February 5, 2020

To: Dr. John Field, chair of the Scientific and Statistical Committee (SSC)
Dr. Dan Holland, chair of the SSC Ecosystem-Based Management Subcommittee (SSC-ES)

From: Dr. Chris Harvey, NOAA Fisheries / NWFSC
Dr. Toby Garfield, NOAA Fisheries / SWFSC
Co-leads, California Current Integrated Ecosystem Assessment team (CCIEA)

Re: meeting of the SSC-ES and CCIEA, anticipated for September 2020 in Spokane, WA

Dear John and Dan,

As you know, since 2015, the SSC-ES and the CCIEA team have met at September Council meetings so that the SSC-ES could review topics intended to improve the indicators and analyses that go into the March ecosystem status report. These meetings have been greatly beneficial to the CCIEA team, and we believe they have resulted in clear improvements to the quality and scope of the report, and the value of information provided to the Council.

As part of the Council-established process for planning these September SSC-ES / CCIEA meetings, the CCIEA team is asked to provide a proposed list of potential review topics prior to the preceding March Council meeting, with the understanding that the list could be amended during the March meeting between the CCIEA and the full SSC. This letter provides three proposed topics for September 2020 (see next page for short descriptions). All topics are pending the availability of the investigators to present on the day of the meeting.

Thank you for your continuing efforts to support and improve the CCIEA team.

Sincerely,

Chris Harvey and Toby Garfield

cc: Kit Dahl, Pacific Fishery Management Council

1 attachment

Topic: Sea lion pup growth and pup counts as indicators of foraging conditions

Presenter: Dr. Sharon Melin, Alaska Fisheries Science Center

Justification: The CCIEA team presents several indicators each year that describe the number and condition of California sea lion (CSL) pups at the San Miguel Island breeding colony. We have offered these time series as indicators of foraging conditions in the region from the Channel Islands to ~Monterey Bay, which is where mature female CSL from San Miguel have been found to feed. Pup count has been presented as an indicator of foraging conditions from October to June, when females are gestating, while pup growth through age 7 months has been presented as an indicator of foraging conditions from June to February, when mothers are nursing pups (Melin et al. 2012). The SSC, the CPSAS, and possibly other Council advisory groups have repeatedly expressed concern that these metrics may not be suitable indicators of foraging status in the region, because the CSL population in the Channel Islands is believed to have been close to carrying capacity for much of the past ~15 years (e.g., Laake et al. 2018).

The CCIEA team would like the SSC-ES to review these CSL time series and the assumptions underlying their use as indicators to resolve this issue.

Topic: Habitat compression index

Presenter: Dr. Jarrod Santora, Southwest Fisheries Science Center

Justification: The CCIEA team is working to develop a suite of indicators that track the spatiotemporal impacts of climate variability and change on California Current productivity, food web interactions, spatial distributions of key species, etc. The physical indices we have been reporting (e.g., ONI, PDO, NPGO, upwelling) provide valuable information up to a point, but additional indicators are likely needed to help track dynamics at regional spatial scales; ideally, such indicators are mechanistic and supported by sound research. As a case in point, the recent series of marine heatwaves that have affected the system since 2014 have caused many dramatic ecological responses, and many of these responses are too fine-scale and/or complex to be predicted by basin-scale indicators. Santora et al. (2020) proposed “habitat compression” as a mechanism by which the coastal upwelling zone becomes constrained by offshore processes, and this leads to high concentrations of species like forage stocks, marine mammals, and other species in ways that can lead to prey shifts, shifts in species composition, and potential management conflicts (e.g., whale entanglement). In this year’s report, we include a plot of Santora et al.’s habitat compression index (HCI) for central California (ESR Figure 7.2.2), as a basic introduction to this concept of environmentally driven habitat compression as a plausible cause of some of the responses to the marine heatwaves in the past 5 years.

The CCIEA team would like the SSC-ES to review the Santora et al. HCI and its potential use as an indicator of processes driven by climate variability in the California Current.

Topic: Revenue consolidation

Presenter: Dr. Karma Norman, Northwest Fisheries Science Center

Justification: During FEP Initiative 2 on improving the indicators in the ecosystem status report, many PFMC advisory bodies requested additional indicators of human dimensions of the California Current ecosystem; more specifically, in 2018, the Ecosystem Advisory Subpanel requested that the CCIEA team develop indicators related to National Standard 8 under Magnuson-Stevens, which states that fisheries

management measures should “provide for the sustained participation of [fishing] communities and, to the extent practicable, minimize adverse economic impacts on such communities.” Based on preliminary discussions within the CCIEA team, we identified proportional changes in port-level commercial fishing revenue as a means of tracking if revenues are becoming consolidated in certain ports (see ESR Section 6.3 for total commercial revenue and Appendix O for FMP-specific revenue). The plots of port-specific revenue percentages through time are presented as initial information meant to generate discussion and further requests from the Council and advisory bodies. Over the spring and summer, members of the CCIEA team (Norman, Holland, Kasperski, Harvey, Samhouri, Phillips) will review Council suggestions and refine this analysis so that we can propose a more robust metric to the SSC-ES in September. We would anticipate exploring correlations between this metric and environmental drivers, spatiotemporal shifts in target species availability, and the timing of management actions.

The CCIEA team would like the SSC-ES to review the to-be-determined indicator of revenue consolidation so that (if approved) it can be more fully incorporated into the 2021 ESR.

References:

Laake, J.L., et al., 2018. Population growth and status of California sea lions. *Journal of Wildlife Management* 82:583-595.

Melin, S.R., et al. 2012. California sea lions: an indicator for integrated ecosystem assessment of the California Current system. *CalCOFI Reports* 53:140-152.

Santora, J.A., et al. 2020. Habitat compression and ecosystem shifts as potential links between marine heatwave and record whale entanglements. *Nature Communications* 11:536.