Agenda Item E.1.b
Supplemental EAS Report 1
March 2026

ECOSYSTEM ADVISORY SUBPANEL REPORT ON THE CALIFORNIA CURRENT ECOSYSTEM ANNUAL STATUS REPORT AND 2026 SCIENCE REVIEW TOPICS

The Ecosystem Advisory Subpanel (EAS) is again impressed by the comprehensive and forward-looking 2025-2026 California Current Ecosystem Status Report (ESR). In particular, we thank the California Current Integrated Ecosystem Assessment (CCIEA) Team for including and responding to input from the EAS and other Pacific Fishery Management Council (Council) Advisory Bodies that have led to the continual improvement that this ESR represents. This is even more impressive considering the significant loss of staff and expertise that occurred in the past year. We provide the following comments on this report and recommendations for future reports, including concerns about the impact on future ecosystem-based management of the Council's fisheries.

Comments on 2025-2026 ESR:

- We consistently comment on the value of highly migratory species (HMS) and seabird diet information and have recommended expanding that diet information to better understand predator/prey relationships. We are concerned that HMS diet data will not be available for the foreseeable future. HMS diet information provides a direct survey of forage abundance in the California Current. HMS are opportunistic predators and information on their diets complements forage surveys, offers insight into how forage varies in space and time, and provides direct measures of forage use by these predators. Prey quality and abundance also may impact not just stock size and distribution, but also product quality which translates to variable market value and potentially adverse economic impact.

- In the infographic that summarizes the ESR's take-home messages (p. 7), humpback whale entanglements have remained stable since 2024 while whale populations have grown and fishing communities have changed their operations to reduce entanglements over this same period. We note that this represents a net positive, rather than negative, reduction in entanglement in relation to whale population size, and we suggest that it be characterized as such.

- This ESR makes a significant advance in predicting how a changing climate may shift the future distribution of species (Appendix E). However, we found the distillation of multiple complex species distribution models in this appendix difficult to follow. There are many potential mechanisms by which climate changes can induce range shifts, and we were unsure which of these were included in the models presented. Specifically, we discussed some key mechanisms that can affect species distributions but could not ascertain if they

were included in the model (e.g., depth-shifting prey bases, Oxygen Minimum Zone distribution). Furthermore, we note the unique nature of the California Current and its multifaceted response to a changing climate and ocean variability, which, while highlighted nicely in the discussion of Pacific Decadal Oscillation (PDO) and El Niño-Southern Oscillation (ENSO) events, also strikes a sharp contrast between the upwelling-driven system of the California Current compared to other U.S. regions. Related to these observations, we found the result that "96% of groundfish species will experience shifts of a portion of their biomass into unfishable waters exceeding 700 fathoms" difficult to believe given that many groundfishes do not have observed depth ranges that extend nearly this deep.

- In our discussion of the metrics presented in Appendix E, we noted that while we appreciated the inclusion of the new multi-species synthesis, we also would have liked to see projected shifts in species-specific stock biomass throughout its range to provide a more holistic overview of climate-related shifts in future stock availability.

- We appreciated the inclusion of additional data streams, a long-time request of the ESR. In particular, the diver surveys were important for understanding fish stocks of young-of-year rockfish, highlighting the importance of an expanding data product. We look forward to the expansion of this metric to include additional diver surveys such as Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO).

- In addition to the HMS diet data, we are concerned that the other areas highlighted in Table W.2 are at risk and may not be included in future ESRs, such as:

    - The CUTI and BEUTI indices, which have been touted for their importance in understanding the nutrients in upwelled waters in the past few years, are considered foundational to the base of the food web. While the included upwelling metric provides insight into water movement, it lacks the biological relevance that BEUTI represents.
    - The Theil index which is used to assess the geographic concentration of fishing revenues and is a key indicator for tracking how the Council is achieving National Standard 8. This would be a loss considering it highlights patterns of spatially-explicit revenue sources that may be sensitive to oceanographic shifts and fisheries management changes.
    - Sea lion pup weight/growth/diet data, particularly as this may be among the most important times to monitor these populations. We understand that the HPAI H5N1 strain of the Avian Flu pandemic has led to widespread loss of pinniped and bird species in parts of the globe, resulting in the loss of 97% of Argentinian Elephant Seal pups. This strain of Avian Flu reached California in February 2026.

Recommendations for Future ESRs:

- We continue to appreciate the inclusion of socio-economic metrics relevant to fishing communities as part of the ESR report. In particular, we note that the reference to increased fisheries revenue overall can be primarily attributed to certain large-scale fisheries (e.g., hake and squid), but that many of the smaller boat fisheries have seen reductions in income, which may be overlooked or missed by inclusion of these larger volume fisheries in the metrics. We encourage examination of fisheries production and revenue both with and without these larger fisheries to better understand the effects on smaller fisheries. This includes splitting total revenue figures into volumes and ex-vessel value to understand the underlying economic drivers of revenue, i.e., did the fishery catch more/less resources or realize higher/lower market value.

- We have concerns about shifting demographics of fishing communities, including barriers to entry, retention of new fishing participants, changes in fishing business and/or fishery capitalization, age of fishery participants, and the size of boats and we encourage the ESR to seek metrics that can track these shifts. In particular, we are concerned about the extent to which fisheries and ports are consolidated, as smaller fishing boats represent important members in coastal communities in different ways than larger boats. Quantifying fleet thinning or shifting can provide a link between the ecosystem and the current and future health and resilience of fishing businesses, fisheries, and fishing communities. Along the same lines, given the limitations of the Community Social Vulnerability Index (Appendix Q), and its inability to be tracked temporally, we encourage identifying other metrics that can be tracked over time to assess important socio-economic trends. We are curious to know if there are other data sources, like the ones suggested above that could be incorporated to provide that valuable insight.

- Greater collaboration with the fishing community to integrate on-the-water observations is an area of potential growth for the ESR. We would like to reiterate our suggestions in our supplemental reports on the ESR from 2024 and 2025 to find more pathways to integrate on-the-water observations by the fishing fleet. For example, the fishing fleet can collect bottom water temperature which could augment the CalCOFI, Glider, and other survey lines. Other fishery management councils, such as the Mid-Atlantic Fishery Management Council, have begun incorporating observations from fishermen using simple reporting tools. The loss of ecosystem science capacity at NMFS and resulting decreased ability to monitor ecosystem indicators highlights the urgent need to collaborate with the fishing community to collect on-the-water observations. The EAS discussed a few potential types of observations, such as salmon flesh color (indicative of salmon prey) and temperature loggers deployed on crab pots.

- The CCIEA Team produced brief two-page reports this past Fall to complement the comprehensive nature of the ESR and provide ecosystem information in near-real-time, and we commend them for this. We also see these out-of-cycle reports as an opportunity to leverage on-the-water observations from some segments of the fishing fleet, allowing inclusion of near real-time information.

- Within the ESR, fisheries production was placed in the context of Ecosystem Services provided by the marine environment (Section 5.1). This treatment focused on the provisioning service of fisheries; however, an expanded use of an ecosystem services framework may be a tool to link the many components of the ESR that span human use to ocean dynamics and fisheries production. Especially in the context of multiple ocean uses, this framework may better connect the many important topics included in the ESR.

- We also suggest that the Council consider a retrospective cumulative analysis of the ecosystem changes across all the ESR reports, now that we have more than a decade of ESRs in hand. This could help inform how the ecosystem has changed over the past decade and how these changes compare to prior years and historical periods. In turn, this can help us better understand the overall health of the ecosystem and guide analyses for future ESRs.

The ESR represents a significant advancement even considering the loss of key staff; however, the ecosystem-based management that this report has been moving towards requires continued investment. The California Current is unique in its response to changing ocean conditions and is also fundamental to fisheries that are critical to our coastal communities. We encourage re-investing in the visionary scientists that have contributed to the Council's essential understanding of the links between ecosystem health and sustainable and productive fisheries.

PFMC
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