

TRIBAL STATEMENT ON METHODOLOGY REVIEW AND OREGON PRODUCTION INDEX AREA HATCHERY COHO FORECAST

Washington Department of Fish and Wildlife (WDFW) presented their evaluation of preseason ocean abundance forecasts for the Oregon Production Index area hatchery coho forecast (OPI-H) to a small group of tribal technical and Northwest Indian Fisheries Commission (NWIFC) staff on October 30, 2023. Tribal staff are happy with the progress being made to improve the aggregate OPI-H forecast and appreciate all of the work done by the Oregon Production Index Technical Team (OPITT) to complete their analyses and presentations. We agree that the mean absolute percentage error (MAPE) weighted ensemble of autoregressive integrated moving average (ARIMA) models with unique covariates for OPI-H forecasts displays a significant improvement over the current OPI-H forecasting methods, but require improved documentation before the new methodology is used.

Suring and O'Farrell (2021) state that OPI-H abundance is forecasted independently and includes only hatchery returns from the Columbia River, coastal Oregon, and northern California, which is also the definition of OPI-H given on page 48 of the [Preseason Report 1](#). But, the 2023 methodology review states that the OPI-H abundance forecast includes all hatchery production in the Oregon Production Index area *and* all naturally produced Coho from the Columbia River basin (Leeman, Conley, Sorel, and Buehrens). It is unclear why one methodology forecasts only hatchery stocks and the other forecasts both hatchery and natural stocks, using the same time series of best available abundance for OPI-H. The tribes request that the mixed stock model output used to represent best available OPI-H abundance and a description of its components be provided.

Furthermore, the co-authors have only evaluated the performance of the current methodology by how well it predicts the total OPI-H abundance. However, this OPI-H forecast is broken into components by the OPI Technical Team and distributed as components (as shown in Table 1 below). Forecast performance of the components is evaluated by the Council, including for: Columbia River Hatchery Early, Columbia River Hatchery Late, and Lower Columbia River Natural (LCN) ([Pre-1 Table III-1](#)). Management decisions are also made based on the components, not the OPI-H total, and the management objective for LCN must be met. These subunits are then broken down further into 22 Coho FRAM stocks. Because of the “portfolio” effect, aggregate forecasts often show better performance than forecasts of the individual components. Understanding the performance at the level that affects management, especially fisheries off the Washington coast, is necessary for tribal fisheries managers.

As this work progresses, tribal technical staff encourage investigating separate wild and hatchery forecasts or separate component forecasts. Currently, the OPI-H aggregate forecast includes wild

stocks, even though wild fish are forecasted separately. One possible first step would be to look at how the model were to perform if you did not include wild fish as part of the aggregate being forecasted. Forecasting the subunits (even just hatchery and natural) would also mean that uncertainty is characterized at a level more useful to fisheries managers. Additionally, we encourage the co-authors to consider performance metrics which incorporate bias and are supportive of the other ideas for continued improvement of the methodology presented by the co-authors.

Tribes request the performance of the new methodology be evaluated at the scale used by the Council and co-managers to make management decisions, since management decisions are not made based on the total OPI-H forecast. Because of the “portfolio effect”, it is important to understand how improvements to the aggregate forecast transfer, or don’t transfer, to the individual components which directly impact fisheries management. Preferably, tribal technical staff would like to see the results of the new methodology presented similarly to Table III-1 in the Pre-I report. It is our priority that we can make certain that forecast improvements are made at the level that these stocks are managed at.

The tribes further request that documentation of how the OPI-H forecast is broken into components and coho FRAM inputs, and we request that this be reviewed by the STT and SSC prior to the March PFMC to inform next year’s preseason and inseason planning. There is a requirement under the Stipulation and Order Concerning Co-Management and Mass Marking that co-managers understand the potential impact of one party’s actions on another. This requires documentation of how the OPI-H is further broken down. The Council and the tribes have requested documentation of the OPI-H forecast in the past, and the breakdown of the OPI-H forecast into components has never been included in the documentation provided by OPITT. Documentation of these methods will not only allow for proper co-management, but it will instill the openness, transparency, and adherence to scientific process that this in-season action is currently lacking.

Table 1: Summary table that describes forecasted abundance for 2023, as distributed by OPITT on February 6, 2023.

2023 OPITT Results

2022 abundance and 2023 forecast of ocean coho run components prior to harvest (thousands of fish)				
	2022			2023
	Pre	Post	Pre/Post	Forecast
Columbia River Early	592.5	434.3	136%	481.8
Columbia River Late	404.7	250.9	161%	404.3
<i>Columbia River Subtotal</i>	997.2	685.2	146%	886.1
<i>Coast Subtotal</i>	6.3	10.8	59%	10.8
Total (OPI-H)	1003.5	696.0	144%	896.9
<i>OCN Rivers</i>	209.0	182.0	115%	226.3
<i>OCN Lakes</i>	13.4	9.6	140%	12.5
<i>OCN Total</i>	222.4	191.5	116%	238.8
Grand Total	1,225.9	887.5	138%	1,135.7