

## SALMON TECHNICAL TEAM REPORT ON POTENTIAL SOUTHERN RESIDENT KILLER WHALE CHINOOK SALMON ABUNDANCE THRESHOLD UPDATES

During their September 2022 meeting, the Pacific Fishery Management Council (Council) identified a list of five topics to be reviewed by the Salmon Technical Team (STT) and the Scientific and Statistical Committee Salmon Subcommittee at this year's salmon methodology review meeting. Included in this list were technical reviews of recent updates to the Fishery Regulation Assessment Model (FRAM) and Shelton et al. ocean distribution models. Output from these two models are used to estimate pre-fishing adult Chinook salmon abundances in the North of Falcon region, which inform the Chinook salmon abundance threshold that was implemented in Amendment 21 of the Pacific Coast Salmon Fishery Management Plan (FMP). Pending the outcome of these reviews, the Council may wish to consider adopting an updated value for the threshold. In the event that this occurs, the STT provides the following options to aid the Council in determining the appropriate numerical value of the threshold. The STT does not recommend moving forward with a recalculation of the threshold that does not incorporate the update to FRAM Round 7.1.1, as this is the version of the model that is currently being implemented during the preseason planning process.

The STT notes that there is some ambiguity in the FMP language as to whether the recalculated threshold should be based on the seven years specified (1994 – 1996, 1998 – 2000, and 2007) or on the seven years with the lowest abundance. In recalculating the threshold values for this report, the STT used the seven years specified in the FMP language, as they were specifically linked to Southern Resident Killer Whale (SRKW) status, as described in Agenda Item D.2.a, [Supplemental NMFS Presentation 1](#). Should the Council decide instead to use the seven years of lowest abundance, this would only affect the option below that incorporates both the FRAM and Shelton et al. updates, and the threshold value could be recalculated as needed. Also, with the exception of those under the status quo option, the abundances presented below incorporate the stock crosswalk correction recommended by the STT with regard to the appropriate ocean distribution parameters for apportioning the abundance of the 'Lower Columbia River Wild' FRAM stock.

Status Quo: The status quo abundances in the table below reflect those originally produced by the Ad-hoc SRKW work group. These were derived using output from FRAM Round 6.2 and the configuration of the ocean distribution model described in Shelton et al. 2019. The 'Lower Columbia River Wild' FRAM stock was apportioned into regional abundances using the 'LCOL' Shelton et al. stock. The existing threshold value is 966,000.

FRAM only update: The abundances presented under this option were derived using output from FRAM Round 7.1.1 and the configuration of the ocean distribution model described in Shelton et al. 2019. The 'Lower Columbia River Wild' FRAM stock was apportioned into regional abundances using the 'UPCOL' Shelton et al. stock. Updating to the use of FRAM Round 7.1.1 results in an overall small increase to the October 1 estimates of adult Chinook salmon abundance in the North of Falcon region. Under this option the recalculated threshold value is 992,000.

FRAM and Shelton et al. update: The abundances presented under this option were derived using output from FRAM Round 7.1.1 and long-term average stock-specific distributions parameters

from the configuration of the ocean distribution model described in Shelton et al. 2021. The ‘Lower Columbia River Wild’ FRAM stock was apportioned into regional abundances using the ‘URB’ Shelton et al. stock. Updating to the use of distributions from Shelton et al. 2021 results in a considerable decrease to the October 1 estimates of adult Chinook salmon abundance in the North of Falcon region. This is primarily a function of modifications to the distributions for Upper Columbia River stocks between the 2019 and 2021 versions of the model, where a single ‘Upper Columbia’ stock was split into separate ‘Upriver Bright’ and ‘Snake River fall’ components. While the total number of fish estimated to be in the ocean is not changing, the 2021 version of the model apportions a much larger portion of the Upriver Bright stock into northern regions (as opposed to the North of Falcon region), which aligns better with the understood distribution of this stock. Under this option the recalculated threshold value is 623,000.

**Table 1.** 1993 – 2016 pre-fishing October 1 estimates of adult Chinook salmon abundance in the North of Falcon region for each of the scenarios identified in the text above. Threshold values were calculated as the arithmetic mean of the seven years identified in section 6.6.8 of the FMP (shaded rows), rounded to the nearest thousand.

Year	Status Quo	Update FRAM	Update FRAM & Shelton et al.
1993	1,079,609	1,088,226	694,959
1994	813,496	852,017	515,797
1995	1,023,196	1,049,498	704,852
1996	1,035,299	1,063,233	667,090
1997	1,144,311	1,125,328	726,362
1998	861,060	876,087	540,346
1999	1,046,803	1,064,383	626,975
2000	1,036,777	1,082,718	755,959
2001	1,921,698	1,962,839	1,372,344
2002	2,135,440	2,155,349	1,482,676
2003	1,961,412	2,022,966	1,373,538
2004	1,969,918	2,006,749	1,288,539
2005	1,479,392	1,479,224	874,616
2006	1,279,105	1,295,046	736,300
2007	946,551	958,658	547,221
2008	1,253,919	1,317,779	762,851
2009	1,062,578	1,087,505	704,194
2010	1,941,244	1,901,923	1,253,483
2011	1,522,917	1,538,210	940,672
2012	1,553,163	1,578,971	980,596
2013	2,440,331	2,433,725	1,181,019
2014	1,976,380	2,026,377	1,177,499
2015	2,292,946	2,378,480	1,335,019
2016	1,438,662	1,468,290	781,475
<b>Threshold</b>	<b>966,000</b>	<b>992,000</b>	<b>623,000</b>