

February 26, 2021

**To: Dr. Galen Johnson, chair, PFMC Scientific and Statistical Committee (SSC)
Dr. Kristin Marshall, chair, SSC Ecosystem-Based Management Subcommittee (SSC-ES)
Mr. John DeVore, SSC staff officer, Pacific Fishery Management Council (PFMC)**

**From: Dr. Chris Harvey, NOAA Fisheries / Northwest Fisheries Science Center
Dr. Toby Garfield, NOAA Fisheries / Southwest Fisheries Science Center
Co-leads, California Current Integrated Ecosystem Assessment team (CCIEA)**

Re: potential topics for SSC-ES / CCIEA in September 2021 (virtual or in Spokane, WA)

Dear Galen, Kristin and John,

As you know, since 2015, the SSC-ES and the CCIEA team have met at September Council meetings so that the SSC-ES could review topics intended to improve the indicators and analyses that go into the March ecosystem status report. These meetings have been greatly beneficial to the CCIEA team, and we believe they have resulted in clear improvements to the quality and scope of the report, and the value of information provided to the Council.

As part of the Council-established process for planning these September SSC-ES / CCIEA meetings, the CCIEA team is asked to provide a proposed list of potential review topics prior to the preceding March Council meeting, with the understanding that the list could be amended during the March meeting of the CCIEA leads and the full SSC. This letter provides two proposed topics for September 2021 (see next page for short descriptions). We are certainly open to other ideas that may arise during our presentation to the SSC at the March 2021 Council meeting.

All topics are pending the availability of the investigators to present on the day of the meeting.

Thank you for your continuing efforts to support the CCIEA team and improve our products.

Sincerely,

Chris Harvey and Toby Garfield

cc: Kit Dahl, PFMC

1 attachment

Topic: Threshold relationships between environmental drivers and performance of salmon preseason abundance forecasts

Presenter: Dr. Will Satterthwaite, Southwest Fisheries Science Center

Justification: The CCIEA held a workshop in 2018 that focused on potential threshold relationships between ecosystem drivers and variables related to Pacific salmon. The statistical approaches used to identify nonlinear dynamics and threshold relationships were previously published by Samhouri et al. (2017), and elements of these approaches have been reviewed twice by the SSC-ES. One workshop product was a study by Satterthwaite et al. (2020) that examined relationships between environmental drivers and the performance of pre-season forecasts of Chinook salmon returns to several systems. The authors concluded that non-linear and threshold dynamics existed between seasonal climate indices and forecast model performance for Sacramento River fall Chinook salmon (though not for Klamath River fall Chinook salmon). Thus, some environmental indices reported by the CCIEA may indicate conditions that are associated with bias in forecasts. Flagging the risk of over- or underestimating returns could be of value to PFMC salmon management and may represent an opportunity for an ecosystem approach to fisheries management.

The CCIEA team requests an SSC-ES review of the analyses of Satterthwaite et al. (2020) for possible inclusion in future ecosystem status reports. The focus would be on California stocks that serve as indicator stocks for their respective stock complexes, but could be extended to other stocks, including Puget Sound stocks that have been analyzed in published work.

Topic: Year class strength and distribution of post-settled groundfish

Presenter: Dr. Nick Tolimieri, Northwest Fisheries Science Center

Justification: Tolimieri et al. (2020) recently applied the vector-autoregressive spatio-temporal (VAST) modeling package to data from the NMFS West Coast Groundfish Bottom Trawl Survey (WCGBTS). They specifically focused on estimating spatial and temporal patterns of abundance of young age classes of 13 groundfish species (generally \leq age 2 but as young as age-0 for some species like sablefish or lingcod). While WCGBTS data availability is often delayed by at least a year due to the intensive nature of data post-processing, this may nonetheless represent a leading indicator of incoming strong year classes relative to when those species recruit into the fishery. It adds further value in providing estimates of where the juvenile biomass is located, and if there are potential hotspots of valuable juvenile groundfish habitat that may be useful in EFH determinations. Further, it would bring the very rich WCGBTS dataset back into the ecosystem status report, where it has not had a presence in recent years apart from benthic dissolved oxygen measurements.

The CCIEA team requests an SSC-ES review of the analyses of Tolimieri et al. (2020) for possible inclusion in future ecosystem status reports. While the VAST methodology is well established and has been reviewed by the SSC in the past, we seek SSC-ES review and guidance on this specific application as well as on species selection, data assumptions, year class aggregation, and quantitative definitions of hotspots that may have some bearing in discussions of groundfish EFH.

References:

Samhuri, J.F., et al. 2017. Defining ecosystem thresholds for human activities and environmental pressures in the California Current. *Ecosphere*, 8: e01860.

Satterthwaite, W.H., et al. 2020. Ecological thresholds in forecast performance for key United States West Coast Chinook salmon stocks. *ICES Journal of Marine Science* 77:1503-1515.

Tolimieri, N., et al. 2020. Spatiotemporal patterns in juvenile habitat for 13 groundfishes in the California Current ecosystem. *PLoS ONE* 15:e0237996.