



## Executive Secretary's Summary of Decisions 34<sup>th</sup> Annual Meeting

The Pacific Salmon Commission held its 34<sup>th</sup> Annual Meeting from February 11-15, 2019 at the Embassy Suites Downtown (Portland, OR), and discussed a number of topics (see attached agenda).

### The Commission AGREED:

1. The minutes from January 2019 are approved as edited.
2. The Parties and the Commission approved the implementation plan for Annex IV tasks and may use this plan to guide bilateral planning and deadlines. Tasks arising from an amended Chapter 4 (Fraser River) will be added once Chapter is finalized.
3. An interim report from the Fraser Strategic Review Committee (FSRC) is accepted, noting that a final report is expected in October 2019. The FSRC will develop this report for the Commission as set out in the interim report, working with national experts, Secretariat staff and the Fraser River Panel.
4. The report from the Standing Committee on Finance and Administration is accepted, including the proposed budget for 2019/2020.
5. The report from the Chinook Interface Group is accepted, noting:
  - a. The CIG will meet with the Chinook Technical Committee (CTC) in June and September 2019 to a) further advance CYER implementation including preparing a matrix identifying opportunities for collaboration to address data gaps identified in the CYER readiness review and provide a written report to the Commission; b) review the Technical Committee Coordinator staffing proposal from the Executive Secretary; and c) review the status of the phase 2 Chinook model improvements, example comparisons of new and current Chinook model results, discuss translating tables 1 and 2 and provide advice to the Commission in its October 2019 Meeting on adopting the new Chinook model.
  - b. The Terms of Reference for the Okanagan Chinook Working Group shall guide that group's work ahead of its final report in October 2019;
  - c. The Parties have exchanged information on the 2019 SEAK catch limits as determined via the CPUE methodology. The information is adequate at this stage and performance will be reviewed as further information becomes available.

ATTENDANCE

PACIFIC SALMON COMMISSION  
ANNUAL MEETING  
FEBRUARY 11-15, 2019  
EMBASSY SUITES  
PORTLAND, OR

COMMISSIONERS

CANADA

R. Reid (Chair)  
S. Farlinger  
J. McCulloch  
M. Ned  
B. Riddell  
P. Sprout

UNITED STATES

M. Oatman (Vice Chair)  
W.R. Allen  
P. Anderson  
W. Auger  
R. Klumph  
R. Turner



**Draft Agenda  
34<sup>th</sup> Annual Meeting  
February 11-15, 2019  
Embassy Suites Downtown; Portland, OR**

1. Adoption of agenda
2. Approval of minutes: January 2019
3. Executive Secretary's report

**Chinook issues**

4. CIG report
  - a. CTC workplan, including base period recalibration
  - b. CYER implementation
  - c. Okanagan Chinook Working Group TOR
  - d. Revisit November 13, 2018 memo from Commissioners to CTC regarding FOG

**Other action items pending**

5. Fraser Strategic Review Committee final report
6. Annex IV, Chapter 4 negotiations report
7. Approval of Commission and Chapter implementation plans for Annex IV
8. Reports from Panels and Committees
  - a. Work plan progress
  - b. F&A Committee
  - c. Endowment Fund Committees
9. Public comment



## MEMORANDUM

TO: Chinook Technical Committee  
 FROM: Pacific Salmon Commission  
 RE: Update on Functions and Operations Group  
 DATE: November 13, 2018

The Pacific Salmon Commission (PSC) would like to provide an update to the Chinook Technical Committee (CTC) on the status of the Functions and Operations Group (FOG)<sup>1</sup>. This group was created in September 2017 to respond to concerns identified around workload, and unclear roles and responsibilities among CTC members.

The Commission received a report from the FOG in October 2017, setting out three general areas of concern:

1. Administrative support by the PSC
2. Accountability by the Management Agencies
3. Clarity of CTC and CIG roles and responsibilities

In response, the Commission approved the following actions in January and February 2018:

1. Responsibility for decision making:
  - Amended the bylaws and presented amendments at the February 2018 Commission meeting for approval; Amendments to Rule 11 of the bylaws was approved by the Commission and indicates that in circumstances where consensus cannot be achieved by Joint technical committees, as deemed by at least one co-chair, the co-chairs will consult the Commission Chair and Vice-Chair for direction.
2. Size and composition of the CTC:
  - The Commission approved a letter to Management Entities regarding the need for succession planning, workplans, financial commitments and required skills in PSC Joint Technical Committees.
  - Management entities have begun the process of succession planning. A meeting of management entities is planned for February 2019 to further develop succession planning and clarification of roles.

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<sup>1</sup> Members: W.R. Allen, C. Swanton, R. Turner (USA); S. Farlinger, R. Reid (CAN); J. Field (Secretariat)

- In January 2018, the Commission approved a process for determining and approving CTC workplans, including timelines and check-ins with the Chair and Vice Chair. For reference, please refer to the CTC workplan.
3. Further actions approved by the Commission through 2018:
- Creation of a data manager position to support the CTC as a pilot for two years.
  - Training for Committee/Panel chairs: All Panel and Technical Committee leadership has been invited to attend a one-day training session on how to run effective technical meetings. This will be led by a fisheries scientist who has offered the course internationally, and whose curriculum comes highly recommended. The event will be held the Sunday before the January 2019 meeting in Vancouver, B.C.
  - Publication support: The Secretariat launched a one-year pilot project for the PSC administrative assistant to format certain CTC reports for final publication. This effort was identified as a major time commitment from the CTC leadership, and the pilot project will be evaluated in spring 2019 for potential extension.

The Commission accepts the recommendations of the FOG which support the operations of the CTC and CIG as the new Annexes are implemented. The Commission intends to meet with the CTC to discuss the actions outlined above at the February 2019 meeting. The CIG will continue its role in supporting the CTC and managing the interface between policy and technical issues, as the FOG will have completed its last task.

Further, three background documents have been attached for PSC records.

Thank you.

Attachment 1: Report from the Code of Conduct Subgroup to the Chinook negotiating team

Attachment 2: Memo to CTC Code of Conduct Workgroup

Attachment 3: Memo to CTC Review Group

## Improving support and function for the Chinook Technical Committee

### A report from the Code of Conduct subgroup to the Chinook negotiating team

#### Introduction

At the direction of Commissioners a sub group of Commissioners was convened in January 2017 to investigate concerns about the workload and functioning of the Chinook Technical Committee.<sup>1</sup>

The Commissioners met with the CTC chairs in February 2017 to discuss their concerns. The group also considered the Applegate Report (date) noting that many of the current challenges have been raised in the past, some resolved and some remain. Initial concerns of the Commission and the co-chairs were identified at that time. The entire CTC was provided with the results of that initial discussion and the Applegate Report in order to prepare for a meeting with a Commissioner from the Committee at their April 2017 meeting in Seattle.

The subgroup of Commissioners has met to consider the information gathered and offers a report at this time to clarify challenges and to narrow a range of possible improvements. We have not, at this point, considered the costs of any of the options.

The challenges and options identified and considered by the Code of Conduct group and options for improvements are set out below.

#### **Planning and approval of the CTC workplan**

Challenges – the Commission is concerned about workload and management of the work inside the CTC.

- 1) The CTC workplan is always ambitious; however it has not always been associated with delivery dates and ongoing annual work resulting in missing of deadlines.
- 2) Guidance from the Commissioners is limited often to the three sessions through the support of the CIG a subgroup of Commissioners; there have been no options to review or adjust the workplan. New tasks are sometimes added on an ad hoc basis by the CTC itself.

#### Options

- i) The CTC workplan as approved by the Commission must be meaningful in terms of workload but also in terms of priorities and timelines for work to be completed. **(Implemented in January 2017)**

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<sup>1</sup> Commissioners – Allen, Swanton, Turner, Farlinger and Reid.

- ii) The Commission has requested a quarterly update to the Commission chairs with respect to implementation of the approved workplan to provide ongoing guidance on priorities and focus. **(Implemented in 2017)**
- iii) The CTC agenda should be driven by the workplan and associated timelines, and known in advance of meetings to increase efficiency and ensure the appropriate resources (people and preparatory work) are available in a timely way in order to make meetings most effective.

### **Operations of the Chinook Technical Committee**

Challenges – the Commission is concerned that the CTC operate in an efficient way and completes tasks in a timely way for the resources spent.

- 1) Meeting arrangements are coordinated and developed both by the Secretariat and by CTC members “off the side of desks” taking time away from technical and agency tasks.
- 2) Agendas are often not determined until the first day of the meeting consuming time and creating uncertainty about necessary or unnecessary attendees.
- 3) Publishing of reports is currently done by ADFG CTC members taking time away from technical issues and agency tasks.
- 4) Programming and data base support is done on an ad hoc basis by whichever members may have the capacity.

#### **Options**

- i) Clarify and consider any incremental secretariat management of the meetings.
- ii) Direction is provided by the agenda for CTC meeting determined in advance by co-chairs linked to work plan items and timelines and transmitted to members in advance. Co-chairs may then adjust attendance (see below)
- iii) Documentation by the co-chairs of current assignments inside the CTC to be used to determine participants, preparatory work and assignments for CTC and/or AWG sessions/Sessions continue to include all CTC members for all tasks.
- iv) Publishing of CTC reports becomes the responsibility of the Secretariat.
- v) Secretariat provides data base management for the CTC/or provided from inside the CTC on an ad hoc basis.

### **Role of CTC and Accountability for Tasks – The Commission wishes to clarify the roles and accountabilities within the CTC**

**(see appendix 1 – Bob’s summary of chapter references)**

Challenge:

- 1) CTC advice/recommendations/determinations to Commissioners (annual calibration, reviews, outcome of analyses) is currently seen as requiring consensus. This has caused delays in getting advice to Commissioners and consumed significant time inside the CTC. There is lack of clarity about the course of action if consensus is not achieved.
- 2) Each member of the CTC is formally accountable to her or his management entity, not to the PSC nor the CTC co-chairs. While positive intentions and motivations are widely recognized within the CTC, formal accountability that can be relied upon to ensure delivery of tasks is unclear. The size of the CTC is a challenge, - from the perspective of resources and the roles of individuals. Are all members required for all meetings? Are roles clear?
- 3)
- 4) Recommendations to Commissioners often are in the gray areas between policy and technical solutions and require a familiarity with technical issues.
- 5) CTC may require guidance between official PSC sessions.

#### Options

- i) Clarify that advice or memos from the CTC may include a description of outstanding and unresolved issues, as outlined (or as modified) in Chapter 5 of the bylaws. Clarify the individuals accountable (and accountable to whom) for completing a task and delivering the review/recommendation/report/determination or other work product to the PSC in the absence of a CTC consensus.
- ii) Update the chapter language as required regarding the role of the CTC and identify accountability for implementation in a non-reporting structure. [Consider closer relationship between the PSC and each management entity whereby the management entity specifically embraces its accountability for its CTC member's performance – i.e., the PSC becomes comfortable speaking to a management entity about the performance of a CTC member. (Turner addition not yet discussed by CoC Committee)]
- iii) Continue use of the CIG as liaison between the CTC and Commissioners. Consider additional meetings of the CIG between meetings as required to support timely response to CTC advice or requests for guidance.
- iv) Provide opportunities for interaction between the CTC and Commissioners as part of PSC meeting planning (info lunches; specific topic sessions; Q and A sessions)

#### **Succession Planning for the CTC**

Challenges:



- 1) The Independent panel report on 2016 reported a lack of familiarity amongst members of the CTC with the chinook model; a lack of documentation was reported.
- 2) Many individuals with knowledge of the work of the CTC have left or will retire shortly.
- 3) What capacities are required in the CTC and how will Parties ensure appropriate participation and accountability in this bilateral organization.

Options:

- i) Agencies with responsibilities for participation in the CTC or for the provision of information to the CTC may
  - a. Identify those responsibilities in the workplans of the individuals with the responsibility (linked to accountability)
  - b. Agencies provide the Commission with succession plans for those positions to be collated by the Secretariat to be provided to Commissioners for planning purposes.

April 27, 2017

To: CTC Code of Conduct Workgroup

From: Ms. Farlinger

The below summary is a product of discussion between Ms. Farlinger and the bilateral CTC on April 25, 2017 regarding follow up from the CTC Code of Conduct Workgroup's efforts to date and to discuss ideas for improved functioning of the CTC.

Ms. Farlinger reviewed the Commission effort to look at the functioning of the CTC by four Commissioners (Ms. Farlinger, Ms. Reid, Mr. Allen, and Mr. Swanton), because of concerns in operation of the committee and it seemed timely to review processes and ensure the Commission is supporting the CTC. Ms. Farlinger said the four Commissioners met with the CTC co-chairs at the February Commission meeting as a first step to discuss issues and review the Applegate Report. Further, discussion uncovered that many of the same challenges identified in the earlier Applegate Report continue today.

Ms. Farlinger introduced two documents: (1) a summary of the February discussion between Commissioners and CTC co-chairs (Attachment 1); and (2) a summary and key recommendations for improving well-functioning of the CTC (Attachment 2).

Ms. Farlinger summarized the main outcomes of the February discussion, recommended next steps, and inquired what the Commissioners could do to better support the CTC, structurally and through more frequent and direct communication. Ms. Farlinger said that her coming to the meeting today and with the support of the other Commissioners signals Commission support and interest to hear from the members of the CTC about what might be out of sync and what could be done better. Ms. Farlinger noted that this year we have added CTC and Commissioner check ins as part of the CTC's workplan, as an example of a process change that may be helpful going forward.

Ms. Farlinger opened to the floor to discussion, and the issues discussed and ideas raised are summarized below.

**More regular communication with Commissioners:** Mr. Carlile thanked Ms. Farlinger for initiating the discussion, and noted that in the past when CTC issues have come up and the CTC has written a memo to the Commission, there would be a long waiting period for response until the next Commission meeting.

- Ms. Farlinger noted that the Commission needs to find a way to convene the required Commissioners when issues arise.
- Mr. Carlile pointed out an example of where the CTC brought forward an issue to the CIG and the CIG and Commission resolved the issue, but did not communicate resolution back to the CTC. The CTC was left to interpret the resolution by reading the Commission minutes.
- Ms. Farlinger responded that this process is large and ponderous and it is a helpful suggestion to close the loop on issues, which she agrees is important.

**Workplan priorities:** Regarding the workplan this year:

- Mr. Carlile said he thought the new structure of the workplan is an improvement relative to the past format in terms of prioritizing tasks.
- Ms. Farlinger noted that within the CTC there will be differences of opinion regarding priorities, and educating the Commissioners about the tasks at play will help inform decisions regarding priorities in the future.

**Educating Commissioners:** Regarding Ms. Farlinger's above referenced need to educate Commissioners, she said that communications between Commissioners and CTC could include face-to-face interaction with the CTC, understanding linkages between projects and tasks and general familiarity with the work of the CTC, and knowing who is doing what.

- Mr. Carlile added that the CTC co-chairs have more interaction with the Commissioners than the rest of the CTC members, and noted there might be disconnect between the Committee as a whole and the Commission.
- One CTC member noted that the more technically inclined Commissioners may be able to help translate the CTC's work to the broader Commissioner group.
- Mr. Parken suggested using brown bag presentations at Commission meetings to educate Commissioners, and Ms. Farlinger said they could institutionalize brown bag presentations as a standard part of the meeting cycle, for example, setting aside two hours for presentation once or twice a meeting cycle. CTC members expressed interest in this idea.
- Ms. Farlinger said more interaction with Commissioners could also be ad hoc, with the Chair and Vice Chair, to inform when the CTC becomes high centered in real time.

**CIG functioning:** Ms. Farlinger inquired if the CTC thought that the CIG functioned well enough, noting that from her perspective it is a useful way to allow the more technical Commissioners to educate the rest of the Commissioners.

- Mr. Clemons noted that when communications are sent to the CIG, they do not get response.
- Mr. Carlile said that they have a phrase in the CTC, "The CIG is where things go to die." Ms. Farlinger noted that is an important issue and a structural issue, because the CIG is only together during the Commission cycle meetings.
- Ms. Farlinger noted that if the Commission Chairs were used as the CTC's point of contact instead of using the CIG, the Commission Chairs could identify when there is need to pull in the CIG for a teleconference, for example.
- A committee member suggested that the CIG should sit in on a bilateral CTC meeting.

**Issues regarding meeting structure:** Ms. Farlinger asked if the meeting structure allows for adequate progress on the issues or if things may need to change.

- Ms. Ryding noted the meetings are helpful to allow time to focus on CTC work, especially for the AWG.

- Mr. Carlile noted it is helpful to hand off workload, where possible, from the AWG to the rest of the Committee.
- Mr. Kope noted that Ms. Evenson has been helping organize the Committee and following up on tasking to include more non-AWG members in the workload.
- Ms. Evenson noted that the Committee struggled administratively, to get the agenda out or to have minutes, for example.

**Committee administrative needs:** Ms. Farlinger inquired if having Secretariat support for Committee administration would be helpful or too distant.

- CTC members agreed, there is need to help administer the meetings, document the meetings, follow up on tasking, develop and distribute the agendas, for examples.
- CTC members also noted the need for such an administrator to have intimate knowledge of the CTC and their work.
- Mr. Carlile noted that the CTC could designate a CTC member as the administrative person.
- Ms. Brown noted that another type of administrative support is developing the technical reports, and that the CTC has relied on ADF&G to provide support for a publications specialist in the past.
- Mr. Kope noted that the PFMC has a dedicated salmon staff officer that divides out report sections, project manages the reports, assembles reports, etc. Mr. Carlile said it may be that the CTC can absorb some of the administrative work, for example dedicating one of its members as an officer similar to the PFMC officer role.

**Committee technical needs:** Ms. Brown noted that some of the CTCs work is very technical and requires specific expertise, for example in programming such as R and Visual Basic, as well as database software such as Access. Ms. Brown noted that some of the CTC members with these areas of expertise are retiring and the expertise will be or has been lost.

- Mr. Carlile noted the Committee has contemplated splitting up into different sub-committees by type of task, for example annual tasks vs. special projects, but at this point do not have enough people with the expertise needed to make such structural changes.
- CTC members thought that if a staff member at the Commission had intimate familiarity with the CTC Chinook Model, there would be more continuity for the Commission, which is lost as members leave or retire.
- Mr. Carlile said the CTC would benefit from having programming expertise at the Commission. Many CTC members agreed with the need for programming support from the Commission, which could support multiple Committees, but most importantly for the maintenance and continuity of the CTC and its modeling work. Mr. Carlile noted that if CTC members are spending their time programming, they can't do other things.
- Other CTC members expressed support for the Commission having database expertise to develop and maintain a well-functioning database for the Chinook Model.

- One CTC member described the need for building capacity both at the Commission and within the Committee to fill some of the roles described, because no one person can do it all.
- Mr. Carlile said that the CTC's capacity to cut contracts for needed programming, database, or other technical support would not continue in the future without model improvement funding.
- Ms. Farlinger noted that during ratification of renewed Chapters funding support will be sought to implement the Chapters. The Commissioners are can consider the capacity issues, both administrative and technical, in the chapter renewal. Further, that the timing is good to consider options.

**Timely data needs:** Ms. Brown noted that the Commission could also communicate annually with the management entities about the need for timely data delivery to inform the model calibration, on time. Further noting that the CTC is not in a position of authority regarding the timeliness of data.

**CTC handbook:** Mr. Carlile noted that having a handbook of documents in one place would be helpful for both on-boarding and to keep the members organized.

**Documenting assigned roles:** Ms. Farlinger noted that if there was documentation of assigned roles within the CTC it would be of benefit to both know who is doing what and to help plan for the future, when members leave the Committee.

**Lack of line reporting:** Committee members also noted that there is not a line reporting structure for the CTC within the Commission.

- Mr. Parken suggested that having documentation of CTC members' assigned roles and tasks could help with communication back to their lines of reporting and management entities, so that the management entities better understand their staff's workload and do not overload the staff with non-CTC related tasks.
- Other members noted that a Panel-like structure could help, for example if the CIG was more of a Panel body. One CTC member said that in his experience, raising issues from a technical committee to a Panel for immediate resolution helps ensure that policy issues do not interfere with technical work. He noted that as a co-chair of a technical committee with a Panel-reporting structure, he and his counterpart can communicate issues for requested resolution to their Panel co-chairs, and get the Panel's responsive decision within a week, which keeps the policy issues separate from the technical work.
- The CTC member further noted that the Chairs of technical committees play an important role in the area of issue resolution, to recognize when an issue needs higher level resolution and to follow up and communicate back the results. He noted that previous Chairs of the CTC were stronger, in that regard, than the current Chairs.

**Problems with consensus reporting:** Dr. John H. Clark said that the CTC gets hung up on the need to provide consensus reporting, which does not allow for differences of scientific opinion to be expressed.

- He said that consensus reporting results in the lowest common denominator of information reported, which is not satisfying where differences in scientific opinion exist.
- Dr. John H. Clark also noted that it should be possible to report on different scientific opinions or interpretation of data results within a CTC report, but that currently the CTC thinks it can only include language in a report that all members agree on, which is not realistic and creates problems.

CTC members noted that the issues discussed today are related and have all contributed to the problems with functionality experienced by the CTC, and further noted that the renewal negotiations present a particularly challenging time for the CTC's workload.

Ms. Farlinger noted the discussion resulted in a lot of good ideas to solve problems, and further noted that it is the Commission's intention to keep this initiative moving forward so that by October there are concrete actions identified to help the CTC.

Ms. Farlinger asked members to continue thinking about this, and raise any additional thoughts to the co-chairs or directly to her.

### **Summary of challenges and opportunities:**

#### Challenge:

Need for process for Commissioners (or subset such as CIG) to meet to respond to issues and questions raised by the CTC in a timely way.

#### Opportunity:

As well as quarterly reporting on the workplan, which may be of some assistance, the creation of an ad hoc channel of communication to CTC-Chairs in the event of an issues which requires direction would be helpful. This would allow the Chair and Vice Chair to convene CIG or other to consider the question(s).

#### Challenge:

Administrative duties (meeting agendas, arrangements, and management of report publication) are often done off the side of desks and through good will (ADFG assistance on publications for example) and take time away from the actual work done by Co-Chairs who are currently both members of AWG.

#### Opportunities:

Two possibilities were discussed:

- 1) That the Commission provide administrative support to the CTC in the areas of meetings and publications.
- 2) That the CTC continue to assign individuals within the group to specifically carry out these responsibilities, as a priority before their other CTC work.

Challenge:

That there are two areas requiring expertise which are either not well supported or are somewhat supported by the CTC members in lieu of other CTC work, that is, programming ( a need for ongoing development of expertise) and databases (actual data base management – not done now but would increase the efficiency of the AWG significantly).

Opportunity:

Two options were discussed:

- 1) As above – support from the Commission in programming expertise and data base management
- 2) Assignment within the CTC as possible.

Challenge:

Without accountability, receipt of data from relevant agencies in a manner that meets CTC obligations.

Opportunity:

Education both within individual agencies or jurisdictions or more broadly on the link between respective agencies domestic responsibilities and international. Could be included in workplanning domestically and performance measured.

Challenge:

CTC memoranda are currently interpreted as not having the latitude to report on dissenting views.

Opportunity:

Direct the CTC to report on agreed matters and to describe the opposing views requiring resolution in memoranda to the Commission.

Challenge:

Improving the interaction between Commissioners and CTC to ensure understanding of issues requiring direction and decision.

Opportunity:

- 1) The quarterly check in of Co-Chairs and Chair and Vice Chair provides an opportunity for the exchange of information.

- 2) Regular sessions between Commissioners and the CTC could be scheduled in the January and February sessions to build relationships and exchange information.
- 3) Brown bag lunches with Commissions and the CTC on particular topics could be helpful venues for these meetings.



## **Attachment 1**

### **Draft notes**

**February 17, 2017**

### **Meeting of the CTC on Observations for Code of Conduct**

#### Comments and observations

- The group had a discussion around sources of conflict within the CTC for the purpose of identifying practices to support a well-functioning group
- Questions and comments raised by the group included:
  - o Need to agree on rules, or governance to provide committee with agreed upon practices to adopt
    - How are decisions made? Consensus? Commissioner decision? When and how to transition/raise issues in a timely way.
    - Helpful to utilize Commissioner structure to provide stability and certainty to conduct of CTC
  - o Identify corrective steps if a statement or action is conducted in an unprofessional manner
  - o Recognize that having differences of opinion is fine, and welcome
  - o Structure and process is needed:
    - Use alternate co-chairs
    - Records of decisions
    - Minutes
    - Draft agendas
    - Written response from CIG on decisions and direction back to CTC so there is no ambiguity or uncertainty of response
- Important for the group to have structure: agreed upon workplan, timelines, check-in points
  - o Extra assignments added onto the CTC are responded to, but only at the expense of the regular and required workplan
- Applegate Report and findings resonate in that many of the issues identified still apply; improvements include creation of CIG, but not much else is different
- 2015-16 disagreement on calibration: technical difference of opinion, but there was no mechanism to resolve the dispute outside the committee structure;
  - o Issue moved from a technical one to a personal one
  - o What was needed was to resolve the technical dispute quickly rather than leave uncertain
- Concern that the CTC is being asked to make recommendations that affect the user groups, but there is no means to get input from those affected by the outcomes
  - o CTC members were left with the load to explain the outcomes
  - o The lack of a Panel as an intermediate step, created a situation where user groups had no outlet to provide input, ask questions; and put the CTC in the position of having to respond to a representative group of harvesters/users;
  - o Current process puts CTC members in a compromised position
  - o Other processes, e.g. Council process provides for an open process, seeks input, and then has policy makers responsible for management decisions;

- Dispute resolution processes are already developed and available with other management bodies; missing in the case of the CTC
  - AWG members left feeling exposed and not well supported
- Since 1999 agreement; CTC function moved from development of methodology to application phase
  - Erosion of funding at the same time put pressure on the group
  - Annual work expectations high, short timeframes, declining resources, increased expectations, moved focus to individual inputs such as spawning returns and individual forecasts
  - Need to take stock on reliance of inputs being used: what quality does each need to be; what are expectations from a data perspective
  - Need to consider data, make decisions: timeliness is a key factor: unable to accomplish extensive vetting of the data before it is applied
- CTC is a large group, representing a lot of constituencies, but not adequately representative
  - Members other than the co-chairs get no real exposure to Commissioners; don't have the context of the questions or concerns raised, or direction provided
- CIG is helpful; but a Panel would be better:
  - Need for more air time with CIG to help set direction, conduct work activities
  - Act as a buffer between CTC and the Commissioners
  - Allow for stakeholder input/involvement
  - CIG is not as representative as a Panel would be; may not represent the various interests
  - The Commission becomes the *de facto* Panel, but in fact spends far less time on the issues that other Panels because of the other calls on their time
- Without a Panel; need for improvements in functioning of CIG
  - Written instructions, decisions
  - More interaction of CIG/Commissioners with CTC members, not just co-chairs
  - Need develop a dispute resolution process
  - Need for better succession planning between and within the groups
- 2015 workplanning process viewed positively; process tightened up
  - Need to extend this into longer term planning; need for understanding about what can be accomplished in short term vs the longer term
- Policy versus technical assignments need to be better delineated, and CTC needs to focus on the technical questions
  - Need to decide what base years to select
  - Guard against dumping assignments that cannot be resolved onto the CTC
- Decision-making
  - Is consensus a required, or the right model?
  - Suggest that if unable to reach consensus within a set timeframe, should create a majority/minority report and seek involvement of Commissioners
  - Aid in communication to Commissioners
- Communication
  - Need for regular check in's with CTC and Commissioners
  - Provide regular updates on workplan progress
  - Prioritize workload and expectations
- Training needs

- Support good meeting practices through written process, procedures, decision-making process
- Strong succession planning
- Training and development for co-chairs and other participants; i.e. process to reach consensus, project management skills
- Encourage social activities and outlets to build a sense of teamwork; improve relationships in an informal setting
- Capacity support
  - CTC needs administrative support
  - Assign staff to support committee
  - Facilitate meeting, interface with Council staff (for example)

## Attachment 2

### Proposed Options for Support of the CTC – Draft from February meeting

#### Summary and Key Recommendations for Improving well-functioning of CTC

1. Better develop process and procedures
  - Set workplans and timelines
  - Assign priorities to team and stick to them
  - Develop agendas, minutes, records of decision for each meeting
2. Improve capacity within CTC
  - Seek training opportunities to ensure necessary communication, facilitation, team building, meeting management skills are in place
  - Look for admin support (PSC?)
3. Engage more effectively with the CIG
  - Lack of a Panel has created a gap: use the CIG more regularly for check in's, to resolve disputes, to make decisions
  - Ensure questions directed to CIG are responded to in a timely manner, and in writing
  - Be clear around roles and responsibilities for CTC, CIG, Commissioners
  - Include CTC/CIG or Commissioner meeting during January or February sessions.
4. Encourage CTC member to act as a team
  - Ensure Commissioners respond to or consult with stakeholders; eliminate need for CTC to respond on policy decisions.
  - Support social activities to encourage team spirit; allow for members to see each other beyond "the job"
5. Separate the policy questions from the technical
  - Allow CTC to focus on key technical questions, activities
  - Expect the CIG or Commissioners to take on policy questions/decisions
  - Develop a protocol for raising issues that arise between workplans that can be used to address stalemates in a timely way.

**October 6, 2017**

**MEMORANDUM**

**TO:** CTC Review Group (Code of Conduct)

**From:** Bob Turner

**RE: CTC Responsibilities Abbreviated**

During our discussion last Friday the Group requested a summary of the existing tasks assigned to the CTC, emphasizing the verbs used to describe the expectations for action by the CTC. The discussion was in the context of “what happens when the process breaks down and expectations are not met?” A cryptic summary of most of those references is below, as is a highlighted version of Appendix A.

Page references are to May 2014 bound version of PST.

Paragraph references are to Chapter 3 (beginning page 60).

2.(a)(ix): “provide scientific advice” to the Commission.

2.(b): CTC “shall:”  
Page 64

- (i) “evaluate management actions.”
- (ii) “report annually on catches”
- (iii) “report annually on escapement”; “evaluate and review escapement objectives”; evaluate trends and report on rebuilding.
- (iv) “evaluate and review” escapement objectives; “recommend” goals.
- (v) “recommend standards” for assessment; Provide information on assessments; recommend improvements.
- (vi) “review” enhancement; “recommend” strategies.
- (vii) “recommend” research and costs.
- (viii) “exchange” information on alternatives regimes.
- (ix) “provide yearly report” detailing Sentinel Stocks Program.
- (x) “provide yearly report” on CWT improvement.
- (xi) “provide yearly report” on mark-selective fisheries.
- (xii) “undertake assignments” such as those in Appendix A.

3. (Money)  
Page 66

- (a)(iii) PSC estimates Sentinel Stock escapement “consistent with standards to be developed” by CTC (See 2.(b) v.)
- (c) “provide guidance” on improving the model.

7. (Total Mortality)  
Page 72

- (b)(iii) estimates of encounters (re: total mortality) result from a relationship “reviewed” by the CTC.
- (c) estimates of incidental mortality in ISBM will be reviewed by the CTC by 2011.
- (d) AABM, once CTC “advises” PSC that incidental mortality can be reliably estimated.
- (e) (footnote 10) references CTC “approved” descriptions of standardized fishing regimes.
- f(ii)(footnote 11) CTC to “develop” landed fishing equivalents.

- (f)(iii) “estimate” the allowable total fishing mortality for the AI.
  - (g) “shall complete” a post season assessment which includes (i), (ii), (iii), and, yes, (iv).
  - (h) “evaluate” effectiveness of corrective management measures and “report”.
8. (ISBM)  
Page 75
- (d) mortality rate applied unless “otherwise recommended” by the CTC; or other metric recommended by the CTC.
  - (f) obligations will be “evaluated” and “reported” by CTC.
  - (g) “evaluate” corrective measures and “report.”
9. (AABM)  
Page 77
- (e) “determine” pre-season prediction of abundance.
  - (f) “determine” if in-season methods are improved – then they are “permitted.”
11. (Monitoring)  
Page 79
- (a) “monitor and regularly report” catch and mortality objectives, metrics.
13. (Additional measures)  
Page 80
- (b) “evaluate and report” (in 2014) precautionary criteria in performance review.
  - (c) standards for precision and accuracy developed by February 1 of year of application.
  - (c)(v) “notify” the PSC of any Paragraph 13 proposed fishing restrictions.
  - (f) “review” ISBM fisheries and “report”.
  - (j) “report” in event Paragraph 13 is invoked.

See also the entirety of Appendix A (Understandings Regarding Chinook Technical Committee Assignments) beginning on Page 87 and attached below.

## **Appendix A to Annex IV, Chapter 3: Understandings Regarding Chinook Technical Committee Assignments Relating to Implementation of Chapter 3 of Annex IV**

### **(1) Harvest Rate Index Metric Improvements**

**Alternative metrics** for evaluating the harvest rate index in different AABM fisheries **will be evaluated**. Metrics which best reflect changes in the true harvest rate in a fishery will be employed by the CTC, and used to maintain the underlying relationship to catches in Table 1. The **implications** of replacing the current metrics while maintaining the relationship between catch and abundance indices (as specified in paragraph 10) **will be evaluated and reported** to the Commission.

### **(2) Total Fishing Mortality**

Consistent with paragraph 7 of this Chapter, the **CTC will**:

- (a) **Establish standards** for the desired level of precision and accuracy of data required to estimate incidental fishing mortality (e.g., encounter rates, estimates of incidental and drop off mortality, stock specific mortalities of marked fish in selective fisheries) to be used for total mortality based management;
- (b) **Complete technical work** required to implement total mortality regimes (Paragraph 7) including reporting on the Landed Catch Equivalent (LCE) concept, describe how gear allocations and transfers will be handled between sectors, and how fisheries will be managed pre-season, and post-season based on direct and derived observational data;
- (c) **Describe standardized fishing regimes** for all AABM regimes (note: only the description for WCVI requires completion);
- (d) **Evaluate the accuracy of pre-season predictions** of incidental mortalities, review assumptions, and **investigate methods** for improving estimates of total mortality in AABM and ISBM fisheries;

### **(3) In-season adjustments**

Consistent with paragraph 9 of this Chapter, the **CTC will evaluate** any **proposed in-season abundance predictors** to determine if these provide more reliable and consistent estimates of post-season abundance as compared to the pre-season predictions currently generated by the PSC Chinook model.

### **(4) Model Improvements**

- (a) Improvements to the Model Structure: The **CTC will** continue **to review and improve** the accuracy and precision of the CTC model (e.g., pre-season forecasts of the aggregate Chinook abundance available to the AABM fisheries, modeling additional stocks and fishery strata, estimates of stock specific mortality, base period recalibration,

etc.). The CTC will evaluate improvements using quantitative, statistical and management criteria and recommend changes to current models and methods for consideration by the Commission.

(b) Abundance Index Improvements: The current Abundance Index (AI) tends to lag behind changes in Chinook stock abundance, under-predicting abundance when stock survival begins to increase and over-predicting abundance when survival trends downward. The CTC will explore techniques (e.g., time-series techniques, and/or use external ecosystem indicators) that may enable AIs to more quickly respond to changes in survival regimes.

(5) Management Objective Review

The CTC will evaluate and review existing management objectives (e.g., escapement goals, exploitation rates) that fishery management agencies establish for Chinook stocks subject to this Chapter for consistency with MSY or other agreed biologically-based escapement objectives.

(6) Framework for Precautionary Management

The CTC will develop an assessment framework for precautionary management which incorporates information on stock status and fishery performance for consideration by the Commission by December 2011. Approaches may include multiple criteria such as escapement, exploitation rates, trends and patterns in survival, ecosystem indicators, and overall harvest rates in mixed stock fisheries. The CTC will develop options for timely adjustments to fishery regimes based on objective criteria (e.g. decision analysis techniques) for consideration by the Commission.

(7) Individual Stock Based Management Improvements

(a) Individual Stock Based Metric Improvement: The CTC will explore alternative metrics to be used to monitor ISBM fishery impacts, and report to the Commission on the utility of these metrics or approaches by 2011. The non-ceiling index referenced in paragraph 8(d) has not proven to be useful for many stocks as a means to monitor or evaluate the performance of ISBM fisheries relative to the obligations for a variety of reasons, including:

- (i) unreliable base period data;
- (ii) mismatched and incomplete information between different stock groups;
- (iii) instability in the metric until all brood years affected by a fishery have completed their life cycles; and (iv) delays in the availability of CWT data.

(b) Paragraph 13 Obligations for ISBM fisheries: The CTC will develop methods to estimate the savings of mature fish expected to result from further reductions to AABM fisheries under paragraph 13 and determine adjustments in ISBM fisheries required to ensure that such savings accrue to escapements.



(c) Evaluate 1991 to 1996 ISBM Average Criteria: The CTC will provide estimates of the 1991 to 1996 average impacts in ISBM fisheries relative to the 1979 to 1982 base period for the stock groups listed in Attachments IV and V.

(8) Development of Paragraph 13 Standards or Guidelines for Escapement

Estimation and Forecasting

The CTC will establish standards for the desired level of precision and accuracy for estimation of spawning escapements and abundance forecasts. Two key characteristics of the new abundance based management framework rely on information on escapement, and the ability to forecast the next year's abundance. These standards shall be applied to the Sentinel Stock Program developed to track escapement and abundance data over the next 5 years.

(9) Five-Year Review Criteria

The CTC will develop a framework to evaluate the effectiveness of, and continuing need for, the harvest reduction measures taken for the AABM fisheries as outlined in Paragraph 9. Factors to be considered include abundance, exploitation rates (fishery harvest rates), and estimates of productivity for individual stocks and stock groups including, but not limited to, those included under the Sentinel Stock Program.

(10) Review of Attachments I-V<sup>1</sup>

The CTC will complete a review of Attachments I-V by 2014 or earlier if agreed by the Commission to determine the following:

- (a) whether the current list of stock groups identified for each attachment continues to be appropriate,
- (b) new criteria that could be employed to revise stock group listings for each attachment, and
- (c) based on the outcome of (a) and (b), whether any changes to the attachments proposed by a Party may be appropriate.

Based on the above review, the CTC will make recommendations to the Commission regarding what, if any, changes should be made to the current Attachments.

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<sup>1</sup> Contingent on policy input and agreement

Terms of Reference for Okanagan Chinook Working Group

As recommended by CIG to the Commission

**Background.** During recent negotiations within the Pacific Salmon Commission to amend the current Chinook regime under Chapter 3, Annex IV of the Pacific Salmon Treaty, the Parties added a sub-paragraph regarding Okanagan Chinook salmon:

"5 (b) the Commission shall establish a work group to explore issues related to Okanagan Chinook, including the establishment of management objectives, enhancement and possible use of Okanagan Chinook as an indicator stock. The work group shall report to the Commission by October 2019;"

A footnote to paragraph 5(b) states that "The work shall be consistent with Paragraph 7 of Chapter 1 of this Treaty." That paragraph states:

... the Parties 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, paragraph 2 and 3. Any such arrangement is intended to *inter alia*:

- (a) Ensure effective conservation of the stocks;
- (b) Facilitate future enhancement of these stocks as jointly approved by the Parties;
- (c) Avoid interference with the United States management programs on the salmon stocks existing in the non-transboundary tributaries and the main stem of the Columbia River.

The Commission agreed at the January 2019 meeting to the following action:

"A small workgroup on Okanagan Chinook is authorized. This group will include one Commissioner and two experts from each Party, and will develop its draft terms of reference consistent within the scope of Chapter 3, paragraph 5(b)."

Task list:

The workgroup shall develop concise summaries of the following items as a basis for the October report:

- 1) Summarize existing information on the population structure of Chinook spawning in the Okanagan River.
- 2) Summarize existing information on factors limiting the abundance, productivity, and spatial distribution of Chinook spawning in the U.S. and Canadian sections of the Okanagan River.
- 3) Describe existing actions to improve the abundance, productivity, and spatial distribution of Chinook spawning in the U.S. and Canadian sections of the Okanagan River.
- 4) Provide existing fishery management objectives for Chinook spawning in the Okanagan River.
- 5) Compile existing information on opportunities to enhance the productivity and abundance of Chinook salmon spawning in the U.S. and Canadian sections of the Okanagan River (habitat restoration; supplementation; water management).
- 6) Describe the current summer Chinook CWT indicator stock and identify whether any limitations exist in using it to monitor fishery impacts on Chinook salmon spawning in the Okanagan River.

- 7) Discuss new information that could assist the Parties in more effectively implementing Chapter 1, Paragraph 7, which may include a discussion of options for additional management objectives or fishery obligations in U.S. and Canadian fisheries and whether adoption of those measures could benefit the abundance, productivity, and spatial structure of Chinook salmon spawning in the Okanagan River.
- 8) Identify research projects that could promote the mutual, effective conservation of Chinook salmon spawning in the U.S. and Canadian sections of the Okanagan River.
- 9) Recommend annual reporting needs to inform the Commission over time.

**Workgroup Members:**

Canada: Dr. Brian Riddell (Commissioner), Mr. Chuck Parken (DFO), Mr. Howie Wright (ONA)

US: Mr. McCoy Oatman (Commissioner), Mr. Mike Matylewich (CRITFC), Mr. Bill Tweit (WDFW).

**Time line:**

By May 15, 2019. Discuss progress on tasks in conference call with CIG; resolve any questions that have arisen regarding the Terms of Reference.

By August 1, 2019. Discuss progress on tasks in conference call with CIG; resolve any questions that have arisen regarding the Terms of Reference.

By Sept 1, 2019. Provide CIG with draft report addressing paragraph 5(b).

## Chinook Interface Group Recommendation Calendar Year Exploitation Rate Implementation

February 14, 2019

- 1) The CIG received a summary of the results of the questionnaire regarding the readiness of the management entities to implement the CYER metric. Although there are some notable gaps in the data that need to be addressed, they should not stop us from moving forward with using the CYER metric.
- 2) The CIG recommends the commission send a letter of thanks to management entities for their responses to the questionnaire with an additional request that they work with us to develop a plan to address and prioritize the data gaps that were identified in the responses to the questionnaire.
- 3) The CIG recommends that the Parties be responsible for the follow up communication with the management entities and the coordination in developing the action plans including prioritization as needed and funding requirements.
- 4) The CIG recommends that they hold a meeting in June of 2019 to review the action plans, prioritizations, funding challenges, and develop a matrix that overlays the elements of the action plans into a single document to identify opportunities for collaboration to address the gaps.
- 5) The CIG will provide a written report to the Commission following the June meeting regarding CYER implementation including next steps and challenges to filling the gaps.



Report of the Standing Committee on Finance and Administration  
February 14, 2019

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

Data management pilot project for CTC and Fraser Panel

In February 2018, the Commission approved a 2-year pilot project for the Secretariat to hire a term database manager to assist the Chinook Technical Committee (CTC) with their database needs, as well as provide in-season database support to the PSC Secretariat.

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

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

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

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

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

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

Test fishing

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

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

The Committee acknowledges that issues of test fishing administration and priority of pay fish are still unresolved, and are currently being discussed by the Parties in parallel with Chapter 4 negotiations. The Committee agreed that financial regulations and/or guidelines addressing the management of the Test Fishing Revolving Fund need to be developed.

#### National dues and projected deficits

The Committee acknowledges that regular annual PSC dues have remained level since FY 2011/2012, at \$1,879,636 CAD per Party, and that the Secretariat has been able to operate at level dues for the past eight years due to a combination of factors, which include:

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

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

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

TABLE I

## PACIFIC SALMON COMMISSION

## FORECAST BUDGETS

	Forecast results 2018/2019	Proposed Budget 2019/2020	Forecast Budget 2020/2021	Forecast Budget 2021/2022
	(Adams)	(pink)	(none)	(pink)
<b>1 INCOME</b>				
A. Contribution from Canada	1,879,636	1,879,636	1,879,636	1,879,636
Special contribution pension CA	162,852	162,852	162,852	162,852
B. Contribution from U.S.A.	1,879,636	1,879,636	1,879,636	1,879,636
Special contribution pension U.S.A.	162,852	162,852	162,852	162,852
Sub total	4,084,976	4,084,976	4,084,976	4,084,976
D. Interest	60,000	60,000	60,000	60,000
E. Other income	182,500	180,000	180,000	180,000
Carry-over from previous fiscal year	1,304,734	790,747	163,531	(332,231)
F. Total Income	5,632,210	5,115,723	4,488,507	3,992,745
<b>2 EXPENDITURES</b>				
A. 1. Permanent Salaries and Benefits	2,896,063	3,020,819	3,053,356	3,120,865
2. Unfunded pension liability payments	325,704	325,704	325,704	325,704
3. Temporary Salaries and Benefits	220,998	252,135	165,744	218,809
4. Total Salaries and Benefits	3,442,765	3,598,658	3,544,803	3,665,378
B. Travel	112,637	126,694	112,916	121,879
C. Rents, Communications, Utilities	228,119	235,209	231,107	234,817
D. Contractual Services	791,007	720,618	651,420	696,448
E. Supplies and Materials	43,935	48,013	57,491	45,530
F. Equipment	223,000	223,000	223,000	223,000
G. Total Expenditures	4,841,463	4,952,192	4,820,738	4,987,052
<b>3 BALANCE (DEFICIT)</b>	790,747	163,531	(332,231)	(994,307)
Carry-over generated (expended) in the year	(\$513,987)	(\$627,216)	(\$495,762)	(\$662,076)

2019-2028 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

Deadline	Chapter/paragraph	Task (emphasis added)
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> 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>

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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>
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 CEI 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 CEI program includes the development of analytical tools that involve catch and escapement data in the implementation of this Chapter...</p>
February 2019	Chapter 1, Paragraph 3(a)(iii).	Increase CWT tag rates for Stikine River Chinook salmon to achieve CTC indicator stock standards.
February 2019	Chapter 1, Paragraph 3(b)(iii).	Increase CWT tag rates for Taku River Chinook salmon to achieve CTC indicator stock standards.
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>

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>
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>
c. February 2020	Chapter 1, paragraph 3(b)(i)(B)	<p><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></p>
c. February 2020	Chapter 1, paragraph 3(b)(i)(C)	<p>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></p>
February 2020	Chapter 3, paragraph 4(c)(i)	<p><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.</p>

<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.
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>
c. December 2022	Chapter 3, paragraph 5(e)	<p><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.</p>

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.
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. 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>
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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>
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>
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.

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<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>
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.
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.
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>
January 2022	Chapter 3, paragraph 2(b) footnote	<p>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></p>



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<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>
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</p>

		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.
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>

**PSC ANNUAL MEETING**  
**February 11-15, 2019**

**NORTHERN PANEL MEETING REPORT**

**Session Activities:**

- The US and Canadian Sections of the Northern Panel did not meet during the 2019 PSC Annual Meeting
- Chapter Implementation Plans
  - An implementation plan was developed bilaterally during the January 2019 session and was agreed upon at the end of that session. The main focus of the plan is work associated with two studies that resulted from re-negotiation of Chapter 2 and encompasses a 5-year time frame. The overall chapter implementation plan covers the full ten-year time for the new chapter with an opportunity for review of Chapter performance after 5 years.
- Terms of Reference
  - During the January session, Terms of Reference were developed for two studies that resulted from the updates to Chapter 2: An update on Escapement Goals and Biological Benchmarks for Skeena and Nass Sockeye (Canada) and an analysis of the District 104 Pink Salmon Fishery (US). Terms of Reference were developed and mutually agreed upon by the end of the January session; however the US has recently sent back the TOR's to Canada with some new revisions that require review by Canada. It is hoped that this will be completed before the end of February 2019.

## PSC ANNUAL MEETING February 11-15, 2019

### SOUTHERN PANEL MEETING REPORT

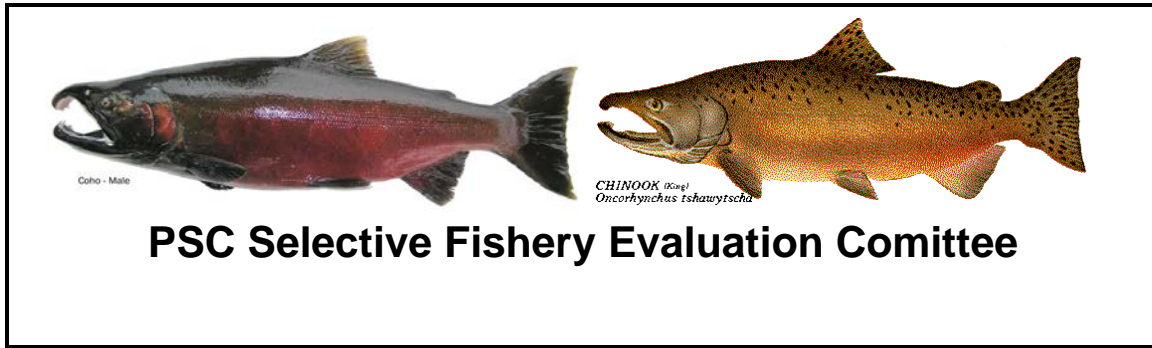
#### Session Activities:

- The US and Canadian Sections of the Southern Panel developed an agenda that enabled bilateral and section time to focus on activities associated with our annual work plans and other related assignments:
  - *Refining the implementation plans for new Chum and Coho Chapters of the PST;*
  - *Receiving and discussing reports from Coho and Chum Technical Committees;*
  - *Developing priorities for Endowment Fund proposals for 2020*
  - *Conduct tasks from workplans for 2019.*
- The Bilateral Panel met and received presentations on:
  - *Sharepoint site for sharing information from John Son, PSC Secretariat.*
  - *Coho and Chum Technical Committee reports on workplans and progress on current Endowment Fund projects and potential proposals for consideration (TC co-chairs)*
  - *Panel members also attended the Management Entities meeting and the Ocean Indicators mini-workshop*
- Chapter Implementation Plans
  - *Both section and bilateral time was spent to refine implementation plans for all new elements of the new Chapters 5 and 6, including assigning tasks to sub-committees, Technical Committees as appropriate, and assigning short-term and longer-term tasks.*
  - *In Chapter 5, there was discussion about the need to determine a cross-Panel structure or process to coordinate work examining the impacts of environmental uncertainty as well as the need for coordination of U.S and Canadian efforts.*
- Update from the Coho Technical Committee
  - *The US and Canadian co-chairs of the Coho Technical Committee presented the following:*
    - *Their 2020 Southern Endowment Fund (SEF) priorities and project updates.*
    - *Their work towards the Periodic Report*
    - *The 2017 Coho Annual Summary ER Report*
    - *Progress on automating post-season exploitation rate report outputs.*
- Update from Chum Technical Committee
  - *The US and Canadian co-chairs of the Chum Technical Committee presented the following:*

- *Their 2019 work plan*
- *General updates on their research projects funded by Southern Endowment Fund in 2018. These included:*
  - *Juan de Fuca Assessment Fishery*
  - *Joint USA/CA DNA baseline, sampling and analysis project*
- *SEF priorities for the 2020 call.*

#### Preparation for Future Meetings

- Finally, the bilateral Panel worked on a schedule for upcoming meetings, including the timing of the manager-to-manager information exchange in mid-March, and the July Coho Working Group and Coho Technical Committee.



## PROGRESS REPORT TO COMMISSION

### February 14, 2019

The SFEC met in December of 2018 to review 2019 Mass Marking (MM) and Mark Selective Fishery (MSF) proposals.

The planned Mass Marking for 2019 included:

- Coho MM proposals included a region-wide total of approximately 33.3 million fish. This is approximately 1.8 million less than 2018. This decrease is due to a combination of agency program changes and broodstock shortfalls.
- Chinook MM proposals included approximately 119.8 million fish. This is approximately 5.4 million more than 2018. This increase was due to a combination of meeting production goals and increases for SRKW prey. It is unknown if the current marking capacity (i.e. tagging trailers and operators) will be sufficient to complete all the planned marking in Washington State.
- Additional future hatchery increases for SRKW were proposed for funding in Washington State last month. These include an additional:
  - 7.2 million Chinook Salmon; and,
  - 850,000 Coho Salmon.
- For the first time, a Chinook MM proposal was received from CDFO. The proposal was limited to 310,000 fall Chinook from three WCVI hatcheries. The purpose of the marking is for broodstock management in rivers where there is a focus to conserve natural production.
- CDFO has dropped their only Coho DIT group (Quinsam R). Chinook and Coho DIT groups are now limited to Puget Sound, the Washington Coast and the Columbia River. WDFW, USFWS and NWIFC are the only agencies still tagging DIT groups.

Planned MSFs for 2019 include 26 proposals for Coho fisheries and 40 for Chinook

- Coho MSF proposals included 5 from CDFO, 5 from ODFW and 3 joint ODFW/WDFW proposals for Columbia River fisheries. Thirteen Coho MSF

proposals were submitted by WDFW, including a new proposal for an on-going test fishery on the Columbia River.

- Chinook MSF proposals included 3 from ADF&G, 2 from CDFO, 26 from WDFW, 4 from ODFW and 3 joint ODFW/WDFW proposals for Columbia River fisheries. Of these proposals, 4 were new including one from CDFO for a sport fishery in the Straits of Georgia, Johnstone, and Juan de Fuca and 3 from WDFW for on-going test fisheries in the Columbia River.
- No proposals were submitted by the Lummi Nation for Nooksack River fisheries, or by Idaho for Snake River fisheries.

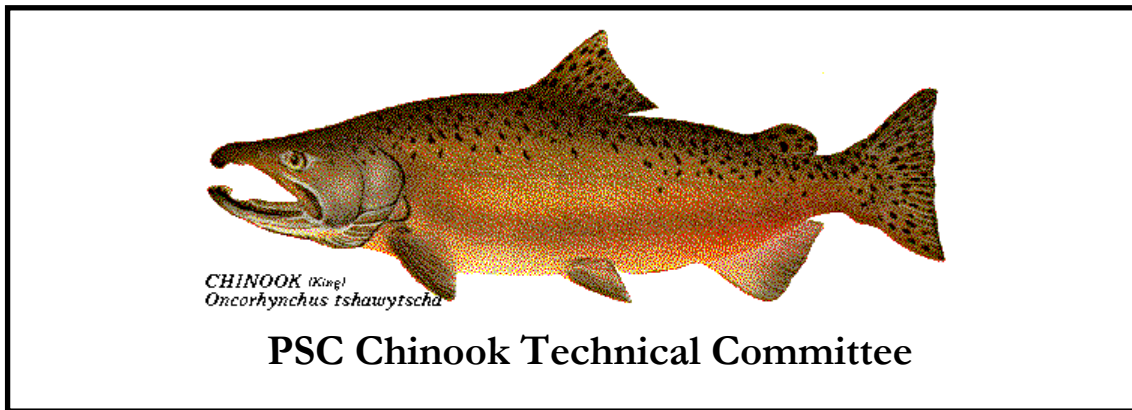
The SFEC requested that mark rates be included in the 2019 MSF proposals for the first time, presented as the ratio marked to unmarked fish. We are working through what it represents and how we would evaluate the rates, whether it be to compare the rates with *sfm* (release mortality rates), or on the basis of data quality in developing the rates.

The SFEC continues to be concerned with the complexity of MSF regulations, incomplete catch sampling, and the lack of electronic tag detection in some areas, e.g., Col. R Sport, outside of Buoy 10 on fall Chinook.

With regard to operations and reporting of the committee

- The SFEC finalized and submitted the *Review of Mass Marking and Mark-Selective Fishery Activities Proposed to Occur in 2017 and 2018* report. We anticipate the 2019 report to be submitted by spring.
- We continue to work on the Coho DIT report, making progress on synthesizing the information at the September 2018 meeting. Current efforts focus on regional analyses that focuses on whether we have adequate coverage of DIT groups for important stock groups and are the requirements for an effective DIT group being met.
- We will again send out a letter to the agencies in May reminding them of MOU requirements to provide finalized MSF plans and early notice of future MSF and MM plans. Last year the agencies were responsive to this request.
- A joint SFEC-AWG and Chinook Technical Committee (CTC) -AWG meeting is up for discussion within the CTC this week. We will be planning a joint SFEC/ Coho Technical Committee meeting once we have a final draft of the Coho DIT report.





**PACIFIC SALMON COMMISSION WORK PLAN UPDATE**  
**2018-2019**

**Panel / Committee:**

The Chinook Technical Committee reports to the Pacific Salmon Commission.

**Date:** PSC Annual Meeting - February 11-15, 2019

**Update on Bi-lateral Tasks Assigned Under the Current PSC Agreement:**

The following list of tasks is from the CTC 2018/19 Workplan:

**1. Annual Analyses**

- 2019 ERA – *In Progress*; ETA March 15
- 2019 Chinook Model Calibration; ETA April 1

**2. Annual Reports**

- 2019 C&E report – *In Progress*; ETA June 10
- 2019 CLB&ER report – *Begin work in April 2019*; TBD
- 2018 CLB&ER report – *Near completion*; ETA February 22
- The CTC will discuss changes to the structure of the annual reports to reflect changes in 2019 PST Agreement. – *In Progress*; TBD

**3. Ad-hoc Reports**

- Documentation of changes to inputs associated with Phase 2 of the base period recalibration of the PSC Chinook Model – *In Progress*; *Documentation templates were developed and will be populated. TBD*

**4. Ad-hoc Analyses**

- Phase 2 of the base period recalibration of the PSC Chinook Model – *Near completion. The CTC-AWG added 2 meetings and additional CTC members to accomplish this task. A summary follows below:*

The CTC-AWG+ group explored the effects of either using or not using the aggregated maturation rate scalars on model performance and concluded that the inclusion of the aggregated maturation rate scalar methods allow for gains in model performance.

A decision to use the BPCV1-25 AC6 model configuration to perform diagnostics of model performance contained within our previously share model framework for assessment has been made.

During the retrospective analysis exercise, unexplained model performance was observed and a preliminary exploration of utilizing either 3 or 5 year average EVs was engaged and the group has decided to use the 5 year EV averaging for the current model configuration. Those unexplained model phenomena have pointed towards the need to engage in a more detailed examination of our maturation rate and EV projection methods, similar to what has been done in the past to optimize performance of the model configuration contained in 1804.

- Review the list of CTC tasks, analyses and assignments contained in Appendix A of the new 2019 PST Agreement to determine what new or modified analyses, reports and workgroups may be required to meet the provisions of the agreement. – *In Progress; the CTC is trying to schedule a presentation of the requirements of the new Chapter 3 this week with Chuck Parken, Jim Scott, and Bob Clark.*
- Investigation and implementation of mark-selective fishery algorithms in the annual exploitation rate analysis - *In Progress but the work is in a preliminary state. A Joint CTC-AWG and SFEC-AWG meeting is being planned for May 13-17 of this year in Portland, OR.*
- Escapement goals presented for review and acceptance will be evaluated by the CTC. – *None submitted to date.*
- Testing and validation of the DGM and evaluation of CWT-based CTC models and methods- *In Progress. The CTC-AWG met November 26-28 in Portland to test the DGM*
- Modify Chinook model, test, and implement stock specific growth functions and agency estimates of shakers - *On 2017 work plan*
- Testing and validation of ForecastR - *In Progress*
- Testing and validation of CIS - *In Progress. The CTC-AWG met November 26-28 in Portland to test CIS*
- Phase III Model Improvements including implementation of MSF capability in the Chinook Model and related stratification of stocks and fisheries, time periods; modify Chinook Model to use forecasts of cohort abundances; etc. – *No work to date.*

- Scope the representativeness of coded-wire-tag indicator stocks in relation to other wild/hatchery stocks they are intended to represent – *No work to date.*

### **Proposed Meeting Dates and Draft Agendas:**

Meeting Locations: The meeting schedule proposed for 2018-2019 includes six full bilateral CTC meetings and three additional CTC-AWG meetings. The schedule also includes a US Chinook Abundance Based Management Implementation Funding meeting. Additional CTC meetings may be required, depending on the number and scope of additional tasks assigned to the CTC.

Meeting	Dates	Location	Meeting Objectives
CTC-AWG	Nov 5-9	Seattle	Phase II BPC; CIS testing; DGM testing
US CTC-LOA	Nov 29-30	Portland	LOA project presentations, RFP
PSC Post-season (& CTC)	Jan 14-18	Vancouver	Phase II BPC; C&E, new Agreement
CTC-AWG+	Jan 28-Feb 1	Vancouver	Special additional meeting-Phase II BPC
PSC 34 <sup>th</sup> Annual (& CTC)	Feb 11-15	Portland	Phase II BPC assessment
CTC-AWG	Feb 25-Mar 1	Vancouver	ERA
CTC-AWG	Mar 11-15	Portland	Model Calibration
CTC Bilateral Meeting*	Apr 29-May 3	Seattle	C&E; Clb&ERA, evaluation of methods and models using the DGM
CTC Bilateral Meeting**	May 13-17	Portland	Address new assignments/joint SFEC/AWG meeting
CTC Bilateral Meeting	Jun 3-7	TBD	C&E; Code MSF algorithms
CTC Bilateral Meeting	Sep 16-20	Bend/Nanaimo	Clb&ER report
PSC Fall Session	Oct 15-18	Spokane	CTC co-chairs attend

\* Tentative (Either this meeting or the May 13-17 may not be necessary)

\*\* Tentative; International Year of the Salmon Workshop is May 18-20, Portland, OR

## **Committee on Scientific Cooperation (CSC)**

### **Annual Report to the Commission**

### **February 14, 2019**

In its 2018/2019 Work Plan, the CSC primarily focused on the Commission directive to examine methods for informing the PSC community on annual variation in environmental conditions and their effects on salmon production. The need for this information has been reaffirmed in the new Agreement, which includes specific requirements to improve assessment methods to incorporate the effects of environmental variation and change on salmon survival and productivity. At the 2018 Annual Meeting, the CSC presented the revised document *“Elaboration of a strategy for consideration of annual variation in environmental indicators and salmon production and its implications for fisheries management under the Pacific Salmon Treaty.”* This document identified several elements for documenting anomalous environmental conditions and evaluating their implications for salmon production under the Pacific Salmon Treaty. The Commission approved moving forward with the development of improved communication and access to information sources and data relevant to this issue. They deferred a decision on developing capacity for compiling and evaluating annual variability in environmental and salmon indicators.

In its 2018/2019 Work Plan, the CSC identified two courses of action for improved communication on these issues:

1. Development of a PSC SharePoint site focused on coastwide variation in environmental indicators and salmon production; and
2. Holding a “mini-workshop” at the 2019 Annual Meeting on variability in environmental indicators and its implications for fisheries management under the Pacific Salmon Treaty.

This Annual Report documents progress on these two approved elements of the CSC annual work plan. In addition, the CSC tracked or progressed on two other important activities germane to scientific collaboration and CSC function.

3. Tracked the International Year of the Salmon process.
4. Developed a Commission-sponsored SharePoint site archiving CSC activities, reports, and associated publications.

#### **1. SharePoint Site on Variation in Environmental Indicators and Salmon Production**

The CSC worked with Secretariat staff (John Son and Teri Tarita) to design and implement the SharePoint site, “Variability of Pacific Salmon and Their Environment”, on the PSC Extranet. Secretariat staff was also instrumental in developing reference resources for the site. The CSC received input from three expert reviewers on the alpha version of the site in April 2018. CSC members then revised the site and all members of

the PSC communities were provided password access to the site in May 2018. The CSC hosted a Webinar in June 2018 to support the use of the site, as well as encourage additional feedback and improvements. The CSC members continue to monitor use and add documents and information to this SharePoint site.

As identified in the CSC's 2018 workplan, further development and utility of the CSC SharePoint site is dependent on its use by the PSC science/management community. Structure, content, and access to the site are all considerations to making the portal of value to the users. Informal feedback from PSC members would indicate that use has been limited; CSC members and the secretariat are the primary users and posters at this point. The CSC is formally requesting feedback from PSC members as part of the questionnaire follow-up to the mini-workshop at the 2019 Annual Meeting to identify ways to make the site more accessible and useful to the PSC science/management community.

Presentations from the mini-workshop will be posted on the CSC SharePoint site contingent of the authors permission. CSC members attended and participated in the Data Den organized by Secretariat staff for the 2019 Annual Meeting, where potential data sharing/interaction tools were highlighted – in particular tools that are in use by PSC technical committee members already, such that the interface applications may be ones that they are already familiar with. The CSC will work to include links to these applications in the “Tools” section of the CSC SharePoint site and to investigate ways by which best practices in data management can be shared across the Commission's Technical Committees in a timely manner.

## **2. Workshop on environmental variability and salmon production**

The CSC obtained a grant from the Southern Fund Committee for a “mini-workshop” to be held at the 2019 Annual Meeting. The workshop was organized into 2 sessions with 3 speakers at each session, and time for a brief panel Q+A discussion at the end of speaker presentations.

Presenters and sessions were as follows:

### **Session 1: State of the Ocean in relation to Salmon**

Brian Burke, NOAA Northwest Fisheries Science Centre – focussing on the Pacific Northwest region

Sue Grant, DFO - focussing on British Columbia

Skip McKinnell, Salmoforsk International Environmental Consulting – focussing on the Gulf of Alaska

### **Session 2: Examples of the use of environmental variation in fisheries management**

Clint Muhlfeld, USGS Northern Rocky Mountain Science Centre – focussing on climate change vulnerability assessment of native salmonids in the Crown of the Continent ecosystem of the US and Canada

Rishi Sharma, NOAA Northwest Fisheries Science Centre – focussing on yellowfin tuna and Oregon coho salmon

Maxine Reichardt, Pacific Salmon Commission – focussing on inseason assessment of Fraser River Sockeye salmon

CSC co-chairs moderated the presentations and facilitated discussion. For Session 1, one of the presenters (McKinnell) was unable to participate due to weather. Along with discussion, workshop participants were provided a questionnaire to provide further input regarding the mini workshop, their themes, potential future themes, and how the information from the workshop may be utilized by the PSC. Although 2019 is not a year for which a roundtable discussion of emerging scientific issues is scheduled, the feedback from discussion during the mini workshop, as well as input from the questionnaire responses, will be considered in identifying new topics or themes for CSC consideration.

The mini workshop presentations, as well as other resources associated with this topic, will be uploaded to the CSC SharePoint site subject to consent by the individual presenters. The intent is to stimulate discussion of the information presented at the workshop, to link the in-person presentation of such information on a periodic basis with an on-going discussion on a virtual platform, and to provide access to this information by the PSC community.

The CSC will summarize the outcome of the workshop and the response to the questionnaires in a final report for the Southern Fund by the end of March 2019. The report will also be submitted to the Commission and posted on the CSC SharePoint site. The report will include recommendations for monitoring environmental variability and long-term changes in productivity and survival driven by climate change as identified in the new Agreement.

### **3. International Year of the Salmon (IYS)**

The IYS is an international framework for collaborative outreach and research to be implemented over the period 2017-2022. In February, 2019, the first IYS research cruise is scheduled for sampling in the Gulf of Alaska. In May 2019, the NPAFC/IYS program, in partnership with the Salmon Ocean Ecology Meeting, is sponsoring a workshop on "Salmon Ocean Ecology in a Changing Climate." This workshop will be a more expansive look at the issues that were presented and discussed in the February 2019 CSC mini-workshop.

As per the Commission's directive, the CSC has no direct role in IYS planning or implementation. However, the CSC recognizes that information from the IYS initiatives will provide valuable information on the relationships between environmental factors and

salmon survival and productivity. The Commission has identified the Executive Secretary as the point of contact for PSC participation in the IYS Initiative, and the Canadian CSC co-chair is involved in the IYS planning as part of their professional responsibilities outside of CSC activities. The CSC will use input from these points of contact to update the SharePoint site with relevant links to the IYS program, and to help develop recommendations for how the Commission can monitor and adapt to changing climate conditions affecting Pacific salmon.

#### **4. SharePoint Archive for CSC Products**

Secretariat staff established a CSC archive site on the PSC Extranet under the Committees drop-down menu. This site functions as a repository for CSC Terms of Reference, membership, CSC Work Plans and Annual Reports, other CSC reports, and links to associated publications.

#### **Future CSC Activities**

The CSC will rely on input following the workshop to help develop recommendations for its 2019/2020 Work Plan. In addition, the CSC welcomes the opportunity to review suggestions put forward by the Panels and Technical Committees and remains prepared to address any priority issues identified by the Commission. Specifically, it would welcome further direction from the Commissioners on implementing additional elements from the document *“Elaboration of a strategy for consideration of annual variation in environmental indicators and salmon production and its implications for fisheries management under the Pacific Salmon Treaty”*. The CSC recognizes a need for collaboration and information sharing among technical committees as they develop methods for incorporating impacts of environmental variability in their assessment and management models. The CSC may be able to play a role in supporting consistency and best practices and facilitating sharing of tools and data between Committees.



**Annual Report of the  
Southern Boundary Restoration and Enhancement Fund and the  
Northern Boundary and Transboundary Rivers Restoration and Enhancement Fund  
for the year 2018.**

***Introduction***

In June of 1999, the United States and Canada reached a comprehensive new agreement (the “1999 Agreement”) under the 1985 Pacific Salmon Treaty. Among other provisions, the 1999 Agreement established two bilateral funds: the Northern Boundary and Transboundary Rivers Restoration and Enhancement Fund (Northern Fund); and the Southern Boundary Restoration and Enhancement Fund (Southern Fund). The purpose of the two funds is to support activities in both countries that develop improved information for fishery resource management, rehabilitate and restore marine and freshwater habitat, and enhance wild stock production through low technology techniques. The United States agreed to capitalize the Northern and Southern Funds in the amounts of \$75 million U.S. and U.S. \$65 million respectively. Canada also contributed CAD \$500,000. The 1999 Agreement also established a Northern Fund Committee and a Southern Fund Committee, each comprised of three nationals from each country, to oversee investment of the Funds’ assets and make decisions about expenditures on projects. Only the earnings from investments can be spent on projects.

***Committee Members***

Northern Fund Committee

**Canada:**

Steve Gotch  
Carmel Lowe  
John McCulloch

**United States:**

Doug Mecum  
Bill Auger  
Charlie Swanton

Southern Fund Committee

**Canada:**

Andrew Thomson/Laura Brown  
Don Hall  
Mike Griswold

**United States:**

Larry Peck  
Peter Dygert  
Joe Oatman



## *Executive Summary*

- Total contributed capital (nominal) was U.S. \$140,065,000 (the equivalent of CAD \$209,796,000 using the exchange rate at the time the last installment was made). Actual fund asset value at December 31<sup>st</sup>, 2018 was U.S. \$204,367,000 or CAD \$278,797,000.
- Global equity markets were rocked by rising concerns of slowing global growth and escalating trade tensions in the fourth quarter of 2018. As a result, positive equity returns that were generated in the first three quarters of the year were largely given up in the fourth.
- In 2018 the Southern Fund Committee supported a total of 33 projects for U.S. \$3.02 million including U.S. \$800,000 provided to the fifth and final year of the *Salish Sea Marine Survival Program*.
- In 2018 the Northern Fund Committee supported a total of 63 projects for U.S. \$4.84 million.
- Informed by advice provided by the Commission, U.S. \$2.3 million was contributed to support 26 *Very High Priority Chinook* projects in 2018. The Northern Fund contributed U.S. \$1.47 million and the Southern Fund contributed U.S. \$0.83 million
- Combined project spending by the Northern and Southern Funds was U.S. \$7.86 million in 2018.
- Since 2004, the total Northern and Southern Fund expenditures have been U.S. \$85.5 million, contributed in financial support to 1,182 projects. This sum is inclusive of U.S. \$6.95 million to the *Very High Priority Chinook* projects and the Southern Fund's contribution of U.S. \$5 million to the *Salish Sea Marine Survival Program*. In addition to the U.S. \$85.5 million, the Funds have contributed another U.S. \$10 million to the *Sentinel Stocks Program*.
- In 2018 the Northern and Southern Fund Committee members met in person jointly on three occasions, February, April and November. In addition, the Northern Fund Committee's met separately on three occasions and the Southern Fund Committee met separately on four occasions.
- A sub-committee of two members, one from each Fund Committee, was formed in April 2018 and tasked with reviewing administrative costs related to the Funds financial custodian and investment consultants.
- Dr. Laura Brown took over from Mr. Andrew Thomson on the Southern Fund Canadian section. Mr. Charlie Swanton left the Northern Fund Committee US section in December.
- Fund staff provided administrative services for the Yukon River Panel's annual U.S. \$1.2 million Restoration and Enhancement (R&E) Fund for an eighth year in 2018.

## ***Investment Review***

Most managers in the portfolio performed well, either outperforming or matching their respective benchmarks. The global equity manager, Morgan Stanley, had another strong year, outperforming its benchmark by 7%. The US equity manager, BlackRock, did its job by replicating the performance of its benchmark. The international equity manager, LSV, was the sole laggard as it underperformed, in part due to its value style of investing which continued to be out of favour. The portfolio also had modest levels of outperformance from its Canadian commercial mortgage fund manager, ACM, its global infrastructure equity manager, RARE, and its US real estate manager, Invesco (based on real estate returns to the end of the third quarter). In January 2018, Phillips, Hager & North (“PH&N”) replaced BlackRock as the Canadian fixed income manager as the strategy was changed from a passive mandate to an active core plus mandate. PH&N performed close to its benchmark as it has taken a defensive stance in the current market environment. Bond returns fluctuated between negative and positive over the year, but with yields dropping in December, most bond markets ended the year with slightly positive returns. Alternative investments such as real estate performed better than equities and bonds in most regions as the risk-off behavior of most investors late in the year did not impact these returns. The US dollar strengthened against most currencies, with an increase of over 8% versus the Canadian dollar. As of December 31, 2018, all investment strategies in the PSC portfolio continued to be rated “Buy” by Aon.

Total contributed capital (nominal) was U.S. \$140,065,000 (the equivalent of CAD \$209,796,000 using the exchange rate at the time the last installment was made). Actual fund asset value at December 31<sup>st</sup>, 2018 was U.S. \$204,367,000 or CAD \$278,797,000.

Contributed capital and asset value of the individual Funds as of December 31<sup>st</sup>, 2018 stood as follows:

	<b>Contributed Capital</b>	<b>Asset Value</b>
<b>Northern:</b>	U.S. \$75,000,000 CAD \$112,388,000	U.S. \$111,212,000 CAD \$151,716,000
<b>Southern:</b>	U.S. \$65,000,000 CAD \$97,408,000	U.S. \$93,154,000 CAD \$127,081,000

### **Note #1:**

In 2003 a rescission of 0.65% applied to the FY 2003 appropriations reduced the final contribution to the Northern Fund by U.S.\$162,500 and to the Southern Fund by U.S.\$97,500. Thus the actual Contributed Capital is:

Northern:	U.S. \$74,837,500
Southern:	U.S. \$64,902,500

### **Note #2:**

U.S. Dollar Exchange (noon) rate: per Royal Trust, December 31, 2018	1.3642	0.73303
U.S. Dollar Exchange (noon) rate: per Royal Trust, November 30, 2018	1.3301	0.75182
U.S. Dollar Exchange (noon) rate: per Royal Trust, December 31, 2017	1.2545	0.79713
U.S. Dollar Exchange (noon) rate: per Royal Trust, December 31, 2016	1.3427	0.74477

### **Note #3:**

Cash withdrawals performed July 4<sup>th</sup> 2018 to a total of U.S. \$7,682,300 or CAD \$10,000,000

### ***Asset Mix Optimization Study***

During much of the previous year, 2017, the Joint Northern and Southern Fund Committees took steps to implement the recommendations of an Asset Mix Optimization Study begun in late 2016.

Specifically the Fund Committees actions in 2017 were as follows:

- Approved the transfer of the Fund’s infrastructure assets from “listed” to “direct” with a view to further separating those assets from market fluctuations. The actual investment date is anticipated to be mid-2019.
- Implemented a move of 10% of the fixed income portfolio to Canadian mortgages.
- Implemented the transfer of the remaining 20% of the fixed income assets to an active management strategy.

In 2018, with these structural changes complete, the Fund Committees turned to the third and final phase of their asset mix optimization strategy. Phase III involved a consideration of recommendations for optimizing each Funds spending policies, in light of the asset mix changes made, to finalize improvements to the risk-reward profile of the Master Trust.

In February 2018 an analysis of each Funds’ spending policy by the investment consultants proposed three basic considerations to be addressed:

- (i) Protection of Fund value in real terms – keeping the market value of the Fund above the inflation-adjusted contribution.
- (ii) Maintenance of spending in real terms – implementing a sustainable spending rate such that spending keeps pace with inflation.
- (iii) Stability of spending – maintaining a dollar amount of spending that does not fluctuate significantly from year-to-year.

With each Fund Committees approval, the investment consultants developed proposed revisions to each spending policy based on a step-wise approach to balancing the trade-off between preservation of capital and stability in spending. These changes were presented to the Committees in April 2018 and approved by each Committee, to be adopted immediately and to be implemented in time for the 2019 Call for Proposals.

#### **Southern Fund Spending Policy as of April 2018**

<b>Market Value of Fund</b> (12-Month Average)	<b>Spending Rate</b> (as % of 4-Year Average Market Value)
Below original contributions	Administration costs only
Between original contributions and inflation-adjusted contributions	2.0%
Above inflation-adjusted contributions (excess < 10%)	4.0%
Above inflation-adjusted contributions (excess ≥ 10%)	5.0%

## Northern Fund Spending Policy as of April 2018

<b>Market Value of Fund</b> (12-Month Average)	<b>Spending Rate</b> (as % of 2-Year Average Market Value)
Below original contributions	Administration costs only
Between original contributions and inflation-adjusted contributions	2.0%
Above inflation-adjusted contributions (excess < 5%)	3.0%
Above inflation-adjusted contributions (excess between 5% – 10%)	4.0%
Above inflation-adjusted contributions (excess > 10%)	5.0%

### *Custodian and consultant fees review*

During review and approval of the Fund Committees' annual administration budget for 2018/19 at the April 2018 meeting, it was noted that the fees for custodial services (Royal Bank of Canada) and investment consultant services (Aon) represented a considerable administrative cost burden and that an Action Item should be noted to the effect that said fees be further investigated with a view to reducing them if possible. Mr. Doug Mecum (N Fund, U.S. section) and Dr. Don Hall (S Fund, Canadian section) volunteered to assist PSC Director of Finance Ilinca Manisali and Fund staff with this task.

A report was commissioned from local consulting firm George & Bell into custodian fees and options in September 2018. The report was delivered to the Joint Fund Committees at their November 2018 meeting by Ms. Kamila Giesbrecht. The principal recommendation in the report was that the Fund Committees consider the firm Northern Trust as the Commission's custodian, due to excellence in operations, reporting, and service capabilities, as well as offering the most attractive pricing assuming the current manager structure is retained for the foreseeable future. An in-person interview process was recommended in order to make a direct assessment of the servicing team and the systems that would be available to the Commission's staff on an ongoing basis. In addition, a second potential custodian firm, namely CIBC Mellon was recommended for interview because they are very similar organizationally to the current custodian but with the second lowest pricing. RBC has been servicing the Commission for many years, thus no particular added-value was seen in interviewing them. In November the Joint Fund Committees approved a plan to conduct in-person interviews in early-February 2019 with a view to developing a final recommendation to the Joint Fund Committees in late-February 2019. Mr. Mecum and Dr. Hall agreed to participate in those interviews along with PSC staff and Ms. Giesbrecht.

With respect to the perceived high cost of investment consultant fees forecast in the annual administration budget, a Request for Proposals (RFP) was developed by PSC staff and Mr. Mecum and Dr. Hall in November 2019 as the next step in "going to market" for investment consultant

services presently provided to the Funds by Aon. This course of action was taken as a due diligence exercise to ensure that the Funds are getting the best value for money from their consultants.

By November 2018, five potential investment consulting firms including Aon had been identified and were sent the RFP. The deadline for responses is mid-February 2019 and interviews are anticipated to take place in April 2019.

## ***2018 Project Funding***

In 2018 the Southern Fund Committee supported a total of 33 projects for U.S. \$3.02 million. The list included projects addressing (i) specific priorities identified by the Pacific Salmon Commission's Fraser River and Southern Panels for U.S. \$1.38 million or 46% of their overall spending, (ii) eleven *Very High Priority Chinook* projects for U.S. \$832,449 or 27.5%, (iii) year 5, the fifth and final year of the *Salish Sea Marine Survival Program* for U.S. \$800,000 or 26.5%.

In 2018 the Northern Fund Committee supported a total of 63 projects for U.S. \$4.84 million. Of these, seven projects with a total value of U.S. \$407,673 were in the Enhancement envelope (8%) with the majority dealing with sockeye enhancement in the Transboundary region. U.S. \$94,512 (2%) was invested in two Habitat access improvement projects in the Transboundary region. U.S. \$2.87 million (60%) was directed to 37 Improved Information-type projects across South East Alaska, the Transboundary and Northern BC. In addition, the Northern Fund provided U.S. \$1.47 (30%) in total to seventeen *Very High Priority Chinook* projects across the region.

In the fifteen years between 2004 and 2018 the Northern Fund has granted U.S. \$46.6 million to 659 projects. Similarly, between 2004 and 2018 the Southern Fund has granted U.S. \$38.9 million to 523 projects. Total Fund project expenditures to date are U.S. \$85.5 million in support of 1,182 projects. Included in this total is a sum of U.S. \$6.95 million between 2015 and 2018 on Very High Priority Chinook projects and U.S. \$5.0 million from the Southern Fund to the Salish Sea Marine Survival Program. In addition to these amounts, the Chinook Sentinel Stocks Program was funded jointly by the Northern and Southern Funds between 2009 and 2014 in the amount of U.S. \$10 million.

## ***Very high priority Chinook projects***

	<b>Very high priority chinook projects 2018 funded by the Southern Fund</b>		<b>Cost</b>		
			<b>CAD \$</b>	<b>US \$</b>	<b>US \$ Total</b>
1	Abundance estimates for Stillaguamish River chinook salmon using trans-generational genetic mark recapture	WDFW		\$56,958	\$56,958

2	Genetic-based abundance estimates for Snohomish River chinook salmon	WDFW		\$168,241	\$168,241
3	Automating procedures for forecasting of terminal run and escapement of Chinook, Coho and Chum salmon stocks using open-source statistical software: "Chapter 2"	DFO	\$68,750		\$55,000
4	DNA stock composition of the Canadian Strait of Georgia chinook catch	DFO	\$15,000		\$12,000
5	Increased Chinook salmon stock coded-wire tagging to improve the quality of Chinook indicator stock analyses	DFO	\$303,495		\$242,796
6	Cowichan Adult Chinook Enumeration methodology change	DFO	\$40,000		\$32,000
7	DNA stock composition of the Canadian Juan de Fuca chinook catch	DFO	\$16,000		\$12,800
8	Chilko River Chinook Salmon Indicator Stock (Fraser River Summer-run Age 1.3 stock)	DFO	\$205,562		\$164,450
9	Burman River Chinook salmon mark-recapture 2016. Year 9	NTC	\$110,256		\$88,205
	<b>Total 2018 very high priority chinook funding from the Southern Fund.</b>		<b>\$759,063 CAD \$</b>	<b>\$225,199 US \$</b>	<b>\$832,450 US \$</b>

	<b>Very high priority chinook projects 2018 funded by the Northern Fund.</b>		<b>Cost</b>		
	<b>Title</b>	<b>Agency</b>	<b>CAD \$</b>	<b>US \$</b>	<b>US \$</b>
10	Mixed stock analysis of districts 108 and 111 chinook fisheries	ADFG		\$40,016	\$40,016
11	Origins of Chinook harvested in SEAK in 2018	ADFG		\$284,602	\$284,602
12	Upriver Bright Density Dependence Analyses of existing samples	MFR		\$60,199	\$60,199
13	Terminal Abundance of WCVI Chinook salmon	DFO	\$194,000		\$155,200

14	Estimation of Fraser River - South Thompson Age 0.3 Chinook Aggregate Escapement	DFO	\$195,575		\$156,460
15	Lower Shuswap River Chinook Salmon Indicator Stock (Fraser River Summer-Run Age 0.3 Stock)	DFO	\$165,000		\$132,000
16	Nass chinook salmon mark-recapture project 2018	NLG	\$114,000		\$91,200
17	Atnarko River Chinook Escapement Estimation project 2018	DFO	\$77,000		\$61,600
18	Klukshu Chinook	DFO	\$51,399		\$41,119
19	Stikine River Coded Wire Tagging	DFO	\$118,684		\$94,947
20	Stikine Fishery Sampling & Stock Assessment	DFO	\$90,374		\$72,299
21	Taku Fishery Sampling & Stock Assessment	DFO	\$39,322		\$31,458
22	Stikine River Chinook Aerial Surveys	DFO	\$23,200		\$18,560
23	Genetic Analyses of samples collected in the Recreational Chinook Fishery in Northern BC 2018	DFO	\$28,000		\$22,400
24	Chinook salmon Escapement Estimation to the Skeena River using Genetic techniques 2018	DFO	\$30,000		\$24,000
25	Genetic Stock Identification of Chinook salmon caught in Northern BC Troll fisheries 2018	DFO	\$73,000		\$58,400
26	Area 3 and 4 Creel Survey, 2018	DFO	\$158,906		\$127,125
	<b>Total 2018 very high priority chinook funding from the Northern Fund.</b>		<b>\$1,358,460 CAD \$</b>	<b>\$384,817 US \$</b>	<b>\$1,471,585 US \$</b>

	<b>Total 2018 very high priority chinook funding.</b>		<b>\$2,117,523 CAD \$</b>	<b>\$610,016 US \$</b>	<b>\$2,304,035 US \$</b>
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The combined total of all Northern and Southern Fund grant awards to Very High Priority Chinook projects in 2018 was U.S. \$2.3 million (exchange rate calculated at 0.8).

## ***Joint Fund Committee Meetings***

The Northern and Southern Fund Committees have agreed that given the congruent nature of their agendas, their decision to combine the funds into a single master account for investment management purposes, and the efficiencies involved with respect to interaction with the Fund managers, it was appropriate to meet together as a Joint Fund Committee at least once a year, preferably twice, for Fund financial reviews and investment manager interviews. The Fund Committees have also determined that it is beneficial to meet jointly early in the year during their annual project selection meetings to discuss and determine co-funding arrangements for *Very High Priority Chinook* projects. Thus the Joint Fund Committees met in person three times during 2018 on February 22<sup>nd</sup> (a.m. only), 2018; again on April 25<sup>th</sup> (p.m. only) and 26<sup>th</sup> (a.m. only), 2018 and finally, on November 8<sup>th</sup> and 9<sup>th</sup>, 2018.

### **February 2018**

In February the two Fund Committees met to select their projects for funding support in 2018. As in previous years the two Committees took the opportunity to meet jointly to discuss funding issues, principally funding for a suite of *Very High Priority Chinook* projects that each Committee had selected to forward to their second round reviews. In this the fourth and final year of the Committees commitment to dedicated funding support for such projects, the Fund Committees again received recommendations from the Commission on a number of priority “themes” to address critical Chinook salmon initiatives in support of implementation of Chapter 3 for inclusion in their Calls for Proposals. Each Fund Committee grouped project proposals that either self-identified or most closely aligned with the Chinook themes in the Calls for Proposals, and identified these as the list of *Very High Priority Chinook* projects for the year. Technical analysis of all the second round VHPC projects North and South, was provided by the four technical advisors to the Northern Fund Committee (Ed Jones and John H. Clark being the U.S. technical advisors and Cameron West and Dave Peacock being the Canadian technical advisors). The Southern Fund identified and funded 9 such projects at a total cost of U.S. \$0.83 million while the Northern Fund identified and funded 17 at a total of U.S. \$1.47 million. Discussions at the Joint Fund Committee meeting centered on funding questions pertaining to coast-wide projects not exclusively associated with Northern or Southern Fund areas of interest by virtue of their geographical location.

Following these discussions Executive Secretary Mr. John Field speaking on behalf of the by-laws sub-committee, presented an update on progress towards the development of revisions to the Fund Committees bylaws. A final draft was scheduled to be delivered for formal approval at the Joint Committees April 2018 meeting.

The Funds investment consultant, Ms. Satinder Sidhu from Aon, provided each Committee with proposed revisions to their spending policies consistent with Phase III of the Asset Mix Optimization Strategy. After recapping the key objectives for undertaking the spending policy review she led each Committee through the proposed potential changes and recommended that a final decision be made at the April 2018 meeting.

### **April 2018**

The Spring meeting of the joint Northern and Southern Fund Committees was held in Vancouver on the afternoon of April 24<sup>th</sup> and the morning of April 25<sup>th</sup>. Ms. Michelle Richardson of Aon Hewitt presented the 2017 Q4 investment performance report that saw global equity markets



ending the year on a high note with the 2018 outlook being positive for most markets, but potentially volatile. Of interest would be the performance of the new investment managers in the year ahead. A discussion on the Fund's tax position with respect to the new direct infrastructure manager IFM was discussed. Ms. Sidhu advised that IFM's anticipated formation of a Canadian pooled fund vehicle in which the Funds would be invested would eliminate the issue of US withholding taxes.

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

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

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

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

## Day 2

PSC Secretariat Director of Finance Ms. Ilinca Manisalli led the Joint Fund Committees through a detailed review of the proposed administration budgets for the Northern and Southern Funds for 2018/19. Topics covered included administrative staff salaries, Committee member honoraria, professional and legal fees, travel costs and the potential of and likely reasons for variance. It was noted that costs associated with fees for investment management charged by Aon had recently been higher than in prior years largely due to additional work that had resulted from the Asset Mix Optimization Study. An outcome of this discussion was an Action Item for the Director of Finance to review the consultant's fees over the last 5 years and take steps to compare the costs and services provided by Aon with those offered by potential alternative service providers. In addition to this work the administrative costs charged by the Fund's custodian, presently the Royal Bank of Canada (RBC) were also reviewed by the Director of Finance and found to be significant. Having become aware of this, the Joint Fund Committees instructed the Director of Finance to add a review of alternative custodians to the consultant's fees Action Item. To help guide the Director of Finance and assist with this task, a working group comprised of one Committee member from each

Committee was struck. Mr. Doug Mecum (U.S. section) volunteered to represent the Northern Fund and Dr. Don Hall (Canadian section) the Southern Fund. The working group was instructed to report back to the Joint Fund Committee by November 2018. *(See page 5 for further details).*

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

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

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

### **November 2018**

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

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

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

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

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

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

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

## Day 2

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

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

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

their February 19-20, 2019 meeting. All potential candidates will be invited for an in-person meeting and presentation to the full Joint Fund Committee members at the May 7-9, 2019 meeting.

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

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

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

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

### ***Northern Fund Committee Meetings***

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

February 19<sup>th</sup>, 20<sup>th</sup> and 21<sup>st</sup> (p.m. only), 2018

- Separate U.S. and Canadian section meetings with their technical advisors.
- Final selection of Northern Fund projects for funding in 2018.
- Technical feedback to project proponents from the technical advisors to the Northern Fund.
- Discussions with Southern Fund on funding strategies and co-funding for the *Very High Priority Chinook* projects.

April 25<sup>th</sup> (p.m. only), 2018

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

September 26<sup>th</sup> and 27<sup>th</sup>, 2018.

- First round selection of 2019 Northern Fund project concepts to be invited to proceed to Stage Two detailed proposals.
- Memo to Southern Fund regarding 5 project proposals having relevance either in large part or in total to the Southern Fund's Call for Proposals and being located within the Southern Fund's geographical area of interest. Plus, identification of two proposals which offer the potential for shared funding arrangements with the Southern Fund.
- Memo to the Commissioners regarding persistent and incremental increases in the number and overall cost of agency "core" programs seeking financial support from the Northern Fund to deliver on the Parties obligations under the Treaty.
- Review and approval of annual audited financial statements.

### ***Southern Fund Committee Meetings***

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

February 20<sup>th</sup> (p.m. only), 2018

- Final selection of Southern Fund projects for funding in 2018.
- Discussions with Northern Fund on funding strategies and co-funding for the very high priority chinook projects.

April 25<sup>th</sup> (p.m. only), 2018.

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

September 18<sup>th</sup>, 2018.

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

November 28<sup>th</sup>, 2018. (1 hour only).

- Briefing from Dr. Hall on custodian and consultant fees review.
- Consideration of the memo from the Northern Fund regarding 5 project proposals having in their opinion relevance either in large part or in total to the Southern Fund's Call for Proposals and being located within the Southern Fund's geographical area of interest. Plus,

identification of two proposals which offer the potential for shared funding arrangements with the Southern Fund.

### ***Committee Appointments***

In August 2018 Dr. Laura Brown took over from Mr. Andrew Thomson as the Southern Fund Canadian section Co-Chair. Her first Committee meeting was on September 18<sup>th</sup>. Mr. Thomson had served on the Southern Fund Committee for a six year term.

In early-December 2018 Mr. Charlie Swanton resigned from his position as Alaska's Commissioner to the Pacific Salmon Commission. His seat on the Northern Fund Committee (U.S. Co-Chair) is ex-officio, tied to his role as the Alaskan Commissioner, therefore that seat was in effect vacated at the time of his resignation. A replacement had not been named by the end of December.

### ***2018 Call for Proposals for projects in 2019/20***

Both Fund Committees issued Calls for Proposals in mid-2018 for projects starting in 2019.

The Southern Fund Committee focused its 2019 Call for Proposals on specific priorities identified by the Pacific Salmon Commission's Fraser River and Southern Panels. The Fund Committee accepted 56 proposals requesting U.S. \$4.5 million. During the first round review meeting in September the Southern Fund Committee approved 4 multi-year, on-going proposals and 48 new proposals that together were in total requesting U.S. \$3.87 million to move to the second stage. The final decisions on 2019 funding will be made at a meeting of the Southern Fund Committee in mid-February 2019.

The Northern Fund Committee received a total of 122 proposals requesting U.S. \$7.12 million. At the first round review meeting in September 2018, 85 of the proposals were selected to move to the second round detailed proposal stage having a total value of U.S. \$6.58 million. In addition, the Northern Fund Committee identified a group of 5 proposals requesting U.S. \$425,000 in total that they believe to be more appropriate for the Southern Fund to consider by virtue of the geographical location of the projects and the stocks that will benefit from successful project outcomes. Two further projects were brought to the Southern Fund Committee's attention as being possible co-funding opportunities. Bilateral technical reviews of the detailed proposals took place in January 2019 and a final decision on 2019 funding will be made at a meeting of the Northern Fund Committee in mid-February 2019.

### ***Yukon River Panel Restoration and Enhancement Fund***

In March 2011 the Yukon River Panel (YRP) invited PSC Fund staff to take responsibility for the administration of the Panel's Restoration and Enhancement Fund (R&E Fund). In April 2014 this arrangement was formalized in a three-year contract between the YRP and the PSC. In May 2016 after an open competition process, the PSC was again selected by the Panel to administer the Fund

for a further three-year period. 2018 was the eighth year in which PSC Secretariat Fund staff have administered the R&E Fund.

In 2018 the Yukon River Panel continued to place emphasis on Chinook Restoration priorities in their R&E Fund selection of projects for the year; this in response to the decline of Yukon River Chinook salmon stocks experienced in recent years.

A total of 29 projects were selected for R&E funding, of which, 23 were on-going multi-year projects and 6 were new. In U.S. dollar terms 50% of the funds were directed towards Conservation projects; 26% to Restoration; 12% towards Stewardship; and 12% towards Communications.

Funds in the amount of U.S. \$1,420,445 were allocated to projects. This sum was comprised of the annual U.S. \$1.2 million disbursement supplemented by unspent funds held by the Panel from previous years. Unspent funds are principally a result of exchange rate fluctuations and, to a lesser extent, from projects that complete under budget.

## **Fraser River Panel – Report out to Commissioners, February 14, 2019**

### **Chapter Re-Negotiations:**

The negotiating team met several times through the week to resolve outstanding issues in Chapter 4. Key outcomes are as follows:

Para 1: Decision on termination date – proposed through end of 2028. As well, there is agreement on language outlining a review of chapter performance should the need arise. This element was very important to the US.

Para 3: Wording changes agreed upon in “chapeau” section to clarify intent of the paragraph, which is to set out how TAC is to be calculated, and to further clarify how test fish “catch” is to be addressed in calculations (i.e. only retained test fishing catch (versus non-retained) is subtracted from run size when calculating TAC.

Para 3a) Changed language to replace arbitrary date (date of relinquishment) with something that is relevant to management decisions. New wording: (a) The annual U.S. share shall be calculated based on the last inseason run size estimates adopted by the Panel, using the escapement targets established by application of Canada’s preseason escapement plan as may be adjusted pursuant to paragraph 3(b), below, and taking into account any adjustments as provided in paragraph 8, below.

Para 5: General clean-up, plus a change to address incorrect reference to 1985 MOU, to the intended document, 1985 Diplomatic Note.

Para 7: Addressed inconsistency between Chapter 4 and Annex II regarding definition of “Panel Area Waters” – the latter refers to the Fraser River watershed. Language now states that by mutual agreement, the Panel may adjust the definition of the Fraser Panel area via annual regulatory control letters. This is what we have been doing so it is an update to wording, not to practice.

Para 13a) Some clean-up of “PSC staff”. Also, some of the Diplomatic Note language pertaining to roles and responsibilities of PSC staff and the Parties is out of date, so proposed new language which references annual work plans. There is a linkage with Para 5.

There are other minor clean-up changes.



## **Regular Business:**

- 1) 2018 season – still working with preliminary estimates for all management units other than E Stu – will be some changes to numbers but not expected to be substantial.

The 2018 median forecast for Fraser sockeye was for a total return of 13,981,000 sockeye. The preliminary post season run size estimate is 10,725,000.

Overview of returns and spawning success:

- a) E Stu: Near-final escapement of 48,400 which is 38% above cycle avg. Fish in good condition and 82% spawning success compared with avg of 88%
- b) E Sum: Pelim escapement est of 787,000 is 2<sup>nd</sup> largest on record for all years, with spawning success of 80% versus 90% avg. Very protracted migration for Nadina and Bowron. Largest return to Nadina on record – 256,800
- c) Summers: Prelim escapement estimate of 1.67 m with Quesnel and Chilco accounting for 86%. Spawning success slightly above avg at 92%
- d) Lates: Prelim escapement estimate of 1.6 m with Late Shuswap accounting for 96%. Had very long delay – 23 days. Spawning success was above avg for all stocks at 99% (89% avg).

US exceeded share of 16.5% due to decrease in run size after final fishing decision made.

## **Planning for 2019:**

Median forecast for Fraser sockeye is ~4.8 M and for Pink salmon is about 5M with Summers comprising 82% of forecast return.

Breakdown of forecast at p50 is 41,000 E Stu, 465,000 E Sum, 3,930,000 Summers, and 359,000 Lates.

May be some commercial opportunity at p50 and above, but ESum and Lates will be constraints. Panel also received information about other stocks and species that may constrain harvest opportunities for Fraser sockeye and pink salmon.

The Panel gave consideration to potential test fishing operations for 2019, which will be refined as more information becomes available. We will be considering both conservation issues and cost implications, and balancing with information needs as we move forward.

Further planning work will proceed as set out in Annual work plan, with meetings scheduled for April and June to complete pre-season work.

LASTLY: Successful send-off for Mike as he retires from Sr Biologist position – he will be greatly missed by all, but we wish him all the best for his retirement. Don Hall organized a wonderful send-off. Mike received a standing ovation as we closed the bilateral Panel meeting.

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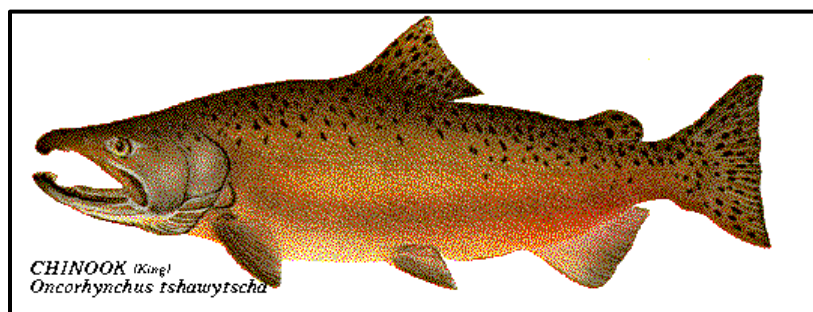
## **Transboundary Panel Report to Pacific Salmon Commission**

*February 15, 2019*

The Transboundary Panel (Panel) in conjunction with key Transboundary Technical Committee representatives met bilaterally during both the 2018 Post-Season and the 2019 Annual meetings of the Pacific Salmon Commission in Vancouver and Portland respectively.

During the January 2019 meeting, post-season reports concerning fisheries performance and stock status of Stikine, Taku and Alsek salmon runs were provided by technical representatives and discussed by the Panel. Accountability of the 2018 management regimes in terms of meeting escapement goals and harvest sharing were reviewed as per Chapter One, Paragraph 4 requirements, resulting in the findings that escapement shortages for Alsek sockeye will require fishery action from the Parties and that management actions will be required to address Canadian Stikine fishery exceedance of the 2019 allowable catch allocation for sockeye salmon. The Panel also received reports concerning enhancement activities in 2018; both egg takes and fry stocking levels for the joint sockeye salmon enhancement programs in the Stikine and Taku watersheds. Draft Stikine and Taku enhancement production plans (SEPP and TEPP) for 2019 were reviewed by the Panel. Final actions concerning the 2017 SEPP and TEPP were taken and plan results approved by Panel Co-Chairs. Several special presentations were provided which included fishery actions taken in 2018 by the U.S. and Canada to address Chinook conservation for TBR/SEAK/NBC stocks, progress on remediation of adult salmon passage in the Stikine River (Tahltan River 2014 landslide), status of the Trapper Lake adult sockeye salmon passage project, melting of the Tweedsmuir glacier and its potential effects on Alsek salmon runs.

During the February 2019 meeting, the Panel received forecasts for salmon returns in 2019 in the Stikine, Taku, and Alsek watersheds. The Panel discussed special management measures for 2019 to address long term conservation concerns for Stikine, Taku and Alsek Chinook salmon. The Panel received presentations on, reviewed and reached agreement concerning needed management actions to address Paragraph 4 actions (Alsek sockeye escapements and Stikine sockeye Canadian Fishery) as well as proposed test/assessment fisheries for 2019 (Taku River coho). 2019 sockeye salmon enhancement program plans were approved for the Stikine and Taku Rivers and the Panel tasked the Enhancement Sub-Committee to explore and report on potential “river-type” sockeye salmon enhancement program options for the Panel’s consideration in January 2020. Presentations were provided on sockeye salmon enhancement (year-class rebuilding strategy at Tatsamenie Lake), juvenile coded-wire tag programs for Chinook and coho salmon in the Stikine and Taku watersheds and results of radio tagging of sockeye salmon in the Taku watershed in 2018. The Panel reviewed progress on the Taku sockeye salmon stock assessment program and efforts to develop a revised MSY escapement goal and reached agreement on considerations for the bilateral mark-recapture program in 2019. The Panel received information concerning northern fund proposals for 2019 and approved revisions to the Transboundary Panel Strategic Salmon Plan for the 2019-2028 period. The Panel also endorsed the creation of a Task Group (comprised of technical representatives) to explore potential stock restoration options for Alsek River sockeye and Chinook salmon.



### PSC Chinook Technical Committee

**TO:** Pacific Salmon Commission

**FROM:** Gayle Brown, Jon Carey, John Carlile

**DATE:** February 14, 2019

**SUBJECT:** Phase 2 base period recalibration of the PSC Chinook Model: Use of new model

The CTC has produced a new base period calibration of the PSC Chinook model (BPCV1-25 AC6). This version offers considerable improvements compared to the current model, including more accurate fishery stratification, better stock representation, improved fishery indices, and corrected data. The BPC Assessment package, based on eight evaluation diagnostics requested by the CIG, demonstrates improved performance for the new model compared to the current model. A synthesis of this evaluation is presented in the attached assessment framework document.

Based on these results, the CTC has determined that the new model represents a substantial improvement. The CTC recommends transitioning to use of the new model after further investigation of the following items:

- The approach to use in determining the environmental variable survival factors (EVs) and maturation rates (ETA: June 2019). This is critical to improving the forecasting performance of the annual calibration.
- Fine-tuning of terminal exploitation rates for the Oregon coast (ETA: March 2019).

Due to the time-frame needed to address these items and to accomplish annual tasks (ERA, annual model calibration), the CTC recommends that the current model be used for determining the 2019 pre-season AIs and the 2018 post-season AIs. Resolution of policy issues regarding the translation of Table 1 are not dependent on completion of the items listed above.

cc John Field  
Alison Chang  
Patti Vandetta

ASSESSMENT OF CHINOOK MODEL BASE PERIOD CALIBRATION  
(BPC V25-AC6)

PSC Chinook Technical Committee

February 2019

## ASSESSMENT OF BASE PERIOD CALIBRATION (BPC V25-AC6)

### I. Context

1. The objectives for Phase 1 and Phase 2 of the base period calibration (BPC) work undertaken by the CTC over the last few years are listed in Box 1.

**Box 1.** List of objectives and improvements identified for Phases 1 & 2 of the BPC.

#### Objectives of BPC (Phase 1)

- The new model stratification allows the CTC to gain accuracy in the depiction of stocks contributing to PST fisheries.
  - Expansion of stock representation in the base period to gain appropriate stock differentiation.

#### Objectives of BPC (Phase 1 & Phase 2)

- The new model stratification allows the CTC to more accurately represent AABM and ISBM fishery impacts.
- It allows for the incorporation of SPFI or ROM indices for NBC and WCVI troll fisheries (V25-AC6 used the ROM for these fisheries).
- It allows the CTC to represent impacts north and south of Cape Falcon in Southern US fisheries, sport fisheries in north and central BC and Strait of Georgia
- It allows for finer stock resolution of fishery impacts and finer resolution of terminal harvests.
  - Some stock groups were simply not represented previously (e.g., Transboundary Rivers, Yakutat, and Mid-Oregon Coastal).
  - Some stocks were split to better represent life histories and ocean distributions (e.g., Fraser Early was split into Fraser Early Springs 1.2, Fraser Early Springs 1.3, Fraser Early Summers 0.3, and Fraser Early Summers 1.3).
  - The CWT codes or proxy group used for some stocks have changed to provide better distribution and maturation representation (e.g., Lower Georgia Strait is now represented by Cowichan CWTs instead of Big Qualicum CWTs).

#### Other changes and improvements

- Escapement/terminal run estimates were updated for a number of stocks.
- CWT codes used for each model stock were reviewed and updated in many cases.
- CWT expansions have been updated due to changes in catch estimates.
- Ricker values have been updated and range of allowable productivity values has been expanded.

2. All of these objectives and improvements were incorporated into the 'new' version of the Chinook Model BPC V1-21 assessed in January 2017.

3. Additional BPC work and investigations were undertaken by the AWG in response to both CTC and Commission observations and queries concerning BPC V1-21. The changes listed in Box 2 were incorporated into BPC V25-AC6.

**Box 2.** List of changes incorporated into BPC V25-AC6.

**Other changes and improvements**

- Maturation rates now represent stock aggregates rather than just CWT indicator stocks. In addition, the number of stocks represented in the MATAEQ model input file has nearly doubled.
- Age-specific input data have been added to select stocks represented in the FCS model input file.
- Stock specific fishery harvest scalars have been updated, added and reviewed for all AABM fisheries and most ISBM fisheries.
- An additional model-fitting methodology has been developed and deployed to better model harvest in selected terminal fisheries.
- Where determined appropriate and fitting, escapement time series have been updated to terminal run currencies.
- Stock naming conventions were normalized.
- Programs used to convert ERA output to stock specific fishery index model input were modified and de-bugged.
- Stock and age inclusion criteria for the SPFI were reviewed extensively and modified.
- Another year's annual calibration was added into the overall BPC assessment.
- Several modifications to MDL files were incorporated into iterative model changes.

4. The CTC has been asked to assess the BPC on the basis of eight diagnostics (Box 3). The goal of the assessment is to evaluate and compare the performance of 'old' and 'new' versions of the Chinook Model relative to observed values (e.g., escapement, terminal run and catch) or independently-calculated (e.g., CWT-based ERs and GSI-based stock composition) values.
5. Preliminary BPC assessments have shown that reporting the multiple materials (tables, figures, summaries, etc.) produced to address all of the diagnostics in Box 3 requires substantial effort. In addition, it has become apparent that the evaluation of the results will benefit from an assessment framework that can integrate the results of the eight diagnostics. The following Section introduces a framework for such synthesis.

**Box 3.** Diagnostics identified for the BPC assessment.

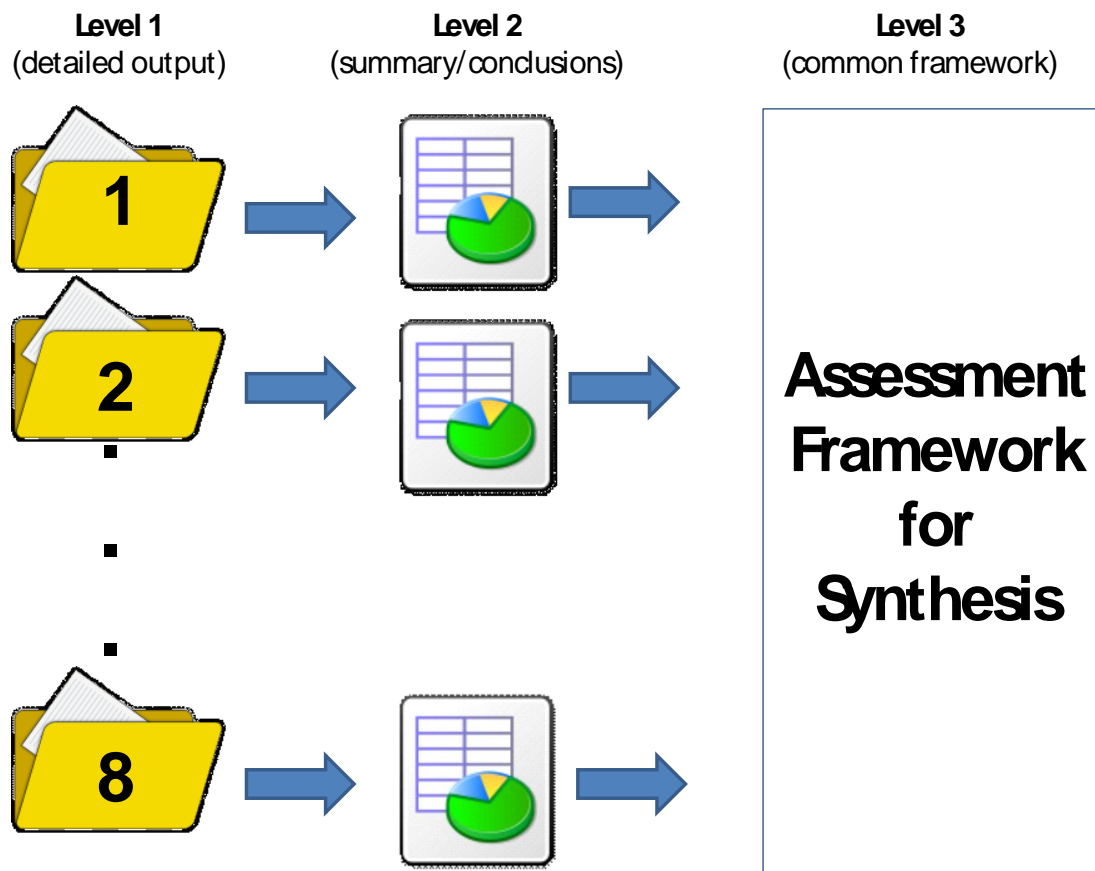
**Comparison and Evaluation diagnostics**

1. Abundance Indices
2. Retrospective evaluation of preseason to first postseason Als
3. Brood-year exploitation rate by stock, age and fishery between models and CWTs
  - Evaluate by terminal and pre-terminal
4. Comparison of stock composition between models
  - Compare to GSI data
5. Comparison of terminal runs and escapement
  - Model fit to terminal run and escapement
6. Cohort sizes
  - Compare to observed cohort (i.e., CWT-FCS data)
7. Catches
  - Model fit to catch
8. EVs
  - Time series
  - Correlation with CWT survival indices

## **II. Assessment framework to evaluate Chinook Model using new BPC**

Previous BPC assessments have been based on evaluating detailed Model outputs (Level 1 in Figure 1) with only a few diagnostics being developed to the point of reaching conclusions or summarizing the information (Level 2 in Figure 1). Level-1 information usually consists of numerous figures and/or tables representing Model output and different comparisons that can be particularly useful to identify data anomalies for specific stocks or fisheries. Level-2 assessments summarize the information and should allow determination of whether Model performance was improved, maintained or eroded for each diagnostic. Examples of Level-2 information produced in previous BPC assessments include statistical evaluations of Model fit ('old' and 'new' versions) to terminal run, escapement, and catch. The assessment framework introduced here (Level 3 in Figure 1), and detailed in Figure 2, is a method to integrate all Level-2 information in a way that facilitates making conclusions on the relative merit of the new BPC.





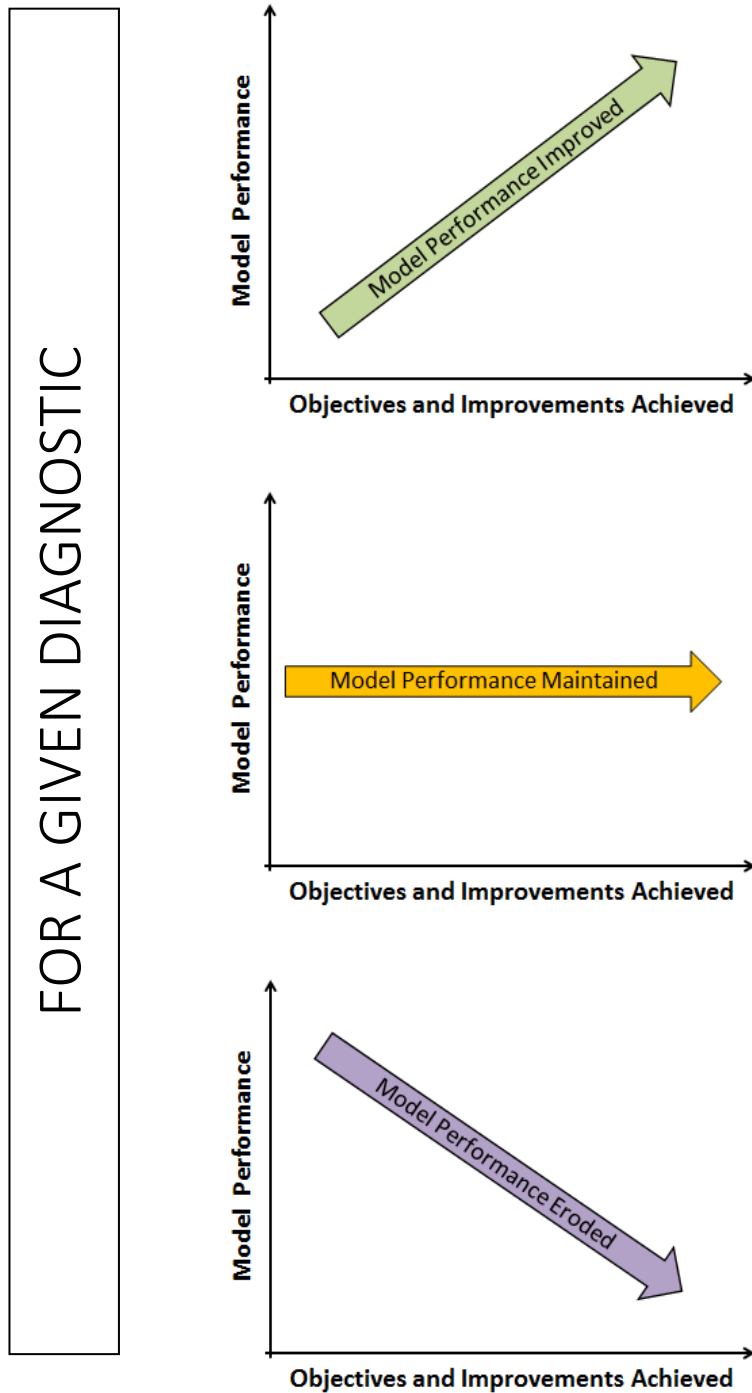
**Figure 1.** Schematic of BPC assessment levels, from the production of detailed Model output (Level 1) to the generation of summaries for individual diagnostics (Level 2) to the integration of Level-2 information into a common assessment framework (Level 3).

The assessment framework has two dimensions: (i) achieving general objectives and improvements; and, (ii) evaluating Model performance for each of the diagnostics. The BPC objectives and improvements were achieved for the new BPC, and by definition, represent an improvement in dimension one. The second dimension represents the quantitative evaluation of model performance ('old' vs. 'new') for each of the diagnostics in Box 3. The assessment therefore has three possible outcomes: (a) BPC objectives were achieved and Model performance was improved; (b) BPC objectives were achieved and Model performance was maintained; and, (c) BPC objectives were achieved but Model performance was eroded (see Figure 2). Although it might seem redundant to include 'achieving general objectives and improvements' in each outcome, it maintains the perspective needed for reaching a conclusion relative to both dimensions.

Model performance improvements cannot be evaluated for diagnostic 1 (AIs) because there is no reference data to compare. Therefore, diagnostics 1 and 2 (Retrospective exercise) in Box 3 were combined into a single diagnostic.

The framework depicted in Figure 2 was applied to diagnostics based on Model output from CLB1804 and BPC V25-AC6. The statistical approaches used below to summarize Level-2 information are not the only methods to summarize results (other approaches have also been proposed to present Level-2 assessments) but these are consistent with the guidelines provided by the CIG in February, 2016: *“Statistical measures [for the calibration assessment] may include mean percent error, mean absolute percent error, and/or mean squared error.”*

Half of the sub-levels in all diagnostics, except diagnostic 4 (Stock Composition), were based on truncated time series (RYs 1999-2015,2016,2017 or the BYs contributing to these RYs) in response to the guidance provided to the CTC by the CIG in February 2016. This factor was not applicable to diagnostic 4 (Stock Composition) because years currently included in the evaluation start in 2005 given the available GSI data.



**Figure 2.** Conceptual framework for the evaluation of BPC’s individual diagnostics. Numbers on the right represent evaluation scores (S). Top: Objectives were achieved and model performance was improved (S = 2). Middle: Objectives were achieved and model performance was maintained (S =1). Bottom: Objectives were achieved but model performance was eroded (S = 0).

### III. Level-2 and Level-3 BPC assessments (BPC V25-AC6& CLB1804)

- |                           |   |          |
|---------------------------|---|----------|
| 1. Abundance Indices      | } | Combined |
| 2. Retrospective Exercise |   |          |

#### Level-2 assessment

**Table 1A.** Comparison of Model AI preseason-to-first postseason abundance index errors (2009-2017) between ‘old’ (CLB1804) and ‘new’ (BPC2018<sup>1</sup>) versions of the Chinook Model. The comparison is based on MPE<sup>2</sup> as a measure of accuracy, MAPE as a measure of precision, and MSE as a measure of both accuracy and precision. *NSD* = no substantial difference.

Model	Accuracy (MPE)			Precision (MAPE)			Acc. & Prec. (MSE)		
	SEAK	NBC	WCVI	SEAK	NBC	WCVI	SEAK	NBC	WCVI
CLB1804	5.7%	2.8%	8.6%	11.3%	11.3%	20.6%	0.059	0.050	0.042
BPC2018	11.1%	9.0%	3.2%	12.9%	16.6%	16.2%	0.044	0.069	0.031
Best	Old*	Old*	New*	NSD	Old*	NSD	NSD	NSD	NSD

1 5-year average EVs were used for BPC2018 projection years (CLB1804 used 1-year EVs).

2 Negative values indicate preseason AIs underestimate postseason AIs on average whereas positive values indicate preseason AIs overestimate postseason AIs on average.

- Difference levels:

*NSD*  $\text{diff.} < \text{abs}(0.05)$

\*  $\text{abs}(0.05) \leq \text{diff.} < \text{abs}(0.1)$

\*\*  $\text{abs}(0.1) \leq \text{diff.} < \text{abs}(0.15)$

\*\*\*  $\text{diff.} \geq \text{abs}(0.15)$

**Table 1B.** Comparison of Model A1 preseason-to-first postseason pre-fishery abundances<sup>1</sup> (driver stocks) errors (2009-2017) between ‘old’ (CLB1804) and ‘new’ (BPC2018<sup>2</sup>) versions of the Chinook Model. The comparison is based on MPE<sup>3</sup> as a measure of accuracy, MAPE as a measure of precision, and MSE as a measure of both accuracy and precision. *NSD* = no substantial difference.

Model	Accuracy (MPE)				Precision (MAPE)			
	SEAK	NBC	WCVI	ALL	SEAK	NBC	WCVI	ALL
CLB1804	10.9%	8.1%	11.5%	12.2%	28.4%	29.8%	36.3%	33.1%
BPC2018	12.6%	10.6%	11.5%	11.2%	28.9%	26.4%	30.7%	30.3%
Best	<i>NSD</i>	<i>NSD</i>	<i>NSD</i>	<i>NSD</i>	<i>NSD</i>	<i>NSD</i>	New*	<i>NSD</i>

1 Pre-fishery abundance are the stock-specific vulnerable abundances making up the numerator of abundance indices

1 5-year average EVs were used for BPC2018 projection years (CLB1804 used 1-year EVs).

2 Negative values indicate preseason AIs underestimate postseason AIs on average whereas positive values indicate preseason AIs overestimate postseason AIs on average.

- Difference levels:

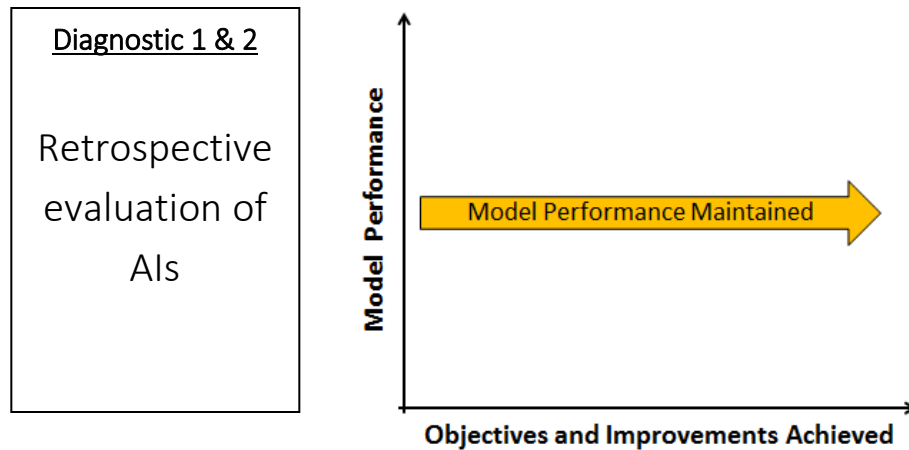
*NSD*  $\text{diff.} < \text{abs}(0.05)$

\*  $\text{abs}(0.05) \leq \text{diff.} < \text{abs}(0.1)$

\*\*  $\text{abs}(0.1) \leq \text{diff.} < \text{abs}(0.15)$

\*\*\*  $\text{diff.} \geq \text{abs}(0.15)$

### Level-3 assessment



### 3. Brood Year ERs

#### Level-2 assessment

**Table 2.** Comparison of Chinook Model AEQ ERs to CWT-based ERs between ‘old’ (CLB1804) and ‘new’ (BPC2018) versions of the Model (BYs 1979-2013 and 1994-2013<sup>1</sup>). ERs include incidental mortality. The comparison is based on MPE<sup>2</sup> as a measure of accuracy and MAPE as a measure of precision as applied to three ER categories: Pre-terminal, Terminal, and Total. The version of the Model performing better is highlighted. *NSD* = no substantial difference.

1 Brood years contributing to calendar years 1999-2015.

2 Negative values indicate the Model underestimates ERs on average whereas positive values indicate the Model overestimates ERs on average.

- Difference levels:

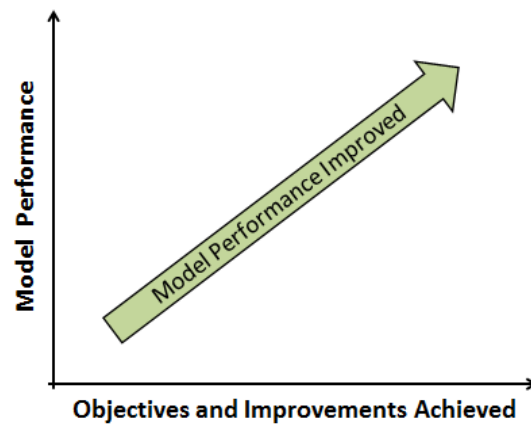
<i>NSD</i>	$\text{diff.} < \text{abs}(0.05)$
*	$\text{abs}(0.05) \leq \text{diff.} < \text{abs}(0.1)$
**	$\text{abs}(0.1) \leq \text{diff.} < \text{abs}(0.15)$
***	$\text{diff.} \geq \text{abs}(0.15)$

Brood Years	TEST	Model	Accuracy (MPE)		Precision (MAPE)	
1979-2013	All stocks Pre-terminal	CLB1804	12.9%	Old *	30.4%	NSD
		BPC2018	19.1%		31.5%	
	Common stocks Pre-terminal	CLB1804	12.9%	NSD	30.4%	NSD
		BPC2018	15.3%		30.7%	
	All stocks Terminal	CLB1804	39.0%	New***	74.2%	New*
		BPC2018	19.7%		68.7%	
	Common stocks Terminal	CLB1804	39.0%	NSD	74.2%	New*
		BPC2018	36.3%		65.3%	
	All stocks Total	CLB1804	-6.7%	NSD	27.3%	NSD
		BPC2018	-6.0%		25.3%	
	Common stocks Total	CLB1804	-6.7%	New*	27.3%	NSD
		BPC2018	1.2%		22.5%	
1994-2013	All stocks Pre-terminal	CLB1804	8.6%	Old *	32.2%	NSD
		BPC2018	17.6%		32.3%	
	Common stocks Pre-terminal	CLB1804	8.6%	Old *	32.2%	NSD
		BPC2018	14.7%		31.1%	
	All stocks Terminal	CLB1804	35.7%	New***	77.1%	New*
		BPC2018	6.6%		70.0%	
	Common stocks Terminal	CLB1804	35.7%	New*	77.1%	New**
		BPC2018	30.1%		64.7%	
	All stocks Total	CLB1804	-8.8%	NSD	28.5%	NSD
		BPC2018	-8.4%		27.2%	
	Common stocks Total	CLB1804	-8.8%	NSD	28.5%	NSD
		BPC2018	-5.4%		24.3%	

Level-3 assessment

Diagnostic 4

Model-based  
vs.  
CWT-based  
BY ERs





#### 4. Stock composition: Model vs. GSI

##### Level-2 assessment

**Table 3.** Comparison of Model-to-GSI RMSE values for combined stock-fishery (2007-2015) compositions between CLB2018 and an annual calibration using the new BPC2018. *NSD* = no substantial difference.

Model	RMSE (1000s of fish)					
	SEAK Troll	NBC Troll	WCVI Troll	ALL Troll	SEAK Sport	ALL Fisheries
CLB1804	163.0	152.6	67.4	175.3	63.9	207.7
BPC2018	101.8	102.9	38.8	150.5	41.3	191.6
Best Model	<i>New***</i>	<i>New***</i>	<i>New***</i>	<i>New***</i>	<i>New***</i>	<i>New*</i>
MPE (%)						
CLB1804	-3.5	-42.1	-19.0	-32.4	-128.3	-42.4
BPC2018	6.8	9.8	31.9	10.0	-10.1	9.4
Best Model	<i>NSD</i>	<i>New***</i>	<i>Old**</i>	<i>New***</i>	<i>New***</i>	<i>New***</i>
MAPE (%)						
CLB1804	54.8	80.5	94.8	66.3	168.8	76.2
BPC2018	34.2	38.0	43.9	26.6	54.6	25.6
Best Model	<i>New***</i>	<i>New***</i>	<i>New***</i>	<i>New***</i>	<i>New***</i>	<i>New***</i>

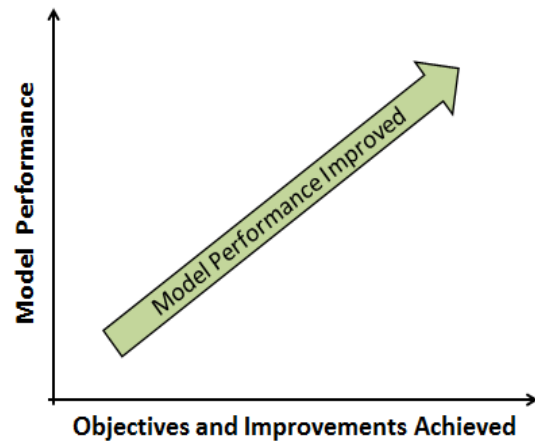
- Difference levels:

<i>NSD</i>	$\text{diff.} < \text{abs}(0.05)$
<i>*</i>	$\text{abs}(0.05) \leq \text{diff.} < \text{abs}(0.1)$
<i>**</i>	$\text{abs}(0.1) \leq \text{diff.} < \text{abs}(0.15)$
<i>***</i>	$\text{diff.} \geq \text{abs}(0.15)$

Level-3 assessment

Diagnostic 4

Model vs. GSI  
stock  
composition



## 5. Model fit to terminal run and escapement

### Level-2 assessment

**Table 4.** Comparison of Chinook Model fit to observed terminal and/or escapement data (i.e., FCS file) between CLB1804 (Old) and BPC2018 (New). The comparison is at the Return-Year level and based on MPE as a measure of accuracy and MAPE as a measure of precision as applied to different subsets of Model stocks<sup>1</sup>. The version of the Model performing better is highlighted. *NSD* = no substantial difference.

Calendar Years	TEST	Accuracy (MPE)				Precision (MAPE)			
		Age-structured Stocks			Non-structured Stocks Total abundance	Age-structured Stocks			Non-structured Stocks Total abundance
		3	4	5		3	4	5	
1979-2017	(A) All Stocks	New**	NSD	Old***	NSD	New**	New*	NSD	NSD
	(B) All Stocks Escapement Only	New**	New*	Old*	NSD	New***	New*	NSD	NSD
	(C) All Stocks Terminal Run Only	New**	New*	Old***	NSD	New**	New*	New*	NSD
	(D) Common Stocks	New***	NSD	Old***	NSD	New***	New*	New*	NSD
	(E) Common Stocks Escapement Only	New***	NSD	New***	NSD	New***	NSD	New***	NSD
	(F) Common Stocks Terminal Run Only	New**	NSD	Old***	NSD	New**	New*	NSD	NSD
1999-2015	(A) All Stocks	New*	NSD	Old***	NSD	New*	New*	New***	NSD
	(B) All Stocks Escapement Only	New*	New**	Old*	NSD	New*	New*	New***	NSD
	(C) All Stocks Terminal Run Only	New**	NSD	Old***	NSD	New**	New*	New*	NSD
	(D) Common Stocks	New*	NSD	Old***	NSD	New***	New*	New***	NSD
	(E) Common Stocks Escapement Only	NSD	NSD	New***	NSD	New***	Old*	New***	NSD
	(F) Common Stocks Terminal Run Only	New*	NSD	Old***	NSD	New**	New*	New*	NSD

<sup>1</sup> Values of statistics are not included in the table given the large number of diagnostic sub-levels. Detailed summaries and figures are posted on the CTC Share Point site.

- Old number of stocks = 30 (28 time series sets)

- New number of stocks = 41 (41 time series sets)

- Number of common stocks = 25

- Difference levels:

*NSD*       $\text{diff.} < \text{abs}(0.05)$

\*

$\text{abs}(0.05) \leq \text{diff.} < \text{abs}(0.1)$

\*\*

$\text{abs}(0.1) \leq \text{diff.} < \text{abs}(0.15)$

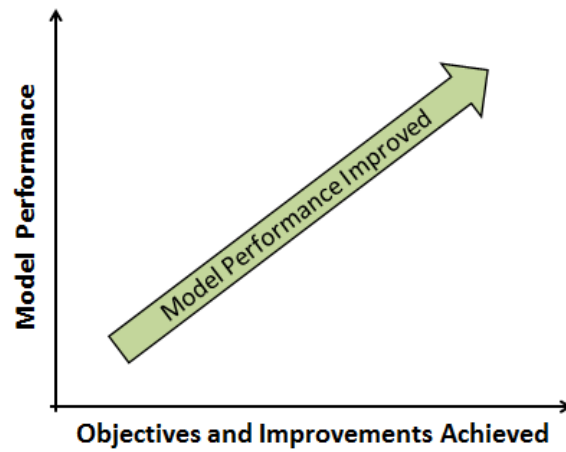
\*\*\*

$\text{diff.} \geq \text{abs}(0.15)$

Level-3 assessment

Diagnostic 5

Model fit to  
terminal run  
and  
escapement



## 6. Cohort sizes

### Level-2 assessment

**Table 5.** Comparison of Chinook Model cohort-size error between CLB1804 (Old) and BPC2018 (New). The error statistics are relative to reconstructed cohorts (i.e., CWT-FCS cohorts). The comparison is based on MPE<sup>1</sup> as a measure of accuracy and MAPE as a measure of precision as applied to different subsets of Model stocks. The version of the Model performing better is highlighted. *NSD* = no substantial difference.

Calendar Years	TEST	Model	Accuracy (MPE)				Precision (MAPE)			
			Age-2	Age-3	Age-4	Age-5	Age-2	Age-3	Age-4	Age-5
1979-2015	All Stocks	CLB1804	13.6%	-7.3%	-27.2%	-34.5%	31.5%	31.5%	36.8%	64.2%
		BPC2018	35.9%	15.3%	1.2%	3.0%	39.7%	33.4%	31.3%	41.1%
			<i>Old***</i>	<i>Old*</i>	<i>New***</i>	<i>New***</i>	<i>Old*</i>	<i>NSD</i>	<i>New*</i>	<i>New***</i>
	Common Stocks	CLB1804	13.6%	-7.3%	-27.2%	-34.5%	31.5%	31.5%	36.8%	64.2%
		BPC2018	25.8%	13.1%	-7.1%	-8.1%	33.4%	31.2%	30.2%	34.8%
			<i>Old***</i>	<i>Old*</i>	<i>New***</i>	<i>New***</i>	<i>NSD</i>	<i>NSD</i>	<i>New*</i>	<i>New**</i>
1999-2015	All Stocks	CLB1804	8.6%	-8.1%	-30.8%	-25.6%	22.5%	25.5%	35.2%	59.7%
		BPC2018	43.8%	17.2%	3.6%	0.9%	43.8%	29.2%	31.9%	39.1%
			<i>Old***</i>	<i>Old*</i>	<i>New***</i>	<i>New***</i>	<i>Old*</i>	<i>NSD</i>	<i>NSD</i>	<i>New*</i>
	Common Stocks	CLB1804	8.6%	-8.1%	-30.8%	-25.6%	22.5%	25.5%	35.2%	59.7%
		BPC2018	22.7%	-4.2%	-12.3%	-13.6%	23.6%	27.1%	26.8%	36.7%
			<i>Old**</i>	<i>NSD</i>	<i>New***</i>	<i>New**</i>	<i>NSD</i>	<i>NSD</i>	<i>New*</i>	<i>New***</i>

1 Negative values indicate the Model underestimates cohort sizes on average whereas positive values indicate the Model overestimates cohort sizes on average.

- Old number of stocks with FCS age-specific data matching CWT-FCS cohort size data = 11

- New number of stocks with FCS age-specific data matching CWT-FCS cohort size data = 17

- Difference levels:

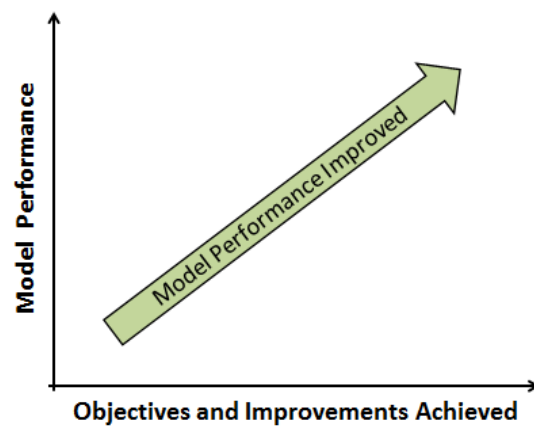
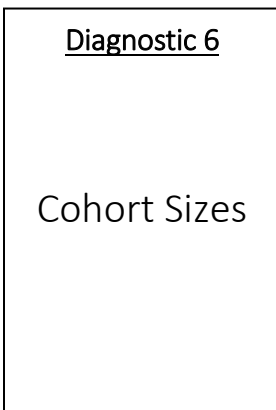
*NSD*  $\text{diff.} < \text{abs}(0.05)$

*\**  $\text{abs}(0.05) \leq \text{diff.} < \text{abs}(0.1)$

*\*\**  $\text{abs}(0.1) \leq \text{diff.} < \text{abs}(0.15)$

*\*\*\**  $\text{diff.} \geq \text{abs}(0.15)$

Level-3 assessment



## 7. Model fit to catch

### Level-2 assessment

**Table 6A.** Comparison of Chinook Model fit to observed catch data (i.e., CEI file<sup>1</sup>) between ‘old’ and ‘new’ versions of the Model, All/Common fisheries for 1979-1984 & 1985-forward. The comparison is based on MPE<sup>2</sup> as a measure of accuracy and MAPE as a measure of precision as applied to two sets of fisheries. The version of the Model performing better is highlighted. *NSD* = no substantial difference.

Calendar Years	TEST	Model	Accuracy (MPE)		Precision (MAPE)	
1979-1984	All Fisheries	CLB1804	-8.5%	<i>Old*</i>	28.8%	<i>Old*</i>
		BPC2018	-16.8%		35.6%	
	Common Fisheries	CLB1804	-8.5%	<i>Old*</i>	28.8%	<i>Old*</i>
		BPC2018	-18.0%		34.6%	
	Pooled Pre-terminal Catch (All)	CLB1804	-6.8%	<i>Old*</i>	11.0%	<i>Old*</i>
		BPC2018	-14.2%		16.4%	
	Pooled Pre-terminal Catch (Common)	CLB1804	-6.8%	<i>Old*</i>	11.0%	<i>Old*</i>
		BPC2018	-16.1%		17.5%	
	All Fisheries	CLB1804	-14.6%	<i>NSD</i>	16.8%	<i>NSD</i>
		BPC2018	-15.8%		21.5%	
1985 - Forward	Common Fisheries	CLB1804	-14.6%	<i>NSD</i>	16.8%	<i>NSD</i>
		BPC2018	-18.6%		18.6%	
	Pooled Pre-terminal Catch (All)	CLB1804	0.3%	<i>Old*</i>	4.9%	<i>NSD</i>
		BPC2018	-5.8%		6.3%	
	Pooled Pre-terminal Catch (Common)	CLB1804	0.1%	<i>Old**</i>	4.9%	<i>Old**</i>
		BPC2018	-15.1%		15.1%	

1 South of Falcon Troll and South of Falcon Sport were excluded from the evaluation because a significant portion of the observed catch in these fisheries is from stocks not included in the Chinook Model.

2 Negative values indicate the Model underestimates catch on average whereas positive values indicate the Model overestimates catch on average.

- Total number of PT fisheries = 22

- Number of common PT fisheries = 20

- Fishery-Years with catch < 10 were excluded from the analysis

- Difference levels:

*NSD* diff. < abs(0.05)

\* abs(0.05) ≤ diff. < abs(0.1)

\*\* abs(0.1) ≤ diff. < abs(0.15)

\*\*\* diff. ≥ abs(0.15)

**Table 6B.** Comparison of Chinook Model fit to observed catch data (i.e., CEI file) between ‘old’ and ‘new’ versions of the Model, AABM Troll fisheries for 1979-1984 & 1985-forward. The comparison is based on MPE as a measure of accuracy and MAPE as a measure of precision as applied to two sets of fisheries. The version of the Model performing better is highlighted. *NSD* = no substantial difference.

Calendar Years	TEST	Model	Accuracy (MPE)		Precision (MAPE)	
1979-1984	SEAK Troll	CLB1804	-14.7%	<i>NSD</i>	14.7%	<i>NSD</i>
		BPC2018	-14.5%		14.5%	
	NBC Troll	CLB1804	-5.8%	<i>NSD</i>	20.7%	<i>New*</i>
		BPC2018	6.7%		14.6%	
	WCVI Troll	CLB1804	-15.7%	<i>New**</i>	31.8%	<i>NSD</i>
		BPC2018	-3.8%		33.7%	
1985 - Forward	SEAK Troll	CLB1804	-15.9%	<i>NSD</i>	15.9%	<i>NSD</i>
		BPC2018	-15.8%		15.8%	
	NBC Troll	CLB1804	-4.5%	<i>NSD</i>	4.5%	<i>NSD</i>
		BPC2018	7.6%		7.6%	
	WCVI Troll	CLB1804	-17.1%	<i>New**</i>	17.1%	<i>New**</i>
		BPC2018	-5.6%		5.6%	

- Difference levels:

*NSD*  $\text{diff.} < \text{abs}(0.05)$

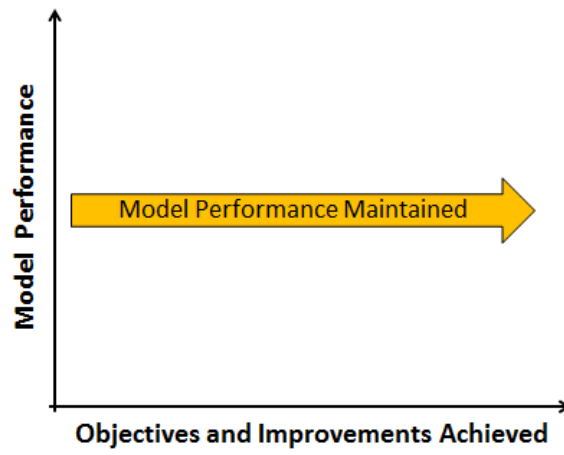
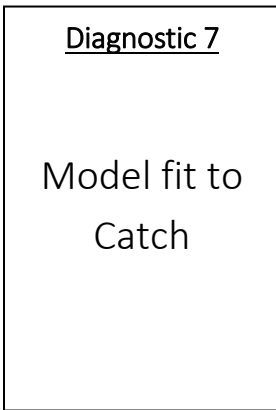
*\**  $\text{abs}(0.05) \leq \text{diff.} < \text{abs}(0.1)$

*\*\**  $\text{abs}(0.1) \leq \text{diff.} < \text{abs}(0.15)$

*\*\*\**  $\text{diff.} \geq \text{abs}(0.15)$



Level-3 assessment



## 8. Time series of EVs

### Level-2 assessment

**Table 7.** Comparison of EV statistics between ‘old’ and ‘new’ versions of the Model. Statistics are based on brood years 1979-2013 and 1993-2013<sup>1</sup> and two sets of stocks: (i) All stocks; and, (ii) a subset of stocks with EV averages  $\geq 0.5$  and  $\leq 2.0$ . EV averages outside of this range were considered ‘extreme’. The last column identifies the ‘best’ model. The criteria for Model Selection are: (a) EV statistic closer to one<sup>2</sup> (for Mean); (b) smaller percent of stocks with ‘extreme’ average EVs; and, (c) smaller percent of stocks with weak correlations. The version of the Model performing better is highlighted. *NSD* = no substantial difference.

Brood Years	TEST	Statistic	CLB1804	BPC2018	Best
1979-2013	All Stocks	Mean	1.43	1.45	<i>NSD</i>
		% of Extreme EVs	43.3%	22.0%	<i>New***</i>
		% of Stocks with EV-CWT Survival correlations < 0.4	57.1%	54.5%	<i>NSD</i>
	Subset of stocks with average EV $\geq 0.5$ AND $\leq 2.0$	Mean	0.90	1.01	<i>Old**</i>
1993-2013	All Stocks	Mean	1.27	1.33	<i>Old *</i>
		% of Extreme EVs	56.7%	29.3%	<i>New***</i>
		% of Stocks with EV-CWT Survival correlations < 0.4	45.0%	39.5%	<i>New***</i>
	Subset of stocks with average EV $\geq 0.5$ AND $\leq 2.0$	Mean	0.97	0.90	<i>New*</i>

1 Brood years contributing to calendar years 1999-2015

2 EV values closer to 1.0 indicate the assumptions of the Model produce brood-year escapement data matching better input abundance data.

- Difference levels:

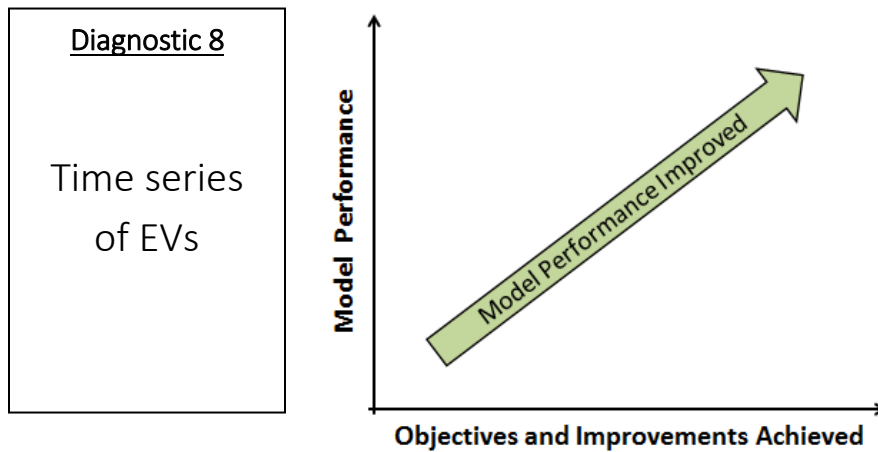
*NSD*  $\text{diff.} < \text{abs}(0.05)$

*\**  $\text{abs}(0.05) \leq \text{diff.} < \text{abs}(0.1)$

*\*\**  $\text{abs}(0.1) \leq \text{diff.} < \text{abs}(0.15)$

*\*\*\**  $\text{diff.} \geq \text{abs}(0.15)$

### Level-3 assessment



#### IV. Level-3 assessment summary

**Table 8.** Summary of Level-3 BPC2018 performance relative to CLB1804 for each the individual diagnostics (DVs).

DV Number	Diagnostic	Level-3 Performance
1 & 2	AI Retrospective Evaluation	Maintained
3	BY Exploitation Rates	Improved
4	Stock Composition	Improved
5	Terminal Run and Escapement	Improved
6	Cohort Sizes	Improved
7	Catch	Maintained
8	EVs	Improved

FSRC preliminary report ... for PSC discussion (February 15, 2019)

**Preliminary Report from the Fraser Strategic Review Committee (FSRC) on In-River Assessment of Fraser River Sockeye and Pink**

**Members: P. Sprout, R. Allen, K. Hughes, & B. Riddell (R. Conrad contributed to this report)**

**A. FSRC charge from the PSC:**

On February 14, 2013, the Commission tasked the Fraser Strategic Review Committee (FSRC) to provide advice on potential modifications to the hydro-acoustic operations in the lower Fraser River based on the following:

- Clarification of in-river assessment objectives.
- Review of technological options<sup>1</sup> (alternative or complementary) for providing accurate, precise and timely information to satisfy obligations under the *Pacific Salmon Treaty*.
- Effectiveness and affordability related to levels of risk tolerance and objectives.

The FSRC was to examine alternative hydroacoustic monitoring configurations for the Mission Bridge and Qualark Creek locations – both as independent and as complementary operations, as well as other assessment methodologies. The examination was to include:

- a) Clarification of the fisheries management objectives for lower Fraser River in-river assessment.
- b) Evaluation of configurations at the two existing hydroacoustics locations, as well as new alternatives or additions, in terms of whether they meet fisheries management objectives, value for money, bilateral management application, and the appropriate distribution of funding responsibilities as may be applicable.

The FSRC was to provide recommendations for the next 5 to 10 years.

**B. Fishery Management Objectives ... provided by the Fraser River Panel, May 8, 2015**

The Fraser River Panel and its technical committee (May 8, 2015) provided the following comments on objectives required from a lower Fraser River assessment program and the linkages to in-season information.

1. The primary purpose of the lower Fraser River hydro-acoustic program(s) is to provide accurate and timely daily escapement estimates of Fraser sockeye and pink salmon in the most cost effective manner.
2. For sockeye, daily escapement estimates are required to be identified at the stock level (stock ID samples from associated test fisheries) to assist in meeting the management objectives for the four run-timing groups in the Fraser.

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<sup>1</sup> The topic of new and/or alternative technologies was examined early in the FSRC process and did not identify any new opportunities. Both PSC and DFO already are using ARIS hydroacoustic systems.

Information at this level is required primarily to achieve identified escapement objectives for the run-timing groups as well as inclusion in the post season determination of the difference between the estimates otherwise known as the Management Adjustment.

3. This information must be available to the Fraser Panel in a timely manner in order to inform the decisions made regarding fisheries in marine and freshwater areas.

In order to develop the most efficient and cost effective hydro-acoustic program going forward, a thorough evaluation which explores all of the component parts of each existing program at Mission and Qualark is required. Among other elements this work should explore whether there are biases associated with the gillnet test fisheries used for stock and species composition that may be affecting the relative accuracies from the Mission and Qualark sites.

Canada and the United States must be able to identify the total allowable catch available for international sharing, for sockeye run-timing groups (Early Stuart, Early Summer, Summer runs, and Late sockeye) and pink salmon. This information must be provided in a timely way such that fish are still available to fisheries in US and Canadian marine waters.

### **C. Technical Reviews and Research**

While there is no question that this review has taken much longer than the Commission likely expected, the technical staff in the Pacific Salmon Commission (Mission Bridge site) and the Department of Fisheries and Oceans (Qualark Creek site) have done extraordinary work to improve assessments, undertake evaluations of each site, and greatly improve the collaboration amongst investigators. Since 2015, evaluations have continuously improved their understanding of each hydroacoustic site.<sup>2</sup>

Following from these studies, the FSRC has prepared a summary table (below) of the Pro's and Cons of the Mission Bridge and Qualark Creek sites. We note though that the Hydroacoustics Review Technical Summary provided by the Pacific Salmon Commission and the Fraser River Panel (August 2017, Section 5.8, pg. 18) concluded that "Qualark alone would not be an acceptable hydroacoustics configuration due to missing sockeye stocks, inability to assess pinks, and delay in in-season management decisions, and that continued work should fund only Mission." *However, this Committee recommends that if methods are developed to:*

- i) compensate for the time delay between Mission and Qualark (2-3 days difference), and
- ii) to account for stocks and species not assessed at Qualark, and
- iii) the uncertainty of the estimates at Qualark are comparable to that currently provided by Mission,

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<sup>2</sup> The Pacific Salmon Commission has kept a comprehensive record of analyses and reporting. These records are maintained in a secure web address and will require authorization to access.

*then a transition to Qualark as the PSC's in-river acoustic monitoring program should proceed.*  
Evaluation of the methods developed would involve the Panel's Technical Committee.

	MISSION	QUALARK	COMMENTS
<b>PROS</b>	<ol style="list-style-type: none"> <li>1. Earlier in-season information for sockeye; by 2-3 days travel time for sockeye to Qualark.</li> <li>2. Lower river sockeye stocks are included in fish counts (Harrison, Chilliwack, Birkenhead)</li> <li>3. Pink salmon escapement monitoring but no verification conducted to-date.</li> <li>4. Longer historical time series than Qualark but consistent hydro-acoustic configuration from 2010 to present.</li> </ol>	<ol style="list-style-type: none"> <li>1. A preferred acoustic site compared to Mission, and is a confined space for test fish sampling.</li> <li>2. Considerably lower cost to operate (~50% in materials provided).</li> <li>3. Less "interference" problems with pinks.</li> <li>4. Provides 'cross-check' information for annual sockeye escapements at Mission. Important in years where uncertainty is created by different abundance indications between marine test fisheries and Mission estimates.</li> <li>5. Provides additional data for management of upper river FN fisheries.</li> </ol>	<p>Following extensive reviews and studies, and from a hydro acoustics perspective, Qualark is a preferred hydro-acoustic site to Mission.</p>
<b>CONS</b>	<ol style="list-style-type: none"> <li>1. Very complex environment for hydro-acoustics and more susceptible to environmental change.</li> <li>2. Greater uncertainty of estimates than at Qualark.</li> <li>3. Approx. twice as costly to operate.</li> <li>4. Evidence of significant under- and over-estimation of recent Late-run sockeye returns in Adams dominant years, although not in 2018.</li> <li>5. Higher occurrences of direct interference from in-river fisheries than at Qualark due to the larger number of fisheries near/below Mission.</li> </ol>	<ol style="list-style-type: none"> <li>1. Information delay (2-3 days) compared to Mission site, continues to be a management concern; related to the timeliness of data to provide fishing opportunities for the Parties.</li> <li>2. Qualark requires additional data to assess sockeye stocks spawning between Mission and Qualark and pink salmon.</li> </ol>	<p>An outcome of recent studies is that both sites are affected by in-river fisheries. Evidence at Qualark is that fish behaviour is impacted, but the ability to enumerate fish is not. This is less likely to be true at Mission.</p> <p>Continued lower river test fisheries and DNA sampling will address the lower river sockeye populations.</p>

Based on the works conducted it is apparent that both sites can provide very similar estimates of sockeye returns, as demonstrated by a comparison for 2018 provided (Figure below, by Xie Yunbo (PSC, October 16, 2018)). The data compared in this figure depict the sockeye estimated at Mission moved 3 days back and overlaid on the daily estimate of passage at Qualark. The magnitude of the cumulative difference in this year is only 4% and the consistency of the pattern of returns is very apparent. However as the table of annual data<sup>3</sup> will demonstrate (to be provided) ... the degree of similarity is quite variable between years.

Consequently, when the Committee considers the stability (or repeatability) of configurations and use of direct counts, the relative affordability (Qualark is approximately half the cost of Mission), and the stability of the hydroacoustic sites over time and environmental conditions; we are in full agreement that the Qualark site is the preferred hydroacoustic site. However, before the transition, we emphasize the two critical technical concerns identified on page 2:

- i) That accurate in-season assessment of the stocks of sockeye and pink salmon entering spawning areas between Mission and Qualark can be done without a facility at Mission, and
- ii) that a means (i.e. alternative technical techniques) to compensate for the 2-3 day time delay for assessment information within a season can be developed.

We are also of the opinion that the hydroacoustic estimates that are provided today may be only a minor component of the uncertainties involved with in-season decision processes. Other sources of uncertainty for in-season management and fishery decisions include:

- Ocean test fisheries and run timing
- In-river gillnet test fisheries ... accuracy of species composition (catchability of species)
- Stock identification of sockeye
- Environmental adjustments (expected in-river losses)
- In-river catches and accounting.

### **Recommendations ... for discussion**

- 1) Decision processes for in-season management should consider all sources of uncertainty and timeliness of data. Over the next 3 years, establish a comprehensive in-season model to incorporate all sources of variation within a cumulative run-timing model.
- 2) Over the next 3-5 years and assuming that the concerns noted above have been addressed (i.e., accepted by the Panel's technical committee), transition to Qualark Creek as the PSC's hydroacoustic enumeration site (see note below).
- 3) Examine the use of fixed-effort marine test fishing to provide timely information on in-season run-size and run-timing while fish remain in the fishing areas and still provide

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<sup>3</sup> The final report from this Committee will also include a summary table of sockeye data for each site and the differences between sites from 2008 through 2018 ... but we were unable to verify each entry before this interim report.

fishing opportunities for both Parties. Or, depending on future funding availability, consider additional marine hydroacoustics programs (or pilot projects) to compensate for the timeliness concern.

**NOTE:** With consideration of transition to the Qualark Creek site, there would be a substantial cost savings<sup>4</sup> (~50%) to the PSC that could be directed to pink salmon in-river assessment, financing marine test fisheries designed to compensate for the 2-3 day delay, improved sockeye stock identification, or monitoring of sockeye migration and survival under increasingly stressful thermal conditions.

Reported costs for comparison are (Appendix 8):

Mission Bridge site, Enhanced (2014 example, 104 days of operation) = \$750,272

Mission Bridge, Enhanced (Odd yr. Pinks, 104 days of operations) = \$753,657

Qualark Enhanced (late run sockeye or Pink year, 104 days operations) = \$335,224

**Contractor's report** (C. Walters, 2015) ... *summary text to be added*. Carl's comments on focusing on additional information from tidal waters merits considerations.

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<sup>4</sup> Appendix 8 in the technical summary documents (Aug2017 docs.zip)



Fraser Sockeye: Qualark Passage Estimate and Mission-based Projection

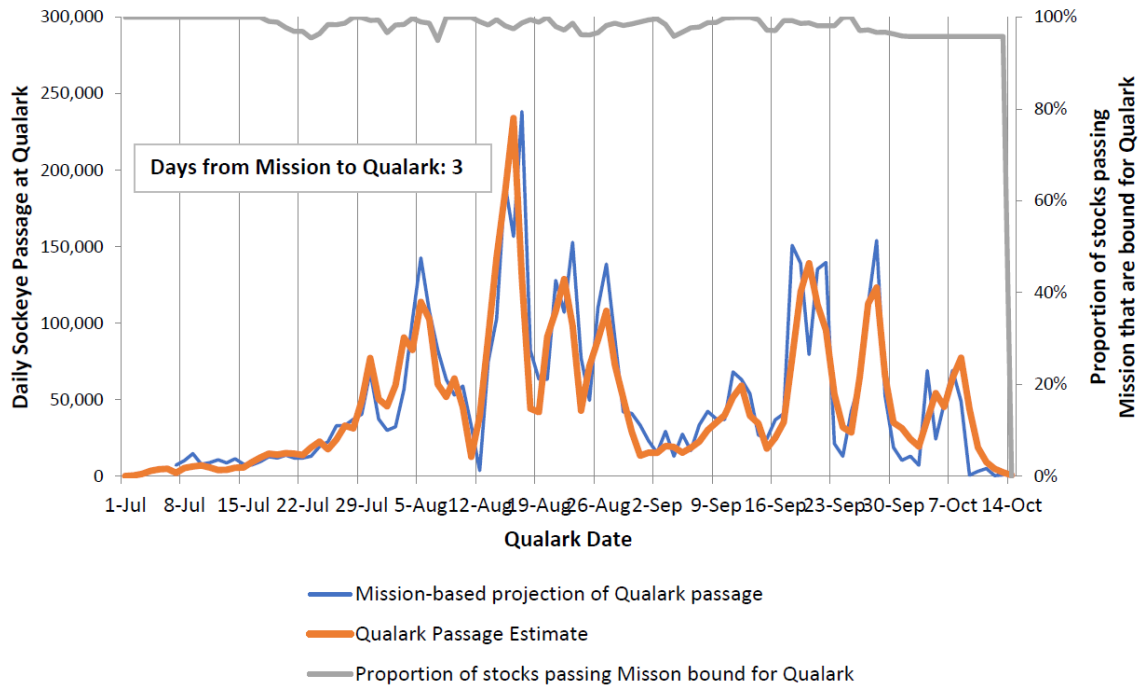
Year: **2018**

Date: 16/Oct/18

Time: 9:01 AM

	All Days	Common Days
Mission projection	5,185,115	5,185,115
Qualark estimate	5,002,292	4,987,092
	<b>Difference</b>	<b>198,023</b>
	<b>%Difference</b>	<b>4%</b>

Compare Qualark Passage Estimate and Mission-based Projection



Difference between Qualark Passage Estimate and Mission-based Projection

