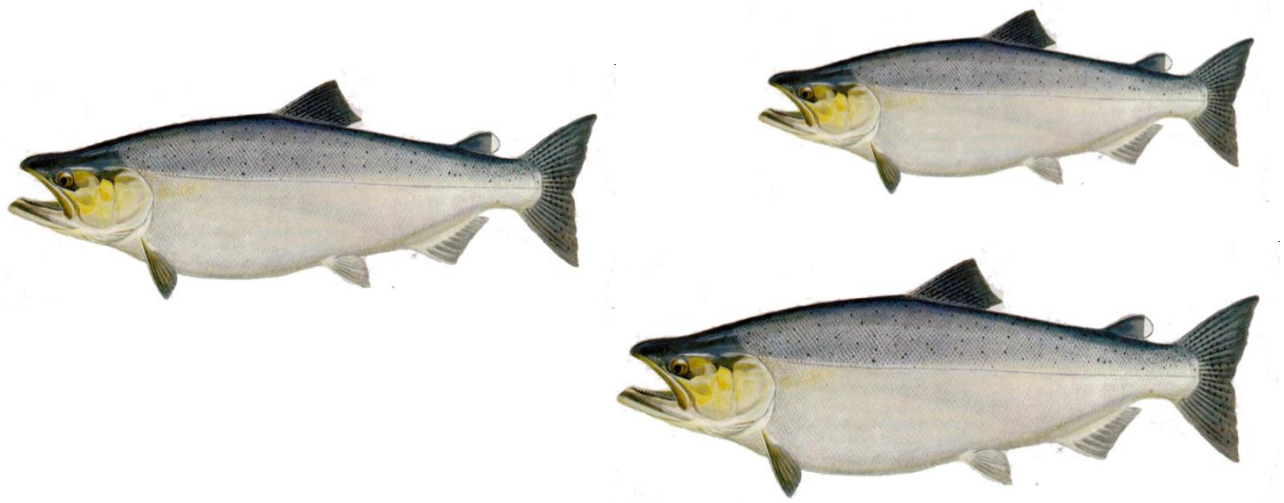
2017 Fraser River Chinook
Key Information for Management



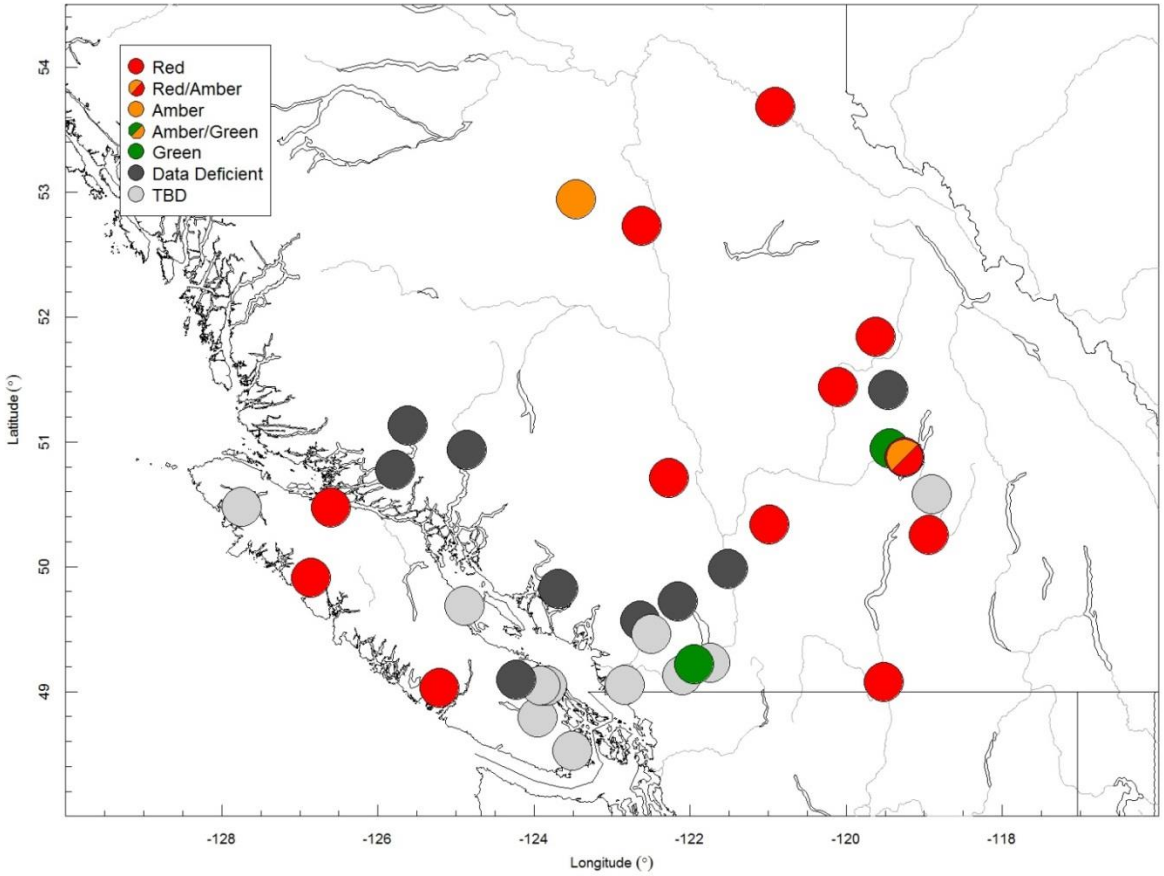
FN Forum March 7-9, 2017

Outline

Provide background information, management objectives and fisheries management approach for:

- Fraser Spring 4_2 Chinook
- Fraser Spring 5_2 Chinook
- Fraser Summer 5_2 Chinook
- Fraser Summer 4_1 Chinook
- Fraser Fall Chinook
- Other southern Chinook

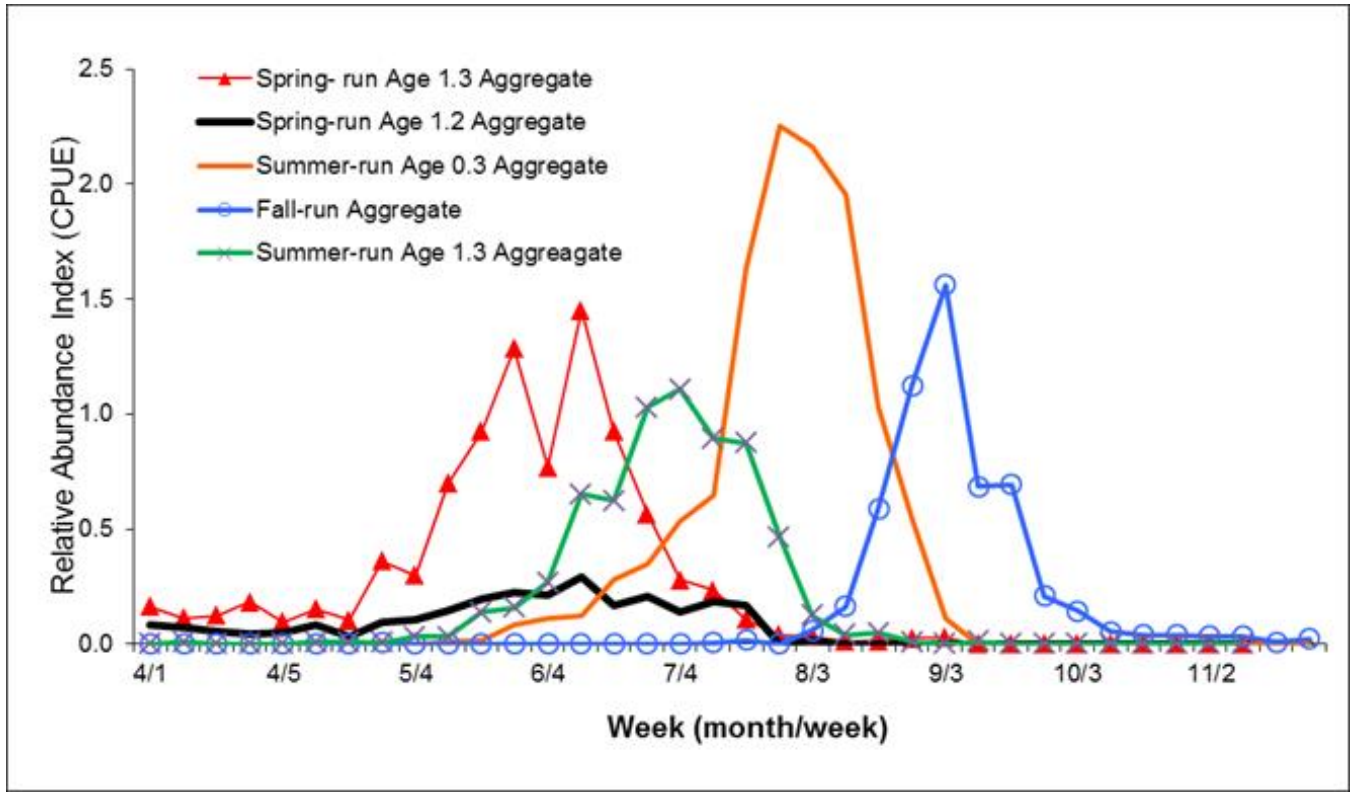
WSP Status Assessment



- 2 **Green** CUs (although 1 is provisional and is flagged for closer monitoring)
- 1 **Amber** CU
- 1 **Amber/Red** CU
- 11 **Red** CUs
- 9 **Data Deficient** CUs (not enough data of sufficient quality to make an assessment)
- 11 **To Be Determined** CUs (pending clarification of enhanced contributions)

http://publications.gc.ca/collections/collection_2016/mpo-dfo/Fs70-6-2016-042-eng.pdf

Fraser Chinook-run timing into Fraser



Data based on returns to Fraser River at the Albion chinook test fishery (2000-2001). Note: run reconstruction model uses average timing and reconstructed abundance.

Fraser River Spring 4_2 Chinook

PST Unit	CU #	CU Name	Spawning Locations
Spring 4_2 Chinook	16	STh Bessette Creek	Bessette Creek;
	17	LTHOM spring	Bonaparte River; Coldwater River; Deadman River; Louis Creek; Nicola River; Spius Creek

- Spring 4_2 chinook return to spawn from early March through late July.
- Migration peaks in June in the lower Fraser River.
- Primarily mature as adults at age 4 (90%) with lower numbers maturing at age 5 (7%) and occasionally at age 3 (3%).
- CWT indicator stock is the Nicola River.

Fraser River Spring 4_2 Chinook

Outlook is low. Expectations for continued depressed abundance due to low parental escapements in 2013 and ongoing unfavorable and highly variable marine survival conditions.

Brood Year	Run Reconstruction Escapement
2011	5,430
2012	11,649
2013	7,347 ← BY
2014	24,965
2015	11,516

These are reconstructions of escapement for all Spring 4_2 populations

Fraser River Spring 4_2 Chinook

- Expect continuation of fisheries restrictions in place in recent years.
- Total exploitation rates average 19% over 2012-2015.
- *Fraser River*: limited directed fisheries permitted for First Nations FSC fishery. In recent years these fisheries have been managed using an effort based tool to limit impact on these stocks. Actual fishing plans will be set based on discussions with First Nations; opportunities are typically short duration fisheries that are spread out across the run timing (April – early August).
- Actions for Spring 4_2 chinook are integrated with Spring and Summer 5_2 actions.
- For all fisheries see *Section 13 Southern Chinook Salmon Fishing Plan - Southern ISBM Chinook*.

Fraser River Spring and Summer 5_2 Chinook

- Spring 5_2 chinook return to the Fraser River to spawn from early March through late July and migration peaks in late June in the lower Fraser.
- Summer 5_2 chinook have later timing and return to the Fraser River to spawn from late June to August with a peak in late July.
- These populations primarily mature as adults at age 5 (approx. 70%) and age 4 (approx. 20%) with lower numbers at age 3 and age 6.
- Current exploitation rate unknown. No current CWT indicator stock (previously Dome Cr.). Work underway to explore feasibility of developing CWT indicator for Chilko (Summer 5_2); 2nd smolt release in 2017

Fraser River Spring and Summer 5_2 Chinook

Outlook is *low*. Expectation for continued overall low escapements due to depressed parental abundance and continuing unfavourable marine conditions.

Brood Year	Run Reconstruction Escapement	
2010	47,587	
2011	37,912	
2012	**27,023**	← BY
2013	37,951	
2014	73,947	
2015	67,947	

Recent 'productivity' trends

Fraser Spring and Summer 5_2 Chinook

Year	Brood Year Escapement (5 years prior)	In-season Terminal Run Size [a]	Post-Season Reconstructed Terminal Run Size	CTC Escapement Index	Escapement [b]	R/S Index [c]
2008	104,299	~61,000	51,483	32,581	39,269	0.61
2009	74,257	~63,000	72,143	47,123	53,234	1.20
2010	49,710	~62,000	50,234	36,513	41,704	1.25
2011	52,867	50,390	45,698	30,674	**32,487**	1.07
2012	27,661	42,730	34,326	21,797	24,302	1.53
2013	39,269	38,550	40,698	30,155	36,169	1.28
2014	53,234	47,550	93,147	56,841	77,761	2.16

[a] Final in-season Albion run size estimate used for management purposes.

[b] Total escapement estimate which includes infilling for missing escapement data. Brood year escapement for the 2016 return is bolded.

[c] Recruits per spawner index. Assumes returns and escapements are all 5 year olds. Pre fishery recruitment is estimated by assuming a marine harvest rate of 19%.

Note: R/S Index will be updated based on updated information in the run reconstruction model.

Fraser River Spring and Summer 5_2 Chinook

- Fisheries based on pre-season cautious (*Zone 1*) management approach with possibility to update approach inseason based on Albion test fishery.
- Similar to recent years the Albion test fishery planned to start the last week of April.
- Data from stat week 5(1) to stat week 6(2) will be input into the model.
- Preliminary in-season updates generally released in mid-May and early June, with final update by the third Monday in June.
- DFO plans to continue to start each year in Zone 1 until brood year escapements and/or the recruitment rates substantially improve.

Fraser River Spring 4_2 + Spring and Summer 5_2 Chinook Management

Fraser River – First Nations

- **January 1 to July 15:** First Nations fisheries taking place during the Spring 4_2 migration period will be managed taking into account conservation requirements for this stock.
- After July 15th, considerations for Fraser Spring and Summer 5_2 chinook as follows:
  - **Zone 1:** Expected exploitation rates on Spring and Summer 5_2 chinook reduced by at least 45% compared with the 2000 to 2006 base period.
  - **Zone 2:** Expected exploitation rates similar to those of the base period.
  - **Zone 3:** Harvests of Spring and Summer 5_2 chinook may occur during chinook-directed fisheries or as by-catch in sockeye-directed fisheries.

Fishery impacts will need to take into account harvests in chinook directed fisheries and/or as by-catch in sockeye directed fisheries. DFO will consult with First Nations on specific fishing plans for FSC fisheries.

- See *Section 13 Southern Chinook Salmon Fishing Plan - Southern ISBM Chinook*.

Fraser River Chinook '5 Year' Review

Draft Terms of Reference for this work circulated and comments received from FN's and stakeholders.

Department committed to collaborating with FN's and stakeholders to conduct *technical* review of the management approach for Fraser River chinook.

Department will be sending letter to FN's and stakeholders outlining the process for completing the review along with a final Terms of Reference.

Feedback Received on draft ToR

Feedback provided by First Nations and stakeholders on draft ToR included:

- focus review on stream-type Fraser River chinook populations, including Spring 4_2, Spring 5_2 and Summer 5_2 chinook
- assess fishery mortalities across all fisheries that may directly or indirectly impact on chinook, including retained catch, release mortality and other sources of fishing related mortality if possible (e.g. depredation).
- Importance of using the results of technical analysis to re-assess the Department's chinook management approach relative to conservation objectives and application of *An Allocation Policy for Pacific Salmon*.
- importance of providing for meaningful FN's consultation on the work and involvement of FN's and stakeholders in both the planning and technical processes. Include technical staff from FN and other organizations in review.
- Need for independent review of results (e.g. CSAS process)

Scope of '5 Year' Review

Given scope of work, substantial requirements for technical analysis of available information, expectations for engagement of First Nations and stakeholders in process, and independent peer review of results; work will not be completed for 2017 season.

Department expects technical review of available information to address questions in the Terms of Reference will likely take until late 2017 to complete.

Department also working to identify and provide data required for technical review process, including inventory of available information on Coded-Wire Tag (CWT) analysis, stock composition samples (e.g. DNA), catch/release data, and any other relevant information.

Fraser River Summer 4_1 Chinook

PST Unit	CU #	CU Name	Spawning Locations
Summer 4_1 Chinook	7	Maria Slough	Maria Slough
	13	STh summer age	Adams River; Little River; South Thompson River; Lower Thompson River;
	15	Shuswap River summer age	Shuswap River-lower; Shuswap River-middle

- Consists of several populations which spawn almost exclusively within the Thompson River watershed.
- Migrate through the Lower Fraser River from mid-July to mid-September.
- Indicator stock is the Shuswap River – lower
- Stocks return primarily as 60-70% four year olds with the remainder being 2, 3 and 5 year olds.

Fraser River Summer 4_1 Chinook

Outlook is *near target*. Brood year spawners in 2013 over two-fold higher than 2012 brood that returned in 2016. However, instability in smolt to adult survival rates, combined with highly variable escapement tempers outlook. If marine survival conditions improve, abundance may be average.

Brood Year	Run Reconstruction Escapement	
2011	140,944	
2012	53,325	
2013	**138,683**	← BY
2014	89,270	
2015	192,177	

Fraser River Summer 4_1 Chinook

- A biologically based escapement objective for the Summer 4_1 has not been established.
- Total exploitation rates average 54% over 2012-2015.
- Directed fishing opportunities expected.
- Fishing opportunities may be limited due to co-migrating possible stocks of concern including: Spring 4_2 chinook, Spring/Summer 5_2 chinook, Fraser Fall chinook (if required), Fraser River sockeye (if required), and Interior Fraser River coho.

Fraser River Fall Chinook

PST Unit	CU #	CU Name	Spawning Locations
Fraser Fall 4_1 Chinook	3	LFR fall white	Harrison River

- Migrate through the Lower Fraser River from Sept to October with the peak during last two weeks of September
- CWT indicators for Harrison and Chilliwack River Hatchery
- Stocks return primarily as four year olds with three year olds and very small numbers of two and five year olds.
- Chilliwack enhanced origin chinook contribute substantial abundance to this group

Fraser River Fall Chinook

Outlook is *low*. Low parental escapement in 2013 and current marine conditions appear unfavorable; high uncertainty about returns. Quantitative forecast available in early Spring.

Brood Year	Harrison Escapement
2011	123,878
2012	44,692
2013	**43,160** ← **BY**
2014	44,915
2015	101,781

Note: these are the Harrison River spawner abundances, not reconstructions for all Fall chinook

Fraser River Fall Chinook

- The PST approved escapement goal (to generate MSY) for the Fall 4_1 (Harrison) chinook is a range of 75,100 to 98,500 spawners.
- The forecast estimate of the spawner abundance (i.e. returns to the spawning grounds after all ocean and freshwater fisheries removals) for Harrison chinook will be available later in March.
- Total exploitation rates average 26% over 2012-2015.
- Additional management actions may be considered if returns are below escapement goal range including:
  - chinook non-retention in commercial / FN economic fisheries in the Fraser River and recreational fisheries on the Harrison River.

Other Southern Chinook

Lower Georgia Strait Chinook

Outlook is *low to near target*. Continued rebuilding with 2016 return higher than previous year; may reach maximum sustained yield (MSY) target.

Management measures remain in place to protect Lower Georgia Strait chinook, including the Nanaimo, Chemainus and Cowichan River chinook stocks. These include seasonal time and area closures in specific locations in Strait of Georgia and approach waters of these systems.

Additional actions may be implemented to respond to environmental conditions (e.g. high temperatures / low flows).

AABM Forecasts and coded wire tag (CWT) based total mortality distributions available in late March / early April.

Update on SBC Chinook Integrated Strategic Planning

Plan intended to account for the biological status of southern BC Chinook conservation units, their habitat and the ecosystem, address the causes of any declines, and identify strategic approaches necessary to remedy their status where possible.

Planning follows Wild Salmon Policy 5 step planning approach

Collaborative planning process with First Nations and stakeholders supported by multi-party technical working group

Terms of reference for the work was completed in 2013 and reflects broad scope of issues

First draft of strategic plan completed in 2016

Key Findings of Independent Science Panel Report

Panel evaluated relative importance of factors that may have affected abundance and productivity of southern BC Chinook salmon and provided recommendations for future research priorities

Short summary of key findings:

- Abundances of chinook spawning in many CUs in southern BC have declined substantially over the past 3 generations, but clearest indication of decline is within the Fraser River.
- Panel could not attribute particular causes to declines other than inferring that low early marine survivals (based on recoveries from CWT indicator stocks) have been primary contributing factor; and,
- have likely been contributions (to varying degrees across CUs but not quantified) from other factors considered at the workshop (harvests, freshwater habitats, hatcheries, pathogens, and climate change and variation).

Numerous recommendations made to address critical information gaps.

What work remains on the strategic plan?

The *draft* plan provides synopsis of work to date and outlines broad strategic directions to address threats.

In many cases, additional work required to identify specific actions and complete technical evaluation of expected outcomes;

- however, we expect strategies will inform interim actions and assist with developing priorities for further work.

Plan helps communicate on potential approaches to address concerns, coordinate activities and support collaborative approaches that optimize collective resources available.

Plan is a draft document and NOT a final product. Further revisions on the draft plan will be incorporate feedback received.

APPENDIX

Integrated status evaluation completed at workshop

Integrated Status	Case #	CU ID	CU Name	Area
RED	1	CK-10	Middle Fraser River_SP_1.3	Fraser
RED	4	CK-18	North Thompson_SP_1.3	Fraser
RED	6	CK-19	North Thompson_SU_1.3	Fraser
RED	11	CK-09	Middle Fraser River-Portage_FA_1.3	Fraser
RED	24	CK-17	Lower Thompson_SP_1.2	Fraser
RED	25	CK-31	West Vancouver Island-South_FA_0.x	WCVI
RED	26	CK-12	Upper Fraser River_SP_1.3	Fraser
RED	29	CK-29	East Vancouver Island-North_FA_0.x	Inner SC
RED	30	CK-32	West Vancouver Island-Nootka & Kyuquot_FA_0.x	WCVI
RED*	3	CK-16	South Thompson-Bessette Creek_SU_1.2	Fraser
RED*	5	CK-01	Okanagan_1.x	Columbia
RED / AMBER	27	CK-14	South Thompson_SU_1.3	Fraser
AMBER	12	CK-11	Middle Fraser River_SU_1.3	Fraser
GREEN(p)	9	CK-03	Lower Fraser River_FA_0.3	Fraser
GREEN	2	CK-13	South Thompson_SU_0.3	Fraser

"(p)" means provisional, and identifies cases where some participants held divergent views.
"*" means that CU definition should be reviewed.

Integrated status evaluation not possible based on information presented at workshop

Integrated Status	Case #	CU ID	CU Name	Area
DD	7	CK-82	Upper Adams River_SU_x.x	Fraser
DD	8	CK-06	Lower Fraser River_SU_1.3	Fraser
DD	10	CK-05	Lower Fraser River-Upper Pitt_SU_1.3	Fraser
DD	28	CK-28	Southern Mainland-Southern Fjords_FA_0.x	Inner SC
DD	31	CK-08	Middle Fraser-Fraser Canyon_SP_1.3	Fraser
DD	32	CK-20	Southern Mainland-Georgia Strait_FA_0.x	Inner SC
DD	33	CK-34	Homathko_SU_x.x	Inner SC
DD	34	CK-23	East Vancouver Island-Nanaimo_SP_1.x	Inner SC
DD	35	CK-35	Klinaklini_SU_1.3	Inner SC

Integrated status evaluation not attempted at workshop due to unresolved methods

Integrated Status	Case #	CU ID	CU Name	Area
TBD**	13	CK-04	Lower Fraser River_SP_1.3	Fraser
TBD	14	CK-21	East Vancouver Island-Goldstream_FA_0.x	Inner SC
TBD	15	CK-33	West Vancouver Island-North_FA_0.x	WCVI
TBD	16	CK-22	East Vancouver Island-Cowichan & Koksilah_FA_0.x	Inner SC
TBD	17	CK-02	Boundary Bay_FA_0.3	Inner SC
TBD	18	CK-07	Maria Slough_SU_0.3	Fraser
TBD	19	CK-25	East Vancouver Island-Nanaimo & Chemainus_FA_0.x	Inner SC
TBD	20	CK-15	Shuswap River_SU_0.3	Fraser
TBD	21	CK-83	East Vancouver Island-Georgia Strait_SU_0.3	Inner SC
TBD	22	CK-27	East Vancouver Island-Qualicum & Puntledge_FA_0.x	Inner SC
TBD	23	CK-9008	Fraser-Harrison fall transplant_FA_0.3	Fraser

"**" means that CU status should be re-evaluated after review of enhancement level definition.

CTC Total Mortality Tables

Pacific Salmon Commission Joint Chinook Technical Committee. **2016 Exploitation Rate Analysis and Model Calibration Supplement – Data Notebook.** TCCHINOOK (17)-1.

The report can be accessed at:

http://www.psc.org/publications/technical-reports/technical-committee-reports/chinook/