in attaining the specified objectives.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1 (d)	Evaluate and review existing escapement objectives; when requested, recommend goals.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1 (e)	Recommend standards for the minimum assessment program required to effectively implement Chapter.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1 (f)	Recommend research projects, and associated costs, to improve implementation of Chapter.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
12	Up to 2 review(s) of CPUE based approach, if requested.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD



## PACIFIC SALMON COMMISSION

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

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### PACIFIC SALMON COMMISSION WORK PLAN 2021-2022

**Panel / Committee:** Fraser River Panel and Fraser River Panel Technical Committee

**Date:** Provided at PSC Executive Session via Teams on October 18-22, 2021.

#### **Update on Bi-lateral Tasks Assigned Under Current PSC Agreement:**

The Panel continued implementation of Chapter 4 of the Pacific Salmon Treaty for the 2021 Sockeye and pink salmon season.

#### **Obstacles to Completing above Bi-lateral Tasks:**

There were no major obstacles to Panel implementation of the Fraser River Sockeye and Pink Salmon chapter (Chapter 4 of the Pacific Salmon Treaty) in 2021.

#### **Outline of Other Panel / Committee Tasks or Emerging Issues:**

1. In 2019 a report to the Commissioners for the October meeting was provided by members of the Fraser Strategic Review Committee (FSRC). The Commissioners accepted that Qualark was the preferred hydroacoustics site; however, three challenges needed to be overcome before a move to Qualark could occur: (1) In-season assessment of Fraser River Pink salmon escapement (2) Assessment of Sockeye populations spawning below Qualark and (3) mitigating the additional 2-3 day migration time for Sockeye to migrate past Qualark. The Commissioners asked that the challenges (technical concerns) and issues to address these concerns along with costs be presented at the January 2020 meeting. The memo was presented to Commissioners at the January meeting, but not all reviewers from Canada were able to review the document and thus was considered a draft pending final review from Canada. A final review from Canada is still pending. At the February 2020 meeting, the FSRC was dissolved.
2. Over the past year discussions have ensued between PSC Secretariat Staff, DFO and Sumas First Nation (FN) regarding the use of the transecting vessel at the Mission hydroacoustic site during FN fishery openings have occurred. A written agreement was reached prior to the start of the 2021 season whereby the PSC would not operate the transecting vessel during the opening hours of the fishery. This was also agreed to by the Fraser River Panel at the June pre-season meeting. However, further data analysis was required to better understand the impact on the data when the vessel is not operated during these fishery openings. An SEF project (Alternative estimation methods for salmon passage on fisheries opening days at Mission hydroacoustics site) was approved to address the impact of missing data on the estimate during drift net openings. Work will continue this fall and next spring and the results will be presented to the Panel before the start of the 2022 fishing season.
3. Outcomes and recommendations from the Test Fishery Review process will continue to be utilized by the Panel in making decisions on the annual test-fishing regime. In some cases, the Review recommendations resulted in the need for new research to inform their utility to the Panel decision process. Work in these areas will continue. As well, outcomes need to be considered in conjunction with

the hydro-acoustics review in providing recommendations for an overall Fraser Sockeye and Pink salmon assessment approach for the future. One of the emerging issues has been the record low sockeye catches in in-river test fisheries in 2019 and 2020, resulting in in-season assessment challenges. In response an SEF project (Lower Fraser River gillnet test fishery site evaluation) has explored an alternative test fishing location. This project has been successful in 2021 in terms of increased catches to derive stock ID information. Additional requests will be made to SEF over the next 3 years to properly evaluate the feasibility of this test fishery to replace Cottonwood.

#### **Potential Issues for Commissioners:**

1. One continuing issue for the Commissioners following the 2021 fishing season is the cost of Panel-related test fisheries and the use of revolving funds after 2022 to cover potential shortfalls. In 2021, returns of Fraser Sockeye were low at 2.2M sockeye for most of the season, however at the final in-season meeting on September 28 after the conclusion of all commercial pink fisheries, the total run size was increased to 2.55 million which did generate a modest international TAC. As a result, only Sockeye needed for biological sampling and those incidentally killed in gillnet test fisheries were retained in the test-fishing program. Uncertainty regarding Fraser pink salmon harvestable surplus and concerns around sockeye morality further prevented the test fishing program from retaining any additional pink salmon. This resulted in a significant shortfall, requiring resources from the Test Fishery Revolving Fund (TFRF) to cover the costs for the 2021 test-fishing program. Following 2021, the TFRF balance has been reduced from \$943,000 on 30 June 2021 to approximately \$350,000 by March 2022 (projected). While a forecast for the 2022 Sockeye return year will not be available until February, the parent year Sockeye escapement in 2018 suggest that 2022 Fraser sockeye return should be much better than 2021. If the historical test fishing program on this cycle would be conducted, potential net revenues in 2022 could range from a surplus of \$1,250,000 (if all fish encountered could be retained and sold) to a potential deficit exceeding \$1,000,000 if the full program was implemented and catches were very poor and restricted. There are currently insufficient funds within the TFRF to cover the deficit associated with the worst-case scenario described above, and given the prospects for poor returns in 2023-2025, future contributions to the TFRF may be required to address potential deficits in those years. However, if returns in 2022 are abundant, consideration should be given to allow for retention of additional fish in 2022, to augment revenues in the TFRF. The Panel's test fishery review did not identify significant cost savings which would reduce the size of the potential deficit (or increase the size of the potential surplus) beyond the cost-reduction actions the Panel has taken in recent years.
2. Salmon passage by the Big Bar landslide was not considered an issue for the 2021 season due to mitigation efforts in the winter/spring of 2021 as well as the extremely low discharge, which both aided natural salmon passage through the slide area. The mitigation efforts improved the natural salmon passage past the slide by increasing the discharge threshold above which salmon are able to use the natural fishway. For the 2022 season, further work will be required to provide in-season assessments of the impact of the Big Bar slide on the management adjustment (MA) estimates in time to guide fisheries management decisions.

#### **Potential Issues for Committee on Scientific Cooperation**

1. The work of the Committee on if and how to incorporate environmental indicators and/or account for changes in productivity will be of great interest to the Fraser River Panel especially considering the poor Sockeye returns over the last few years.
2. The assessment of Fraser River Sockeye traditionally has relied on hydroacoustic estimates at Mission in combination with species composition estimates from in-river test fisheries. The low Sockeye abundances in recent years have increased the relative abundance of other comigrating species within the Fraser River, especially Chinook and this has required a greater focus on accurately estimating Chinook abundance in addition to Sockeye salmon, using a variety of different data sets and methods. This has resulted in a need for integrated data and information, not just for Fraser River Sockeye salmon but also for other co-migrating salmon species. The Fraser River Panel is probably not the only PSC panel wanting to combine information from various salmon species. The Committee on Scientific Cooperation could support this type of multispecies work by exploring how to make the data and information for integrated multispecies models more available and accessible across different Technical Committees and Panels.

#### **Proposed Meeting Dates and Draft Agendas:**

##### **October 18-22, 2021 PSC Executive Session**

Present the 2021-2022 Fraser Panel/Fraser River Panel Technical Committee Work Plan to the Commission.

Request an update on any changes to the test-fishing policy.

##### **Special issues the Panel will address by the conclusion of the Annual meeting cycle include:**

1. Review and provide a report to the Commission on the 2021 implementation of Chapter 4 of the Pacific Salmon Treaty.
2. Address management performance and accountability issues, including a review of “2021 Fraser Management Plan Principles and Constraints” and consistency in managing all fisheries to meet bilateral objectives.
3. Continue to review the technical information and modeling work being used as the basis for the Fraser Panel’s Management Adjustments, as well as additional in-season information that has been used when applying Management Adjustments in-season, including information from the Big Bar landslide. Review the procedure for incorporating these adjustments into in-season management of Fraser Sockeye.
4. Compare in-season estimates of Sockeye run size by management group with observed spawning escapements, catches and any applied management adjustments, including a review of upstream migration timing, en route mortality and spawning success of late-run stock components. Where differences are observed, evaluate the potential causes of observed differences, including consideration of the potential contribution of fishery induced mortalities to any discrepancies. Compare the observed differences to the projected differences based on the Management Adjustments adopted by the Panel in-season.

5. As a result of the significant uncertainty associated with the in-season estimates of escapement of both Sockeye and Pink salmon in 2021 a thorough review of the various elements of the Mission hydroacoustics program is required which will include the information from the Qualark and Big Bar hydroacoustics programs. Species composition and changes in fish migration behavior associated with low discharge (i.e. greater mid-channel movement, milling, etc) were some of the areas affecting escapement estimation and require further investigation by PSC staff, DFO, US and possibly other external hydroacoustics experts. Whereas this review and associated work is primarily focused on the presence of Pink salmon, other salmon species are known to impact assessments in low Sockeye return years. Completion of this work along with an implementation plan should be reviewed by the Panel prior to the 2023 in-season management period. To ensure all parties have a full understanding of the work to be conducted and the roles and responsibilities of those involved the parties and the secretariat will draft the Terms of Reference for adoption no later than the Annual meeting in Feb. 2022. This issue will draw on the work already completed by the FSRC (see #1 under emerging issues).
6. The Panel will prepare recommendations on 2022 Fraser Sockeye and Pink salmon related proposals to the Southern Endowment Fund (SEF) Committee. The Panel developed a list of specific funding priorities, which was used in the SEF call for proposals, so that applications will be focused on work of the most value to the Panel.
7. Review issues concerning the management of Fraser Sockeye and Pink salmon, including escapement planning and escapement goal determination, documentation of escapement levels, and variations in marine area migration timing and diversion that result in stock and/or species overlap and management complications in Panel fishery harvest areas.
8. The Panel will continue discussions on methods for determining allowable impacts on non-targets stocks and species, and necessary conservation actions, in Panel Area fisheries.
9. The Panel will determine whether further revision of stock management group assignments for individual stocks is warranted following the changes made to the stock aggregations in 2012, and whether the stocks would be more appropriately managed as part of other stock management groups for 2021 and beyond.
10. The Panel will develop and document a process for updating in-season run size decisions (i.e., updates to in-season run size pertaining to changes in species composition, or other information and timeliness of updates).
11. The Panel will discuss issues concerning small but acceptable harvest during pink directed fisheries as well as the use of gillnets in pink directed fisheries.

#### **January, 2022 PSC Post-Season Meeting**

Each National Section shall conduct detailed reviews of the 2021 Fraser River Sockeye and Pink salmon return, fishery performance, special conservation actions and escapement levels and provide a summary of this information to the Commission.

#### **February, 2022 PSC Annual Meeting**

The Panel shall continue discussions of any unresolved special issues.

The Panel shall address “Other Activities” identified for the Panel in the 2021/2022 Work Plan.

The Panel will initiate the 2022 Pre-Season Planning process consistent with the provisions of the renewed Annex IV, Chapter 4 of the Pacific Salmon Treaty, and any guidance provided by the Commission. The Panel will require meetings in late-April or early May and June 2022 in addition to the PSC Annual Meetings to complete pre-season planning tasks.

#### **Outline of Other Activities of the Fraser River Panel for the 2021/2022 Cycle**

***This list includes special items/topics of less time sensitive nature or one-time projects.***

1. Finalize development of an improved Fraser Sockeye and Pink salmon fishery planning model. The Panel will facilitate, monitor and provide guidance as necessary to the efforts of the PSC Staff and Fraser River Panel Technical Committee to complete the development of the new Fraser Fishery Pre-season Planning Model.
2. Continue work on Hydro-acoustics: The Panel will continue work on Hydro-acoustics as directed by the Commissioners; including the continuation of work to assess the accuracy of acoustic abundance estimates and how these estimates relate to spawning ground estimates (see 5 above).
3. Continue work to advance recommendations from the Test-Fishing review: The Panel will continue to implement test-fisheries in the most cost-effective manner possible, while obtaining information required to inform in-season run size decisions.
4. Evaluate Panel-Approved Test-Fisheries and potential use of data from other sources. The Panel will review the work done by various SEF projects in 2018, 2019, 2020 and 2021 that evaluated the usefulness of current as well as alternative data for in-season assessment and management. The Panel continued to identify this research as an SEF priority for 2022.
5. Review 2021 Test Fisheries and develop a Test Fishing Plan for the 2022 Season. The plan will incorporate any changes and recommendations from the Test Fishery Review and follow-up projects, and/or use of data from other sources that could improve in-season assessments. This includes further discussion exploring if the Cottonwood test fishery could be moved or adjusted to increase catches, the Brownsville Bar SEF test fishery and if the Area 20 test fishery will require different net materials in the future. More discussion is also required to address expected future funding shortfalls.
6. Review progress in completing the Canadian Fraser River Sockeye Spawning Initiative and Recovery Potential Assessment: Further updates will be provided to the Panel in 2022.

7. PSC staff will provide a progress report on the sampling programs at Mission and Qualark, including any issues that arose from modifications made to the programs in 2021.
8. The Technical Committee will review data updates to the Fraser Sockeye catch and exploitation rate files, and make revisions as needed. Work will include advancement on the Run Size Adjustment process.
9. The Technical Committee will receive progress reports on the updates to the production data set.
10. Consider future changes to the pink salmon program from ONCOR to CBAYES.
11. Administrative Issues: Review and approve outstanding Panel minutes and Fraser River Panel Annual Reports.
12. Review the PSC proposed budget for 2022 Fraser River Panel Programs.

**Status of Annual Reports:**

Fraser River Annual Reports up to and including 2019 are complete and have been posted to the PSC website. The 2020 report has yet to be sent for review to the Parties; however, it is anticipated this will happen by the end of the year. The 2021 Annual Report will be sent to the Parties for review spring 2022.



### **Fraser River Panel Meeting Schedule<sup>1,2</sup>**

December, 2021 – 4 days	Forecast meeting (& RSA?) Meeting	Virtual
January 10-14, 2022	PSC Post-Season Meeting	Portland
February 14-18, 2022	PSC Annual Meeting	Vancouver
March, 2022– 1 day	FRTC Model Inputs	Virtual
April, 2022 – 2 days	Fraser River Panel Technical Committee	Victoria or Virtual
April, 2022 – 2 days	Fraser River Panel Pre-Season Planning	Victoria or Virtual
May, 2022 – 2 days	Technical Modeling Meeting (RSA?)	Vancouver
June, 2022 – 2 days	Fraser River Panel Technical Committee	Suquamish
June, 2022 – 2 days	Fraser River Panel Pre-Season Planning	Suquamish
July 12, 15, 19, 22	Fraser River Panel – In-Season Meeting	Calls
July 26, 2022	Fraser River Panel – In-Season Meeting	Richmond
July 29, 2022	Fraser River Panel – In-Season Meeting	Calls
August 5, 12, 19, 26	Fraser River Panel – In-Season Meeting	Calls
August 2, 2022	Fraser River Panel – In-Season Meeting	Richmond
August 9, 2022	Fraser River Panel – In-Season Meeting	Richmond
August 16, 2022	Fraser River Panel – In-Season Meeting	Richmond
August 23, 2022	Fraser River Panel – In-Season Meeting	Richmond
August 30, 2022	Fraser River Panel – In-Season Meeting	Calls
September 2, 6, 9, 13, 16	Fraser River Panel – In-Season Meeting	Calls
September 27-29, 2022	Fraser River Panel – Post-Season Meeting	?

1 – This schedule will be reviewed for opportunities to improve upon efficiency and reduce Panel costs.

2 – Both parties may choose to schedule pre-meeting caucuses virtually or in-person before Panel meetings

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## **PACIFIC SALMON COMMISSION WORK PLAN** **2021-22**

### **Panel / Committee:**

- *Southern Panel; reports to the Pacific Salmon Commission.*
  - *Coho Technical Committee (CoTC); reports to the Southern Panel.*
  - *Chum Technical Committee (ChumTC); reports to the Southern Panel.*

*This work plan includes a summary of the work plans submitted by both the Coho and Chum technical committees, and as such does not include all the detail in those work plans. This is not intended to deny the importance of that detail, only to provide a high-level summary of it for Commissioners.*

**Date:** *October 18-22, 2021 -- PSC Executive Session, Webinar*

### **Update on Bi-lateral Tasks Assigned Under Current PSC Agreement:**

#### **Southern Panel:**

- *Annual Post Season Review – A detailed bilateral review of the 2020 coho, chum and chinook salmon abundances, fishery performances, and preliminary estimates of escapement levels was conducted at the January 2021 PSC post-season meeting.*
- *Present updates on the development of management objectives/breakpoints for Coho management units for the Southern Coho Management Plan of Chapter 5.*
- *Conduct pre-season data exchanges.*
- *Review and update status of bilateral tasks listed in Chapter 5 and Chapter 6 Implementation Plans.*
- *Continue work on developing a bilateral process per the new Southern Coho Agreement (Chapter 5, Paragraph 11b and 11c new language)*
- *Review and recommend priorities for Southern Endowment Fund Committee consideration.*
- *Update reporting requirements, and assign work as required for completion.*

#### **Coho Technical Committee:**

*The following list includes updates on the status of ongoing tasks from previous work plans, as well as descriptions of bilateral tasks planned for 2021-22:*

- *Complete post-season ER estimates for Coho Management Units in the 2020 fishing season.*
- *Develop a new reporting tool to facilitate post-season ER reporting that is in an R package and combines the former Strait of Georgia Vancouver Island and Mainland MUs into a single Strait of Georgia MU for the annual post-season ER report.*
- *Work to update a periodic report to cover the catch years 1986–2019 continues; updates were provided to the Coho Workgroup and Southern Panel on producing an electronic format for the Periodic Report. Development of programs to*

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facilitate generation of tabular summaries of data for the Periodic Report continued. Tables and figures are now easily updated using R code and a draft of the report will be made available in 2022.

- The annual information exchange for fishery planning will be performed, probably remotely in March 2022, and a report summarizing expected fishery impacts on Coho MUs during the 2022 fishing season will be distributed by 30 June 2022.
- Regional fishery planning model development. Bilateral interaction for the CoTC was centered on model improvements to increase efficiencies in production of estimates of post-season exploitation rates provided to the Southern Panel. A current Southern Fund project is looking into validating model generated exploitation rates using CWT-based cohort analyses and exploitation rate analyses. In addition, mark rates are being compared between model-based estimates and direct sampling programs. A sensitivity analysis is also being undertaken. The goal of this project is to evaluate the effects of abundance changes of influential Coho stocks on the exploitation rate of other model stocks to determine which forecasts of abundance have the greatest effect on key wild stocks. Results could be used to inform decision makers about prioritizing the timing and availability of forecast information and allocation of limited stock assessment resources. Project completion is tentatively scheduled for 2021.
- Beginning in March 2020, all CoTC and Coho Workgroup (CoWG) meetings were held remotely due to COVID-19. During the July 2021 CoWG meeting, the implementation plan for the 2019 Southern Coho Agreement was reviewed and the CoTC provided informational presentations on reporting expectations after preseason planning, unanticipated mortalities, electronic hosting of the periodic report, further details from the SFEC Coho Double Index Tag (DIT) report and SEF projects, follow-up from the environmental change workshop, an overview of the Canadian Pacific Salmon Strategy Initiative, and future CoTC workload/priorities. Additionally, information was provided on issues relating to conducting remote meetings, and the Workshop on incorporating environmental information into abundance forecasts, organization, and operation of the CoTC SharePoint site, creation of a library for publications, concerns regarding limitations of staffing and support for coho-related stock and fishery assessments, and ideas for continuing efforts to develop approaches to prepare for and adapt to environmental change.
- CoTC will review the SFEC Coho Double Index Tag Report and develop an action plan based on the recommendations.
- Complete MU descriptions. An outline of requirements was developed in 2003 and reviewed in 2009. A Coho database has been developed for U.S. stocks. Draft descriptions were prepared for Canadian MUs and will be finalized once reference points are determined. Draft descriptions for most US MUs were completed in 2012, reviewed by local fishery managers, and are currently being finalized. During the July CoWG meeting, a couple people were assigned to focus on getting each MU updated to incorporate in the Periodic Report.

- **Assessment Framework.** A presentation was made to the Southern Panel at the February 2012 Annual Meeting in Vancouver describing a draft framework to identify the biological and fishery assessments required for implementation of the Treaty provisions for Coho. No subsequent modifications have been made. The framework provides guidelines or criteria to help evaluate the adequacy of available information and the capacity of assessment programs to produce information required to implement the current Southern Coho Agreement and develop a new Southern Coho Agreement, highlights issues relating to CWT data for coho, and presents information needs within a decision-theoretic framework to help inform policy deliberations of relationships between uncertainty, risk, and potential requirements for assessment programs. Criteria discussed include: 1) conservation risk and stock outlook; 2) loss of fishing opportunity; and 3) costs for monitoring and assessment.
- **Environmental Change.** The Southern Coho Agreement contains a provision that recognizes the emerging and increasing urgency of addressing impacts of environmental change on salmon resource and dependent communities. These impacts have included effects of extreme events such as heat domes, hypoxia, alteration of precipitation and temperature regimes and ecological processes and food webs, changes in rates of survival, maturation, growth, fecundity, productivity, and patterns of distribution, and migration, all of which increase uncertainty and undermine confidence in our ability to rely on historical relationships, models, and methods to guide future salmon management. Environmental change has been incorporated into previous workplans of the Southern Panel, Chinook Technical Committee, and the Committee on Scientific Cooperation (CSC). In light of the crosscutting nature of environmental change across species and areas, the Pacific Salmon Commission has established an information sharing portal on Environmental Change and the CSC has developed management/assessment templates for each PST chapter.

The CoTC established an Environmental Change Workgroup that included participation by the CSC. Plans for addressing environmental change were shared with the Southern Panel and CoWG during the 2020-21 cycle. The CoTC subgroup on Environmental Change developed recommendations for near term (1-2 years) and intermediate term (5-10 years) actions and measures that should be reviewed in conjunction with the Committee on Scientific Cooperation. On May 11, 2021, the CoTC and CSC convened a half-day electronic conference titled ‘Introduction to Using Environmental Indicators to Inform Salmon Management’ to share information regarding the incorporation of environmental information into salmon management. Over 150 participants attended the workshop and survey responses indicated broad interest in helping to organize and conduct future workshops. A final report is available on the PSC website.

All workshop materials can be found at:

<https://www.psc.org/publications/workshop-reports/environmental-indicators-workshop>. At the Coho Workgroup meeting in July 2021, CoTC members described the positive feedback they received, and discussions revealed interest and support in developing a strategic plan to address environmental change and holding additional workshops within the next cycle.

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For the 2021-22 cycle, the CoTC proposes to continue to advance efforts to address environmental change by establishing a steering committee to guide development of an actionable strategy to help prepare and support the ability of the PSC family to contend with the challenges ahead. The Steering Committee would be comprised of volunteers from the PSC family so as not to interfere with other responsibilities and obligations. It would be desirable to include membership from a broad spectrum of groups across the PST area. As a result of the May 2021 workshop on forecasting, several individuals from other technical committees have expressed interest in participating in future activities relating to environmental change.

The CoTC proposes to convene one or two workshops and conduct a series of topical seminars. Topics and timing would be determined by the guidance provided by the Steering Committee while operational details are anticipated to be handled primarily by CoTC members. Workshops and seminars would be conducted remotely due to continuing COVID concerns and to minimize budgetary impacts for agencies, participants, and the PSC staff.

We will need assistance from the PSC Secretariat Staff for advertising, registration, hosting, and web site services, as well as posting recorded workshops and seminars to the PSC SharePoint site.

The workshops would be focused on development of a framework and actionable strategic plan for addressing environmental change. The CoTC is seeking support from the Southern Endowment Fund to provide funding and staffing to support this effort.

The seminar series would consist of monthly half-hour presentations by effective speakers on topics of interest to the entire PSC family followed by a full hour of facilitated discussion. Presentations and discussion will be recorded and available on the PSC SharePoint site. In some cases, seminars would be tag-team or debate-style events to get both US and Canadian (or other) perspectives and information. Speakers may be either external or internal to PSC, but the facilitator(s) will come from PSC, and likely a member of the Steering Committee. The steering committee for this seminar series would consist of interested members of all PSC panels and committees, to ensure seminars include topics of interest to all PSC members and PSC groups.

The proposed workshops and seminars are intended to follow-up on recommendations from the May 2021 environmental indicators/forecasting workshop to help prepare the PSC family to address the increasingly urgent problem of environmental change for salmon and dependent communities and help increase awareness and capacity for negotiation of future PSC agreements.

A partial list of possible topics for the seminars is provided below. A list of potential speakers is being compiled.

- Interspecies considerations (E.g., carrying capacity, pinks – species displacement, range expansions & reductions)
- Fishery planning models
- Hatchery practices and hatchery wild interactions

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- Habitat Restoration and Improvement
- Restructuring Fisheries (selective harvest opportunities and effectiveness)
- Restructuring stock assessments to provide abundance assessments earlier and in-season
- Escapement goals and harvest benchmarks in the face of changing productivity
- Decarbonizing fishing – just transition and energy consumption
- Monitoring and assessment systems (e.g, sentinel stocks, environmental stop lights, data collection, analysis, management, and access)
- High risk and Stronghold stocks/habitats
- Heat Waves and Domes
- Ecological and Hydrologic drought
- Hypoxia
- Harmful Algal Blooms
- Ocean acidification
- Visions for the future sustainability of salmon
- Indigenous, Participant, and Local knowledge & governance, citizen science.
- Integration of research efforts and events (OSU surveys, Pan Pacific Cruise, Year of the Salmon)
- Effecting Change – overcoming fragmentation, developing & sustaining policy, administrative, and budgetary support
- Availability & Allocation of resources
- Salmon life histories and declining body size
- Biological oceanography and salmon prey
- Salmon predation trends and natural mortality estimates revisited
- Carryover effects and life cycle models
- Non-stationary relationships between climate and salmon
- Modeling changes in stream temperature and adaptive capacity

**Chum Technical Committee:**

- *Beginning work on the draft report covering 2019 fisheries and research will be a principal focus during the PSC meetings in January 2022.*
  - *Continue to work on the bilateral implementation plan for Chapter 6*
- *The committee's other focus will be continued development of aspects of the strategic plan (see attached Figure).*
- *To provide updates on any approved 2021 SEF projects: Currently 3 Chum salmon projects are being conducted in 2021:*
  - **Juan de Fuca Strait Chum Salmon Sampling program, Year 6**
  - **Puget Sound Chum salmon GSI, Year 4**
  - **Chum Salmon Baseline and GSI in Southern Boundary Region, Year 2**

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- *Work on 2021 reports associated with SEF projects for later submission*
- *Review of SEF priorities and ensure projects are ready for 2022 implementation should funding materialize.*
- *Identify additional sampling requirements to complete and/or update the existing DNA baseline collections*
- *Seeking other funding opportunities or resources to help with the database development, and other priority items such as Environmental co-factors with Chum abundance.*

**Obstacles to Completing above Bi-lateral Tasks:**

**Southern Panel:**

- To accomplish the above bi-lateral tasks, we will need the Commissioners' support to hold the requested number of meetings during the 2021-22 work cycle that are noted below in the subsection, "Proposed Meeting Dates and Draft Agendas."

**Coho Technical Committee:**

- An implementation plan for the 2019 Southern Coho Agreement continues to be developed. Efforts of the CoTC are focused on improving CoTC efficiencies, stock and fishery assessments, and proactively dealing with uncertainties relating to environmental change.
- The new Agreement also contains a provision requiring the Parties to bilaterally exchange projected ERs upon completion of their respective preseason fishery planning processes. Canada developed a report of expected pre-season ER impacts and circulated the report to CoTC and the Southern Panel by June 30<sup>th</sup>. During the July 2021 CoWG meeting, Canada confirmed that no substantive changes resulted from its domestic fishery planning processes from the information shared via the March data exchange and that the resulting expected ER impacts on Coho MUs were summarized in the report circulated by June 30<sup>th</sup>. Those expectations were incorporated into US fishery planning processes of the Pacific Fishery Management Council. The form and information in the pre-season ER report was discussed during the July 2021 COWG meeting and may be altered in the future.
- Staffing and funding levels to support implementation of the new Coho Agreement are uncertain. The CoTC is concerned about: (1) the capacity of both Parties to maintain catch sampling and stock monitoring programs, and to provide required inputs into joint management planning models; (2) the need for additional dedicated staff to participate in activities of the CoTC; (3) the need to improve information exchange on preseason FRAM runs for impact projections (preseason model runs from Canada are needed to provide projections of planned fishery impacts on MUs); (4) the lack of established monitoring and reporting systems to assess impacts of environmental change; and (5) lack of adequate CoTC meeting space at the Portland Embassy Suites.

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Chum Technical Committee:

- While support from the Southern Endowment Fund has facilitated our efforts to implement the ChumTC strategic plan, time constraints for committee members remains a challenge to task completion. At this point in time, it seems unlikely that the ChumTC will meet in person during 2022, due to COVID-19. While this lack of in-person ChumTC meetings will be mitigated by continuing to hold additional virtual meetings, work progress may progress slower than expected.

**Outline of Other Panel / Committee Tasks or Emerging Issues:**

Southern Panel:

Due to uncertainty regarding COVID-19, the Southern Panel plans to work remotely for the entire 2021-22 cycle. Most of the Southern Panel members' agencies are still not permitting travel to in-person meetings.

Coho Technical Committee:

Budget availability and timing remain of concern. The capacity of the Parties to undertake assignments is being challenged by agency staffing and budget constraints and limitations of funding to support PSC related activities. The PSC and domestic management entities should be made aware of the need to address workforce and budgetary shortfalls reported by the three sub-groups that convened at the CoTC/CoWG meeting in Nanaimo BC in June 2019. Canada has appointed additional members to the CoTC; U.S. CoTC membership changes include the retirement of Andy Rankis, addition of Marlene Bellman, and Rishi Sharma relocating to join the Food and Agricultural Organization in Rome, Italy. Concerns regarding the exacerbation of uncertainty in staffing and budget limitations, including impacts on agency capabilities due to COVID-19, were also discussed during the remote July 2021 CoWG meeting. Uncertain appropriations and budget allocation decisions for both the U.S. and Canada impede the capacity of the CoTC to plan its schedule and complete tasks. The CoTC and CoWG may need to revise the workplan once budgetary and staffing limitations and requirements are clarified.

- Due to uncertainty regarding COVID, the CoTC plans to work remotely for the entire 2021-22 cycle. Remote collaboration will be a learning experience. A number of issues which have arisen were discussed during the July 2021 CoWG meeting, including:
  - There is a need to standardize meeting platforms to the extent feasible – agency restrictions and the wide variety of meeting platforms has increased the difficulty of convening and conducting remote meetings. For the most part, the CoTC expects to rely upon agency-supported platforms to the maximum extent feasible. Support from PSC staff will be needed to arrange CoTC-Southern Panel meetings.
  - There is a potential for remote meeting burnout. CoTC is planning to limit meetings from 2-4 hours in length to increase productivity and maintain attention span.
  - Complications can and have arisen with variable capabilities to work remotely, e.g., connection reliability, band width. Support and assistance from PSC staff



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- will be needed to host large meetings and work through connection and information sharing issues.
- With remote meetings, there is a potential for participants to be distracted by other activities and responsibilities, increasing the need for maintaining official minutes, calendars, and reporting systems.
- With multiple workgroups within the CoTC, there is a need for the PSC to provide scheduling support, such as meeting calendars, quick contact information for participants, and potential recording of meetings.
- Guidelines for meeting conduct – protocols for participation and meeting control/facilitation, including public participation, password protection for read and edit authority, version tracking, separation of working from public information, privacy and security – are needed.
- In the event that more normal activities resume, adjustments to meeting schedule and arrangements will be requested as needed. Anticipate that special precautions and adjustments to previous meeting arrangements will be needed should in-person meeting resume, including: (a) adequate meeting space will be needed for health and safety; (b) availability of sanitation stations; (c) isolation protocols; (d) contact tracing.
- Per PSC request, COVID-related impacts were reported. In addition to impacts on PSC assignments, the CoTC wishes to note that COVID is expected to affect agency budgets and operations. Specific impacts are uncertain at this time, but adjustments to hatchery production, stock and fishery monitoring and assessment programs are under consideration.
- A process is needed to provide the CoTC with the opportunity to review relevant proposals that are submitted for Southern Endowment Fund support and receive copies of progress and final reports for SEF projects involving CoTC priorities.

### **Big Bar Slide**

In late October 2018, the Big Bar landslide occurred in the upper Fraser River in the vicinity of Lillooet which resulted in a 5 meter high blockage that obstructed passage of several species of salmon, including Interior Fraser Coho. A preliminary estimate indicates that about 12% of the spawning area utilized by Interior Fraser Coho occurs upstream of the Big Bar slide. Issues relating to reporting and accounting for unanticipated post-fishery mortalities were discussed and addressed by the CoWG. Substantial amounts of staff from DFO, First Nations, and partners and funding has been devoted to address this situation, but it is unclear how long salmon passage will continue to be affected. DFO continues to provide occasional updates to the CoTC and CoWG on the impacts of the Big Bar Slide on the Interior Fraser Management Unit and efforts to remediate passage problems.

### **Potential Issues for Commissioners**

#### **Coho Technical Committee:**

- Transition to a new Southern Coho Agreement. This proposed workplan anticipates that CoTC efforts during this cycle reflect a transition and redirection of some old

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assignments and redirection of resources to new tasks in anticipation that measures to begin work under the PSC annex will be put in place within the current cycle. Additional resources will be required for addressing requirements under the new Agreement. In July 2021, the CoTC and CoWG met to continue development of an implementation plan for the 2019 Southern Coho Agreement. Continued deliberation with the Coho Workgroup and Commissioners will be needed regarding CoTC priorities.

- Guidance will be needed regarding establishment of a process to provide the CoTC with the opportunity to review relevant proposals that are submitted for Southern Endowment Fund support. In addition, progress and final reports for Southern Endowment Fund projects involving Coho should be routinely provided to CoTC for information.
- Support for conducting workshops and a seminar series dealing with Environmental Change is requested, including assistance from PSC Secretariat Staff for advertising, registration, hosting, and web site help, as well as posting recorded workshops and seminars to the SharePoint site, and support for resources from Southern Endowment Fund.

*Chum Technical Committee:*

- Uncertainty on how the fall and winter activities will proceed with the uncertainties around COVID-19. Existing programs at this time are unaffected but that could change.

**Potential Issues for Committee on Scientific Cooperation**

The PSC could consider establishing a coast-wide, multi-species forum under the oversight of the Committee on Scientific Cooperation to share developments and advice regarding adaptation of Pacific salmon management approaches to environmental change. There is strong evidence that environmental change is occurring and accelerating to a degree such that past experience cannot be expected to serve as a reliable basis to forecast the future. Increases in uncertainty, variability, and directional change are expected to alter hydrologic, precipitation, and temperature patterns which, in turn, are likely to affect the productivity, abundance, distribution, and migration patterns of Pacific salmon. The forum should provide reporting of significant developments in the knowledge base as well as vetting of recommendations for monitoring and reporting systems, and potential adaptation strategies. The CoTC and CSC jointly sponsored a workshop on incorporating environmental information into abundance forecasts in May 2021. Continued participation and coordination between the CoTC and CSC are recommended to discuss and review recommendations for addressing environmental change in management of Pacific Salmon.

**Proposed Meeting Dates and Draft Agendas**

*Proposed meeting dates and key activities planned for Southern Panel, Coho Technical Committee (CoTC), Coho Working Group (CoWG), and Chum Technical Committee (ChumTC) are listed in the following section. Additionally, a summary table by meeting*

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date in the 2021-22 work cycle is provided below. Attendance of panel and committee members may be dependent on available resources.

Southern Panel Meeting Schedule:

- January 10-14, 2022 – PSC Post Season Meeting, Webinar.
- February 14-18, 2022 – PSC Annual Meeting, Webinar
- Manager-to-Manager Review Meeting – March 2022 – date TBD – Webinar
- Also, see Coho Working Group meeting schedule in the table below, which will include a subset of Southern Panel members.

Coho Technical Committee (CoTC) and Coho Working Group Proposed Meeting Schedule (for the 2021-22 cycle, all meetings are assumed to be virtual via remote electronic platforms):

- November 2021 – Environmental Change monthly seminars begin through remainder of cycle (Webinar).
- December 2021/January 2022 – SFEC – CoTC follow up on Coho DIT report (Webinar);
- January 10-14, 2022 - PSC Post-Season Meeting (Webinar)
  - CoTC dates flexible to continue work on assignments. Main task will focus on preparing for estimation of 2020 exploitation rates and work with CoWG to revise workplan in light of instructions from PSC Executive Session; briefing of CoTC on status of FRAM Model evaluation project and receive input from committee members; update on periodic report; planning for electronic conference on environmental change, and update on environmental conditions and Big Bar developments.
  - If remote, two meetings between the CoTC and Southern Panel are anticipated during the January Post Season meeting.
- February 14-18, 2022 – PSC Annual Meeting (Webinar)
  - CoTC – dates flexible. Preparation of 2020 ER report; planning for electronic conference on environmental change; continue working on periodic report.
  - If remote, at least three meetings between the CoTC and Southern Panel are anticipated during the February Annual PSC meeting to report 2020 ERs and provide a briefing on environmental conditions.
  - Review draft Strategic Plan.
  - Identify priorities for Southern Endowment Fund support.
- March 2022 (date TBD, mid-March) – Coho Working Group; Panel chairs and select members (Webinar).
  - Annual manager-manager information exchange. Exchange preseason stock forecasts and fishery plans.
- April-June 2022 (select dates TBD) – Steering Committee – Webinar Meetings for Workshop on Environmental Change;

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- *July 2022 (dates TBD) – CoTC and CoWG meeting (Webinar)*
  - *Review draft strategic plan for Southern Coho.*
  - *Review methods for determining status of Canadian MUs, bilateral exchange of projected ER caps upon completion of domestic preseason fishery planning processes, and stock and fishery assessment programs for implementation of the new Coho Agreement.*
  - *Review estimates of ERs for MUs resulting from domestic planning processes.*
  - *Review Periodic Report and CoTC priorities. Initiate discussion of implications of environmental change for Southern Coho Management.*
- *Sept 2022 (date TBD) – CoTC and CSC meeting (Webinar)*
  - *Initiate deliberations between the CoTC and CSC on recommended actions for implementing the Environmental Change provisions of the new Southern Coho Agreement and to further explore alternative approaches for monitoring, evaluating, and addressing environmental change for management of Southern Coho and other species of Pacific salmon.*

*Chum Technical Committee Proposed Meeting Schedule:*

- *January 10-14, 2022 – PSC Post-Season Meeting (Webinar)*
  - *Review and discuss preliminary post-season 2021 fisheries information*
  - *Collate and review report items for 2019 final post-season report*
  - *Continue work on Southern Chum genetic baseline inventory and expansion for adequately identifying stock origin of fish in mixed stock fisheries on both sides of the border*
  - *Continue to evaluate and test the ChumGEM model*
    - *Presentation on CHUMGEM progress, issues and next steps*
  - *Updates on any completed SEF programs related to Chum*
  - *Review and discuss research and analysis activities essential to the Committee tasks*
  - *Review Chum Strategic plan and update*
  - *Provide any bilateral analyses, as requested by the Southern Panel.*
- *February 14-18, 2022 – PSC Annual Meeting (Webinar)*
  - *Continue work on 2019 annual report.*
  - *Address any specific tasks assigned to the Committee by the Southern Panel at the January meeting*
  - *Continue work on tasks not completed at the January meeting*
  - *Assign workgroups and workgroup tasks for items still pending at the end of the February meeting*
  - *SEF projects for 2023 should be identified and program planning initiated*
  - *Start to develop new SEF priorities document for upcoming call*
  - *Initiate 2020 annual report*

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- *May 2022 – PSC Chum TC Spring Meeting, location to be determined*
  - *Finalize 2019 annual report for submittal*
  - *Continue to define and develop Tier 2 components of the Southern Chum Strategic Plan*
  - *Review status of all SEF related projects and develop plan for new submission following identified priorities*

Proposed Schedule of Meetings for 2021-22: PSC Southern Panel, CoTC, CohoWG, ChumTC			
When	Who	Location	Purpose/ Primary Tasks
December 2021/January 2022 (dates TBD; remote)	CoTC & SFEC	Remote	SFEC and CoTC follow-up meeting on the Coho DIT report.
Jan 10-14, 2022 PSC Post Season Meeting	Southern Panel CoTC ChumTC	Remote	<p><u>Southern Panel</u></p> <ul style="list-style-type: none"> <li>• Annual Post Season Review</li> <li>• Review and update status of bilateral tasks listed in Chapter 5 and Chapter 6 Implementation Plans.</li> <li>• Continue work on developing a bilateral process per the new Southern Coho Agreement (Chapter 5, Paragraph 11b and 11c new language).</li> <li>• Ocean Indicators presentation.</li> <li>• Present updates on the development of management objectives/breakpoints for Coho management units for the current Southern Coho Management Plan of Chapter 5.</li> <li>• Plan priority activities for future work.</li> </ul> <p><u>Coho Tech Committee</u></p> <ul style="list-style-type: none"> <li>• Prepare for estimation of 2020 exploitation rates and work with CoWG to revise workplan in light of instructions from PSC Executive Session; briefing of CoTC on status of FRAM Model evaluation project and receive input from committee members; update on periodic report; planning for electronic conference on environmental change, and update on environmental conditions and Big Bar developments.</li> </ul> <p><u>Chum Tech Committee</u></p> <ul style="list-style-type: none"> <li>• Review and discuss preliminary post-season 2021 fisheries information</li> <li>• Collate and review report items for 2019 final post-season report</li> <li>• Continue work on Southern Chum genetic baseline inventory and expansion for adequately identifying stock origin of fish in mixed stock fisheries on both sides of the border.</li> <li>• Continue to evaluate and test the ChumGEM model <ul style="list-style-type: none"> <li>◦ Presentation on ChumGEM progress, issues and next steps.</li> </ul> </li> <li>• Updates on any completed SEF programs related to Chum</li> <li>• Review and discuss research and analysis activities essential to the Committee tasks</li> <li>• Review Chum Strategic plan and update</li> <li>• Provide any bilateral analyses, as requested by the Southern Panel.</li> </ul>
Feb 14-18, 2022 PSC Annual Meeting	Southern Panel CoTC ChumTC	Remote	<p><u>Southern Panel:</u></p> <ul style="list-style-type: none"> <li>• Pre-season data exchanges.</li> <li>• SEF priorities developed and presented by technical committees and endorsed by Panel.</li> <li>• Review and update status of bilateral tasks listed in Chapter 5 and Chapter 6 Implementation Plans.</li> <li>• Continue work on developing a bilateral process per the new Southern Coho Agreement (Chapter 5, Paragraph 11b and 11c new language).</li> <li>• Update reporting requirements, and assign work as required for completion.</li> </ul> <p><u>Coho Tech Committee:</u></p> <ul style="list-style-type: none"> <li>• Prepare 2020 ER report; plan for virtual (webinar) conference on environmental change; continue working on periodic report.</li> <li>• Briefing on environmental conditions with Southern Panel.</li> <li>• Review draft Strategic Plan.</li> <li>• Identify priorities for Southern Endowment Fund support.</li> </ul> <p><u>Chum Tech Committee:</u></p> <ul style="list-style-type: none"> <li>• Continue work on 2019 annual report.</li> <li>• Address any specific tasks assigned to the ChumTC by the</li> </ul>

Proposed Schedule of Meetings for 2021-22: PSC Southern Panel, CoTC, CohoWG, ChumTC			
When	Who	Location	Purpose/ Primary Tasks
			<ul style="list-style-type: none"> <li>Southern Panel at the January meeting</li> <li>Continue work on tasks not completed at the January meeting</li> <li>Assign workgroups and workgroup tasks for items still pending at the end of the February meeting</li> <li>Start to develop new SEF priorities document for upcoming call</li> <li>Initiate 2020 annual report</li> </ul>
<u>March 2022</u> (1 day; date TBD)	Coho Working Group (CoWG); Panel chairs, select members	Remote	<ul style="list-style-type: none"> <li>Annual manager-manager information exchange. Exchange preseason stock forecasts and fishery plans.</li> </ul>
<u>May 2022</u> (dates TBD)	ChumTC	Remote	<ul style="list-style-type: none"> <li>Finalize 2019 annual report for submittal</li> <li>Continue to define and develop Tier 2 components of the Southern Chum Strategic Plan</li> <li>Review status of all SEF related projects and develop plan for new submission following identified priorities</li> </ul>
<u>April - June, 2022</u>	Steering committee members from CoTC, So. Panel, CSC	Remote	<ul style="list-style-type: none"> <li>Steering Committee webinar meetings for Workshop on Environmental Change.</li> </ul>
<u>July 2022</u>	Coho Working Group + CoTC	Remote	<ul style="list-style-type: none"> <li>Review draft strategic plan for Southern Coho.</li> <li>Review methods for determining status of Canadian MUs, bilateral exchange of projected ER caps upon completion of domestic preseason fishery planning processes, and stock and fishery assessment programs for implementation of the new Coho Agreement.</li> <li>Review estimates of ERs for MUs resulting from domestic planning processes.</li> <li>Review Periodic Report and CoTC priorities.</li> <li>Initiate discussion of implications of environmental change for Southern Coho Management.</li> </ul>
<u>Sept 2022</u> (dates TBD)	CoTC & CSC	Remote	<ul style="list-style-type: none"> <li>Initiate discussions between the CoTC and CSC on recommended actions for implementing the Environmental Change provisions of the new Southern Coho Agreement and to further explore alternative approaches for monitoring, evaluating, and addressing environmental change for management of Southern Coho and other species of Pacific salmon.</li> </ul>

### **Status of Technical or Annual Reports:**

#### **Southern Panel:**

- *To be reviewed at the January 2022 Post Season meeting, with a plan developed to complete outstanding reporting requirements.*

#### **Coho Technical Committee:**

- *Annual reporting by the CoTC is limited to production of estimates of exploitation rates. 2019 post-season estimates of exploitation rates were presented to the Southern Panel at the February 2021 meeting.*
- *Work plans and status were reviewed through presentations at 2021 PSC meetings.*
- *Tools were developed to improve report generation capabilities using data generated by Backwards FRAMA Southern Endowment Fund project was initiated to evaluate FRAM performance.*

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- Efforts to update the periodic report and transition to electronic hosting were initiated and progress on development was reported to the CoWG in July 2021.
- Draft descriptions for most U.S. MUs undergoing review. Completion of Canadian MU descriptions are pending determination of MU reference points anticipated in 2022.
- Annual report on CoTC priorities was developed for the Southern Fund Committee.

Chum Technical Committee:

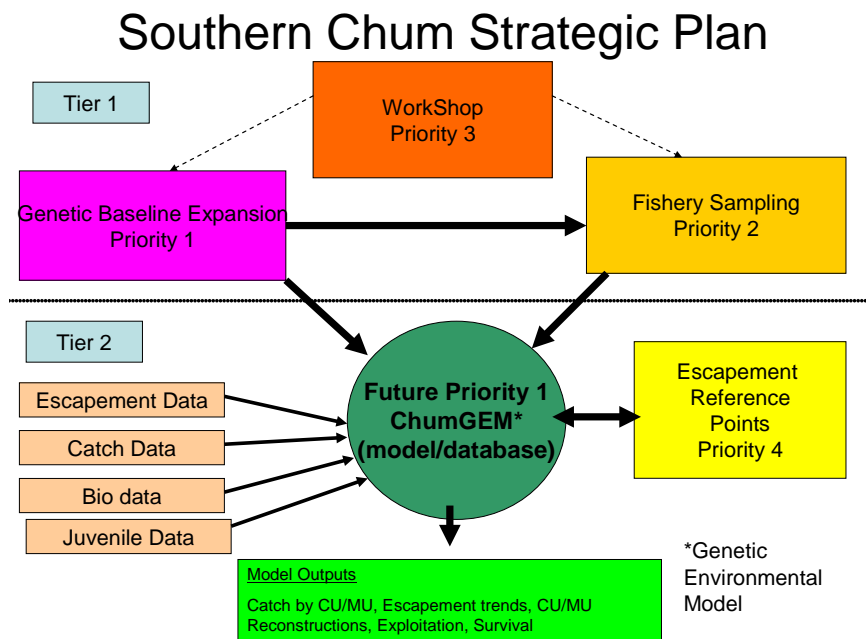
- The committee anticipates having the 2018 Annual Report complete very soon.
- The committee anticipates having the 2019 Annual Report complete by the end of the February meeting in 2022.

Comments:

Coho Technical Committee:

The CoTC workplan reflects redirection of efforts to support emphasis areas anticipated under the Southern Coho Agreement. The proposed priority list for CoTC during the 2021-22 cycle follows (high to low): (1) Generate estimates of 2020 ERs for MUs; (2) Informational outlook for 2022 ocean conditions; (3) Information exchange for 2022 preseason fishery planning; (4) Update periodic report; (5) Evaluate and improve performance of Coho FRAM; (6) explore alternative approaches for addressing environmental change and management of Southern Coho; (7) initiate deliberations regarding status determinations for Canadian MUs; (8) follow-up with SFEC on Coho DIT report; (9) all other assignments to be undertaken on time available basis.

Chum Technical Committee:





**PACIFIC SALMON COMMISSION  
SELECTIVE FISHERY EVALUATION COMMITTEE WORK PLAN  
October 2021 – September 2022**

**Panel / Committee:**

Selective Fishery Evaluation Committee (SFEC).  
SFEC Reports to the PSC Commissioners.

**Date:**

October 18-22, 2021 (Executive Session)

**Update on Bi-lateral Tasks:**

The PSC established the SFEC to assess impacts of mass marking and mark-selective fisheries on the viability of the coded wire tag (CWT) system. The SFEC has three components: (1) an Oversight Committee, comprised principally of the Co-Chairs of the PSC SFEC, Coho, Chinook, and Data Sharing Committees; (2) an Analytical Work Group (SFEC AWG), which is responsible for developing methods and conducting analyses of impacts of mass marking and mark-selective fisheries on the viability of the CWT program; and (3) a Regional Coordination Work Group (SFEC RCWG) which coordinates information sharing on mass marking and regional sampling programs, including electronic tag detection

**A. SFEC assignments for 2020 - 2021****Annual Tasks**

1. Review of mark-selective fisheries (MSF) proposed for 2021 – *Completed.*
2. Review of proposed mass marking (MM) activities for 2021 – *Completed.*
3. Finalize annual report summarizing review of MSF and MM proposals for 2020 – *Expected publication in Fall 2021; Review of Mass Marking and Mark-Selective Fishery Activities Proposed to Occur in 2020.*
4. Finalize annual report summarizing review of MSF and MM proposals for 2021 – *Expected completion in Fall 2021; Review of Mass Marking and Mark-Selective Fishery Activities Proposed to Occur in 2021.*
5. Requested finalized MSF plans and early notice of future MSF and MM plans from agencies– *Memo sent to agencies in June 2021. Replies received July 2021.*
6. Request for MSF and MM proposal for 2022 activities, and post-season reporting for MSFs conducted in 2020. *Memo sent to agencies September 30, 2021.*

**Other Tasks 2020**

1. SFEC (21) -1 Analysis of Coho Double Index Tag (DIT) Groups for Brood Years 1998-2011) – *Final Publication July 2021.*
  - a. Presentation given to Coho Technical Committee, February 2021.
  - b. Presentation given to PSC Community, June 2021.

2. Provide support to other PSC Technical Committees for estimating impacts of MSFs on naturally spawning Chinook and Coho stocks. – *Joint SFEC/Chinook Technical Committee (CTC)/Calendar Year Exploitation Rate (CYER) workgroup proposed meeting in October, 2020. This work did not occur because MSF methods are still under development by the CYER sub-group.*

## **B. SFEC Tasks for 2021 - 2022**

### **Annual Tasks**

1. Review of mark-selective fisheries and mass marking activities proposed for 2022 – *SFEC annual meeting scheduled November 15-18, 2021.*
2. Compile annual report summarizing review of MSF and MM proposals for 2022 – *Draft November 15-18, 2021; final early 2022.*

### **Other Tasks 2021 – 2022**

1. Discuss and outline next steps within SFEC for working with Technical Committees (CTC, CoTC, and CYER workgroup) on assessing impacts on naturally spawning Chinook and Coho stocks – *During SFEC annual meeting in November 2021 and conference call in December.*
2. Participate in joint meeting with CYER/CTC as needed to support analysis of MSF impacts to PSC Chinook stocks.
3. Participate in joint meeting with CoTC on review of Coho DIT Report and Backwards FRAM used for post-season Coho modeling.

### **Obstacles to Completing above Bi-lateral Tasks:**

**Post-Season Reports:** Two post-season reports on MSFs are required for each prosecuted MSF to provide data needed by the Chinook (CTC) and Coho (CoTC) Technical Committees for implementation of PSC fishing regimes and for analysis of MSF impacts. The first report, due November 2021 consists of information outlined in the SFEC post-season report template for MSFs conducted in 2020. This information can also be included in the annual post-season reports submitted to the PSC by the US and Canada for the post-season meeting in January to simplify MSF reporting by agencies.

The timeliness and consistency of agencies in providing first post-season reports for MSFs still needs to be improved. SFEC members have worked with agency staff through personal contact to obtain some of the requested data.

The second MSF report, on incidental mortality of unmarked fish, is to be provided by agencies prosecuting MSFs not later than November 30<sup>th</sup> following the year in which the MSF fishery occurred. This report is to provide stock-age-fishery specific estimates of mortalities of unmarked fish in MSFs. These reports are available in an online reporting system for Puget Sound Chinook salmon MSFs, but SFEC has not received any of the

second type of MSF reports for other MSFs. Availability of the information requested in the post-season reports would facilitate PSC technical committees to estimate impacts of MSFs on naturally spawning Chinook and Coho stocks as required under the 2019 PST agreement.

***Inability to estimate impacts of mixed-bag fisheries:*** Proposals for Chinook and Coho MSFs from all agencies include various forms of mixed-bag regulations (e.g., daily bag of 2 Coho, 1 of which can be unmarked), with varying degrees of complexity; further, the incidence of mixed-bag regulations is increasing. Because of the on-going variation of regulations employed for MSFs, the SFEC is unable to develop standardized methods for estimation of mortalities of unmarked fish. Additionally, catch sampling programs and analytical methods are generally inadequate to estimate impacts on marked and unmarked fish under these varying mixed-bag regulations. The increasing incidence of mixed-bag fisheries will continue to reduce the accuracy of estimates of MSF impacts on unmarked fish.

***COVID19 impacts:*** The COVID-19 pandemic has prevented the SFEC from convening in-person meetings of the committee, its work groups, and joint meetings with other technical committees. The proposed schedule below reflects our intent to perform as much of the MM and MSF review, analyses, and report development, and work with other technical committees as possible via independent evaluation, emails, and webinars. We do not anticipate meeting in person until sometime in 2022.

#### **Outline of Other Panel / Committee Tasks or Emerging Issues:**

The CTC has been incorporating estimates of fishery impacts on some unmarked naturally spawning Chinook stocks in its annual Model Calibration and CWT Exploitation Rate reports. The methods need to be expanded to all exploitation rate indicator stocks by 2021. Review of CWT recoveries of Chinook DIT releases in non-selective (NSF) and mark-selective fisheries and escapements, and their utility for estimation of impacts on unmarked fish in MSFs, is in progress by the SFEC-AWG and CTC-AWG. This work is of high priority.

The SFEC will continue to work with Technical Committees and the CYER to incorporate MSF algorithms in the annual exploitation rate analysis (ERA), the PSC Chinook Model, and the annual Coastwide Chinook Model calibration. The SFEC can best aid in this process by providing information on the time, area, and associated regulations of MSFs that have occurred so that CWT recoveries can be properly identified to NSF or MSF. Specification of the regulations associated with a particular MSF will guide the choice of appropriate algorithm to assess the MSF impacts to a stock. Currently this information is not readily accessible for incorporation into the CTC's exploitation rate analysis.

The CoTC and SFEC will meet to evaluate results of the Coho DIT and Backwards FRAM estimates of stock-specific impacts of MSF.

### **Potential Issues for Commissioners:**

Timely and accurate information via post-season reports on prosecuted MSFs is needed by the SFEC to assess the impacts of MM and MSFs on the CWT system. Little can be done without the post-season information from MSFs, but to-date, workload and other agency issues have resulted in few submissions. As noted above, post-season reports providing estimates of stock-age-fishery mortalities of unmarked fish have not been submitted to SFEC for all MSFs. This does not mean that the data are unavailable. It will, however, require some effort to compile the information to aid the other technical committees, e.g., the CTC, in estimating MSF impacts. WDFW and NWIFC have developed a prototype reporting system that could expedite reporting of data from these agencies.

Further joint SFEC-CTC-CYER meetings will be needed to develop algorithms and methods to incorporate the capacity to evaluate MSFs in the PSC Chinook Model. MSFs have been implemented at a spatial and temporal scale that is much finer than that employed in the CTC Chinook Model.

Several agencies have dropped or are dropping DIT releases and are not recovering CWTs from unmarked DIT fish due to budget constraints. DIT groups require the release of paired groups of tagged fish (marked and unmarked) and the use of electronic tag detection in recovering unmarked DIT fish from fisheries and escapements. An additional complicating factor is the reporting of DIT recoveries in sub-sampled escapements without information required for expansion. DITs have two uses in evaluation of MSFs and estimation of their impacts. First, DITs with a marked and unmarked tag group provide the ability to quantify differences in mortalities between marked and unmarked fish as a result of MSFs for indicator stocks. Reduced mortality on unmarked stocks is a primary goal of MSFs according to the PST (e.g., Chapter 3, paragraph 5(a)). The second use of DITs is to provide information to help bound estimates of stock-age-fishery mortalities of unmarked fish, required to maintain the viability of the coastwide CWT program.

SFEC is concerned that the Canadian catch sampling and reporting system is not fully aligned with the complexity of MSF regulations. Absent alignment, it is difficult to evaluate MSF impacts and comparing recoveries of DIT groups is not possible.

### **Potential Issues for Committee on Scientific Cooperation**

*None identified.*

### **Proposed SFEC Meeting Dates and Draft Agendas:**

COVID-19 has impacted travel policies throughout the region. The SFEC anticipates needing flexibility for travel arrangements throughout this cycle. Additional SFEC meetings may be required, depending on the number and scope of additional tasks assigned.

<b>When</b>	<b>Who</b>	<b>Location</b>	<b>Purpose/ Draft Agenda items</b>
November 15 - 18, 2021	SFEC RCWG, AWG	Webinar	Review annual proposals for MM and MSFs submitted by agencies. Request clarifications from agencies as needed. Prepare summary report for PSC Commissioners. Review and revise format and content of post-season MSF reports, as necessary. Review COVID-19 impacts to planned 2021 marking and tagging activities.
January 10-14 (PSC Annual Post-season Meeting)	SFEC	Webinar (Tentative)	Webinar as schedules allow to finalize annual report.
February 2, 4	SFEC and CYER WG	Webinar	Identify data needs for implementing MSF methods.
February 14-18 (PSC Annual Meeting)	SFEC Co-chairs	Portland, OR (Webinar)	SFEC Co-chairs report to PSC and identify any issues or concerns regarding agency proposals for 2021 MM and MSF, and status of post-season reporting.
March 22	SFEC and CYER WG	Webinar	Develop assessment of logistics and costs for implementing recommended MSF methods.
May 16-20	SFEC, CTC and CYER WG	Olympia (Tentative)	Develop preliminary application of MSF estimation methods to CWT indicator stocks.
June 1	SFEC, CTC and CYER WG	Webinar	Finalize recommendations for implementing MSF methods based on logistics and costs.
TBD	SFEC and CoTC	Webinar	Evaluate results of the Coho DIT and Backwards FRAM estimates of stock-specific impacts of MSF.

### **Status of Reports:**

***Technical or Annual Reports.*** The reports reviewing MM and MSF proposals for 2020 and 2021 are expected to be published in Fall 2021.

### **Comments:**

*Include any additional comments not included above that you think that would be useful to the Commissioners.*

**PACIFIC SALMON COMMISSION WORK PLAN**  
**2021-2022**

**Panel / Committee:**

**Joint Technical Committee on Data Sharing (TCDS) and its subcommittee Data Standards Work Group (DSWG).**

The Joint Technical Committee on Data Sharing functions as a steering committee for Coded Wire Tag (CWT) data sharing issues and liaises with the Chinook Technical Committee (CTC), Selective Fishery Evaluation Committee (SFEC), and Coho Technical Committee (CoTC) to improve CWT data to better support their analytical work to meet Treaty obligations. This Committee defines requirements needed for bi-lateral CWT data exchange and additional verification rules that would improve the integrity of the data.

The Data Standards Working Group (DSWG) sub-committee reviews requirements established by the TCDS, makes recommendations on how to implement them, and does the work of modifying the bi-lateral data exchange standards and verification process.

Data Sharing reports directly to the Commissioners.

**Date:**

This work plan will be presented to the commission during the 2020 Fall Session October 18-22, 2021 over Webinar.

**Update on Bi-lateral Tasks Assigned Under Current PSC Agreement:**

There were no specific bi-lateral tasks for this committee under the 1999 or 2008 PSC agreement other than the general agreement as described in the 1985 Memorandum of Understanding to maintain and make improvements to the CWT system. Since 1985, TCDS and DSWG have been maintaining and updating the CWT data exchange standards and verification process.

Following the work of the CWT Expert Panel, the CWT Workgroup and the CWT Improvement Team, we understand that the Commissioners want the TCDS to continue in the role of examining issues pertaining to CWT data. The new data specification standards that the committee may complete in 2020/21 will support analytical work of the joint committees and improve confidence levels, quality and accuracy of the data.

The onset of COVID-19 and the resulting disruptions have made it difficult to make progress on the TCDS work tasks. Other technical committees and their associated members have prioritized responding to impacts result from COVID-19 health measures, with the TCDS task being a lower priority. However, with the coming year, Data Sharing Technical Committee will work to formalize feedback from other

technical committees and approve changes for an improved CWT data exchange specifications.

**Obstacles to Completing above Bi-lateral Tasks:**

**1) Data Sharing Committee Membership**

Participation at meetings and progress on addressing data sharing issues may be a low priority for members with other competing PSC Committee activities or the PST negotiations workload.

Limited work has been accomplished by the Data Sharing Committee, with preliminary work on engaging other PSC technical committees during the past year (2020 / 2021). Further work on engaging other technical committees is needed to ensure that the CWT data exchange specification is meeting their needs and that proposed changes align with their analytical methods.

**Outline of Other Panel / Committee Tasks or Emerging Issues:**

None

**Potential Issues for Commissioners, including enhancement activities reported under Article V:**

None

**Potential Issues for Committee on Scientific Cooperation**

None

**Proposed Meeting Dates and Draft Agendas:**

<b>When</b>	<b>Who</b>	<b>Location</b>	<b>Purpose</b>
January, 2022	TCDS Co-Chair(s) @ CTC-AWG	Webinar/in-person	Meet with CTC-AWG members to discuss the proposals and potential impacts.
April 12 <sup>th</sup> 2022	TCDS	Webinar	Workshop on the editing and maintaining proposal within GitLab
June 8 & 9, 2022	TCDS	Webinar	Review and approve DSWG recommendations and timelines for implementation of updates to CWT data exchange specifications. An in-person meeting will occur only if there are significant issues to resolve that cannot be effectively addressed by the January 2020 conference call.
Sept 21 & 22, 2022	DSWG	Webinar	Finalize documentation of updates to CWT data exchange specifications. Review new proposals for changes/improvements for data exchange.

<b>When</b>	<b>Who</b>	<b>Location</b>	<b>Purpose</b>
Oct 11 & 12, 2022	TCDS	Webinar	Complete CWT data sharing report containing new data exchange specifications. Review new requirements for changes/improvements for data exchange.

**Status of Technical or Annual Reports:**

DSWG has developed a standard formal process for documentation and review of proposals for change. By Sept 2022, TCDS will complete a report containing updated data exchange standards and an implementation plan for improvements to CWT data sharing.

**Comments:**

No additional comments.



## PACIFIC SALMON COMMISSION ROSTER

### Slate of Officers 2021/22

<u>OFFICE</u>	<u>COUNTRY</u>	<u>REPRESENTATIVE</u>
Commission Chair	U.S.	Mr. Scott Rumsey
Commission Vice-Chair	Can.	Ms. Rebecca Reid
Fraser River Panel Chair	U.S.	Mr. Mark Baltzell
Fraser River Panel Vice-Chair	Can.	Mr. Les Jantz
Northern Panel Chair	U.S.	Mr. Lowell Fair
Northern Panel Vice-Chair	Can.	Ms. Sandra Davies
Southern Panel Chair	U.S.	Ms. Laurie Peterson
Southern Panel Vice-Chair	Can.	Ms. Linda Higgins
Transboundary Panel Chair	U.S.	Mr. Troy Thynes
Transboundary Panel Vice-Chair	Can.	Mr. Steve Gotch
Stan. Comm. on F&A - Chair	U.S.	Mr. Ron Allen
Stan. Comm. on F&A - Vice-Chair	Can.	Ms. Rebecca Reid
Stan. Comm. on Scientific Cooperation - Chair	U.S.	Mr. Scott McPherson
Stan. Comm. on Scientific Cooperation - Vice-Chair	Can.	Dr. Brendan Connors
Technical Committee on Data Sharing - Co-Chair	U.S.	Mr. George Nandor
Technical Committee on Data Sharing - Co-Chair	Can.	Mr. Nicholas Komick
Fraser River Panel Technical Committee - Co-Chair	U.S.	Mr. Gordon Rose
Fraser River Panel Technical Committee - Co-Chair	Can.	Mr. Jamie Scroggie
Northern Boundary Technical Committee - Co-Chair	U.S.	Mr. Bo Meredith
Northern Boundary Technical Committee - Co-Chair	Can.	Ms. Charmaine Carr-Harris
Transboundary Technical Committee - Co-Chair	U.S.	Mr. Edgar Jones
Transboundary Technical Committee - Co-Chair	Can.	Mr. Bill Waugh
Enhancement Subcommittee of the Transboundary Technical Committee - Co-Chair	U.S.	Mr. Garold Pryor
Enhancement Subcommittee of the Transboundary Technical Committee - Co-Chair	Can.	Mr. Corino Salomi
Joint Technical Committee on Chinook - Co-Chair	U.S.	Mr. John Carlile
Joint Technical Committee on Chinook - Co-Chair	Can.	Dr. Antonio Velez-Espino
Joint Technical Committee on Coho - Co-Chair	U.S.	Mr. Gary Morishima
Joint Technical Committee on Coho - Co-Chair	Can.	Dr. John Holmes
Joint Technical Committee on Chum - Co-Chair	U.S.	Mr. Bill Patton
Joint Technical Committee on Chum - Co-Chair	Can.	Mr. Pieter Van Will
Selective Fishery Evaluation Committee - Co-Chair	U.S.	Ms. Kristen Ryding
Selective Fishery Evaluation Committee - Co-Chair	Can.	Dr. Rob Houtman