

ECOSYSTEM WORKGROUP REPORT ON THE
WESTERN REGIONAL ACTION PLAN ON CLIMATE SCIENCE

At the Ecosystem Workgroup (EWG) meeting on August 26, 2022, Drs. Rich Zabel and Toby Garfield of the Northwest and Southwest Fisheries Science Centers, respectively, presented the draft updated Climate Science Western Regional Action Plan (WRAP) to the EWG and the public. We thank them for their time and recommend that the Council forward the following comments on the draft updated WRAP and associated climate science work at the fisheries science centers:

- Drs. Zabel and Garfield noted that the WRAP is a coordinating document and process for discussing climate science work across the fisheries science centers, but that there is little funding associated with the WRAP. We recommend that the agency provide the Council with detailed information on how climate and ecosystem science would change if the [Climate, Ecosystems, and Fisheries Initiative](#) (CEFI) were funded. The new initiatives proposed in the WRAP (e.g. Human Dimensions, gaps, ecosystem shifts) aligned with Fishery Ecosystem Plan goals, but it was unclear how much of this effort could be accomplished with existing funds versus new CEFI activities. We also recommend that the agency specify or prioritize the work that would get conducted if CEFI is not funded. The EWG is concerned that the Council's work to manage fish stocks and fisheries for adaptation to climate change will stall without stronger science funding and staff support.
- The EWG recommends that the 2022-2024 WRAP explicitly include the scientific work needed to support what is now characterized as potential Initiative 2.2 (Science Policy and Planning for Understanding the Effects of Oceanographic Conditions and Recruitment on Council-Managed Finfish Species) in the September 2022 draft Fishery Ecosystem Plan appendix (Agenda Item H.1.a, EWG Report 1). The work described under that initiative is ripe for scientific exploration, which could then support future fisheries policy development by the Council. Specifically, the 2022-2024 WRAP should support a workshop or series of workshops to coordinate science planning and foster collaboration on understanding the effects of near- and medium-term oceanographic conditions on juvenile survivability and recruitment of commercially- and recreationally-important finfish species to West Coast fisheries. Objectives for these workshops could include:
 - An inventory and planning process for developing new indicators of larval recruitment. The inventory of available tools to model recruitment dynamics could include, for example, such emerging tools as:
 - High resolution video monitoring
 - eDNA to resolve larval and juvenile predator and prey fields
 - Chemical biomarkers such as compound-specific stable isotope analysis
 - Regional Ocean Modeling System (ROMS) models to fuel Individual Based Modeling
 - An assessment of the feasibility of combining the inventoried tools to produce robust forecasts of year class strengths.

If developing such a multi-method framework proves feasible, further development would also integrate the effects of oceanographic variability on larval survivability and recruitment. The goal would then be to help the Council, scientists, and the public better

understand the status of managed stocks and the effects of environmental drivers on the recruitment and statuses of different stocks.

- The EWG recommends that the agency list, either in the updated WRAP or on a website specific to the task, the management strategy evaluations (MSEs) completed to date on West Coast species or fisheries, with links to papers published from that work. We are aware of MSEs on sablefish (Haltuch et al. 2019), Pacific hake (Jacobsen et al. 2021), albacore, sardine (Tommasi et al. 2017), and swordfish (Smith et al. 2021). MSEs on Pacific bluefin and anchovy are just getting started. MSE-related publications should be made available to the Council and the public in a clearly identified online location.
- Drs. Zabel and Garfield were unable to provide an update on the status of the climate vulnerability assessment (CVA) for non-salmonid West Coast finfish species. Crozier et al. (2019) provided the CVA for West Coast salmonids. While awaiting the non-salmonid CVA publication, the Council and public may be interested in the recent [Koehn et al. \(2022\) paper](#), which includes a variety of species managed by the Council and by the states and tribes, and assesses the social-ecological vulnerability of West Coast fishing communities to climate change.
- During their presentation, Drs. Zabel and Garfield characterized the California Current Integrated Ecosystem Assessment (CCIEA) as focusing on the northern California Current Ecosystem, and the WRAP as focusing on the entire ecosystem including freshwater habitats. The EWG notes that the CCIEA also covers the entire ecosystem, including freshwater habitats. We would like to see the National Oceanic & Atmospheric Administration continue to discuss integration of ecosystem efforts such as the WRAP and CCIEA.

References

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PFMC
09/08/22