

## ECOSYSTEM ADVISORY SUBPANEL REPORT ON THE CALIFORNIA CURRENT ECOSYSTEM AND INTEGRATED ECOSYSTEM ASSESSMENT (IEA) REPORT AND SCIENCE REVIEW TOPICS

The Ecosystem Advisory Subpanel (EAS) met jointly with the Ecosystem Working Group and with Dr. Toby Garfield and Dr. Chris Harvey on February 23, 2021, to hear their presentation of the 2021 California Current Integrated Ecosystem Assessment (CCIEA) California Current Ecosystem Status Report (Report). The EAS continues to appreciate the extensive work of the CCIEA team to produce the Report, the rigor of the analysis, and the clarity of presentation. We particularly note the effort to present the material in a transparent fashion allowing readers to interpret the data themselves. In addition, the team continues to be responsive to EAS requests for additional information related to evaluating community well-being despite the added challenges of COVID-19, which the EAS greatly appreciates. Each year, the team is presented with new challenges, such as the COVID-19 pandemic, and they continually overcome these obstacles to produce a superior product.

### **Report Utility and Application**

The EAS continues to see this document as instrumental to inform a variety of management practices. The EAS views management of fisheries in the California Current Ecosystem without this document as akin to driving at night without the headlights on--it is certainly possible, but the risks are vastly greater. In particular, the long-term perspective provides the opportunity to understand temporal trends, and helps place event-scale dynamics (e.g., transition in Pacific decadal oscillation phase, status of the marine heatwave, harmful algal blooms, etc.), in the context of other drivers of ecosystem and fisheries productivity in the California Current.

### **Linking the Report to the Fishery Ecosystem Plan (FEP)**

Making concrete links between indicators and the goals for the ecosystem as identified in the FEP could help inform future management actions and evaluate future progress. **The EAS recommends making explicit links between the indicators (and thresholds when available) tracked by the CCIEA team and: (1) the goals and objectives in the FEP and (2) the products produced by the Climate and Communities Initiative.**

### **Intersection with Climate and Communities Initiative**

The EAS highlighted the potential value of the Report as we move forward with the Climate and Communities Initiative. The information contained in the Report may provide insight into the impacts of different ocean conditions and how they will impact individuals and communities, allowing actions to minimize the risks such as those highlighted in the Climate and Communities Initiative. In particular, the Report could annually answer: 1) Where are we within the trajectory of climate change? 2) Who or what is at risk? 3) What can the Council do to minimize this impact this year and in the future? Specific efforts to answer these questions would increase the utility of the Report.

The Report provides comprehensive data to facilitate the success of the climate-change related planning effort and for identifying risk, managing risk, and incorporating risk mitigation measures into Fishery Management Plans. For example, insights were gained from recent salmon management and low productivity in the southern portion of the CCE that merit concern by management – ecosystem and fisheries in distress with indicators that point in a negative direction. **The EAS recommends the Council engage in discussion with the IEA team to determine how information in the Report and its datasets and analyses, and perhaps which indicators in particular, could best be used to track climate change and mitigate risk.**

### **Cumulative Impact Analysis**

The EAS discussed the need to understand the cumulative impacts of stressors and interactions among indicators. The Report highlights the increasing importance of diverse event-scale phenomena. These, in combination with chronic stressors and externalities such as COVID-19 and associated market disruption, have the potential to cause non-linear impacts on fish stocks and communities. **We encourage the IEA team to explore ways to analyze and represent such cumulative impacts with respect to the goals and objectives in the Fishery Ecosystem Plan and Fishery Management Plans.**

### **Socio-Economic Analysis**

The EAS appreciated the socio-economic indicators present in the Report. We feel this information is of great importance, and we also understand the difficulty obtaining data addressing human and community well-being. We especially appreciated the type of analysis included in Figure 6.1.1 (Agenda Item I.1, 2021 California Current Integrated Ecosystem Assessment (CCIEA) California Current Ecosystem Status Report, page 18) that combines the 2018 Social Vulnerability Index and commercial fishing reliance. This type of analysis is a first step beyond the economic metrics often used (e.g., dollars and landings), and begins to capture a more complete picture of the human dimension of the California Current Ecosystem. **The EAS recommends also exploring other indicators that reflect other aspects of human well-being (for example Breslow, et al. 2016<sup>1</sup>) and expanding this type of analysis as new metrics are developed or become available.** In particular, we would encourage socio-economic indicators that better capture all participants in the fishing sector, including tribal fishery components, vessel crew, and processing facility workers. Questions that would be valuable to address include: What is the sustainability of participation in fisheries by fishing communities? Is fishing important to them anymore? Have they lost the opportunity to fish? How can we best measure the ability for a fishing community to participate in fisheries?

The EAS notes that the length of the report limits the amount of information that can be included and that much of the socio-economic information is included in the appendices. It would be useful to highlight the subset of social vulnerability data and indicators in the report itself. **We also suggest that the website be improved to be more user friendly and that the report and website**

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<sup>1</sup> Breslow, S.J., Sojka, B., Barnea, R., Basurto, X., Carothers, C., Charnley, S., Coulthard, S., Dolšak, N., Donatuto, J., García-Quijano, C. and Hicks, C.C., 2016. Conceptualizing and operationalizing human wellbeing for ecosystem assessment and management. *Environmental Science & Policy*, 66, pp.250-259.

**be linked so the public and others are aware of analyses and data available in the appendices and on the website.**

The EAS also appreciated the addition of the Theil Index (Figure 6.3.1, Agenda Item I.1, 2021 California Current Integrated Ecosystem Assessment (CCIEA) California Current Ecosystem Status Report, page 20). This analysis was useful in understanding fishery revenue geographically. However, using descriptors on the y-axis labels (in addition to a numeric scale) might make the information more interpretable for the layperson. We also note that it was difficult to understand the maps in the report, without also exploring the associated analysis included in Appendix O. Understanding that this analysis is new and a work in progress, we support further clarification.

### **Additional Glider Data Off Washington and Oregon**

The EAS applauds the inclusion of new data streams, including the novel inclusion of glider data. **We support continued use of such data, including data streams coming from the Ocean Observatories Initiative glider data**, which would expand these data sets off Oregon and Washington and to deeper water depths that may be increasingly informative moving forward. The value of these data was especially critical in the time of COVID-19 with reduced shipboard observations.

### **Research and Data Needs**

Lastly, the EAS sees value in the inclusion of terrestrial indicators (e.g., snowpack), as they provide a full system-wide view for salmon. These provide the opportunity to pull out “summit to sea” stories that would be useful and compelling for the public. We note there are interesting new findings of wildfire impacts on ocean conditions, most notably detectable effects of wildfire on ocean productivity and ocean chemistry. There are no existing indicators in the Report that would link directly or can show impacts from wildfires. **The EAS suggests that terrestrial indicators are an appropriate issue to add to the “Research and Data Needs” document.**

In summary, we reiterate that this is an exemplary and continually improving document; we appreciate the impressive effort that the CCIEA team has put into the 2021 report.

PFMC  
03/08/21