

SALMON TECHNICAL TEAM REPORT ON 2025 SALMON METHODOLOGY REVIEW RESULTS

The Salmon Technical Team (STT) and the Scientific and Statistical Committee Salmon Subcommittee (SSC-SSC) held the Salmon Methodology Review meeting on October 9, 2025, and discussed the two topics selected for review:

1. The Oregon Production Index Hatchery (OPI-H) Forecast Methodology;
2. Technical Revision to the Marine Survival Forecast of the Oregon Coastal Natural (OCN) Coho Work Group Harvest Model

The Oregon Production Index Hatchery (OPI-H) Forecast Methodology

Cassie Leeman (STT, MEW, Oregon Department of Fish and Wildlife [ODFW]), Thomas Buehrens, and Shannon Conley (Washington Department of Fish and Wildlife) presented an overview of incorporating an exponential weighted approach within the OPI-H coho forecast methodology at the Methodology Review Meeting.

The current forecast methodology is a multistep process that produces an ensemble forecast utilizing an autoregressive integrated moving average (ARIMA) model structure. The forecast is an ensemble of the top 10 of the 1,485 individual models considered ranked by the unweighted mean absolute percent error (MAPE) over the prior 15 years, where each of those years has equal weight in the calculation. The modification presented calculates MAPE during the process of choosing the top 10 models as an exponentially weighted average where more recent years receive greater weight than older years within the 15-year time frame. Results suggest exponentially reducing the weight of each year (decay rate) by 25 percent relative to the following year has a MAPE of 33.3 percent where the current methodology has an MAPE of 39.4 percent, suggesting this proposed approach improves model performance.

STT Recommendation: The STT supports the use of the MAPE-weighted ARIMA ensemble forecast methodology. The STT also encourages further investigation of additional ways to refine the forecast approach, including evaluating whether performance could be improved by forecasting individual stock components rather than the total OPI-H aggregate abundance.

Technical Revision to the Marine Survival Forecast of the OCN Coho Work Group Harvest Model

Erik Suring and Cassie Leeman (ODFW) presented multiple approaches to calculate the marine survival component of the Amendment 13 (A-13) OCN coho harvest matrix. The matrix prescribes maximum allowable exploitation rates based on brood year spawning escapement levels and a marine survival index (MSI). Data used for the MSI is derived from life-cycle monitoring (LCM) sites, and the baseline data for MSI calculations are updated annually. Due to funding limitations, ODFW discontinued monitoring of the two southernmost LCM sites in 2025, which leaves three sites in operation. Given this change in monitoring, four alternatives to adjust to this monitoring change for use beginning in 2026 were presented. The four alternatives included:

1. Continue refitting the forecast generalized additive models (GAMs) annually, calculating the MSI using a multivariate state-space model to interpolate missing LCM sites from remaining previous data (interpolation method);
2. Continue refitting the forecast GAMs annually, calculating the MSI using the three remaining LCM sites (reduced method);
3. Discontinue the process of refitting the forecast GAMs annually and use the 2025 model without annual updates to baseline data to forecast OCN marine survival (fixed method); and
4. Reverting to the Oregon Production Index hatchery jack/smolt survival index used prior to 2013 (OPI-H jacks method).

The marine survival forecasts between the alternatives explored were relatively similar. The fixed method and the OPI-H jacks method did not fit the MSI forecast as well as the interpolated or reduced methods. Marine survival forecasts from the interpolation method better represented the observed MSI than the reduced method. The marine survival forecasts of the alternatives explored from 2021 through 2025 always had the same A-13 harvest matrix marine survival designation, except for the 2021 forecast from the OPI-H jacks method. The interpolation does increase model complexity but allows for flexibility if monitoring opportunities become available where interpolated data could be substituted for observed data. There are concerns regarding the reduced spatial coverage of the available LCM sites.

STT Recommendation: The STT supports using the interpolation method for calculating marine survival beginning in 2026. The STT suggests the analysts notify the Pacific Fishery Management Council if it no longer continues to be a suitable approach.

PFMC
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