



February 26, 2018

Mr. Phil Anderson, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, #101
Portland, OR 97220

RE: Agenda Item F.2: Fishery Ecosystem Plan Climate and Communities Initiative Update

Dear Chair Anderson and Council Members:

Ocean Conservancy, The Nature Conservancy (TNC), The Pew Charitable Trusts, Natural Resources Defense Council, Wild Oceans, and Oceana thank the Pacific Fishery Management Council (Council) for its continued work to implement ecosystem-based fisheries management (EBFM) and the Council's Fishery Ecosystem Plan (FEP). A changing ocean environment has and will lead to unpredictable impacts on our valuable fisheries and the ecosystem upon which they depend. Consequences for coastal communities have already been felt as a result of natural variability in the California Current, and increasing variability due to climate change will likely exacerbate existing pressures and add to uncertainty. As the Council moves forward with its Climate and Communities Initiative we recommend the following:

1. **Adopt the initiative goal statement proposed by the Ecosystem Workgroup (EWG) in their Workgroup Report 1 (Agenda Item F.2.a) with modifications to clarify that the initiative goal is not only to consider climate-related impacts but also actions to address these impacts.**
2. **Voice support for the TNC-sponsored climate workshop, scheduled for May 15-16, 2018.**
3. **Consider the recommendations made previously by our organizations, which include:**
 - a. **Conduct Management Strategy Evaluations (MSEs) for key climate-vulnerable species to identify robust harvest control rules (HCRs) and/or management actions**
 - b. **Implement procedural and operational best practices**
 - c. **Develop climate-ready indicators**
 - d. **Explore options to directly prepare fishing communities**

Background

Recent unprecedented oceanographic events and their consequences on fishing-dependent communities have highlighted both the variability inherent in the California Current Large Marine Ecosystem (CCLME) and the impacts that a changing ocean can have on people.^{1,2} The “warm blob” (North Pacific marine heat wave), El Niño conditions, and domoic acid events have all impacted West Coast fisheries and coastal communities in recent years.³ We witnessed unusual mortality events for sea lions,⁴ bird die-offs,⁵ and general low ecosystem productivity.⁶ The FEP catalogs some of the existing threats related to climate on target species and communities, and the widespread implications of climate change on fish and fisheries in the California Current is widely documented by multiple scientific and policy sources.^{7,8,9} Two of the Council-sponsored climate webinar series¹⁰ have been completed to date; these additionally highlight recent climate-related events and the need to evolve fisheries management to ensure resilient fisheries.

Environmental variability and climate change affect multiple, interrelated parts of the ecosystem. Many of the direct impacts of climate change, such as sea-level rise or an increasing number of storms, are driven by global forces. Approaching the question of “how to prepare west coast fisheries for climate change” requires starting from the standpoint of what is possible. While most tools to combat global climate change are beyond the control of fishery managers, the Council can employ other management tools and scientific information to increase readiness and improve outcomes in the face of change. Achieving optimum yield while ensuring a productive and healthy ecosystem, stable fleets and thriving communities, despite climate change, is only possible with careful planning.

With a better understanding of current variability and better ability to adapt to changing conditions in the future, we can promote a more stable fleet, long term stability for our fishing communities, and meet ecosystem protection goals. As the last four years have shown, conditions will change, often in surprising ways, and likely pose challenges for managers. Preparing now will help the Council meet those challenges, elevate awareness among stakeholders, and limit adverse consequences on people and the environment.

¹ NMFS Climate Science Strategy Western Region Action Plan, Appendix B. *The 2012-2015 “climate change stress test” for the West Coast*. Pg. 63.

² Daniel Mintz, The Humboldt Independent. *Crab Disaster Could Reflect Long-Term Trend*. August 16, 2016.

³ NOAA Fisheries. News and Features. *Commerce Secretary Pritzker declares fisheries disasters for nine West Coast species*. January 19, 2017. <http://www.noaa.gov/news/commerce-secretary-pritzker-declares-fisheries-disasters-for-nine-west-coast-species>.

⁴ 2013–2016 California Sea Lion Unusual Mortality Event in California (NOAA, 2016); <http://www.nmfs.noaa.gov/pr/health/mmume/californiasealions2013.htm>

⁵ Opar, A. Lost at sea: starving birds in a warming world. Audubon Magazine (2015); <https://www.audubon.org/magazine/march-april-2015/lost-seastarving-birds-warming-world>

⁶ Whitney, F. A. Anomalous winter winds decrease 2014 transition zone productivity in the NE Pacific. *Geophys. Res. Lett.* 42, 428–431 (2015).

⁷ NMFS Climate Science Strategy Western Region Action Plan. Expected Impacts of Climate Change in the CCLME. Pg. 17.

⁸ Sydeman, W.J., and S.A. Thompson. Potential impacts of climate change on California’s fish and fisheries. Farallon Institute. 2013.

⁹ California Ocean Science Trust. *Readying California Fisheries for Climate Change*. June 2017.

¹⁰ Webinar Series on Ecosystem Climate and Communities to be held in January-February 2018. ; <https://www.pcouncil.org/2018/01/51541/51541/>

Recommendations

- 1. Adopt the initiative goal statement proposed by the EWG in their Workgroup Report 1 with modifications to clarify that the initiative goal is not only to consider climate-related impacts but also actions to address these impacts.**

The EWG report 1 proposes a goal statement for the Climate and Communities Initiative, as well as three objectives:

Proposed goal statement:

The goal of a cross-FMP Climate and Communities Initiative is to consider strategies for improving the flexibility and responsiveness of our management actions to near-term climate shift and long-term climate change, and strategies for increasing the resiliency of our managed stocks and fisheries to those changes. This approach should better support West Coast fishing communities that depend on marine fishery resources.

Proposed objectives:

- 1. To build a collective understanding of what the best available climate science forecasts for change in the California Current Ecosystem over the near- and long-term*
- 2. For the Council to assess:*
 - a. How West Coast fisheries management systems may interact with each other to affect fisheries operations in different coastal communities;*
 - b. How Council decisions may be affected by climate science forecasts;*
 - c. How the results of Council decisions may (or may not) have unintended consequences as our climate shifts and changes; and,*
 - d. How Council decision-making might be modified to better account for the greater variability and uncertainty associated with near-term climate shift and long-term climate change.*
- 3. To use information to better characterize uncertainty and manage risk in its future decision-making, and to improve flexibility and responsiveness of management action to near-term climate shift and long-term climate change.*

We support the proposed goals and objectives with minor improvements. The goal statement includes as its action “to consider.” While consideration and information-gathering are appropriate and sizeable components of this initiative, we encourage the Council to give thought to a goal that is action-oriented. We recommend changing “consider” to “implement,” but also support any wording the Council may propose that focuses on development of tangible outcomes. The Council has many obligations and resource constraints, and we would like to ensure from the beginning that that this initiative benefits the Council beyond reference material. We also note that “...increasing the resiliency of our managed stocks and fisheries...” is correct, but we suggest the phrase be amended to include the broader ecosystem. The goal statement is excellent overall and reflects a thoughtful approach, and we appreciate the efforts of the EWG.

We support the proposed objectives and want to highlight objective 3 around using information to improve management. At its core, this is what a Climate and Communities initiative should be about – bringing information about the relationship between the ecosystem and fisheries, specifically climate, into the management process, thus increasing resiliency of stocks, communities, and the associated ecosystem.

Beyond the proposed goal and objectives in the EWG report, we also appreciate Section 3 of the report that provides a framework for why and where ecosystem and climate-related information could be incorporated into the Council management process.

2. Voice support for the TNC-sponsored climate workshop, scheduled for May 15-16, 2018.

TNC secured funding for a workshop that will be structured to meet the needs of the Council in moving forward with the Climate and Communities initiative. A two-day workshop will be held on May 15 and 16 in Portland, Oregon, with the goal of providing a venue to address components of the initiative.

We strongly encourage Council member and stakeholder participation in this workshop. Stakeholder input is critical to successful implementation of EBFM, as societal needs and values are a foundational part of defining what management should achieve.^{11, 12}

3. Consider the recommendations made previously by our organizations, which include:

- a. Conduct Management Strategy Evaluations (MSEs) for key climate-vulnerable species to identify robust harvest control rules (HCRs) and/or management actions;**
- b. Implement procedural and operational best practices;**
- c. Develop climate-ready indicators; and**
- d. Explore options to directly prepare fishing communities.**

Based on knowledge gained in the previous FEP initiative around ecosystem indicators, national and regional policies, and global best practices, we suggest several actions that the Council can explore through the Climate and Communities Initiative. We also recommend structural, operational and procedural improvements that will help the Council prepare for coming decades.

- a. Conduct Management Strategy Evaluations (MSEs) for key climate-vulnerable species to identify robust harvest control rules (HCRs) and/or management actions

The National Marine Fisheries Service (NMFS) recently finished a climate vulnerability assessment (CVA) to identify economically important West Coast stocks that are most vulnerable to climate change. Based on a methodology developed and first used in New England and supported for use by the NOAA Fisheries Climate Science Strategy Western Regional Action Plan (WRAP),^{13, 14} the results can inform managers on what species should receive attention first. We support the EWG concept that the Council use the results of this investigation and conduct MSEs to identify fishery management approaches that are robust to the long-term effects of climate change.¹⁵ These management approaches can be implemented via updated HCRs and FMP amendments, as appropriate. MSE is the evaluation of different management options using simulation. It is largely considered a powerful method to examine trade-offs, and identify plausible management option/s when evaluated against the goals and objectives

¹¹ Levin PS, Fogarty MJ, Murawski SA, Fluharty D (2009) Integrated ecosystem assessments: Developing the scientific basis for ecosystem-based management of the ocean. *PLoS Biol* 7(1).

¹² Lenfest Fishery Ecosystem Task Force. *Building Effective Fishery Ecosystem Plans*. November 2016.

¹³ National Marine Fisheries Service, Office of Science and Technology. Assessing the Vulnerability of Fish and Invertebrate Species in a Changing Climate. <https://www.st.nmfs.noaa.gov/ecosystems/climate/activities/assessing-vulnerability-of-fish-stocks>.

¹⁴ NMFS Climate Science Strategy Western Region Action Plan, pg. 41.

¹⁵ PFMC, Ad-hoc Ecosystem Workgroup Report, March 2017, Agenda item F.3.a

for a given fishery or ecosystem.¹⁶ MSEs vary widely in scope, focus, and cost; some require extensive large-scale modeling such as Atlantis, while others require simpler simulations using smaller and simpler models. We recommend (1) that the Council develop a process for prioritizing and executing MSEs, informed by the NMFS stock assessment prioritization process, and (2) that based on results of the CVA, the Council select priority stocks with which to begin.

b. Implement procedural and operational best practices

i. *Implement Existing Best Practices for Climate-Ready Stock Assessments*

The FEP chapter on bringing Cross-FMP and Ecosystem Science into the Council Process states that “...stock assessment and other harvest-level support science are the largest category of science products directly used in the Council process.” Recognizing the importance and centrality of stock assessment to the management process, we recommend three steps to strengthen the use of climate-related information within stock assessments:

1. Task the Scientific and Statistical Committee (SSC) with developing guidelines for how and when climate-related ecosystem information can be included in stock assessments.¹⁷
2. Develop terms of reference for Stock Assessment and Review (STAR) panels and other analogous technical teams that include a review of climate and other ecosystem considerations as recommended by the EBFM Road Map.
3. Request that NMFS include ecosystem scientists and/or climate scientists on NMFS Stock Assessment Teams (STATs), STAR panels, and Council management teams (i.e., GMT, STT, HMSMT, CPSMT, and HC) where possible.

ii. *Implement FMP-specific ecosystem reporting to help focus scientific efforts and investments on practical management solutions.*

We recommend developing and incorporating FMP-specific ecosystem reporting. These reports could cover indicators and ecosystem trends including information about the effects of climate change, but should directly relate to each FMP and be delivered to each advisory body, management team, and the Council at the appropriate time in each FMP’s management cycle. As an example, a groundfish ecosystem report could be developed by the CCIEA program and reflect indicators and trends that most impact and are impacted by groundfish stocks and the fishery in the previous two years. The CCIEA program would then deliver and present the contents of the report to the Groundfish Advisory Panel, Groundfish Management Team, and Council at the meeting when it would be most relevant in the groundfish management cycle. Such reports would not be intended as replacements for the Annual Ecosystem Report, which provides a broad cross-FMP and cross sector overview, but would pull mainly from the same indicator database and would allow for a tailored and direct information flow.

iii. *Make the EWG a permanent standing management team*

We recommend evolving the EWG from an ad-hoc committee to a permanent and standing management team. To best achieve the benefits associated with EBFM and employ the FEP, a management team dedicated to advising the Council is essential. As with other management teams, a

¹⁶ Punt, André E., et al. *Management strategy evaluation: best practices*. Fish and Fisheries 17.2 (2016): 303-334.

¹⁷ PFM, Supplemental SSC Report Agenda item H.1.c, September 2010. The SSC recommended that the SSC ecosystem subcommittee develop guidelines for how ecosystem considerations can be included in stock assessments.

standing Ecosystem Management Team (EMT) would include representation from the states, tribes, NOAA fisheries West Coast Region, and the NOAA Fisheries Science Centers. We recommend a distribution of membership similar to other management teams with one representative from each state, one tribal representative, and two members from NOAA Fisheries West Coast Region. The EWG already follows this structure; however, to improve the ability of the group to advise the Council we recommend adding two members from the West Coast Fishery Science Centers, including an ecosystem expert, as well as a seat for the United States Fish and Wildlife Service. We additionally recommend adding two rotating seats to be filled by appropriate issue experts, at least one with technical knowledge, throughout the duration of a given FEP initiative.

c. Use Climate-Ready Indicators with reference points

i. *Single-species indicators*

We already use indicators and thresholds in single-species management. For example, spawning biomass is often used as an indicator of stock size and tied to the Council objective of healthy target stocks. Utilizing biomass indicator data, reference points are determined based on knowledge of a given species' life history, and then used to guide management action. Using a similar process, where known relationships exist between changes in climate and a species' life history; we can use indicators and develop reference points to guide management action in response to climate change. For example, current work by NMFS around Oregon Coho salmon return indicators affected by climate variability (snowpack, river temperature, and river flow) identified a threshold where returns were significantly lower. By tracking this indicator set and associated threshold in the Annual Ecosystem Report, and notifying the Council when the threshold is reached, managers are better prepared to address this potential threat within the management process. We recommend that NMFS identify those species that have known relationships between life history and climate change and where we may be able to implement thresholds on the related climate indicator.

ii. *Ecosystem-level indicators*

Beyond single-species applications, better incorporating indicators into management at the ecosystem level is also important. Thresholds or reference points are a way to do this where scientifically possible. For example, NMFS is developing a warm blob indicator that includes a threshold for when a blob will likely occur. Including this indicator in the Annual Ecosystem Report along with a notification for the Council (and/or other managers), would allow the Council to consider the future risk and expectations when making routine decisions. We recommend that that Council investigate the warm blob indicator and other ecosystem-level indicators of climate change that may be ready for Council use now or in the near future.

The FEP five-year review, currently on the Council agenda for June 2018, could be another opportunity to consider ecosystem-level reference points as a mechanism to bring a growing body of ecosystem science and ecosystem information into the management process. We recommend that during a potential five-year review the Council refine ecosystem-level goals and objectives, including social and economic, to prioritize and guide development of indicators and subsequent reference points in the future.

d. Understand potential impacts to fishing communities

i. *Explore the impacts of species-specific vulnerability on communities*

We recommend that the Council consider further using the results of the CVA to explore the impacts of species-specific vulnerability on communities. For example, if canary rockfish and Pacific Ocean Perch are considered highly vulnerable, what will the specific effects of climate be on those species and how will those predicted changes translate for fishermen, sportfishing businesses, and ports.

ii. *Address geographically shifting stocks*

We are in support of developing an emerging fisheries policy to address movement of key stocks across jurisdictional boundaries. We recommend exploring near-term policy solutions, and developing a Council policy that outlines how the Council can best address geographic shifts. For example, this policy could inform new entrants on how to build climate-ready fishing portfolios or further streamline the Exempted Fishing Permit process. Part of this could include expansion of Council Operating Procedure #24 (regarding the development of new fisheries on forage species) to all species.

Conclusion

We greatly appreciate the efforts of the Council, especially the EWG, to further develop and refine this initiative. Appropriate and specific goals and objectives provide a solid foundation from which to build a Council process that results in tangible action to prepare the West Coast for climate change. We look forward to the TNC-sponsored climate workshop and believe it will provide useful information towards refinement of the initiative, and encourage Council members to attend. We also reiterate our recommendations made in September 2017 and restated above; preparing for climate change is essential and it should be done so strategically, with a targeted set of actions, an adaptive approach, and with a commitment to climate-ready fisheries management.

Sincerely,



Corey Ridings
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The Nature Conservancy



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February 26, 2018

Mr. Phil Anderson, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, #101
Portland, OR 97220

RE: •Agenda Item F.2: Fishery Ecosystem Plan Climate and Communities Initiative Update

Dear Chair Anderson and Council Members:

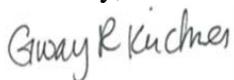
I am pleased to announce the Climate and Communities Initiative Workshop has been scheduled to occur in Portland, Oregon on May 15-16, 2018. Please see the attached invitation.

As you will remember, in November 2016, The Nature Conservancy (the “Conservancy”) received funding to sponsor a two-day workshop focused on providing information to the Pacific Fishery Management Council (Council) on the third initiative selected through the process defined in the Fishery Ecosystem Plan (FEP), the Climate Shift Initiative.

We appreciated the considerable time and attention the Council and advisory bodies devoted to determining the best use of this workshop. We look forward to having robust discussions at the workshop and providing the Council with concrete recommendations at the September meeting.

I will be attending the ecosystem agenda items at the March Council meeting and am available to answer any questions related to this letter or the workshop. Additionally, please do not hesitate to contact me at gway.kirchner@tnc.org. Thank you.

Sincerely,



Gway Kirchner
Marine Fisheries Project Director, Oregon Chapter
The Nature Conservancy



Save The Date

May 15–16, 2018 Portland, OR

Please ***Save The Date*** for this unique invitation-only, two-day workshop. The purpose of this working meeting is to help inform the Pacific Fishery Management Council's Fishery Ecosystem Plan by examining how climate-related variability and changes could impact managed fisheries as well as identifying potential opportunities for responding and adapting to climate-related changes.

Through collaborative discussion, workshop participants will:

- Increase their understanding of climate related changes, the drivers of change, and the scientific information available;
- Develop shared understanding among the Council, its science and management advisors, industry and the public to discuss and respond to climate-related changes;
- Share perspectives on the region's most pressing issues related to climate variability and change;
- Consider the pathways for addressing these issues, including specific management and non-management actions;
- Identify information needs to support action or further consideration; and
- Provide ideas and information to support the Council's development and implementation of the climate shift initiative.

To register for the workshop: <http://bit.ly/2popUJS>

There is limited travel support available. Please contact Gway Kirchner if you would like to be considered for financial assistance with travel: gway.kirchner@tnc.org; (541) 336-7215.