

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

In their 2022 Guidance Letter under agenda item D.3.b, Supplemental NMFS Report 1, the National Marine Fisheries Service (NMFS) provided guidance regarding Endangered Species Act (ESA) listed Southern Resident Killer Whales (SRKW). As part of this guidance, NMFS indicated that, since the adoption of Amendment 21 of the Pacific Coast Salmon Fishery Management Plan (FMP) in 2020 there have been updates to both the Chinook [Fishery Regulation Assessment Model](#) (FRAM) and the [Shelton et al. \(2019\)](#) ocean distribution model. Outputs from each of these models are used to produce region-specific estimates of pre-fishing Chinook abundance per the methods described in the Ad-hoc SRKW Workgroup's [Risk Assessment](#) which, in turn, were used to derive the threshold for the North of Falcon area that went into effect under Amendment 21 of the FMP.

In 2020, when Amendment 21 of the FMP was adopted, it was acknowledged that there would likely be future changes to the configurations of both Chinook FRAM and the Shelton et al. ocean distribution model. This sentiment is captured in Section 6.6.8 of the FMP, which indicates that these types of changes (i.e., best scientific information available per technical review of the Salmon Technical Team [STT], Scientific and Statistical Committee [SSC], and Council) may alter the numeric value of the pre-fishing Chinook abundance threshold in the North of Falcon area. Below, we provide a summary of the recent changes to both Chinook FRAM and the Shelton et al. ocean distribution model.

Chinook FRAM updates:

In conducting the analyses contained within their Risk Assessment, the Ad-hoc SRKW Workgroup used post-season information for 1992 through 2016 that was derived using 'Round 6.2' of the Chinook FRAM base period calibration, which was completed in October of 2018. In September 2021, Washington State and Tribal comanager technical staff produced a revised base period calibration that also included an expanded post-season model run time series, adding 2017 and 2018 to the existing time series.

The updates that were incorporated into the new base period calibration can best be classified as data changes aimed at refining the existing calibration. In addition, there was a small correction that modified the way fishery expansions were calculated during the base period calibration; originally calculated on an annual basis, they are now calculated on a time-step-specific basis. Listed below are the notable updates that are most likely to have affected the starting cohort sizes of FRAM model stocks relevant to computing estimates of region-specific pre-fishing Chinook abundances. Note, however, that there were other small refinements and corrections associated with this update that are not listed here.

- Re-queried the Regional Mark Information System (RMIS) for the most up-to-date coded-wire tag (CWT) recovery information.
- Improved estimates of catches in Canadian sport fisheries.
- Improved representation of Snake River Fall Chinook age specific terminal returns.
- Incorporated escapement expansions to account for inter-dam loss of Columbia River stocks that originate upstream of Bonneville Dam.

The STT understands that the Washington comanagers have conducted extensive review of this updated configuration of the model ('Round 7.1.1') and they have agreed to its use for 2022 preseason planning. In concert with this, and with the understanding that the changes incorporated in this update are best characterized as 'updates to existing data sets,' the STT also intends on using Round 7.1.1 of the Chinook FRAM base period calibration for all 2022 preseason modeling tasks and will review components of the update prior to the April Council meeting. The STT appreciates the continued efforts of comanager technical staff to refine the Chinook FRAM base period.

#### Shelton et al. ocean distribution model updates:

Improvements were made to the Shelton et al. ocean distribution model that were peer reviewed and published in [Shelton et al. \(2021\)](#). Highlights of these changes include the following:

- Expanded CWT data (approximately 3-4x and 20 more contemporary years of data).
- Increased stock stratification from 12 stock groupings to 16 stock groupings.
  - Split Upper Columbia into Upriver Bright and Snake River stock aggregates.
  - Split Puget Sound and Strait of Georgia into Northern and Southern components.
  - Added Select Area Bright stock aggregate.
- Refined spatial stratification:
  - Combined central Oregon and southern Oregon regions.
  - Added a Juan de Fuca region.
- Incorporated a temperature variable that allowed for annual deviations from average stock-specific distributions as a function of sea surface temperature.

Given less familiarity with this model within the STT, there has not been sufficient time to evaluate these changes and determine what level of review may be required, specifically whether methodology review is warranted.

#### Effects to North of Falcon pre-fishing abundance threshold and considerations for 2022 preseason planning:

With the implementation of Round 7.1.1 of the Chinook FRAM base period, the STT would like to note that proceeding with the numerical threshold of 966,000 (as identified in the FMP) would result in a disconnect between the threshold and the preseason abundance estimates, as the former

will have been derived using FRAM 'Round 6.2' cohort sizes, while the latter will be derived using FRAM 'Round 7.1.1' cohort sizes.

Estimates of pre-fishing Chinook abundance based on 2022 forecasts will be presented for each of the five spatial areas when the STT reports on initial modeling assignments under agenda item D.4, at which point the estimate in the North of Falcon area can be assessed against the threshold. Until then, the STT cannot provide quantitative estimates of preseason Chinook abundances, however, preliminary indications are that the 2022 projected abundance in the North of Falcon area will be sufficiently above the current threshold.

PFMC  
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