SACRAMENTO RIVER FALL CHINOOK WORKGROUP REPORT ON
METHODOLOGY REVIEW PRELIMINARY TOPIC SELECTION

The Sacramento River Fall Chinook (SRFC) Work Group (SRWG) has identified three topics that could be suitable for salmon methodology review this year:

1. **Derivation of natural-area S_{MSY} for SRFC.** Pacific Fishery Management Council (Council) guidance as captured in the November 2024 Decision Summary Document instructed the SRWG to "use the F_{MSY} value adopted under Agenda Item F.2 Salmon Methodology Review to derive an updated S_{MSY} value per the formula described in Agenda Item F.2, Attachment 2" and instructed that "S_{MSY} [be] based on natural-area spawners". This requires an estimate of S_{MP}, the natural-area escapement maximizing production of natural-origin recruits, which would then be multiplied by F_{MSY}, which equals the ratio between S_{MSY} and S_{MP} under a Ricker spawner-recruit relationship. At its January 2025 meeting, the SRWG evaluated S_{MP} estimates from spawner-recruit analyses for SRFC based on recruits measured as Upper Sacramento juvenile production (Voss and Poytress 2022), system-wide juvenile production (Munsch et al. 2020 updated with more recent data), an abundance index based off the Sacramento Index (SI, O'Farrell et al. 2013) and the proportion of escapement that is natural origin (based on Kormos et al. [2012], Dean and Lindley [2023], and intervening reports), or the newly adopted cohort reconstruction (Chen et al. 2024). The SRWG identified a preferred approach based on the updated Munsch et al. (2020) juvenile production index, with a flow covariate. The SRWG anticipates being able to complete full documentation of that approach, along with a description of the challenges and timelines associated with obtaining cohort reconstruction estimates for a sufficient number of years and range of conditions, in time for a methodology review in the fall.

2. **Methods for evaluating consequences of changes in allowable exploitation rates, evaluating forecast performance, and potentially adjusting forecasts for bias and/or uncertainty buffers**. Previously, the SRWG recommended methodology review of Satterthwaite and Shelton (2023) based on its utility in addressing tasks in the SRWG Terms of Reference (TOR) related to potential improvements to forecasting (e.g., as a bias correction applied to the point estimate) and/or the control rule for SRFC (as a buffer to the control rule input). It is important to note that this paper also offers a method for retrospective and prospective evaluation of likely fishery and conservation consequences of changes in allowable exploitation rates for a single stock in the context of mixed-stock fisheries, consistent with the TOR task to "analyze the biological risks and fishing-related benefits of alternatives". In addition, it provides a pathway to "consider the effect of environmental variables on the stability and accuracy" of possible management measures as called for in the TOR. The published paper is complete and ready for review.

3. **Methods for deriving a total (natural areas plus hatchery) escapement objective based on consideration of natural production and hatchery needs.** November 2024 Council guidance also instructed the SRWG to "develop options for an updated conservation objective based on total escapement (natural and hatchery areas combined) and based on

an S_{MSY} based on natural-area spawners". Satterthwaite (2023) presented an approach for identifying a total escapement goal that has a defined probability of simultaneously achieving a desired fraction of the maximum possible natural production and meeting broodstock needs of hatcheries. The basic methodology is fully documented in a published paper ready for review. The published paper was based on previously reported hatchery escapement goals that may not represent current practices. Although this should not affect evaluation of the general approach, the SRWG is working on obtaining updated metrics for hatchery needs and may be able to incorporate them into an updated analysis by the fall. While the approach documented in the paper is based on achieving a desired fraction of potential natural production rather than S_{MSY} per se, similar principles could be applied using a natural-area S_{MSY} value when available.

The SRWG understands that all materials submitted for methodology review are due two weeks in advance of the review and should be technically sound, comprehensive, clearly documented, and identified by author(s).

PFMC
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