

November 1, 2022

Mr. Marc Gorelnik, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

RE: Agenda Item I.4: Terms of Reference for Coastal Pelagic Species (CPS) Stock Assessments

Dear Chair Gorelnik and Council members:

The National Marine Fisheries Service declared Northern subpopulation of Pacific sardine overfished in 2019 and the stock is not rebuilding. Despite this, NMFS and the Council continue to use a flawed formula for setting sardine catch limits that is falsely predicting high productivity based on the temperatures from CalCOFI index. We ask that the Council include direction in the Coastal Pelagic Species (CPS) stock assessment Terms of Reference to calculate updated maximum sustainable yield fishing rates¹ for CPS stock assessments and request NMFS update the MSY fishing rate for Pacific sardine in the 2024 benchmark assessment and all future stock assessments using estimates of recent productivity and recruitment. We attach our June 2022 letter to the Council on this topic for additional background and rationale.

Updating the MSY fishing rate is a straightforward exercise for NMFS stock assessment authors to complete for CPS species using Stock Synthesis models as has been done with the Central Subpopulation of Northern Anchovy ("anchovy"). Due to the stated need for an updated MSY fishing rate for anchovy, the 2022 anchovy stock assessment calculated an updated anchovy MSY fishing rate using data from the stock assessment time series.² The SSC reviewed this calculation, and the Council adopted it in its harvest specifications recommendations in June 2022. However, stock assessments will not provide this analysis for Pacific sardine without clear direction in the Terms of Reference. Because the new stock assessment is expected to incorporate the latest information on stock delineation of Pacific sardine, it is an opportune time to calculate an updated MSY fishing rate that reflects recent stock and environmental conditions.

Sincerely,



Geoffrey Shester, Ph.D.
California Campaign Director & Senior Scientist

Attachment: June 6, 2022 Oceana letter to PFMC on D.2 CPS Stock Assessment Terms of Reference

¹ Note in the context of this letter and the 2022 anchovy assessment, MSY fishing rate is referred to as Fmsy or Emsy as an annual (not instantaneous) exploitation rate.

² Kuriyama et al. 2022. Assessment of the Northern Anchovy (*Engraulis mordax*) Central Subpopulation in 2021 for US Management. NMFS. June 2022. Appendix E: Calculation of Fmsy with SS3.30.19.

<https://www.pcouncil.org/documents/2022/05/d-1-attachment-1-draft-assessment-of-the-northern-anchovy-engraulis-mordax-central-subpopulation-in-2021-for-u-s-management-full-version-electronic-only.pdf/>

June 6, 2022

Mr. Marc Gorelnik, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

RE: Agenda Item D.2: Terms of Reference for Coastal Pelagic Species (CPS) Stock Assessments

Dear Chair Gorelnik and Council members:

The Northern subpopulation of Pacific sardine was declared overfished in 2019 and is not rebuilding. Despite this, NMFS and the Council continue to use a flawed formula for setting sardine catch limits that is falsely predicting high productivity based on the temperatures from CalCOFI index. We ask that the Council include direction in the CPS Terms of Reference to calculate updated maximum sustainable yield Exploitation Rates (E_{MSY}) for CPS stock assessments and request NMFS update the E_{MSY} for Pacific sardine in the 2024 benchmark assessment. We urge the Council to recommend that NMFS include a re-evaluation of E_{MSY} for Pacific sardine as an objective of NMFS's proposed 2022-23 CPS workshops for Pacific sardine.

At the April 2022 meeting, stakeholders expressed concern about the science underlying sardine management, including stock structure and attribution of catch to northern and southern subpopulations and in the current MSY harvest rate used in sardine management. Due to ongoing scientific concerns, NMFS has chosen not to do an annual stock assessment for Pacific sardines in 2023, and instead embark on a scientific analysis to resolve long-standing issues over sardine stock structure to improve assessment biomass estimates.¹ We acknowledge and agree with the need to improve the differentiation of northern and southern subpopulations in stock assessments, and accurately attribute U.S. and Mexican catch to the appropriate stock. However, NMFS indicated it will not be including a new analysis of E_{MSY} temperature control rule. The NMFS report² states:

A main discussion item centered on when and where to review the E_{MSY} temperature control rule, either in the Stock Structure workshop or the Methodology Review; however, the SSC CPS Subcommittee stated that the assessment model needs to be updated prior to reviewing the status of E_{MSY} and therefore suggested that this item wait until after the 2024 benchmark assessment.

¹ PFMC June 2022 Agenda Item D.2.a. Supplemental NMFS Report on 2022-23 CPS Workshops for Pacific Sardine <https://www.pcouncil.org/documents/2022/06/d-2-a-supplemental-nmfs-report-1-2022-2023-cps-workshops-for-pacific-sardine.pdf/>

² *Id.*

While we agree that the assessment model should be updated with the best available understanding of stock structure, there is no reason that the E_{MSY} cannot be updated as part of the 2024 benchmark assessment. The corresponding E_{MSY} can and must be calculated using the updated assessment model. This objective should be explicitly added to the objectives of NMFS's proposed sardine workshops and included in the CPS Stock Assessment Terms of Reference.

There is consensus among the Scientific and Statistical Committee, Coastal Pelagic Species Management Team, and NMFS Southwest Fisheries Science Center (SWFSC) that the current CalCOFI-based E_{MSY} is flawed and, as a result, is producing OFLs that are far too high. NMFS SWFSC presented analysis in 2017 and later published in 2019 an analysis showing the CalCOFI-based E_{MSY} formula does not reflect the best available science on sardine productivity,³ resulting in an overestimation of the MSY for the stock. The E_{MSY} fishing rate is set based on an index of sea surface temperature (SST) measured in the Southern California Bight (the CalCOFI index). The study found this "correlation with SST is likely invalid" and cautioned that "environmental proxies for fish productivity might not always prescribe the correct amount of fishing mortality and should be avoided..."⁴ The study suggests the environmental index used now is flawed in part because it used data assuming a single undifferentiated sardine population, prior to the more recent differentiation of the southern and northern Pacific sardine subpopulations.

Specifically, the CalCOFI index indicates high relative recruitment conditions and produces MSY harvest rates at the high end of the range, whereas actual recruitment over the last decade has been the lowest in recent history. Both the SSC and the CPSMT recognized the need to reevaluate E_{MSY} in recent reports to the PFMC:

SSC: The value for E_{MSY} based on the CalCOFI temperature index suggests a productive stock but this is not evident from recent assessments, suggesting the need to re-evaluate the best way to calculate E_{MSY} for the northern subpopulation sardine stock.⁵

CPSMT: The CPSMT recommends evaluation of the E_{MSY} term based on the California Cooperative Oceanic Fisheries Investigations (CalCOFI) temperature index because it no longer appears to adequately reflect sardine productivity. The value for the E_{MSY} term applied to the OFL formula is capped at 0.25 which corresponds to the upper quartile of CalCOFI temperatures. This environmental proxy was designed to reflect stock productivity, yet it has been near that upper cap for the last five years, while the most recent benchmark assessment stated that actual recruitments have been some of the lowest on record during that same time period.⁶

SWFSC scientists identified this problem and presented their analysis at the March 2017 North Pacific Marine Science Organization/International Council for the Exploration of the Sea Symposium on Drivers

³ Zwolinski, JP and DA Demer. 2019. Re-evaluation of the environmental dependence of Pacific sardine recruitment. Fisheries Research 216, 12-125.

⁴ Zwolinski, JP and DA Demer. 2019. Re-evaluation of the environmental dependence of Pacific sardine recruitment. Fisheries Research 216, 12-125.

⁵ SSC Statement. April 2021. Agenda Item E.4.a. <https://www.pcouncil.org/documents/2021/04/e-4-a-supplemental-ssc-report-1-2.pdf/>

⁶ CPSMT Report 1. April 2021. Agenda Item E.4.a. <https://www.pcouncil.org/documents/2021/04/e-4-a-supplemental-cpsmt-report-1.pdf/>

Mr. Marc Gorelnik, PFMC Chair

Agenda Item D.1: Anchovy Assessment and Harvest Specifications

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of Dynamics of Small Pelagic Fish Resources. We highlighted this scientific information in our June 2018 comments to NMFS and on each of the proposed 2018-2019, 2019-2020, 2020-2021, 2021-22, and 2022-23 sardine catch specifications. In 2019, the SWFSC published an analysis, including the recommendation for how to fix the E_{MSY} formula:

“Alternatively, for species assessed periodically, dynamic fishing mortalities could be based on measurements of recent stock productivity inferred directly from surveys, or from the results of analytical assessments based on those observations.”⁷

Consistent with this recommendation, we ask the Council to request NMFS produce a new E_{MSY} that reflects current stock and climate conditions. NMFS has known about the flaw with its sardine E_{MSY} formula since 2017 and has been aware of the SWFSC’s recommendation on how to fix the problem since 2019. NMFS can and must update the E_{MSY} based on the best available science.

As part of a climate-ready, ecosystem-based approach to fisheries management, managers must continuously evaluate predictive indicators to ensure they are working. The Pacific sardine temperature control rule continues to serve as one of the few examples where environmental indicators are used to determine catch limits, as temperature has been thought to predict sardine recruitment. However, now that new science has shown this index to be a false predictor, it is time to change it. Continued use of a faulty E_{MSY} that predicts the highest sardine productivity conflicts with the best available science that shows the stock has collapsed and is not recovering. We ask the Council to make E_{MSY} a top scientific priority in its 2022-23 workshops so the Council can adopt a new E_{MSY} reflecting recent stock and ecological conditions that will serve to rebuild the overfished stock of Pacific sardines.

Sincerely,



Geoffrey Shester, Ph.D.

California Campaign Director & Senior Scientist

⁷ Zwolinski, JP and DA Demer. 2019. Re-evaluation of the environmental dependence of Pacific sardine recruitment. Fisheries Research 216, 12-125.