

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

Dr. Mary Hunsicker and Dr. Amanda Phillips of the Northwest Fisheries Science Center (NWFSC) and Dr. Andrew Leising of the Southwest Fisheries Science Center (SWFSC) presented the California Current Ecosystem Status Report (ESR) in a public online webinar on February 25, 2026, and joined the Ecosystem Workgroup (EWG) discussion on this topic on March 4, 2026. The EWG commends the California Current Integrated Ecosystem Assessment (CCIEA) team for producing another excellent report. The report continues to improve each year with input from Pacific Fishery Management Council (Council) advisory bodies, the public, and the dedicated efforts of the ESR authors and the many contributors (see ESR Appendix W.1). This was particularly impressive following on the significant challenges of 2025 (see ESR Appendix W.2). Particular appreciation is extended to the CCIEA team for the effort that went into developing automation tools that allowed the team to produce this year's timely ESR despite the six-week Federal furlough in Fall 2025.

Diet data is a critical source of information on species abundance and interactions. The Council has long recognized the importance of understanding the forage dynamics within the California Current Ecosystem (CCE) and has taken precautionary steps over the years to help ensure a strong forage base. The highly migratory species (HMS) diet program was a hallmark example of collaborative research with industry, where HMS fishermen collected and submitted stomachs to scientists in the Trophic Ecology Program at the SWFSC. Unfortunately, capacity and funding for the systematic collection and analysis of CCE diet data (including but not limited to HMS diets and California sea lion scat) has diminished (Table W.2 of the ESR), despite its particular utility in understanding our highly variable ecosystem and its productive fisheries. The EWG highlights this issue to ensure Council awareness of potential future impacts. The EWG notes the value of diet data and could see additional value with bringing back the aforementioned data and expanding diet data collection in the future.

The EWG recommends that the Council:

- Support all of the SSC review topics detailed in Agenda Item E.1.a Supplemental CCIEA Report 2, with the EWG's suggested priority order for the three topics listed being:
 - a. Topic 2: Review of the Pacific Decadal Oscillation (PDO) index and its utility as an ecosystem indicator;
 - b. Topic 3: Revisiting indicators to support management of groundfish stocks. Note: given the harvest setting cycle this topic should be conducted during an even numbered year;
 - c. Topic 1: Review of changes to fishery diversification indices.
- Support the CCIEA team in providing mini-ESRs as informational reports at times that align with appropriate Council agenda items; for example, see this report's Appendix, a mini-ESR which the Science Centers presented at the EWG's September 2025 meeting.
- Refer to the ESR in future Council agenda items related to the Special Projects, as it can serve as a valuable source of synergistic information.

The EWG provides the following feedback to the CCIEA team for consideration for future ESRs:

- The EWG would like to thank the CCIEA team for the two-page updates (mini-ESRs) that happened off-cycle (see the Appendix of this report) and felt it was extremely valuable both for providing context for the broader report, and in providing ecosystem information aligned with the Council process in a timely and useful manner.
- The combined effect of pan-basin warming patterns (PBP) and PDO should be explored in terms of effects on salmon stoplight tables, as part of the review by the SSC Ecosystem-Based Management Subcommittee (SSC-ES). If the physical understanding cannot be improved, the PDO should be revisited as part of the salmon stoplight table. The ecosystem interpretation of a low PDO in the CCE is different now versus when the table was first created. For example, anomalously low ocean temperature was traditionally associated with negative PDO values, but over approximately the past decade, record high temperatures have remained even when the PDO was negative. Similarly, the oceanic niño index (ONI) manifestation is now unusual as there can be warm water in the CCE during a La Niña, but this dynamic is much more extreme with the PDO. While recognizing the limitations in funding and personnel time, NOAA physical oceanography scientists will need to work with the CCIEA team using the PDO for management on exploring new ecosystem indicators for use in fisheries assessments before SSC review in September (Topic 2).
- The EWG appreciated the forecasts of potential future species distributions in the CCE presented in Appendix E. However, Appendix E does not provide clear explanations of uncertainty provided in the original publications on which the Species Distribution Models (SDMs) are based. Such context is important for the Council as it considers the potential strategic value of projected species distributions. As is the case with the scenario planning exercise that the Council conducted as part of the Climate and Communities Initiative, the CCIEA team should emphasize that projections of future states are intended to help identify potential scientific, management, and business barriers, rather than predict specific outcomes, and should clearly include caveats about uncertainty as well as opportunities to learn from projections that prove incorrect. As part of this exercise, the CCIEA team could provide hindcast SDMs and skill evaluations of retrospective forecasts/projections.

PFMC
03/04/26

Appendix: *Quarterly ESR Infographic (March – September 2025)*

March-September 2025

CCIEA Ecosystem Survey Highlights

Washington - Oregon



Abundant gelatinous and crustacean-rich plankton, krill, juvenile sardine, juvenile rockfish, whitebait smelt, and adult herring¹



Coho and chum salmon are above average, in good condition. Average juvenile chinook abundance²



Promising signs of seabird productivity at Yaquina Head and Depoe Bay³



Greatest area of near bottom low dissolved oxygen on shelf in 19 year time series²



Shellfish closures due to high levels of domoic acid and paralytic shellfish toxins (Aug).



Drought emergencies due to low snowpack (Apr/May)



Below-normal streamflow forecasts & long-term drought impacts

North - Central California



Early upwelling elevated coastal nutrients and HAB events throughout CA; Spring shellfish advisories from Santa Barbara to San Diego (Mar/Apr)



Above average to average abundance of krill^{4,5}



Above average catches of juvenile rockfish, and anchovy, but anchovy catches lower than recent high years. Highest ever catches of pyrosomes in this region.⁴



High temperatures & record-breaking snowpack melt-out (May/Jun)

Snowpack mostly absent by June, below-normal summer streamflow



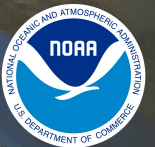
Southern California Bight



Intense series of HAB events, with toxins affecting CA sea lions and other pinnipeds, dolphins, sea birds, larger cetaceans (March/April)



High abundance of pyrosomes, very few rockfish and modest numbers of northern anchovy relative to recent years



NOAA
FISHERIES

Learn more at: <https://www.integratedecosystemassessment.noaa.gov/regions/california-current>

Map from USGS

March-September 2025

CCIEA Ecosystem Indicators

Most oceanographic indicators for late spring and summer 2025 indicate generally favorable conditions within the California Current System.



ENSO remains neutral (neither El Niño or La Niña) with a negative PDO (cooler coast).



Upwelling and nutrient transport was above average during summer, leading to cool coastal waters, and likely above-average productivity.

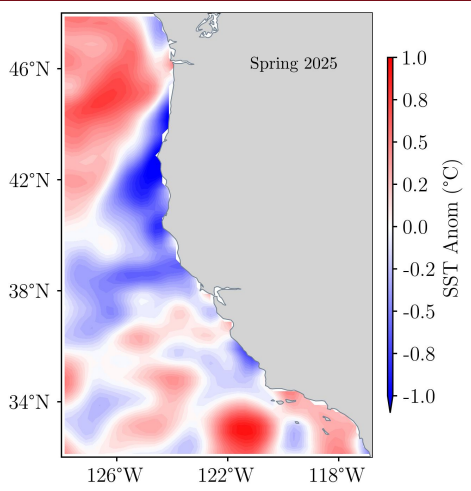
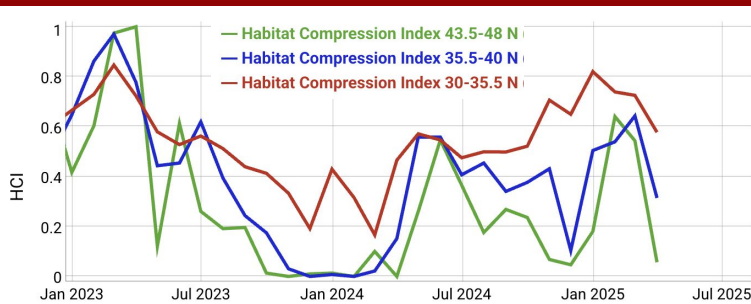


The development of a large offshore marine heatwave (MHW) led to some habitat compression during the later summer.



A fairly widespread HAB event was some cause for concern earlier in the season.

As the MHW developed offshore, the habitat became increasingly coastally compressed particularly in the north.



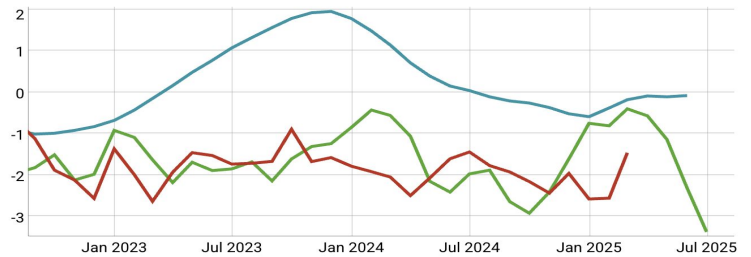
Water temperatures were colder than average along the central coast, but much warmer than average within SoCAL and offshore as a MHW developed during summer 2025.



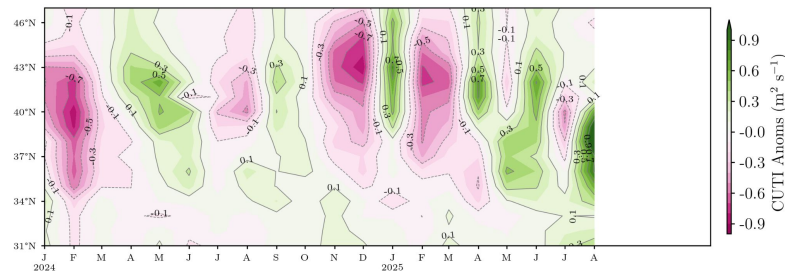
'Longest, most toxic, and deadliest' algae bloom may finally be at an end' LA-TIMES

From February -June 2025, a large HAB occurred off the coast of southern CA, leading to deaths of hundreds of marine mammals. This event was likely tied to anomalous oceanic conditions during that time; specifically, late winter bursts of upwelling followed by intermittent warming.

— Pacific Decadal Oscillation Index (Normalized)
— Oceanic Nino Index (degree_C)
— North Pacific Gyre Oscillation Index (Normalized)



The Pacific Decadal Oscillation (PDO) is currently negative while the ONI is neutral. NPGO is also negative to neutral. Taken together, these basin-scale indices suggest average conditions during summer 2025.



CUTI (an indicator of coastal upwelling and subsequently nutrient transport) indicates that upwelling was below normal for the first part of the year, but rapidly increased to above average during spring (central and northern regions) and summer (central and southern regions, indicating positive biological conditions for productivity).

Looking Ahead: The current Center for Climate Prediction forecast suggests a moderate probability of a short La Niña this winter, with a return to ENSO neutral conditions. Marine heatwaves are forecast to persist through the winter in the far offshore regions.