

ECOSYSTEM WORKGROUP SUPPLEMENTAL REPORT ON IMPLEMENTING FISHERY
ECOSYSTEM PLAN INITIATIVE 2: COORDINATED ECOSYSTEM INDICATOR REVIEW
FOR THE ANNUAL CALIFORNIA CURRENT ECOSYSTEM STATUS REPORT

The first Ecosystem Workgroup (EWG) report for this September 2016 Agenda Item D.1 asked some framing questions to help the Council and its advisory bodies provide guidance on finishing this second Fishery Ecosystem Plan initiative. In March 2016, the EWG provided specific comments on the indicators and analyses of the March 2016 California Current Ecosystem Status Report in our Agenda Item D.1.b supplemental report for that meeting. The EWG is particularly grateful to the National Marine Fisheries Service (NMFS) Northwest and Southwest Fisheries Science Centers for the ongoing Center leadership support and for the participation of their ecosystem scientists in the Council process. We particularly appreciate the Center's providing the annual ecosystem status reports and supporting this initiative through the January-February 2016 webinars.

In this report, we recommend a process to develop amendments to future ecosystem status reports by annually identifying focal topics for ecosystem science work. We also make suggestions for near- and longer-term improvements to the annual ecosystem status report and suggestions for ecosystem science outside of the reporting process. Throughout the processes to develop the Fishery Ecosystem Plan (FEP) and the annual ecosystem status report, communication among advisory bodies, the public, and the Council has been key to the success of these endeavors. Ensuring that meaningful communication occurs is challenging; however, it is essential to successful implementation of ecosystem-based fishery management.

Council Process for Incorporating Focal Areas into Future Ecosystem Status Reports

Although this September 2016 meeting finalizes this initiative, the EWG believes that the Council, its advisory bodies, and the public should discuss and evaluate the annual ecosystem status report contents on an ongoing basis. The annual ecosystem status report process is an opportunity for scientists, managers, and the public to discuss ecosystem-based management and its supporting science. Given the breadth of the annual ecosystem status report and available information, we anticipate that the Centers will not be able to address all suggestions for all indicators and analyses in any one year. Therefore, we recommend that the Council provide annual suggestions to the Centers on which portions of, and topics within, the report should be improved in the coming year. In our March 2016 D.2.a. supplemental report, we characterized these areas for improving or expanding the report as "focal topics" for that year's work.

At future March meetings, the ecosystem status report agenda item would include both the delivery of the current year's report and Council reflections on needs for future years' reports. In March 2017, the Council will hear the next annual ecosystem status report and could also provide guidance for focal topics for the 2018 status report. We see focal topics as addressing two major areas of Council decision-making needs, specific to fishery management plans (FMPs) or cross-FMP work, and preparation for FEP initiatives or other major Council decision points. First, we would like to see the Centers work with the management teams and advisory panels for each of the four FMPs to improve indicators for those FMPs over time. For example, the Council could ask the Centers to improve the salmon indicators for the 2018 report, working with the Council's

salmon-focused advisory bodies, and then work on another FMP group in the following year. Or, the Council could ask for an analysis of the cumulative bycatch of FMP species in fisheries managed under other FMPs. We suggest that the Council and Centers begin with either salmon or coastal pelagic species because those species groups have faster response times to environmental change. The EWG notes that we have heard from Center scientists that the Centers anticipate developing a publicly-accessible website to provide real-time results from their Integrated Ecosystem Assessment (IEA) work. If the Council works through each of the FMPs as focal areas, that will help the Centers fine-tune FMP-specific ecosystem science queries for their website. Second, focal topics could be used to prepare the Council for upcoming FEP initiatives, or could be incorporated into major Council decision-making processes. For example, if the Council were interested in undertaking the FEP initiative on the effects of fisheries management on fishing communities, it might ask the Centers to expand the socio-economic section of the annual ecosystem status report in the year prior to beginning that initiative. Or, if the Council were interested in IEA analyses related to the five-year catch share and intersector allocation review, that review could be a focal topic for IEA work. In March 2016, we provided a list of upcoming major Council decision points that we thought might inform a focal area for ecosystem science work. In March 2017 and subsequent years, we would expect to review potential focal areas and provide advice to the Council and its advisory bodies on which focal areas might be ripe for consideration for the oncoming year. To that end, the EWG notes that we continue to be an ad hoc committee, and that the Council might wish to consider whether we could better support the Council process as a standing committee.

Related to the Council's ecosystem issues process, we note that in providing direction on this initiative, the Council asked for a Management Strategy Evaluation (MSE) on the effects of climate on sablefish recruitment and coastwide sablefish stock status. We understand that the Centers initially reported on this work to the Scientific and Statistical Committee's Ecosystem Subcommittee at this meeting and plan future reports of the more-finished products to the Council and its advisory bodies early next year. The Centers' draft Western Regional Action Plan to implement the NMFS National Climate Science Strategy indicates that the Centers are working on climate-related MSEs for sablefish, Pacific whiting, and albacore. Going forward, we recommend that the Council work with the Centers to identify candidate MSE species or species complexes in a more systematic fashion. MSE candidate species could be discussed and identified at March or September Council meetings, where the Council tends to discuss ecosystem agenda items.

Questions and Suggestions for Future Ecosystem Status Reports and Analyses

We refer the Science Centers back to all of the advisory body reports from that March 2016 agenda item, including ours, for specific requests and directions on ecosystem status report contents. We also appreciate the reports submitted for this meeting by the Highly Migratory Species Management Team and the Salmon Advisory Subpanel, and look forward to seeing September 2016 comments from other Council advisory bodies and the public.

For this meeting, we discussed the overall structure of the ecosystem status report so that we could provide broad recommendations on future report directions and specific recommendations on the future annual ecosystem reporting process. The EWG supports continuing the foundational three-part structure of the report, which provides information on the physical environment (climate and oceanographic indicators,) the biological environment (focal components of ecological integrity,) and the socio-economic environment (human dimensions and human well-being). We note that this structure is useful to the Council's ongoing efforts to support the goals and objectives of the

FEP and FMPs, and to meeting the analytical requirements of the National Environmental Policy Act and other applicable laws.

The EWG has a suite of broad questions for IEA scientists and the Council for consideration in future reports. Not all of our questions will be answerable with new or different indicators in the annual ecosystem status report. Some of our questions may need to be addressed through longer-term analyses and more detailed modeling exercises, and may support future FEP initiatives. Bearing in mind the Council's analytical needs under the laws that guide its actions, we suggest that the Centers consider the following issues:

Physical Environment:

- In the 2016 presentation of the ecosystem status report, the Centers noted that some effects of upwelling can be positive for California Current Ecosystem species, while other effects may be negative. We suggest that the Centers add more specific information to the annual report on the potential effects of upwelling on the biological environment.
- The 2016 report discussed the potential effects of the Warm Blob on the ecosystem. What are some useful physical environment metrics that will help us better assess the effects of major oceanographic phenomena and weather events on fisheries? This question might be better addressed in the socio-economic section of the report. For example, if the Centers examine extreme weather frequency and severity in the physical environment section, the socio-economic section of the report might look at the effects of extreme weather events on fisheries safety and coastal communities' economies.
- We appreciated the addition of the snowpack equivalent indicator in 2016. Do the Centers and the salmon advisory bodies see snowpack as an ongoing useful physical environment indicator? Are there other physical indicators that might be useful to freshwater questions in support of salmon management, such as river flow, river temperature, or air temperature? The Salmon Advisory Subpanel and Salmon Technical Team will likely have more insightful suggestions on this topic.

Biological Environment:

- For the different regions within the California Current Ecosystem, what are the trends in forage over time? We appreciate the report's discussion of regional forage availability, although we preferred the 2015 report's breakdown of forage by species over the 2016 report's distinction between "high energy" and "medium energy" taxa. Recognizing that other readers may prefer the energy distinctions, would it be possible to include both breakdowns in future reports? Are there links that could be made between forage species' availability and the abundance of higher trophic order species within particular geographic areas?
- We are interested in seeing some highly migratory species (HMS) information in the ecosystem status report. Since HMS harvest levels are set internationally, we suggest that HMS information in the ecosystem status report look beyond biomass, possibly at species' distribution in space and over time. The Centers might also consider information looking at predator-prey links between HMS and their preferred California Current Ecosystem prey, and/or information on their co-occurrence with protected species. We are also interested in the effects of temperature shifts on HMS habitat. The HMS Advisory Subpanel and HMS Management Team will likely have more insightful suggestions on this topic.

- Is it possible to estimate total biomass removals by fisheries over time? We are also curious about whether we could see estimates of total bycatch over time for all of our fisheries cumulatively and broken out by FMP.
- Also for longer-term analysis, we are interested in the effects of shifting levels of phytoplankton blooms, domoic acid, and paralytic shellfish poisoning on fisheries – are these phenomena affecting fisheries participation? Are they identifiable at a localized scale?

Socio-Economic Environment:

- As we discussed in March 2016, recreational fisheries information should be a near-term priority for inclusion in the annual ecosystem status report. Recreational fisheries information is critical for Council decision-making. What are portfolios of recreational fishing opportunities in different sections of the coast? For example, the Council may be interested in income diversity within the charterboat fleet, broken out by geographic area. The Council’s Advisory Panels will likely have more insightful suggestions on this topic.
- Is there available information about employment in the commercial and recreational fisheries? How many jobs are supported by West Coast fisheries? Are those job seasonal or year-round? Are those vessel jobs versus shoreside jobs?
- We appreciate the March 2016 report’s information on community vulnerability and dependence on fisheries. That information could be supplemented with additional indicators or analysis on efficiency, profitability, and employment in FMP fisheries. We are also curious about longer-term fishing community stability, both in the past (How does distribution of target species catch by port change over time?) and, potentially, in the future (Are there shifts in species distribution in response to climate change and potential effects on coastal communities?). If there are coastal communities that we expect will be vulnerable to the physical effects of climate change (flooding, sea level rise) are those same communities vulnerable to shifts in available fisheries harvest levels?
- Could the ecosystem status report include more explicit metrics on the effects of fishing activities on essential fish habitat, or conversely, the effects of essential fish habitat on fish stocks and fisheries? Are we aware of any habitats that are essential to the long-term health of our stocks, and which are also vulnerable to degradation from non-fishing activities? These questions cross between the physical, biological, and socio-economic environments and we defer to the Centers on where best to locate this information in the ecosystem status report.

PFMC
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