Agenda Item G.5
Attachment 1
April 2025

COASTAL PELAGIC SPECIES SCIENCE AND MANAGEMENT PRIORITIES: A DISCUSSION PAPER

Contents

LIST OF ACRONYMS AND ABBREVIATIONS

ABC acceptable biological catch
ACL annual catch limit
ACT annual catch target
AM accountability measure
ATM acoustic-trawl method
CalCOFI California Cooperative Oceanic Fisheries Investigations
CCE California current ecosystem
CSNA central subpopulation of northern anchovy
COP Council Operating Procedure
CPS coastal pelagic species
CPSAS Coastal Pelagic Species Advisory Subpanel
CPSMT Coastal Pelagic Species Management Team
EEZ exclusive economic zone (from 3-200 miles from shore)
FEIS Final Environmental Impact Statement
FMP fishery management plan
HCR harvest control rule
HG harvest guideline
MSA Magnuson-Stevens Fishery Conservation and Management Act
MSE Management Strategy Evaluation
MSST minimum stock size threshold
MSY maximum sustainable yield
NOAA National Oceanic and Atmospheric Administration
NMFS National Marine Fisheries Service
NSNA northern subpopulation of northern anchovy
NSP northern subpopulation
OFL overfishing limit
SAFE stock assessment and fishery evaluation
SSC Scientific and Statistical Committee
SSP southern subpopulation
SST surface sea temperatures
SWFSC Southwest Fisheries Science Center

1 INTRODUCTION

The Pacific Fishery Management Council (Council) manages several coastal pelagic species (CPS) through the CPS Fishery Management Plan (FMP), including northern anchovy, market squid, Pacific sardine, Pacific mackerel, and jack mackerel. CPS fisheries have been economically valuable for California, Oregon, and Washington for more than 100 years. Management of CPS is complex; most CPS stocks experience characteristic boom and bust cycles of abundance, even in the absence of fishing. The dynamics of the California Current Ecosystem (CCE), influenced by intra-annual, inter-annual, and decadal climate fluctuations, play a significant role shaping the abundance of stocks year to year. Further, many CPS stocks have expansive ranges with stocks distributed across areas off the U.S. West Coast, Mexico, and Canada.

As a whole, West Coast fishing communities continue to experience socio-economic impacts due to various factors, including changes in ocean and environmental conditions, salmon fishery closures, restrictions in opportunities due to protected species interactions or rebuilding of overfished species, loss of infrastructure, and changes in market conditions. In terms of the CPS portfolio, the boom-bust nature of CPS stocks and changes in seafood markets has generated socio-economic hardship for the CPS fleet and their communities, particularly since the closure of the directed Pacific sardine fishery in 2015.

Over the past several years the Coastal Pelagic Species Advisory Subpanel (CPSAS), the Coastal Pelagic Species Management Team (CPSMT), the Scientific and Statistical Committee (SSC), the Council, and Council Staff have identified several science and management topics in the CPS fishery. Many of these management topics are connected to ongoing science and research but can be brought forward presently in the management context. With a diverse range of topics brought forth by stakeholders over the past several years, the Council will need to consider which topics are true priorities for the management of the CPS fishery. Further, one of the biggest considerations the Council must consistently make in determining which management topics to prioritize is the capacity of Council staff, the National Marine Fisheries Service (NMFS), and the states to work on new fishery management developments in addition to routine annual management actions. By developing a process by which to consider various science and management interests and prioritize select topics, the Council may be able to tackle fishery priorities step by step through multiple annual touchpoints.

1.1 HISTORY

In April 2023, the Council discussed scheduling a workshop to explore alternative methods for calculating E_{MSY}, a component of the formula for annual harvest control rules in Pacific sardine (*Sardinops sagax*) management. However, it was determined at the time that the work on this topic by the Southwest Fisheries Science Center (SWFSC) should not precede the next benchmark stock assessment. In September 2023, the Council tasked staff with the addition of an agenda item to tackle CPS science needs and sardine stock structure. In November 2023, the agenda item "Science Needs and Stock Structure" was added to the Council's Year at a Glance agenda. Since then, the agenda item has continued to be rescheduled due to the prioritization of other items. At the November 2024 meeting, based on direction from the Council, the CPSAS and CPSMT provided recommendations to the Council on the proposed scope for the then titled, "Science Needs and

Priorities" agenda item (Agenda Item C.6.a, Supplemental CPSAS Report 1 and Agenda Item C.6.a, Supplemental CPSMT Report 1). Both advisory bodies highlighted the management of Pacific sardine, and particularly a need for the Council to consider the stock structure of Pacific sardine for coastwide management as the highest priority topic. The advisory bodies also identified the evaluation of E_{MSY} and DISTRIBUTION terms as long-standing science and management priorities for Pacific sardine. During their November 2024 discussion, the Council requested the April 2025 agenda item cover these recommended top priorities as well as a 'state of the science' of various CPS management topics.

1.2 PURPOSE

Following the November 2024 discussion by the Council, staff have developed this white paper to assist in identifying science and management topics for the CPS fishery. This paper intends to provide a brief list of science and management issues that have been raised for CPS fisheries, generating a list that the Council could reference in establishing workload priorities. This list should not be seen as comprehensive or as constituting current prioritization of science and management needs but is rather a summary of topics described in past statements from the CPSMT and CPSAS, research and data needs lists, and input by Council staff. This document will also highlight the fundamental 'base-level' and near-term management priorities, as identified by the advisory bodies in their November 2024 meetings, providing information to help the Council determine which fishery management actions could and should be developed first, in terms of both priority and sequence. Finally, this paper will propose a 'science and management' process for the Council to consider adopting into the Council Operating Procedures (COPs), by which the Council may continue to weigh in on CPS science and management topics annually, making modifications to the list as progress on current priorities develops or as new priorities and topics arise.

1.3 CONCEPT OF 'MANAGEMENT LEVEL'

'Management level,' as described for each priority in the topic list below, will help inform the Council on the potential sequence by which to prioritize various CPS topics. The essential basis of fishery management can be "...increasingly added to in complexity once the basics are in place, adding more fine-tuned ...management measures and control rules as practicable (Bahri, et al., 2021). However, it is necessary to first have properly defined 'building blocks' at the basis of management before adding complexity to management measures, controls, and assessments. Therefore, information on where each topic sits in the hierarchy of fishery management complexity will help the Council know how to sequentially prioritize CPS science and management needs.

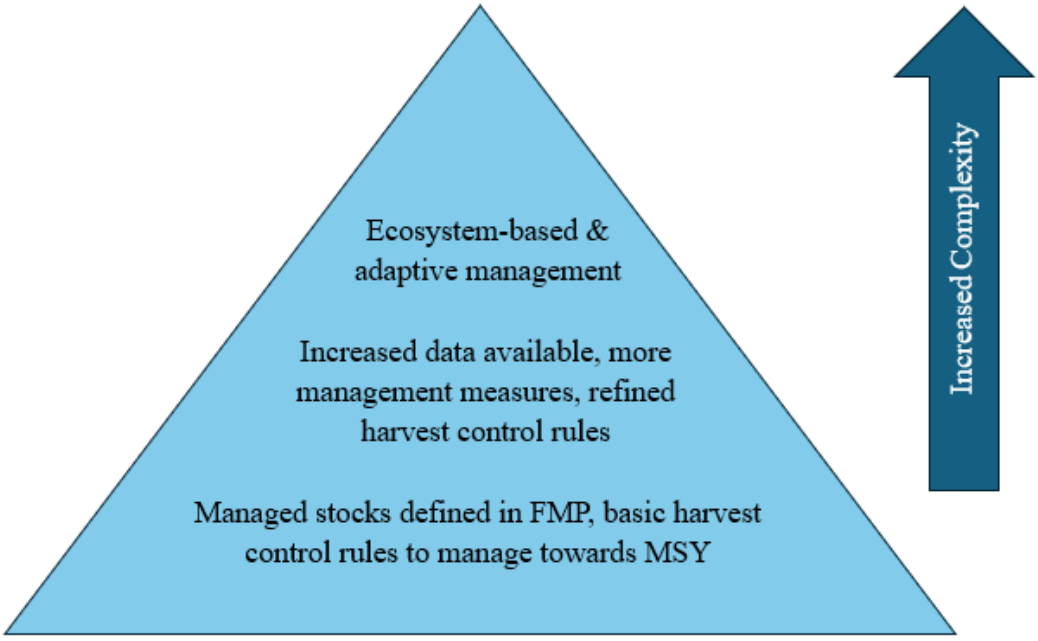

Figure 1: Hierarchy of fishery management complexity (adapted from Bahri, et al., 2021)

2 SCIENCE AND MANAGEMENT TOPICS

The following CPS science and management topics have been identified over time by the CPSAS, CPSMT, SSC, the Council, and Council Staff. This list can serve as a working reference and a living, non-exhaustive list for the Council to use, as capacity permits and needs arise, to develop CPS fishery management priorities. Each topic is described and characterized by the CPS stocks affected, the existing science and previous Council family work on the topic, and the factors that may influence how the topic is potentially prioritized, based on recommended priority and management levels.

List of Science and Management Topics

The following list of topics may be revised, adopted, and prioritized by the Council as they see fit.

1. Pacific sardine stock structure
2. Use of EMSY in Pacific sardine harvest control rules
3. Distribution term in CPS harvest control rules
    a. Pacific Sardine
    b. Northern Subpopulation of Northern Anchovy
4. Stock Assessments
    a. Pacific Mackerel
    b. Northern Subpopulation of Northern Anchovy
5. Managing Annual Opportunity
    a. Central Subpopulation of Northern Anchovy ACL
    b. Incidental landing limits

2.1 PACIFIC SARDINE STOCK STRUCTURE

The CPS FMP currently described three subpopulations of Pacific sardine; the northern subpopulation (NSP) ranges from southeast Alaska to the northern portion of the Baja peninsula (CPS FMP Appendix A-9; (Pacific Fishery Management Council (PFMC), 2022a)) and is the only subpopulation currently managed under the CPS FMP. The southern subpopulation (SSP) ranges from the Baja peninsula to southern California. U.S. fisheries typically harvest both the northern and southern subpopulations, though in-season catch accounting counts all landings towards the annual catch limit (ACL) for the NSP. Proportions of landings (as well as biomass estimates) attributed to the NSP and SSP are reported in Pacific sardine stock assessments, after the fishing season has ended, by use of a habitat model (Zwolinski & Demer, 2023). There is also a Gulf of California subpopulation of Pacific sardine, though this stock is not present in U.S. waters.

The current stock structure hypothesis, detailed in Appendix A-9 of the CPS FMP, is as follows:

"It is generally accepted that sardine off the West Coast of North America form three subpopulations or stocks. A northern subpopulation (northern Baja California to Alaska), a southern subpopulation (off Baja California), and a Gulf of California subpopulation were distinguished on the basis of serological techniques (Vrooman 1964). A recent electrophoretic study (Hedgecock et at. 1989) showed, however, no genetic variation among sardine from central and

southern California, the Pacific coast of Baja California, or the Gulf of California. A fourth, far northern subpopulation, has also been postulated (Radovich 1982). Although the ranges of the northern and southern subpopulations overlap, the stocks may move north and south at similar times and not overlap significantly. The northern stock is exploited by U.S. fisheries and is included in this FMP."

2.1.1.1 Previous Work and State of the Science

In 2022, the SWFSC hosted a stock structure workshop based on the comments by the SSC in their statement under the 2021 update assessment for Pacific sardine (Supplemental SSC Report, Agenda Item E.4.a, April 2021). The SSC statement noted how the Mexico catch attributed to the NSP was on the same order as the entire NSP population size from the 2020 benchmark assessment. From these findings, the SSC recommended reconsideration of how landings and surveyed fish are attributed to NSP and SSP.

The workshop included five presentations of ongoing research related to Pacific sardine stock structure, which were summarized in the workshop report (Yau, 2023). Key preliminary findings and ongoing research were reported to the Council in April 2023 (Yau, 2023). These included:

- Work is underway at the SWFSC to evaluate population structure using genetics (Craig, Adams, Longo, and Hyde). *Since the workshop, a study by Adams and Craig* (2024) *supported the hypothesis that there is no genetic stock structure for Pacific sardine*.
- Sardine captured off San Pedro are typically NSP in cooler months, SSP in warmer months. During the 2014-2016 heatwave, presence of northern habitat and associated sea surface temperature were largely absent off southern California (Muhling).
- Habitat around the northern Channel Islands was characterized as unsuitable for NSP for the 2021 Spring CPS survey (Zwolinski, Stierhoff, and Demer). There was also a spatial gap between the presumed northern stock in the Pacific Northwest and the presumed southern stock in Southern California in that year (Zwolinski, Stierhoff, and Demer*). For the most recent (2024) survey, unlike in past years, nearly all of the biomass attributed to NSP was observed in the nearshore region near Pt. Conception and between Santa Cruz and San Francisco.*
- Delineation of two stocks is based on several historical studies that support the existence of multiple subpopulations (James and Erisman). These include studies on tagging, blood groups, vertebral counts, isolated spawning centers and growth rates (Smith 2005) and regional differences in length at age (Felin 1954). James and Erisman noted that sources of uncertainty in Felin's study warrant re-examination of whether length at age is a viable criterion to determine population structure. *Since the workshop, Erisman et al. determined that length-at-age data and growth information should not be used to help delineate subpopulations or apportion biomass of Pacific sardine into multiple subpopulations* (Erisman, Craig, James, Schwartzkopf, & Dorval, 2025). *Craig et. al also reviewed the body of historical studies, finding little to no evidence to support the existence of multiple subpopulations* (Craig, Erisman, Adams-Herrmann, James, & Thompson, 2025).
- A study was in progress to test the null hypothesis of a single population by comparing variations in length at age (James and Erisman). Since the workshop, a study was published

reviewing somatic growth patterns in relation to population structure. *This study concluded that no evidence from historical studies on growth patterns supports the hypothesized existence of two subpopulations* (Erisman, Craig, James, Schwartzkopf, & Dorval, 2025).

- Early studies referenced to support a two-stock hypothesis do not have data to reject a null hypothesis of a single, coastwide population of Pacific sardine ranging from Baja California to Canada (Craig, Erisman, Muhling, Thompson).

The workshop report described the operative definition for both the NSP and SSP (see above), supporting the working hypothesis that there are two distinct subpopulations. It was also widely discussed at the workshop that there exist alternative hypotheses from the working hypothesis, primarily one that defines a single stock ranging from British Columbia to Baja California, with no differentiation between northern and southern subpopulations. Publications from the SWFSC building on the workshop have been released in the past year (2024-2025), expanding on the preliminary findings from the 2022 workshop (see above) and revealing that there is less evidence than previously thought supporting the currently operationalized two-stock hypothesis (Craig & Adams, 2024, Erisman, Adams-Herrmann, Craig, James, & Thompson, 2025, Erisman, Craig, James, Schwartzkopf, & Dorval, 2025). In February 2025, scientists at the SWFSC published a NOAA tech memo detailing an extensive literature review to revisit the working population structure hypothesis (Craig, Erisman, Adams-Herrmann, James, & Thompson, 2025). The review, covering a century of scientific literature on spawning areas, migration and growth patterns, and genetics, concluded that 'there is little, if any, evidence supporting a hypothesis of multiple subpopulations of Pacific sardine throughout their North American range.' The authors also found no evidence against the idea of a single coastwide population of the species. The scientists at the SWFSC continue to work to explore information that supports the working and alternative hypotheses, but ultimately, stock definitions within the FMP are policy decisions based on the best scientific information available.

Recent stock assessments also provide insight into the proportion of landings in U.S. waters that can be attributed to the NSP and SSP. Following the 2021 catch-only update, wherein the biomass of landings in Mexico attributed to the NSP exceeded the estimated biomass for the entire NSP in the 2020 benchmark assessment, Demer and Zwolinski (2023) produced an updated habitat model for the subpopulations to revise the classification of landings. This updated habitat model was incorporated into the 2024 benchmark stock assessment reporting updated proportions of NSP. Based on the updated habitat model Zwolinski & Demer, 2023) applied to data in recent stock assessments, a large portion of catch in U.S. waters, all of which is attributed to NSP in-season, is attributed to the SSP (see Table 1), particularly in recent years.

Table 1: Total U.S. Pacific sardine landings (mt) by fishing year since the onset of federal management and NSP landings (mt and percentage of total) using the updated habitat model. Source: 2025 Stock Assessment Update for Pacific Sardine. Landings for the 2024-2025 fishing year are incomplete.

Fishing Year	Total Landings	NSP Landings	% NSP
2009	72,847	61,220	84
2010	60,862	49,751	82
2011	55,017	43,725	79
2012	86,230	76,410	89
2013	69,833	63,832	91
2014 (1)	6,806	6,121	90
2014-2015	23,113	19,969	86
2015-2016	1,919	75	4
2016-2017	1,885	602	32
2017-2018	1,775	351	20
2018-2019	2,278	525	23
2019-2020	2,062	627	30
2020-2021	2,276	657	29
2021-2022	1,772	298	17
2022-2023	1,620	565	35
2023-2024	1,774	844	48
2024-2025*	772	267	35

Externally, the California Wetfish Producers Association has funded research to elucidate the stock structure of Pacific sardine using a combination of data sources in response to "immense frustration" among fishers over the closure of the directed fishery (Pleschner-Steele, 2024). The paper co-authored by Ms. Pleschner-Steele and Dr. Parrish is yet to be published.

Stock structure of Pacific sardine has also been discussed at the Trinational Sardine and Small Pelagics Forum, a conference of scientists and stakeholders from the U.S., Mexico, and Canada. Most recently in 2022, Ruben Rodriguez-Sanchez, Hector Villalobos, and Sofia Ortega-Garcia presented their work to understand the spatial population dynamics of sardine in the California Current system. When asked whether their data suggests the existence of a coastwide population, the presenters stated that the data did not deny the existence of multiple stocks but rather demonstrated that these stocks are dynamic in time and space, and adaptation to available favorable habitats will generate modest mixing amongst the stock. Multiple defined habitats are also most recognizable when the stock expands, but less so when unfavorable habitats shift and the stock shrinks (Rodriquez-Sanchez, Villalobos, & Ortega-Garcia, 2022).

The emergence of Japanese sardine (*Sardinops melanosticta*) off U.S. waters is another subject of research that could potentially influence management of sardines present in the U.S. Exclusive Economic Zone (EEZ). A 2024 SWFSC presentation and subsequent publication reported that Japanese sardine were discovered in genetic sampling of survey samples off the U.S. west coast in 2022 and 2023. Shifts in frequency and intensity of warm water anomalies and marine heatwaves are hypothesized causes for shifts in species ranges, including the novel presence of Japanese sardine along the U.S. west coast (Longo, et al., 2024). The 2024 CPS survey detected Japanese sardine across the survey area; among 613 sardine samples, 18.3 percent were determined to be Japanese sardine (Longo, James, Hinton, Topping, & Craig, 2025).

2.1.1.2 Priority and Management Level

The topic of stock structure is important to the goal of managing all sardine stock(s) in need of conservation and management in the U.S. EEZ. While only the NSP is currently defined for management in the CPS FMP, from the most recent science described above, the SSP (as currently defined) and Japanese sardine are also present to some extent in U.S. waters. The presence of these fish has led to restriction of the fishery as all catches are attributed to the NSP, as well as contributed to uncertainty in the stock assessment.

In November 2024, the CPSAS and CPSMT recommended that the stock structure of Pacific sardine be considered the primary CPS management priority and requested relevant steps be taken for coastwide U.S. management of Pacific sardine. The CPSAS noted unnecessary constraints to CPS fleets could be alleviated by ensuring all sardine encountered in U.S. waters are under U.S. management (Agenda Item C.6.a, Supplemental CPSAS Report, November 2024), a topic which has been routinely brought up by the advisory body's statements and public comments by industry members in recent years. After the 2022 stock structure workshop, the CPSAS reported some of industry members' frustration in an April 2022 statement, sharing comments like, *"We have lost our fishery. This has been a road to nowhere,"* and *"Fishing management is in the same place it was 20 years ago,"* (Supplemental CPSAS Report, Item E.3.a, April 2022). The CPSMT noted the absence of in-season catch accounting to subpopulations under the current management regime as a shortcoming negatively impacting CPS fisheries (Supplemental CPSMT Report, Agenda Item C.6.a, November 2024).

In considering a systematic approach to taking action on CPS science and management priorities, stock structure sits at the 'base' level of management. Defining stocks is one of the foundational building blocks of fisheries management. All other science and management topics will depend on how stocks are defined. Questions such as productivity, population size, stock status, and the appropriate management of that population will depend upon how a stock is defined and therefore measured. If stock structure is changed for a managed species, it will be necessary to re-evaluate other aspects of management, including the inputs to harvest control rules such as E_{MSY} (see Section 2.2). For instance, if Pacific sardine stocks are redefined in the CPS FMP, new methods for developing harvest control rules (HCRs, including components such as DISTRIBUTION) would also need to be coordinated with that action.

From a prioritization standpoint, addressing fundamental issues of science and management should be first in a sequence of workload priorities. This is because of the effect this question has on any subsequent management or science question. Prior public comments, advisory body and workshop

reports, and research, have recommended Pacific sardine stock definitions as a high priority topic and potential first step for the CPS fishery.

2.1.1.3 Workload Considerations

A change in the definition of the stock(s) in the CPS FMP may necessitate several additional coordinated actions, such as identifying sustainable yield of potentially re-defined stocks, updating stock status, redefining assessment needs and cycles as needed, and defining appropriate management measures. It would also require amendment(s) to the CPS FMP. Near-term work on this topic would impact the 2027 benchmark assessment (currently planned for the NSP only) and require appropriate planning to incorporated into the multi-year assessment planning process. If this topic is prioritized, the first steps would include a review of updated scientific information on stock structure, defining a range of alternatives for stock structure definitions, and considering potential implications and coordinated actions (e.g., defining HCRs) for each alternative. Changes and additions to any HCR formulas and implementation of other management measures are authorized by the FMP (Section 2.2.3) and may be accomplished through the point-of-concern mechanism (Section 2.1.1) or the socioeconomic mechanism (2.1.2).

2.2 USE OF E_{MSY} IN PACIFIC SARDINE HARVEST CONTROL RULES

E_{MSY} is a key component in the formula for Pacific sardine HCRs, including the overfishing limit (OFL), allowable biological catch (ABC) and ACL. HCRs for Pacific sardine are calculated annually based on an estimate of that year's biomass (CPS FMP Sections 4.6.3, 4.6.4).

The Pacific sardine HCRs include the following:
OFL = Biomass * E_{MSY} * Distribution
ABC = Biomass * BUFFER * E_{MSY} * Distribution
ACL = LESS THAN OR EQUAL to ABC
ACT = OPTIONAL; LESS THAN ACL

In the context of the HCRs, biomass is the age 1+ biomass of the Pacific sardine in the middle of the year for which OFL is needed. It is estimated in annual stock assessments. The E_{MSY} input is an estimate of the exploitation rate of the stock at maximum sustainable yield (MSY). F_{MSY} is an instantaneous measure of the fishing mortality rate corresponding to deterministic equilibrium MSY, but an annual exploitation rate, E_{MSY}, is when computing the OFL. The value used for E_{MSY} is therefore determined annually based on recommendations from the Council's SSC.

Currently, the E_{MSY} term for Pacific sardine is based on an environmental relationship to productivity of the stock, derived from the CalCOFI index, a temperature-based relationship (see footnote of CPS FMP section 4.6.4). This environmentally informed approach modifies the harvest rate for Pacific sardine based on changes in sea surface temperatures (SST) to account for the boom-and-bust cycles of stock population dynamics driven by environmental variability. The currently used E_{MSY} relationship is detailed in the footnote in section 4.6.4 of the CPS FMP, adopting use of the use of the CalCOFI temperature index in the E_{MSY} equation, and revising the upper and lower bounds of the fraction to 5 and 20 percent, respectively. However, specific use of the CalCOFI index is not required per the CPS FMP and other environmental relationships and static values have historically been used to derive E_{MSY}. Alternatives to the current HCR may also be developed that do not use E_{MSY} at all. If the goal of managing this dynamic stock is to sustain a

fishery in the face of environmental changes and account for environmental drivers of population dynamics in the management process, then the Council may wish to consider all options for achieving this goal, including deriving a new E_{MSY} or alternatives to E_{MSY}.

2.2.1.1 Previous Work and State of the Science

Recent comments by the SSC (Scientific and Statistical Committee Report on Pacific Sardine Assessment, Harvest Specifications, and Management Measures - Final Action. Agenda Item E.4.a, April 2021) and a U.S. District Court decision have prompted NMFS to review the CalCOFI temperature-based relationship.

A review of environmental relationships for use in HCRs for Pacific sardine is not unprecedented. In 2013, a workshop on Pacific sardine harvest parameters was held, which considered recommendations for a new predictive relationship between recruitment success and environmental variables, following a review of the relationship between the SST at Scripps Institution of Oceanography (SIO) Pier and sardine recruitment strength (Pacific Sardine Harvest Parameters Workshop. Situation Summary, Agenda Item I.1, April 2013). From this workshop, the panel of experts made the recommendation, further endorsed by the SSC and Council, to use the CalCOFI temperature index, as well as a revised E_{MSY} relationship, for use in HCRs for Pacific sardine. In 2014, the Council took action to adopt the use of this new temperature index and the use of CalCOFI SST data for specifying an environmentally dependent E_{MSY} each year (National Marine Fisheries Report. Situation Summary, Agenda Item E.1, November 2014).

In February 2025, NMFS produced a re-evaluation of the relationship between the SST produced by the CalCOFI survey and Pacific sardine recruitment dynamics (Agenda Item G.3, Attachment 2, April 2025). The results of this re-evaluation were compared with the results of the 2013 Pacific sardine harvest parameters workshop. The analysis was presented for review by the CPS Subcommittee of the SSC at their February 2025 meeting. Overall, the results demonstrate that there is still a valid statistical relationship between CalCOFI SST and sardine productivity, though the predictive power did not appear to be as strong as in the 2013 analysis (SSC CPS Subcommittee Report, available with April 2025 SSC materials). Results of the evaluation in context of the E_{MSY} will be presented to the SSC and the Council for consideration in the Council's decision making during the 2025-2026 Pacific sardine harvest specifications agenda item at this meeting (Agenda Item G.3, Attachment 2, April 2025)

If a new environmental relationship is ever suggested to derive E_{MSY}, the SSC has recommended the following analysis: evaluation of the relationship between recruitment and the specific environmental variable as well as a simulation to compute E_{MSY} as a function of the environmental variable (Scientific and Statistical Committee Report on Stock Assessment Terms of Reference - Final Action. Agenda Item I.4.a November 2022.) Per COP 26, this process would first require a proponent to propose a methodology review of the updated E_{MSY}, then complete the analyses required, present results, and respond to potential requests for further analyses (Scientific and Statistical Committee Report on Stock Assessment Terms of Reference - Final Action. Agenda Item I.4.a, November 2022). Upon reviewing the 2025 evaluation of the relationship between CalCOFI SST and recruits-per-spawner for Pacific sardine, the SSC CPS Subcommittee recommended performing a Management Strategy Evaluation (MSE) comparing the expected performance of static values versus temperature-dependent E_{MSY} and potentially deriving a new

E_{MSY} formula or value, if deemed necessary (SSC CPS Subcommittee Report, available with April 2025 SSC materials).

2.2.1.2 Priority and Management Level

The CPSMT recommended E_{MSY} in Pacific sardine management as a long-standing priority topic in November 2024 (Pacific Fishery Management Council (PFMC), 2024b). Ultimately, an environmentally informed input to the HCR formula is intended to reflect changes in the stock in response to environmental variation. If the Council chooses to prioritize this topic in light of the 2025 NMFS analysis, they could consider deriving a new E_{MSY} for the HCR (status quo path) or consider other ways to generate an HCR that is resilient to environmental drivers of sardine population dynamics. Therefore, the priority level for this science and management topic should be evaluated at the April 2025 meeting, taking into account recommendations made by the SSC and the CPS Subcommittee after their review of the CalCOFI analysis. Further, the topic may continue to be monitored on an ongoing basis, with evaluations of E_{MSY} taken up as the Council deems necessary and per the point-of-concern framework outlined in the FMP (Section 2.1.1).

Relative to other items in the list, use of E_{MSY} in Pacific sardine harvest control rules is sequentially tied to the Pacific sardine stock definitions (section 2.1). If stock definitions for Pacific sardine are changed, the HCR for the new operational stock will likely also need to change, including inputs to the HCR formulas such as E_{MSY}. Therefore, efforts to derive a new E_{MSY} formula or value for the NSP of sardine would be made void if followed by a change in stock definitions for Pacific sardine (i.e., if going to a single stock).

2.2.1.3 *Workload Considerations*

The Council may consider the SSC CPS Subcommittee's recommendation to perform an MSE to potentially derive a new E_{MSY} sometime in the future (SSC CPS Subcommittee Report, available with April 2025 SSC materials). If alternatives to E_{MSY} in the HCR formula need to be analyzed in the future, that action will incur a higher workload. It may also be useful to consider whether a new approach can be taken to revising E_{MSY} and the HCRs. For instance, E_{MSY} or another input could be dynamically considered in each assessment and harvest specification cycle, rather than requiring a large workload to revisit and evaluate the relationship every several years. Near-term work on this topic would impact the 2027 benchmark assessment and require appropriate planning to be incorporated into the multi-year assessment planning process. Work on this topic should also be coordinated with other priorities that are identified from this list to ensure efficient sequencing.

2.3 DISTRIBUTION TERM IN CPS HARVEST CONTROL RULES

Transboundary CPS stocks can be difficult to manage, particularly without the establishment of an agreement with Mexico or Canada. According to the CPS FMP (section 4.2), in cases where biomass estimates include portions of a population in foreign waters, a DISTRIBUTION term is used to estimate the percentage of the population in the U.S. EEZ. The DISTRIBUTION term was initially set during the implementation of Amendment 8 to the CPS FMP, which converted the Northern Anchovy FMP to the CPS FMP, see pages B-86 through B-89 of the Final Environmental Impact Statement (FEIS) for Amendment 8 (Pacific Fishery Management Council (PFMC), 1998). The term is applied to the formulas for OFL, ABC, and harvest guideline (HG) to determine those harvest specifications. This is the default approach described in the FMP, though the FMP does note that other approaches may be used. For instance, the CPS FMP also provides an example of

using a "high CUTOFF in the MSY control rule to compensate for stock biomass off Mexico or Canada (CPS FMP Section 4.6). In this case, a higher CUTOFF threshold would trigger additional management measures, using adjusting harvest levels to account for portions of the stock outside U.S. waters. Per section 4.1.3.2 of Appendix B of the CPS FMP, managers may also decide, as a policy decision, a particular season of data on which to base the estimation of catch in U.S. waters. Managers may also choose to revise this estimate as additional data becomes available or if conditions in the fishery change. For most CPS stocks these DISTRIBUTION terms remain defined in the FMP:

Table 2: CPS DISTRIBUTION terms as defined in the CPS FMP

Stock	**DISTRIBUTION term**
Pacific sardine (NSP)	87%
Pacific mackerel	70%
Central subpopulation of northern anchovy (CSNA)	82%
Jack mackerel	65%

There is no DISTRIBUTION parameter set for the northern subpopulation of northern anchovy (NSNA) although the FMP (Section 4.6.2.2) does recognize that "the portion of the northern subpopulation of northern anchovy resident in U.S. waters is unknown. It is likely that some biomass occurs in Canadian waters off British Columbia." Market squid also does not have a DISTRIBUTION parameter set in the CPS FMP. However, the reference points for market squid are set based on the spawning population within the fishery's current range, therefore a DISTRIBUTION term is not relevant for this species.

Under Amendment 8 to the CPS FMP, two sources of data were used to establish DISTRIBUTION terms for the four stocks in Table 2; historical CalCOFI larval data and fisher spotter estimates were averaged to produce "best estimates" for most CPS. For the NSP of Pacific sardine, only fish spotter data was used to produce a best estimate. Advantages and disadvantages of developing a DISTRIBUTION term are noted in the FEIS for Amendment 8, with the most serious disadvantage being that the term must be estimated and actual portions of CPS in U.S. waters will "[vary] with season and is affected by a number of variables." (PFMC 1998 p. B-86). Upon defining and analyzing these inaugural percentages for the DISTRIBUTION term, it was also acknowledged in the FEIS that it is not possible to estimate the portion of CPS in U.S. waters (for DISTRIBUTION) frequently, let alone on an annual basis.

As currently codified as precise values in the FMP, it is difficult to update the DISTRIBUTION term to reflect additional and recent data or changes in the fishery. A framework or generalized rule for calculating a value would provide more flexibility compared to the current default values.

2.3.1 PACIFIC SARDINE

The DISTRIBUTION term for the NSP of Pacific sardine has perhaps been most contentious out of all CPS stocks due to potential changes in range shifts tied to oceanic conditions, debates over stock structure (see section 2.1), and the economic importance of the sardine fishery. Pacific sardine exhibit annual and inter-annual migratory patterns dependent on population dynamics and

oceanographic conditions, hence the actual portion of NSP in U.S. waters at any given time (annually or inter-annually) is highly variable (Kuriyama, Akselrud, Zwolinski, & Hill, 2024).

2.3.1.1 Previous Work and State of the Science

In 2015, a workshop was held to re-evaluate DISTRIBUTION due to a settlement agreement related to *Oceana Inc. v. Penny Pritzker, et al.* The purpose of the workshop was:

"To examine and discuss the DISTRIBUTION parameter in the Pacific sardine harvest control rule used in setting reference points to account for the presence of sardine in the waters of the United States, Mexico, and Canada. Workshop participants are expected to compile the best available scientific information on the distribution of Pacific sardines along the North American Pacific coast as well as examine potential alternative means of accounting for the fact that some portion of Pacific sardine stock exists and is subject to catch outside of U.S. waters."

(Pacific Fishery Management Council (PFMC), 2015a)

The workshop examined five alternatives to the set percentages for establishing DISTRIBUTION. Ranges of annual proportions of NSP in U.S. waters were estimated for several alternatives. The five alternatives included:

1. Setting the value for the DISTRIBUTION parameter annually as part of the specifications process based on the most recent data on the actual mean distribution of the Pacific sardine stock in U.S. waters.
2. Using landings information from Canada and Mexico to account for catch in the waters of those nations in estimating the DISTRIBUTION parameter in the HCR, using work from recently published scientific studies regarding Pacific sardine management.
3. Estimating the stock biomass in U.S. waters only, instead of the total sardine biomass, in the stock assessment.
4. Using a numerical-based DISTRIBUTION parameter as an alternative to the existing percent-based DISTRIBUTION parameter.
5. Using a temperature-based model to predict the proportion of Pacific sardines in U.S. waters for a particular year.

The workshop also reviewed the original analysis conducted for Amendment 8 and new analysis developed in anticipation of the workshop re-evaluating original estimates. Potential data sources to set DISTRIBUTION were also reviewed, including spotter data, acoustic-trawl data, ichthyoplankton data, and Canadian surveys were reviewed as potential data sources to set DISTRIBUTION.

Main conclusions of the workshop included:

- All methods for estimating proportion of biomass of NSP in U.S. waters are subject to uncertainty due to the seasonal and inter-annual changes in oceanographic factors and stock size.
- If the U.S. and Mexico acoustic-trawl surveys can be made comparable, it should be possible to estimate sardine biomass across its entire range.
- Spotter data could be re-analyzed to estimate yearly values for DISTRIBUTION.
- An environmental-based model estimate would not be suitable as the NSP is not likely to utilize their entire potential habitat.

- Landings data should not be used to estimate distribution.
- Accounting for inter-annual variation could be done by identifying various categorical variables to estimate biomass or by estimating the proportion of biomass in U.S. waters annually.
- Conducting an assessment and generating an estimate of only U.S. waters is infeasible and would lead to biased estimates of biomass.
- DISTRIBUTION could be removed from the HG HCR entirely in favor of another approach.
- It would be beneficial to initiate discussions with Mexico and Canada toward more coordinated management.

Recommendations for research required to pursue any of the five described alternatives were also developed and described in pages 16-17 of the workshop report. Ultimately, in November 2015, the Council recommended maintaining the DISTRIBUTION term of 87 percent for the northern subpopulation of Pacific sardine, which was also recommended by the SSC, CPSMT, and CPSAS (Agenda Item H.1.b, Supplemental SSC, CPSMT, and CPSAS Reports, November 2015 (Pacific Fishery Management Council (PFMC), 2015b, 2015c, 2015d).

Following presentation of the workshop report, the SSC agreed with several of the workshop's conclusions, including that the workshop had not produced a better estimate of DISTRIBUTION compared to the working 87 percent static percentage. Further, sufficient analyses had not yet been conducted to evaluate potential changes to the HCR via the DISTRIBUTION term. However, workshop participants noted several shortcomings of the current approach and provided recommendations to improve DISTRIBUTION; for instance, an expanded and coordinated coastwide acoustic-trawl sampling program, inclusive of Canadian and Mexican waters and application of modern regression models were suggested (Scientific and Statistical Committee Report on Pacific Sardine Distribution Workshop, Supplemental SSC Report, Agenda Item H.1.b, November 2015). Most recently, in April 2024, the SSC further commented during the setting of the 2024-2025 Pacific sardine harvest specifications that "the catch of sardine attributed to the NSP in Mexican waters appears to have declined over time, suggesting that the static DISTRIBUTION term used to apportion the OFL for the NSP should also be reconsidered," (Scientific and Statistical Committee Report on Pacific Sardine Harvest Specifications and Management Measures for 2024-2025 - Final Action, Supplemental SSC Report 1, Agenda Item I.3.a, April 2024).

2.3.1.2 Priority and Management Level

The CPSMT recommended DISTRIBUTION terms as a long-standing priority topic in November 2024 (Pacific Fishery Management Council (PFMC), 2024b).

There are several approaches to working on the DISTRIBUTION topic. New values could be derived for CPS distribution in U.S. waters and updated in the FMP. Alternatively, a new process or framework may be developed to guide more dynamic updates to the DISTRIBUTION term as science and new information evolves. In other words, not set the value directly in the FMP. The goal of either of these approaches is to ensure that the HCRs accurately account for the proportion of each transboundary CPS stock that is present in U.S. waters.

Participants in the 2015 workshop noted that all deliberations were conditional on the existence of a northern and southern subpopulation of Pacific sardine. Given the uncertainty regarding stock structure of Pacific sardine, workshop participants recommended continued research focusing on the stock structure of Pacific sardine. If the stock structure is changed (section 2.1), it will also be necessary to re-evaluate DISTRIBUTION to be consistent with the working stock structure hypothesis. The SSC agreed with this conclusion and the research recommendation above in their report reviewing the workshop conclusions (Scientific and Statistical Committee Report on Pacific Sardine Distribution Workshop, Supplemental SSC Report, Agenda Item H.1.b, November 2015). Coordinated transboundary management of CPS stocks with Mexico and Canada has also been recommended by the CPSMT and is another long-term avenue to pursue.

2.3.1.3 *Workload Considerations*

Changes to DISTRIBUTION would require coordination with scientists at the SWFSC to derive a new framework or value and a review by the SSC once derived. An FMP amendment would be required to either update the values set in the FMP or to replace these values with a framework for calculating DISTRIBUTION. Changes and additions to any HCR formulas are authorized by the FMP (Section 2.2.3) and may be accomplished through the point-of-concern mechanism (Section 2.1.1) or the socioeconomic mechanism (2.1.2).

2.3.2 NORTHERN SUBPOPULATION OF NORTHERN ANCHOVY

As described above, there is currently no DISTRIBUTION parameter set for NSNA in the CPS FMP. MSY for NSNA is based on a specified fixed F_{MSY} of 0.3, rather than an HCR formula including a DISTRIBUTION term. While the F_{MSY} value is recommended for management of the stock, that does not prohibit the Council from adding a DISTRIBUTION term for NSNA in the future.

2.3.2.1 Previous Work and State of the Science

The SSC has stated that due to both high uncertainty in the available biomass estimates and the large fluctuations in stock biomass that occur for species like anchovy, an alternative to a fixed biomass-based approach to specifying MSY could also be appropriate (Scientific and Statistical Committee Report on Establishing Maximum Sustainable Yield (MSY) Reference Point for Northern Anchovy. Agenda Item E.3.c, November 2013). If the HCR for NSNA was changed to a dynamic formula, the distribution of NSNA in waters of British Columbia would likely need to be incorporated.

2.3.2.2 Priority and Management Level

Overall, NSNA is not a highly targeted stock (the fishery brought in 65 mt in landings and $60,250 in ex-vessel revenue in 2023 (SAFE portal)). Therefore, it may not be a high priority at this time to understand the distribution of this stock. However, if there is a need in the future to account for the proportion of NSNA in U.S. waters in order to avoid overfishing of the stock, a DISTRIBUTION term may be derived. This may be best identified as needed through the point-of-concern framework outlined in section 2.1.1 of the CPS FMP. Currently, management of NSNA is less complex compared to other CPS stocks, with a simple, fixed MSY. However, additional complexity could be added to NSNA HCRs, for example, by adding a DISTRIBUTION term. This

additional complexity may require additional scientific information on the species and/or stock to be collected.

2.3.2.3 *Workload Considerations*

Developing a DISTRIBUTION term would require coordination with survey and stock assessment scientists and review by the SSC. Changing the HCR formula and adding a DISTRIBUTION term requires FMP amendment. Changes and additions to any HCR formulas are authorized by the FMP (Section 2.2.3) and may be accomplished through the point-of-concern mechanism (Section 2.1.1) or the socioeconomic mechanism (2.1.2).

2.4 STOCK ASSESSMENTS

Stock assessments are a critical input to monitor the status of CPS stocks and generate specifications that support conservation and management of CPS. Stock assessments are typically improved as new methods, new information, and published studies become available, subject to the review of stock assessment review (STAR) panels. Stock assessments are also resource-intensive in terms of SWFSC staff capacity, and therefore, benchmark stock assessments are typically balanced with interim update assessments and catch-only updates. Every other November since 2022, the Council also goes through the Stock Assessment Prioritization process for CPS, recommending which stock assessment activities should be prioritized for the following two management years, potentially requiring deviation from the general schedules outlined in COP 9 and summarized in Table 3, below.

Table 3:Stock assessment schedules for species managed under the coastal pelagic species fishery management plan.

Species	Assessment Schedule
Pacific sardine	Assessed every three years with updates in interim years
Pacific mackerel	Assessed every four years, with a catch-only update in the second interim year
CSNA	Assessments are conducted every eight years, and both the catch levels and survey estimates are evaluated every two years to determine if adjustments to harvest parameters should be made or if the assessment schedule should be adjusted (framework available in Figure 1 of COP 9)
Jack mackerel	No schedule
NSNA	No schedule
Market Squid	Managed largely by States

2.4.1 PACIFIC MACKEREL

Typically, Pacific mackerel benchmark assessments are conducted every four years, with a catch-only projection in the second interim year.

2.4.1.1 Previous Work and State of the Science

In their November 2024 supplemental report under Agenda Item J.3 – Stock Assessment Prioritization, the CPSAS noted that high-level assessments of Pacific mackerel were a relative low priority (Supplemental CPSAS Report, Agenda Item J.3.a, November 2024). The CPSAS also recommended the Council consider a different, lower-frequency process for assessing Pacific mackerel, such as the current framework for assessing CSNA (see COP 9)

2.4.1.2 *Workload Considerations*

A reduction in the frequency of mackerel assessments, if determined to be possible, could reduce the workload of the SWFSC, NMFS West Coast Region, and Council staff, potentially freeing up capacity for other priority topics in highly targeted fisheries. This modification would require a change to COP 9.

2.4.2 NORTHERN SUBPOPULATION OF NORTHERN ANCHOVY

NSNA has never been formally assessed, and while not highly targeted, is the target of some harvesting effort (ranging from 31 mt to 113 mt 2017-2023; CPS SAFE portal).

2.4.2.1 Previous Work and State of the Science

In their November 2024 report under Agenda Item J.3 – Stock Assessment Prioritization, the CPSMT recommended the Council consider requesting an assessment of the stock in the future Coastal Pelagic Species Management Team Report on Stock Assessment Prioritization, Supplemental CPSMT Report 1, November 2024). The CPSAS concurred that there could be benefits of future assessments of NSNA, though this was not an imminent need. An annual stock assessment of NSNA would allow for the HCRs to move away from a set MSY to an annual ACL, making harvest specifications more responsive to changing conditions (see section 2.3.2). As described above in section 2.4.1.1, the process for scheduling the assessments of other minimally targeted stocks has been generated to balance regular evaluation with the associated resources required for this work.

2.4.2.2 Workload Considerations

A new assessment methodology would require a high level of coordination with the SWFSC (survey and stock assessment scientists) as well as the SSC. Changes to the CPS survey may be required to accommodate a new assessment methodology for NSNA. Overall, capacity would potentially take away from the ability to do status quo CPS management. Scheduling a regular assessment would require changes to COPs and potentially an FMP amendment if HCRs subsequently require change.

2.4.2.3 Priority and Management Level (Considering both Pacific Mackerel and NSNA)

As reiterated throughout this document, Pacific mackerel and NSNA are lower-priority CPS fisheries, given their relative level of fishing pressure. Reducing stock assessment frequency for Pacific mackerel, as described in 2.5.1, may open capacity to take on other priorities in this list. Adding a stock assessment for NSNA, though described by the CPSMT as a potential long-term goal, has not been recommended as a near term priority (Supplemental CPSAS Report, Agenda Item J.3.a, November 2024). This topic is likely not relevant to current management goals unless there is a significant increase in landings NSNA or other reason to re-evaluate the HCRs identified

in the future. As described in section 2.3.2, relying on the point-of-concern framework outlined in section 2.1.1 of the CPS FMP would be an established mechanism for identifying if and when significant changes to the stock assessment are needed. Under this framework, the Council may also choose to monitor this topic until a management need emerges. However, it must be noted that stock assessments are close to the "base" level of management as inputs to harvest control rules, and changes in stock assessments should likely precede, or at least run parallel to, more complex management topics like developing a DISTRIBUTION term for NSNA (see section 2.3.2).

2.5 MANAGING ANNUAL OPPORTUNITY

2.5.1 CSNA ACL

In May 2024 NMFS issued a final rule (89 FR 28679) implementing multi-year annual reference points for CSNA including an OFL of 243,779 mt, an ABC of 60,945 mt and an ACL of 25,000 mt. The OFL and ABC both increased from the reference points issued in 2020 (119,153 mt and 28,788 mt, respectively (85 FR 86855)), while the ACL remained static.

2.5.1.1 Previous Work and State of the Science

As described in section 2.5.3 of this document, the flowchart in COP 9 (Figure 1) dictates the parameters for managing CSNA. This framework determines the frequency with which the stock is assessed, as well as the parameters for initiating a change to the harvest control rules. However, this framework focuses on the acceptable biological catch (ABC) but does not dictate the parameters for revising the ACL. While landings of CSNA have been relatively low in recent years, in previous decades, market demand has led to higher landings. From 1965 to 1977, reduction landings of anchovy ranged from 12,515 mt per year to 141,586 mt per year (Pacific Fishery Management Council (PFMC), 2024h). In response to decreases in fish meal prices, landings declined to an annual average of 46,500 mt from their peak during 1979-1982. Landings intended for processing into fish meal and oil have been extremely low since then, largely due to low ex-vessel prices and reduced consumer demand, rather than low anchovy abundance. If a market does emerge for anchovy again in the future, the current ACL, which is set to be much lower than the ABC, may limit the opportunity for the CPS fishery to respond to that opportunity. Further, in their 2022 report on the assessment and harvest specifications, the CPSMT noted the upward trend of the stock's population, favorable ecosystem conditions, and no need to recommend an ACL lower than the ABC and the CPSAS concurred with this conclusion (Coastal Pelagic Species Management Team Report on Central Subpopulation of Northern Anchovy Assessment and Harvest Specifications, Supplemental CPSMT Report 1, Agenda Item D.1.a, June 2022). The Council, however, recommended the 25,000 mt ACL to take a precautionary approach, noting uncertainty in the assessment, low recent catch levels (under 25,000 since 1999), and the importance of anchovies in the ecosystem.

2.5.1.2 Priority and Management Level

At this time, the CPSAS and individual industry members have not expressed concerns for explicit restriction of the CPS fishery by the ACL set for CSNA. However, both the CPSMT and the CPSAS have recommended a higher ACL than was set by the rule. Therefore, while this item might not be a near-term need, Council staff predict it may be a topic of interest in the future to adjust the ACL to allow for higher opportunities when available.

2.5.1.3 *Workload Considerations*

Changes to the annual management process would require changes to status quo management and the COPs and any change to the ACL itself would require a regulatory amendment.

2.5.2 INCIDENTAL LANDING LIMITS

Section 5.2 of the CPS FMP guides the setting of incidental catch limits to minimize fishing mortality on overfished stocks and minimize discards of overfished stocks, while allowing catches that are difficult to avoid during normal fishing for other species. For CPS species these limits are as follows:

"When a stock is not overfished as defined in the FMP, incidental catch allowances for commercial fishing shall be set at 0 percent to 45 percent of landed weight, as recommended by the Council (FMP Section 5.2.2) …

When a stock is overfished as defined in this FMP, incidental catch allowances for commercial fishing shall be set at 0 percent to 20 percent of landed weight, as recommended by the Council (FMP Section 5.2.1)."

2.5.2.1 Previous Work and State of the Science

Per the requirements in the CPS FMP, incidental landing limits of Pacific sardine in other CPS fisheries were reduced from 40 percent by weight per landing to 20 percent (see Section 5.1.1 of CPS FMP) in 2019 when the stock's biomass dropped below the 50,000-mt overfished threshold (also referred to as the minimum stock size threshold, MSST). In the 2024-2025 harvest specifications, the incidental landing limit was raised to 30 percent, as the stock's biomass had increased above the MSST (89 FR 93522).

In their April 2024 Reports, the CPSMT and CPSAS conferred that an increase in the incidental landing limit, now that the stock is above the minimum stock size threshold of 50,000 mt would provide more flexibility for other CPS fisheries that incidentally catch sardine (Coastal Pelagic Species Management Team Report on Central Subpopulation of Northern Anchovy Assessment and Harvest Specifications, Supplemental CPSMT Report 1, Agenda Item D.1.a, June 2022). The CPSAS has described restrictions on incidental catch as a major limiting factor to industry viability in their statement under (Coastal Pelagic Species Advisory Subpanel on Pacific Sardine Rebuilding Plan Fishery Management Plan Amendment, Supplemental CPSAS Report 1, Agenda Item J.2.a, November 2024). Public comments by industry members from 2021 through 2024 have also consistently expressed concern for the impacts of low incidental catch limits.

This topic has previously been evaluated by the CPSMT in various contexts. Amendment 17 to the CPS FMP (adopted by the Council in November 2018 (84 FR 40296)) removed the pre-specified 15 percent incidental landing limit for the live bait fishery. In the 2018 CPSMT statement on final action, the CPSMT noted that the 15 percent incidental landing limit may lead to direct and indirect economic costs through decreasing the availability of live bait (CPSMT report 1, Agenda Item E.3.a, November 2018). In April 2019, the CPSMT evaluated potential incidental allowance needs for CPS and non-CPS fisheries. The CPSMT determined that, at least for the 2019-2020 fishing

year when the ABC value dropped well below the ACL set in previous years (7,000-8,000 mt) to 4,514 mt, the maximum 20 percent incidental landing limit was recommended to minimize fishing mortality on the overfished stock while avoiding restriction of non-CPS fisheries that may incidentally harvest sardine (Supplemental CPSMT report 1, Agenda Item E.3.a, April 2019). The CPSMT has not, in recent years, recommended an increase in the incidental catch limit range set in the FMP.

2.5.2.2 Priority and Management Level

As described above, incidental landing limits have been a frequent concern for CPS industry stakeholders, expressed continuously in both CPSAS reports and public comments. However, the CPS FMP does require incidental allowances be set for overfished stocks, in priority order: 1) to minimize fishing mortality on overfished stocks, and 2) to minimize discards of overfished stocks (Section 5.1.6.1). As the stock biomass rebuilds, the Council may wish to consider this topic. Further, incidental landing limits are additional management measures that add layers of complexity to HCRs. If stocks are redefined, or components of HCRs are revised, incidental landing limits would also need to be re-considered. Therefore, sequentially, development of guidance for incidental landing limits would fall after the priorities described in sections 2.1-2.3.

2.5.2.3 Workload Considerations

The Council may consider reviewing the limits set in the FMP and potentially revising limits as they deem necessary. Review of these limits could reduce economic restrictions for CPS fisheries, while ensuring that incidental catch does not result in excess fishing mortality or discards. Changes to the incidental landing range would likely require additional analysis from the CPSMT or Council staff and an FMP amendment.

2.6 CONCURRENT COUNCIL PROCESSES

2.6.1 ADAPTIVE AND ECOSYSTEM-BASED MANAGEMENT

The Council is currently working on several cross-fishery management plan initiatives, including one project focused on adaptive management and flexibility (Agenda item C.4, April 2025). This project aims to identify how Council decision-making and implementation of Council actions can be more timely, efficient, and responsive to changing conditions in the ocean environment. Currently, the Council plans to apply recommendations from this project in the next several years. The Council may wish to coordinate the outcomes of this project with the priorities in this list. Several other projects external to the Council process have been ongoing, exploring ecosystem-based management for CPS (Future Seas, Ocean Modelling Forum). At any time, the Council may request an update from these research groups to inform Council priorities.

2.6.2 RESEARCH AND DATA NEEDS

The Council's Research and Data Needs (RDN) database (available online) also lists specific CPS research needs, including science priorities for improving the ATM survey, biology questions, and socio-economic data gaps, which the Council may access to inform action on priorities. In November 2024, the Council adopted top science and management challenges, as outlined in Agenda Item D.3, Attachment 1 (Pacific Fishery Management Council (PFMC), 2024h). The

CPSAS and CPSMT provided supplemental reports outlining their recommendations on the top-level challenges and topics related to CPS (Pacific Fishery Management Council (PFMC), 2024k, 2024l). As top science priorities emerge from the RDN process, the Council may wish to coordinate those priorities with those on this list to ensure cohesion.

3 SCIENCE AND MANAGEMENT PRIORITIES - PROPOSED PROCESS

Every November of even years, the Council undertakes the CPS stock assessment prioritization process, setting stock assessments for the upcoming years. The Council and its advisory bodies could use this same recurring timeline to discuss the current status of science questions related to the management of CPS, amend the list as necessary, and similarly prioritize items for the following two years. If work is still ongoing on current priorities or if capacity is limited, then the Council may choose to skip that prioritization meeting and schedule for a later time if necessary. This process could be incorporated into the COPs if deemed appropriate.

4 CONCLUSION

In conclusion, Council staff requests the Council take the information provided in this white paper, as well as any additional information provided in supplemental reports by NMFS and the CPS advisory bodies to set a workload list and top priorities for CPS Science and Management topics. By adopting a workload list, similar to the process that is already in place for groundfish (Groundfish Management Team Report on Workload & New Management Measures Update, Agenda Item F.8.a, REVISED GMT Report 1, March 2023, 2023), the Council may identify key science and management topics for CPS, working towards addressing priorities in a systematic and efficient manner. This list can be routinely revisited (see section 3, above) to address priorities when capacity allows and re-prioritize various topics based on evolving information and input from NMFS, advisory bodies, and fishery and conservation stakeholders. By adopting the first "near-term" priority (or priorities) from this list, staff could begin working on scoping the priority over the summer allowing the Council to have its first meeting on the top CPS priority in November 2025, taking next steps, such as describing a range of alternatives, as they see fit. The Council can also suggest a timeline for any top priority topics, informing the SWFSC on whether they need to anticipate changes to multi-year planning efforts for routine management. As described in section 1.1, generating innovations for the science and management of CPS fisheries has been requested for several years, but has long been postponed due to capacity and the need to prioritize routine actions. However, the information provided in this report is intended to allow the Council to finally take action to move such innovations forward.

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