AT A GLANCE:

California Current Integrated Ecosystem Assessment

State of the California Current Report 2018

THE BEGINNING OF THE END?

Signals indicate that the anomalous oceanographic conditions of recent years may be over and we'll return to long-term average conditions (pg. 3). These cooler temperatures hopefully mean a more productive ecosystem, although exact conditions and their impacts on the food web remain unknown. We do know that while some warmer than usual water remains in the northern part of the California Current ecosystem, the warm blob has largely departed. Fortunately, NOAA is working on an early warning index that may help us understand and predict ecosystem state shifts in the future (pg. 22).

SOME LASTING EFFECTS OF THE BLOB

Marine conditions in 2017 were not favorable for Fall Chinook, Spring Chinook, and coho stocks returning to the Columbia Basin, indicating poor expected returns in 2018. NMFS scientists suspect this may be in part due to some lasting effects of the warm blob. While not optimistic news for salmon, the hard work by many to develop the stoplight approach that links environmental conditions to management is allowing us to proceed with caution (p12).

Photo: Oliver Dodd via Flickr CC

NEW REPORTING TOOL: THRESHOLDS

This year's report includes thresholds for several key indicators. These thresholds were established scientifically through modeling and experiments, and can serve as sign-posts for managers. Thresholds for dissolved oxygen and ocean acidification were developed (pg. 6), and an exploratory relationship between upwelling and sea lion pup counts are included in this year's report along with an update on the development of a new ecosystem-wide early warning index (pg. 22). These represent an approach to using indicators that could be extremely useful in the future. And the good news is that while still experimental, these sign-posts don't indicate any major system re-organizations this year.

WHALE OF A TIME

Reports of whale entanglements (the unintentional "tangling" of a whale in debris, often fishing gear) have been at an all-time high in the last four years with 203 whales reported as entangled 2014-17 (pg. 15). This is an average of over 50 whales per year, compared to the 2000-12 average of 11. The exact cause of this increase is unknown, but the impacts on whales and fisherman are substantial. There is hope that with changing ocean conditions these numbers will return to normal, in the meantime, the State of California is working with fisherman and other stakeholders to explore solutions.[1]

RECREATIONAL FISHERIES IN THE SPOTLIGHT

This year's report includes a new indicator of recreational fishing and its relationship to coastal communities (pg. 20). This will enable managers to better understand the connection between recreational fishing and communities, and is a start in helping infuse much-needed insights into the management process. Although many of our social and economic indicators are nascent, this is an important step in the right direction.

A LACK OF FLEET DIVERSITY

All categories of vessels that fished along the West Coast decreased in average diversification from 2015 to 2016, with 2016 being the least diverse fleet in 36 years (pg. 20). Although the decline has been slow and steady, diversity is important for maintaining individual financial solvency and overall fleet stability, especially in changing environmental conditions. The inherent variability of the California Current and predicted impacts of climate change make diversity an important factor to consider.

VISUALIZING HMS

This year's report includes graphs and time plots that show how recent trends in HMS biomass and recruitment can be integrated into a stoplight approach (pg. 14). No fancy modeling here, but a useful and easy-to-digest representation of HMS species. Swordfish and skipjack biomass are well above the long-term average, while bluefin tuna, bigeye tuna, and, are all well below. Recruitment is a similar picture, with skipjack doing well and bluefin continuing to show poor recruitment.

[1] http://www.opc.ca.gov/whale-entanglement-working-group/

PREPARED BY
Corey Ridings, Manager
cridings@oceanconservancy.org • (831) 440-7056

Michael Drexler, Fisheries Scientist
mdrexler@oceanconservancy.org • (727) 369-6628

February 26, 2018

Phil Anderson, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

RE: F.1. – Ecosystem: California Current Ecosystem and Integrated Ecosystem Assessment Report and Science Review Topics

Dear Chairman Anderson,

Wild Oceans has long supported the Council's adoption of ecosystem based fisheries management (EBFM), focusing on maintaining resilient food webs and abundant forage stocks critical to maintaining healthy populations of commercially and recreationally important predator species, marine mammals, sea turtles, and seabirds. We commend the Northwest Fisheries Science Center and the Southwest Fisheries Science Center and their Ecosystem Science Programs for their coordinated work with the Integrated Ecosystem Assessment Program on the production of a clear and informative California Current Integrated Ecosystem Assessment (CCIEA) California Current Ecosystem Status Report, 2018 (Report), one of the cornerstones of a solid foundation for EBFM. The Report provides a yearly update on the state of the California Current Ecosystem (CCE) as derived from environmental, biological and socio-economic indicators. Over the past five years, the Report has evolved from a report card of key biological and oceanographic processes. This year's Report includes many changes and improvements made in response to advice gathered during Initiative 2, "Coordinated Ecosystem Indicator Review." The CCIEA Program has incorporated new data, expanded the scope of the Report to address unprecedented environmental changes such as the persistent marine heat wave and delivered information that can be used to inform management action and help managers and stakeholders secure healthy, resilient and stable fisheries and a healthy ocean ecosystem into the future.

The Report can inform managers about key changes in the ecosystem that will affect managed species and provide feedback to managers about the affect of their decisions on their ecosystem goals. To be useful in a management context, the Report should not only include indicators of ocean conditions, but also identify ***targets*** or "healthy" states to be maintained and "unhealthy" states to be avoided, so that managers can interpret ecosystem health status and trends. At present, the Report does not provide a basis for comparison of an indicator to a standard or *target* that sets the bar for achieving a management goal.

Foundational integrated ecosystem assessment documents and current ecosystem-based management (EBM) literature highlight the importance of ***targets***.[1] "Alone, a transparently selected, ecologically defensible, politically acceptable set of ecosystem indicators is of limited value for EBM. To guide effective management, indicators must be associated with targets, or values of the indicators equated with successful achievement of management goals."[2] The Report will be more useful if it translates ecosystem information into decision criteria that can inform the Council and its management decision-making process of when and under what conditions intervention, preparation, and mitigation may enhance progress toward EBFM goals.

For example, one ecosystem goal that resonates throughout the Fishery Ecosystem Plan and the Council's Fishery Management Plans is the preservation of the marine food web and the provision of adequate forage for dependent species. The Report's Focal Components of Ecological Integrity includes a description of trends in Regional Forage Availability which satisfies the task identified under the highest priorities for Ecosystem-based Fishery Management in the 5-year Research and Data Needs Plan approved in 2013: identify abundance of key ecosystem process indicators, such as zooplankton and forage fishes. The Council should support the current work at the Science Centers and by the IEA Program to develop a Forage Status Indicator including a target reference point that provides clarity on whether we are achieving our ecosystem goal and which could be used to inform future Council decision making.

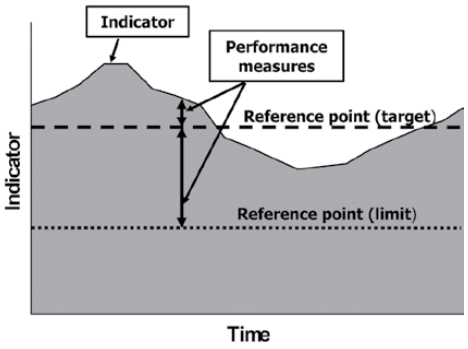
Ultimately, managers use indicators and reference points – both quantitative and qualitative – to make and inform decisions. Through development of a Forage Status Indicator, the Council and stakeholders will identify the healthy ecological forage state that we strive to achieve and will use this to evaluate whether and when we can maintain or increase the removal of forage fish from the CCE. A Forage Status Indicator, in conjunction with the established benchmarks, can be used quantitatively (Q1) and/or qualitatively (Q2) to develop management measures and terms of reference that help ensure sufficient abundance of forage species while providing appropriate opportunities for sustainable management of existing forage species fisheries or increase the removal of forage fish from the CCE.

Q1	Biomass Numbers of Fish Age Structure of the Population (relative to a "natural" state)
Q2	Relative Value to Keystone Predators or Indicator Species 2a – Primary Prey (preferred or staple) 2b – Secondary Prey (alternate, of secondary importance as a food source)

[1] Samhouri, J. et. al. 2017. *Defining ecosystem thresholds for human activities and environmental pressures in the California Current.* Ecosphere, 8(6); Samhouri, J. et. al. 2012. *Sea sick? Setting targets to assess ocean health and ecosystem services.* Ecosphere, 3(5).

[2] Samhouri, J. et al. 2014. *Lessons learned from developing integrated ecosystem assessments to inform marine ecosystem-based management in the USA.* Journal of Marine Science, 71:1205-1215.

Suggesting a framework for assessing ecosystem health in a fisheries context, Livingston *et al* (2005) discussed the need to a) develop indicators to assess the ecosystem-level impacts of fishing, and b) predict possible future trends in these indicators. Noting the goals of maintaining predator-prey relationships, energy flow and balance within the system and species diversity, the authors recommended (among other things) a *quantitative* index of forage biomass, with a threshold for action, as an indicator for maintaining pelagic forage availability.[3]



As in this simple diagram (FAO 2003)[4], a Forage Status Indicator should include an indicator (e.g., total biomass, species diversity, predator/prey ratios) and associated target and limit reference points, such as are used in conventional management. It is critical that the indicators be linked to performance measures that incorporate the Council's ecosystem level goals.

Each year, after receiving the Report, members of the Council ask for instructions for using the report card. Incorporating targets and reference points into the Report will advance EBM from concept to commonplace.[5] **Wild Oceans asks the Council to 1) select a narrow suite of Report topics, including forage availability and salmon, and 2) recommend that the Northwest Fisheries Science Center and Southwest Fisheries Science Center, in coordination with their Ecosystem Science Programs and IEA Program, develop target reference points that could be used to inform future Council decision-making.** We urge the Council to provide direction for this preferred path forward at the March 2018 Council meeting in order to give staff and scientific and technical experts sufficient time to prepare and present their work at the March 2019 meeting as part of the State of the California Current Ecosystem Report. Thank you for your consideration.

Sincerely,

Theresa Labriola
Pacific Program Director

[3] Livingston, P.A. et al. 2005. *A framework for ecosystem impacts assessment using an indicator approach.* ICES Journal of Marine Science, 62: 592-597.
[4] FAO. 2003. *The ecosystem approach to fisheries.* FAO Technical Guidelines for Responsible Fisheries. Food and Agriculture Organization of the United Nations. Rome 2003.
[5] Samhouri, J. et. al. 2017. *Defining ecosystem thresholds for human activities and environmental pressures in the California Current.* Ecosphere, 8(6).