Agenda Item J.1
Attachment 3
September 2026

Proposed Amendment to the Coastal Pelagic Species Fishery Management Plan to Revise the Pacific Sardine Stock Definition

September 2026

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List of Acronyms and Abbreviations

Acronym or Abbreviation	Meaning
ABC	acceptable biological catch
ACL	annual catch limit
ACT	annual catch target
BSIA	best scientific information available
CFR	Code of Federal Regulations
Council	Pacific Fishery Management Council
CPS	coastal pelagic species
CPSAS	Coastal Pelagic Species Advisory Subpanel
CPSMT	Coastal Pelagic Species Management Team
EO	Executive Order
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
FMP	fishery management plan
FMU	fishery management unit
FPA	final preferred alternative
HG	harvest guideline
iFPA	interim final preferred alternative
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSST	minimum stock size threshold
mt	metric ton
MSY	maximum sustainable yield
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NS	National Standards
NSP	northern subpopulation (of Pacific sardine)
OFL	Overfishing limit
OY	optimum yield
PFMC	Pacific Fishery Management Council
PPA	Preliminary preferred alternative
ROA	range of alternatives
SAFE	Stock Assessment and Fishery Evaluation
SDC	status determination criteria
SSB	spawning stock biomass
SSC	Scientific and Statistical Committee
SSC-CPSSC	SSC CPS Subcommittee
SSP	southern subpopulation (of Pacific sardine)
U.S.	United States

1.0 Introduction and Background

This action revisits the stock definition in the Coastal Pelagic Species Fishery Management Plan (CPS FMP) for Pacific sardine (Sardinops sagax), an economically valuable fishery resource off the U.S. West Coast. The term "stock of fish" means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit (Magnuson-Stevens Fishery Conservation and Management Act [MSA] § 3 104-297(42)). Table 1-1 in Section 1.2 of the CPS FMP defines the stocks included in the fishery management unit (FMU) and subject to the provisions of the FMP (see Table 1, below). The northern subpopulation (NSP) of Pacific sardine was defined as a stock in the CPS FMP when the Northern Anchovy Plan was converted to the CPS FMP (via Amendment 8) in 2000. At the time, a second southern subpopulation (SSP) of Pacific sardine was hypothesized to occupy the area south of the U.S. border on the west coast of North America, occasionally moving north into the waters off Southern California and overlapping with the NSP. However, newly available scientific literature on Pacific sardine, including genetic studies and a review of all preceding research on Pacific sardine population biology, reveals a lack of scientific evidence to support any population structure, including the long-held hypothesis that NSP and SSP are distinct subpopulations that underlies current management of sardine. Instead, this new information and thorough reviews of past hypotheses and population biology show Pacific sardine comprise a single, panmictic population without regional differences in demographics or other life history traits (e.g., growth) ranging from the Gulf of California, Mexico, to Canada (Longo et al. 2025; Craig et al. 2025; Erisman et al. 2025). While sardine in different locations may exhibit phenotypic differences, this is the result of phenotypic plasticity, individual variations, and a life history pattern in which growth, survival, and reproduction respond to changes in local to broad environmental conditions.

Table 1. Table 1-1 of the CPS FMP includes the FMU species which are "in the fishery" and subject to provisions of the FMP, including stocks managed under this FMP. The FMU species are specified within the Fishery Management Area, defined as the U.S. exclusive economic zone (EEZ) off the coasts of Washington, Oregon, and California between three and 200 nautical miles offshore, bounded in the north by the boundary between the United States and Canada, and in the south by the boundary between the United States and Mexico.

Common Name	Scientific Name
Pacific sardine	*Sardinops sagax*
Northern subpopulation	
Pacific (chub) mackerel	*Scomber japonicus*
Northern anchovy	*Engraulis mordax*
Central and northern subpopulations	
Market squid	*Doryteuthis opalescens*
Jack mackerel	*Trachurus symmetricus*
Krill or Euphausiids	*All Species in West Coast EEZ*
Including these eight dominant species.	*Euphausia pacifica*
First two species are common and are	*Thysanoessa spinifera*
most likely to be targeted by fishing	*Nyctiphanes simplex*
	Nematocelis difficilis
	T. gregaria
	E. recurva
	E. gibboides
	E. eximia

Considering the newly available information on Pacific sardine population structure alongside management needs, the Pacific Fishery Management Council (Council) has determined it appropriate to review the current stock definition for Pacific sardine, as described in the FMU of the CPS FMP.

When Councils identify and define a stock that requires conservation and management in their FMP (per § 302(h)(1) of the MSA), they must evaluate and describe reference points in their FMPs to align their management objectives to prevent overfishing of the stock and achieve optimum yield (OY). Currently, for Pacific sardine, these values are evaluated and described for the NSP stock that is defined in the CPS FMP, thereby necessitating a review of those reference points and the management framework in the CPS FMP for their potential applicability to a new stock. While current management follows best scientific information available (BSIA) to date, this action seeks to revise the sardine stock definition to align with new science, and accordingly, revise the FMP to implement management for a revised stock. Further, the FMP amendment proposed herein covers a review of management provisions for Pacific sardine to ensure that reference points and control rules align with BSIA and the appropriate extent of the stock, in order to prevent overfishing and attain OY.

1.1 History of this Action

In April 2025, the Council adopted a list of CPS science and management priorities. This list came together from the topics proposed by Council staff in Agenda Item G.5, Attachment 1 and the Scientific and Statistical Committee (SSC) in Agenda Item G.5.a, Supplemental Report 1, both available in the April 2025 briefing book. The priority topic scheduled for development from this list was "Pacific Sardine Stock Definitions," per the recommendations of the Coastal Pelagic Species Advisory Subpanel (CPSAS) and Coastal Pelagic Species Management Team (CPSMT). The Council also recognized this action as a priority item for responding to Executive Order (EO) 14276 Restoring American Seafood Competitiveness in September 2025 (September 2025 Decision Summary Document). In November 2025, the Council scoped an action to revise the stock definition specified in the CPS FMP's FMU, adopting a Range of Alternatives (ROA) and Preliminary Preferred Alternative (PPA) for the stock definition, due to newly published research on the population structure of Pacific sardine, describing a single population ranging from the Gulf of California, Mexico, to British Columbia, Canada.

In April 2026, the Council considered the update in scientific information to adopt an 'interim' Final Preferred Alternative (iFPA) stock definition. The selection of an iFPA indicated a preferred stock definition and was intended to provide a Council decision point to help focus the further development of the action and FMP amendment, which includes potential revisions to management provisions and reference points for sardine. At that meeting, the Council adopted Alternative 1 as the iFPA for the sardine stock definition in the CPS FMP's FMU. Alternative 1 would amend the CPS FMP (Section 1.2, Table 1-1) to define a stock of Pacific sardine in U.S. waters in the FMU, delineated coastwide.

The next steps to develop an FMP amendment package included a review of the key management provisions for Pacific sardine described in the CPS FMP (as outlined in Attachment 1 under this agenda item). Council and National Marine Fisheries Service (NMFS) staff's review included the CPS FMP and management provisions for CPS stocks, the requirements of an FMP per the MSA,

guidance for defining reference points and status determination criteria (SDC), and National Standard (NS) guidelines for meeting the foundational requirements of the MSA (i.e., prevent overfishing and achieve OY). This review, presented in Attachment 1, was first presented to the SSC CPS subcommittee (SSC-CPSSC), the CPSMT, and members of the CPSAS at their July 2026 joint meeting (see details below), and included a look at past work to analyze and set reference points and control rules for NSP and other stocks in the CPS FMP. In addition to a review of statutory obligations, the review also considered the unique dynamics of Pacific sardine, how the framework of the CPS FMP is designed to account for these dynamics, and the management objectives that may be considered in revisions to management provisions.

The July 2026 joint meeting, comprising the SSC-CPSSC, CPSMT, and representatives of the CPSAS, was held to develop initial recommendations for key management provisions (reference points and control rules) for the proposed revised Pacific sardine stock definition (U.S. stock), identified by the Council in April 2026, and the related amendment to the CPS FMP. Meeting participants prepared a final joint report including all recommendations from their review. This report, including sections from the SSC-CPSSC, CPSMT, and CPSAS is available for consideration by the Council and its SSC at the September 2026 meeting (Attachment 2). Recommendations from this report inform the development of the proposed FMP Amendment alternatives and options (for overfished SDC) below.

1.2 Purpose and Need

In November 2025, the Council adopted the following purpose and need for this action:

Due to newly published research on the population structure of Pacific sardine, this action aims to re-evaluate the Fishery Management Unit (FMU) for sardines in the CPS Fishery Management Plan (FMP). Specifically, the action will determine if the Pacific sardine stock in the FMU is defined consistent with current science.

This action is necessary to ensure Pacific sardine conservation and management is consistent with the goals and objectives of the Magnuson-Stevens Act, the National Standards, and the CPS FMP.

1.3 Description of Management Area

The proposed action area is inclusive of and limited to the United States West Coast EEZ, from 3 to 200 nautical miles offshore of Washington, Oregon, and California, bounded in the north by the Provisional International Boundary between the United States and Canada, and bounded in the south by the International Boundary between the United States and Mexico. The range of Pacific sardines can extend beyond the U.S. West Coast EEZ; however, U.S. jurisdiction and management for CPS stocks does not extend beyond the EEZ.

1.3.1 Description of the Fishery

The CPS Fishery has been an economically valuable fishery for California, Oregon, and Washington for more than 100 years, with Pacific sardine as a primary target. The directed commercial fishery has been closed since July 1, 2015. Pacific sardine continues to play an important role in West Coast fisheries through its integration as live bait in West Coast recreational fisheries, primarily in Southern California, though also in commercial albacore fishing off Oregon and Washington. Minor directed fisheries for Pacific sardine also still operate. A full description

of CPS and the Pacific sardine fishery can be found in the annual Stock Assessment and Fishery Evaluation (SAFE) document (PFMC 2025a).

2.0 Description of Alternatives

The proposed ROA below represents the full FMP amendment to revise the Pacific sardine stock definition in the FMU of the CPS FMP and management provisions for this stock. The proposed ROA includes the components of the FMP Amendment that Council and NMFS staff have determined, based on their review of the CPS FMP, MSA, and NS guidelines, require attention for the revised Pacific sardine stock to meet the requirements of a stock in an FMP. These components include the stock definition itself, as well as select management provisions (reference points and control rules) within the CPS FMP's framework.

The ROA for the FMP amendment is organized into three connected and sequential actions:

- Action 1 addresses the stock definition and reflects the iFPA previously adopted by the Council.
- Action 2 addresses status determination criteria (SDCs) and associated reference points and control rules, including the minimum stock size threshold (MSST), overfishing limit (OFL), and acceptable biological catch (ABC).
- Action 3 addresses additional reference points and harvest control rule provisions within the CPS FMP framework, including annual catch limit (ACL) and harvest guideline (HG).

As described above, the Council has previously adopted an ROA and an iFPA related to the Pacific sardine stock definitions for an FMP amendment, therefore Action 1 has already been addressed by the Council and is not scheduled for further action at this meeting. Selection of a stock definition was a necessary step to facilitate development of a comprehensive FMP amendment inclusive of management provisions for the stock. While the stock definition alternatives are presented below as a part of this FMP amendment, no action is required at the September 2026 meeting on Action 1 (Revising the Pacific sardine stock in the FMU of the CPS FMP). In November 2026, the Council is anticipated to take final action on the complete FMP amendment and will make an FPA recommendation on all action items, including the stock definition (Action 1), at that time.

Therefore, at this meeting (September 2026), the Council is scheduled to take action to adopt an ROA and PPA for the remainder of the FMP Amendment, including Actions 2 and 3, based on the Council's adoption of an iFPA, indicating a revision to the Pacific sardine stock and thus establishment of reference points and control rules for the revised stock.

The proposed ROA does not include management provisions within the CPS FMP that Council and NMFS Staff determined do not require attention under this action; these provisions include, but are not limited to, essential fish habitat (EFH), incidental limits, guidance for directed fishery closures and seasonal allocation. The proposed ROA also does not include aspects of CPS management that are part of the Council's process for adopting BSIA and setting harvest specifications (e.g., adopting assessments, calculating E_{MSY} values). The rebuilding plan for NSP (Amendment 23 to the CPS FMP) would also be removed under this amendment, as the plan would not apply to the U.S. Pacific sardine stock. The SDCs included within this amendment will be

applied to determine overfishing and overfished stock status for the U.S. Pacific sardine stock. Attachment 4 highlights the sections of the FMP that Council and NMFS staff have determined may be revised within this FMP amendment.

As described in staff's review of Pacific sardine management provisions (Attachment 1), the CPS FMP is designed to meet the requirements of the MSA and guidance of the NS's as well as CPS-specific management objectives via framework management, including both more intensive and less intensive management approaches. Based on the recommendations of the joint meeting participants (Attachment 2), all action alternatives within Actions 2 and 3 apply the "more intensive" management approach, including the related OFL, ABC, ACL, and 'general' HG control rule. This approach was previously utilized for NSP and was recommended to be applied to the U.S. Pacific sardine stock by the joint meeting participants (see report, Attachment 2). Consistent application of a single approach across reference points and control rules (i.e., Actions 2 and 3, below) is intended by the CPS FMP.

The proposed ROA also incorporates NS guidance and NMFS technical guidance, including those for SDC (Restrepo et al. 1998, Methot et al. 2025, see full references incorporated in Attachment 1). The MSA requires FMPs to specify "objective and measurable criteria for identifying when a fishery to which the plan applies is overfished," (MSA section 303(a)(10)). NS1 guidelines explain that FMPs should describe how objective and measurable status SDC will be specified to determine both overfishing and overfished status (50 CFR 600.310(b)(1)(ii)). A NMFS white paper on flexible status determination criteria (NMFS 2024) provides additional guidance to define flexible SDC in FMPs that ensure SDC are consistent with both BSIA and the regulatory process. The white paper guidance includes approaches such as using reasonable proxies and defining multiple methodologies and possible circumstances under which each could be applied, which are incorporated into the proposed ROA, specifically for MSST.

2.1 Proposed Range of Alternatives – FMP Amendment

Action 1 - Revising the Pacific sardine stock in the FMU of the CPS FMP (No Additional Council Action Needed in September 2026)

No Action – *The Council would not define stocks other than those currently defined in the CPS FMP (Section 1.2, Table 1-1). Only the northern subpopulation of Pacific sardine would continue to be defined as a stock in the FMU.*

Alternative 1 (iFPA) – *The Council would amend the CPS FMP (Section 1.2, Table 1-1) to define a U.S. stock of Pacific sardine in the FMU, delineated coastwide.*[1]

Note, under Alternative 1, delineated coastwide means the fishery management area (i.e., the EEZ off the coasts of Washington, Oregon, and California between 3 and 200 nautical miles offshore, bounded in the north by the Provisional International Boundary between the U.S. and Canada, and bounded in the south by the International Boundary between the U.S. and Mexico.)

[1] Council staff have made editorial revisions for clarity to the wording of the ROA adopted by the Council in November 2025. The revisions do not change the intent of the Council's adopted ROA.

Action 2 - Pacific Sardine Status Determination Criteria and Related Reference Points and Control Rules

No Action – *No status determination criteria or related reference points and control rules would be adopted for the U.S. stock of Pacific sardine.*

Alternative 1 – *Status determination criteria would be adopted for the U.S. stock of Pacific sardine, per the framework outlined in Table* 2.

Table 2. Pacific sardine status determination criteria and related reference points and control rules to be applied under Action 2, Alternative 1.

FMP Element	Specification
Management Strategy	More intensive (i.e., general harvest control rule)
Overfished SDC	Biomass < MSST
a) Static Specification of MSST	MSST = X mt age 1+ biomass or reasonable proxy[2]
b) Formulaic Specification of MSST	MSST = X%SSB_0 where X% is determined upon BSIA (bound between y and z) or other reasonable proxy[2]
Overfishing SDC	Catch > OFL
OFL	BIOMASS * E_{MSY} * DISTRIBUTION
ABC	BIOMASS * BUFFER * E_{MSY} * DISTRIBUTION
DISTRIBUTION	1

Note, the parameters within the control rules are also included within this Alternative, as applicable. BIOMASS is generally the estimated biomass of fish age 1+ at the beginning of the season, E_{MSY} is the exploitation rate for deterministic equilibrium maximum sustainable yield (MSY), BUFFER is comprised of the Council's risk policy (P* and sigma), DISTRIBUTION is the estimated long-term average portion of the stock biomass in the U.S. Also note that while E_{MSY} is a parameter within the OFL and ABC control rules proposed under Alternative 1, there are numerous options to set and calculate E_{MSY} (as detailed in Attachment 1), and its value is established during the harvest specifications cycle through the BSIA framework including review by the SSC. Therefore, calculation of an E_{MSY} is separate from this FMP amendment. The SSC-CPSSC had preliminary discussions at the July 2026 meeting on E_{MSY} (page 11 of Attachment 2) but no decisions on E_{MSY} need to be made at this time.

Regarding the SDC portion of the proposed ROA, the Council may specify values in the place of "X" when adopting an ROA. The Council may also specify values "y" and "z," static values to

[2] Per National Standard 1 at 50 CFR 600.310(e)(2)(ii)(B) The MSST or reasonable proxy must be expressed in terms of spawning biomass or other measure of reproductive potential. MSST should be between 1⁄2 B_{MSY} and B_{MSY}, and could be informed by the life history of the stock, the natural fluctuations in biomass associated with fishing at MFMT over the long-term, the requirements of internationally-managed stocks, or other considerations.

bound the formulaic calculation. Options a and b are not mutually exclusive. The Council may also include either or both Options a and b, where MSST is defined in terms of age 1+ biomass via static value until such time that spawning stock biomass (SSB) can be calculated and $X\%SSB_0$ is available based on an accepted stock assessment consistent with the BSIA and regulatory process, or by other framework the SSC and Council determine is appropriate.

Action 3 - Harvest Control Rules (HCR) for Pacific Sardine

No Action – *No harvest control rules from the CPS FMP would be specified to be applied to the U.S. Pacific sardine stock.*

Alternative 1 – *Harvest control rules would be specified in the CPS FMP to be applied to the U.S. Pacific sardine stock, within the CPS FMP framework. During the annual harvest specifications process (upcoming cycle scheduled for April 2027) the Council may set harvest specifications based on those outlined in Table 3 in order to prevent overfishing and achieve optimum yield (OY).*

Table 3. HCRs that may be applied to the U.S. Pacific sardine stock under Action 3, Alternative 1.

FMP Element	Specification
Management Strategy	More intensive
ACL	Less than or equal to the ABC
HG	H = (BIOMASS – CUTOFF) * FRACTION * DISTRIBUTION (not to exceed MAXCAT or ACL)
CUTOFF	150,000 mt
FRACTION	Equal to E_{MSY}
DISTRIBUTION	1
MAXCAT	200,000 mt

Note, the parameters within the HG control rule are also included in this Alternative. DISTRIBUTION and E_{MSY} are as defined above. CUTOFF is the lowest level of estimated biomass at which directed harvest is allowed and FRACTION is the fraction of the biomass above CUTOFF that can be taken by the fishery. MAXCAT is the maximum allowable catch by the directed fishery.

2.2 Action 1: Revising the Pacific Sardine Stock in FMU of the CPS FMP (No Additional Council Action Needed in September 2026)

No Action

Under No Action, the Council would retain existing stocks in the CPS FMP (Section 1.2, Table 1-1). Only the NSP of Pacific sardine would continue to be defined in the FMU as the stock in need of conservation and management in the EEZ and managed via the CPS FMP. The stock definition under No Action is not consistent with the latest peer reviewed science or recommendations of the SSC, as the most recent information on Pacific sardine population dynamics and reviews of past hypotheses and population biology show Pacific sardine comprise a single, panmictic population without regional differences in demographics or other life history traits. Therefore, No Action would retain a stock unit based on a nonexistent subpopulation boundary and an outdated understanding of the population present in U.S. waters and subject to the CPS fishery. As such,

the CPS FMP and management would continue to misalign the stock definition with NS2 guidance, requiring that conservation and management measures be based on BSIA. Overall, under No Action, the stock assessment would not be aligned with BSIA on population dynamics and management would fail to accurately track overfished and overfishing status for the U.S. Pacific sardine stock based on BSIA, as needed.

Alternative 1 (iFPA)

Under Alternative 1, the Council would amend the CPS FMP (Section 1.2, Table 1-1) to define a stock of Pacific sardine in the FMU, as the portion of the Pacific sardine population in U.S. waters, delineated as a single stock. The stock definition under Alternative 1 is consistent with the Council's iFPA, the SSC, CPSMT, and CPSAS recommendations (Agenda Item F.5, April 2026), and the latest peer reviewed literature and reviews of past hypotheses and population biology showing Pacific sardine comprise a single, panmictic population without regional differences in demographics or other life history traits (e.g. growth patterns). Differences among fish in different locations arise from phenotypic plasticity and individual variation, a result of sardine life history in which growth survival, and reproduction all respond to changes in local to broad environmental conditions. Best practices, current literature, and the advice of the SSC suggest that delineations of stocks and management boundaries should align with population dynamics to the extent possible within political and geographic bounds (see Craig et al. 2025; Fogarty and Botsford, 2007; Cadrin and Secor, 2009; Cadrin, 2020; Agenda Item E.8.a, Supplemental SSC Report 1, November 2023, Agenda Item H.5.a, Supplemental SSC Report 1, November 2022; Agenda Item E.3.a, Supplemental SSC Report 1, November 2021, Cope and Punt 2009; Cadrin et al. 2023). Therefore, Alternative 1 would align the stock definition with NS2 guidance, requiring that conservation and management measures be based on BSIA and ensuring assessments and SDC are to the appropriate extent to align with BSIA.

2.3 Action 2: Pacific Sardine Status Determination Criteria and Related Reference Points and Control Rules

Based on the Council's adoption of Alternative 1 as the iFPA under Action 1, the alternatives under Action 2 concern the specification of SDC and related reference points and control rules (OFL, ABC) for the U.S. Pacific sardine stock.

No Action

No Action would not establish measurable and objective SDCs for the U.S. Pacific sardine stock. This alternative provides no measurable and objective criteria by which to sufficiently monitor the overfished or overfishing status of the stock, as required by the MSA and NS1 guidance. By definition, an overfished stock in the CPS fishery is a stock at a biomass level low enough to jeopardize the capacity of the stock to produce MSY on a continuing basis. Under No Action, an MSST or other measure to track overfished status for the U.S. Pacific sardine stock would not be defined. The CPS FMP also utilizes OFL control rules to measure overfishing status for stocks. Under No Action, an OFL would not be specified for the U.S. Pacific sardine stock.

Overall, under No Action, management would fail to accurately track overfished and overfishing status for the U.S. Pacific sardine stock based on BSIA, as needed and would not meet the requirements of the MSA or NS guidance.

Alternative 1

Alternative 1 would establish SDCs for the revised U.S. Pacific sardine stock, providing measurable, objective criteria by which to monitor the stock status, within the "more intensive" framework of the CPS FMP, including the related OFL and ABC formulas, detailed below.
NS1 guidance requires setting reference points, including SDC for determining whether a stock is overfished or subject to overfishing and this alternative would specify SDCs consistent with NS1. The SDCs under Alternative 1 are consistent with the recommendations of the SSC-CPSSC. The overfished SDC has been proposed as a broad framework, which the Council may further specify in their ROA based on the recommendations of the SSC-CPSSC, the full SSC, and their review of the information provided in Attachment 1 and within this document.

2.3.1 Overfished SDC

As described in Table 2, under Alternative 1, the overfished SDC would be when the biomass is below the MSST. The Council may consider the following options for defining MSST to include in the ROA under Action 2:

Options

a) **Static Value:** MSST = X mt age 1+ biomass or reasonable proxy consistent with BSIA
b) **Formulaic (bounded):** MSST = X%SSB_0 where X% is determined upon BSIA (bound between y and z) or other reasonable proxy consistent with BSIA
c) **A combination of a) and b):** MSST is defined in terms of age 1+ biomass via static value a) until such time that SSB can be calculated and X%SSB_0 is available based on an accepted stock assessment consistent with the BSIA and regulatory process

With regards to Option a, static MSST, for the revised U.S. Pacific sardine stock, the SSC-CPSSC recommended a static-value MSST of 65,000 mt, though considered a range of potential static values for specifying MSST to determine the overfished status (see page 8 of Attachment 2). For context, 50,000 mt was the MSST established for the NSP in CPS FMP Amendment 8 (1998). The SSC-CPSSC's recommended value would reflect the expanded stock while also accounting for variability over recent years in the survey biomass in Southern California. The SSC-CPSSC full rationale and considerations are described within their report (Attachment 2).

Option b is based on the SSC-CPSSC's recommendation that the FMP should also explicitly provide for a formulaic, depletion-based MSST. Taking into account recommendations from the SSC, the Council may consider specifying a particular formulaic value based on a percentage of unfished spawning stock biomass (%SSB_0 or proxy). Per National Standard 1 at 50 CFR 600.310(e)(2)(ii)(B) MSST should be between 1⁄2 B_{MSY} and B_{MSY} and could be informed by the life history of the stock, the natural fluctuations in biomass associated with fishing at MFMT over the long-term, the requirements of internationally-managed stocks, or other considerations. The MSST may be specified via a reasonable proxy, which must be expressed in terms of spawning biomass or other measure of reproductive potential. A depletion-based approach was recommended as appropriate by the SSC-CPSSC (particularly compared to directly estimating B_{MSY}) for Pacific sardine given the species' life history characteristics[3], though it would still entail

[3] Thus far, there is no evidence of life history differences between Pacific sardine off the U.S. and Mexico (e.g. spawning, growth, maturity schedule, longevity)

challenges due to the dependency of the stock on environmental dynamics. While the SSC-CPSSC did not specify a particular percentage, the SSC and Council may consider information cited from past analyses and technical documentation reviewed in Attachment 1, considerations of the SSC-CPSSC in Attachment 2, as well as examples from other regions, including *Sardinops sagax* and other small coastal pelagics.[4] The SSC-CPSSC also recommended the use of static bounds (i.e., specifying the y and z values shown above) within a dynamic approach to balance adaptability with stability and limit the risk of large swings in overfished determinations, also providing an absolute level for action.

Option c would combine a and b to include both a static and formulaic option for measuring MSST, utilizing the static value until an estimate of SSB and calculation of $X\%SSB_0$ is available in an accepted stock assessment of the U.S. Pacific sardine stock. This option utilizes the flexibility approach of specifying multiple possible specifications for MSST within the FMP, to be reviewed and adopted by the SSC and Council as BSIA in a given year (e.g., include both static value(s) and formula(s)) Further flexibility may be added in various ways, for instance, by specifying upper and lower bounds for values and formula inputs. For instance, a range of $X\%SSB_0$ (e.g., 10–30%), wherein the SSB_0 is calculated within a benchmark stock assessment, and the appropriate percentage is adopted by the SSC and Council in a given harvest specifications cycle. A framework could be established in the FMP for when one of multiple specifications might be selected over the other in a given year. Including both static and formulaic SDC specifications in the FMP provides a contingency method in instances when an improved method is not available (due to data limitations, etc.). It also eliminates the need for an FMP amendment when scientific advancements, consistent with the BSIA and regulatory process, result in new abilities to calculate reference levels.

All options presented for MSST above allow for reasonable proxies to ensure uptake of BSIA as new reasonable proxies for B_{MSY} expressed in terms of spawning biomass or other measure of reproductive potential become available. Allowing for reasonable proxies can expedite stock status determinations if the BSIA process recommends a different MSY proxy (reference level) or endorses switching from an MSY proxy to a direct estimate, or vice versa. In sum, the Council may adopt the flexibility approaches included within the proposed ROA and/or specify in their ROA any additional flexibility that should be incorporated within the FMP amendment.

2.3.2 Overfishing SDC and Control Rules

For the OFL and ABC control rule, the SSC-CPSSC recommended specifying the more-intensive control rules for the U.S. stock of Pacific sardine, utilizing E_{MSY} but removing the DISTRIBUTION parameter or setting it equal to 1:

OFL = BIOMASS * E_{MSY} * DISTRIBUTION

[4] BC Pacific herring: 30% SSB_0 under low productivity conditions (Forrest et al. 2023)
U.S. Atlantic Herring: ½ B_{MSY} (translated into about 15–20% SSB_0 based on 2022 and 2026 assessments; NOAA 2022, NOAA 2026)
Australian sardine (*Sardinops sagax*): 20% B_0 (Stewart 2025)
Southern Benguela, South Africa CPS (including *Sardinops sagax*): 20% B_0 (Shannon & Shin 2013)
$20\%SSB_0$ was analyzed for NSP in 2016 and estimated to be 84,314 mt based on the data from the 2016 stock assessment (NMFS 2016)

ABC = BIOMASS * E_{MSY} * BUFFER * DISTRIBUTION

Setting the DISTRIBUTION parameter to 1 is based on the fact the revised stock definition only includes biomass within U.S. waters, and therefore the estimate of the stock in U.S. waters is 100 percent. This revision has the same effect as removing the DISTRIBUTION term for Pacific sardine, while keeping Pacific sardine within the framework of the CPS FMP. As described above, a value or formula is not specified for E_{MSY} in the OFL or ABC within the CPS FMP, and therefore no decisions are to be made on E_{MSY} as a part of this FMP amendment.

2.4 Action 3: Harvest Control Rules for Pacific Sardine

Building on Actions 1 and 2, Action 3 considers establishment of HCR aligned with the iFPA under Action 1 and the alternatives under Action 2. As described above, consistent application of a single approach across reference points and control rules (i.e., Actions 2 and 3, below) is intended by the CPS FMP. Therefore, No Action under Action 3 would be consistent with No Action under Action 2, and Alternative 1 under Action 3 would be consistent with Alternative 1 under Action 2.

No Action

No Action would not establish specific HCRs for the revised, U.S. Pacific sardine stock. While the CPS FMP establishes a framework of control rules that may be applied to stocks, under No Action, no rules within this framework would be applied to the U.S. Pacific sardine stock.

Alternative 1

Under Alternative 1, stock-specific HCRs would be defined in the CPS FMP to set annual specifications for the U.S. Pacific sardine stock. Consistent with the recommendations of the SSC-CPSSC, CPSMT, CPSAS representatives, Alternative 1 includes the use of the HG control rule, which reduces the exploitation rate as the stock declines and is expected to achieve OY, including the parameters specified in Table 3 (reproduced below for reference). Alternative 1 under this action aligns with Alternative 1 under Action 2 (SDC), consistently applying the more intensive management approach, as intended by the framework in the CPS FMP.

Table 3 (reproduced for reference). HCRs that may be applied to the U.S. Pacific sardine stock under Action 3, Alternative 1.

FMP Element	Specification
Management Strategy	More intensive
ACL	Less than or equal to the ABC
HG	H = (BIOMASS – CUTOFF) * FRACTION * DISTRIBUTION (not to exceed MAXCAT or ACL)
CUTOFF	150,000 mt
FRACTION	Equal to E_{MSY}
DISTRIBUTION	1
MAXCAT	200,000 mt

Per the recommendations of the joint meeting (Attachment 2), the more-intensive management approach in the CPS FMP would be applied, including the HG control rule. This approach would

best meet relevant goals and objectives in the CPS FMP, including *"promoting efficiency and profitability in the fishery, stability of catch, achieving optimum yield, providing adequate forage for dependent species, and preventing overfishing."* The joint meeting participants recommended that the parameter values within the HG control rule (detailed in Table 3) previously utilized for NSP are appropriate to maintain for the U.S. Pacific sardine stock in order to achieve the above goals. The one exception is DISTRIBUTION, where the CPSMT recommended removing or setting equal to 1, consistent with the OFL and ABC, as the revised stock only includes biomass within U.S. waters.

The joint meeting also recommended that the process to set ACLs and an annual catch target (ACT) implemented by the Council for Pacific sardine in past harvest specification cycle continue annually to avoid exceeding the ABC and ACL, respectively. The ACL is set equal to or less than the ABC. The ACT is set equal to or less than the HG or ACL, whichever is less.

2.5 Rationale for the Council's Preferred Alternative

The Council indicated in April 2026, via an iFPA, a preferred Pacific sardine stock definition that would amend the CPS FMP (Section 1.2, Table 1-1) to include the portion of the Pacific sardine population in U.S. waters in the FMU. The FMU would include one U.S. stock of Pacific sardine, delineated coastwide within the U.S. jurisdiction (EEZ). The Council's rationale was based on aligning the stock definition with BSIA in order to meet the requirements of the MSA and NS, highlighting newly available scientific literature on Pacific sardine, including genetic studies and a review of the existing research on Pacific sardine population dynamics. The Council noted the lack of evidence to support the long-held hypothesis of two distinct subpopulations. Action 1, Alternative 1 represents the Council's stock definition iFPA.

The Council has not yet indicated a preferred alternative for Actions 2 or 3. This section will be updated for November 2026.

2.6 Alternatives Considered but not Analyzed Further

In the materials presented by Council staff in November 2025 (Agenda Item J.3, Attachment 1), staff put forth potential alternatives for the Council to consider in defining their range of alternatives for the stock definition portion of this action. Council staff proposed a potential Alternative for the stock definition based on the hypothesis that Pacific sardine comprises two subpopulations off the U.S. West Coast (NSP, SSP). Under this alternative, two separate stocks – a northern and southern stock – would be defined in the FMP for management in U.S. waters. However, based on the review of current science, presented in a literature summary to the Council (Agenda Item J.3, Attachment 1, November 2025, incorporated herein by reference), the Council ultimately determined that there was not sufficient evidence to support the hypothesis of multiple subpopulations; the latest peer reviewed literature and reviews of past hypotheses and population biology support the most parsimonious conclusion - that Pacific sardine comprise a single, panmictic population without genetic differentiation or regional differences in demographics or other life history traits (Erisman et al. 2025, Craig et al. 2025, Longo et al. 2025). Differences among phenotypic traits are a result of phenotypic plasticity, individual variation , and opportunistic life history strategy to respond to changes in local to broad environmental conditions. Therefore, the Council determined that management should align with the newly published research revealing that Pacific sardine comprise a single population, and revise management to not

include multiple management units for a single biological unit. The proposed ROA reflects this scientific understanding and Council consensus to move forward with an FMP amendment to revise the Pacific sardine stock definition consistent with BSIA.

References

Berger, A.M., J. J. Deroba, K. M. Bosley, D. R. Goethel, B. J. Langseth, A. M. Schueller, and Hanselman, D. H. 2021. Incoherent dimensionality in fisheries management: consequences of misaligned stock assessment and population boundaries. ICES J. Mar.Sci. 78:155-171.

Cadrin, S. X. 2020. Defining spatial structure for fishery stock assessment. Fisheries Research 221:105397.

Cadrin, S. X., D. R. Goethel, A. Berger, and F. Jardim. 2023. Best practices for defining spatial boundaries and spatial structure in stock assessment. Fisheries Research 262:106650. 55

Cadrin, S. X., and D. H. Secor. 2009. Accounting for spatial population structure in stock assessment: past, present and future. In: The Future of Fisheries Science in North America (R. J. Beamish, B. J. Rothschild, eds), p. 405–425. Springer, New York.

Craig, Matthew T., Brad E. Erisman, Ella S. Adams-Herrmann, Kelsey C. James, and Andrew R. Thompson. 2025. The subpopulation problem in Pacific sardine, revisited. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-713. https://doi.org/10.25923/zzvw-x557

Cope, J. M. & Punt, A. E. 2009. Drawing the lines: resolving fishery management units with simple fisheries data. Canadian Journal of Fisheries and Aquatic Sciences. 66(8): 1256-1273. https://doi.org/10.1139/F09-084

Cope, J. M., and A. E. Punt. 2011. Reconciling stock assessment and management scales under conditions of spatially varying catch histories. Fish. Res. 107:22–38.

Erisman, B., Carig, M., James, K., Schwartzkopf, B., & E. Dorval. 2025. Systematic review of somatic growth patterns in relation to population structure for Pacific Sardine (Sardinops sagax) along the Pacific Coast of North America. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-708. https://doi.org/10.25923/0j1j-xv61

Fogarty, M. J., and L. W. Botsford. 2007. Population connectivity and spatial management of marine fisheries. Oceanography. 20:112–123

Longo, G. C., K. D′Amelio, W. Larson, et al. 2025. "Population Genomics Reveals Panmixia in Pacific Sardine (*Sardinops sagax*) of the North Pacific." *Evolutionary Applications* 18, no. 9: e70154. https://doi.org/10.1111/eva.70154.

Methot, R.D., M.A. Karp, J.M. Cope, M.O. Nadon, E.N. Brooks, D.R. Goethel, A.M. Berger, C. Szuwalski, D. Lambert, J. Brodziak, S. Calay, S. Hunt, T.J. Miller, C. Porch, C. Wetzel, K. Blackhart, K.E. Greene, and M. Macpherson. 2025. Technical Guidance for Estimating Reference Points Used for Stock Status Determination in Accordance with the National Standard 1 Guidelines. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-261, 96 p. https://doi.org/10.25923/4dvw-v426

NOAA Fisheries (NMFS). 2016. Review and Re-evaluation of Minimum Stock Size Thresholds for Finfish in the Coastal Pelagic Species Fishery Management Plan for the U.S. West Coast. Agenda Item E.1.a, Supplemental NMFS Report, September 2016, Pacific Fishery Management Council. https://www.pcouncil.org/documents/2016/09/e1a_sup_nmfs_rpt_mssts_sept2016bb.pdf

NOAA Fisheries (NMFS). 2024. Flexible status determination criteria example and their application white paper. https://www.fisheries.noaa.gov/s3/2024-09/Flexible_Status_Determination_Criteria_Examples_and_their_Application_White_Paper_FINAL_0.pdf

Pacific Fishery Management Council (PFMC). (1998). Amendment 8 (to the Northern Anchovy Fishery Management Plan). Incorporating a Name Change to: The Coastal Pelagic Species Fishery Management Plan. Portland, Oregon: Pacific Fishery Management Council.

Pacific Fishery Management Council (PFMC). 2021. Agenda Item E.3.a Supplemental SSC Report, November 2021. Available from https://www.pcouncil.org/documents/2021/11/e-3-a-supplemental-ssc-report-1-2.pdf/

Pacific Fishery Management Council (PFMC). 2022. Agenda Item H.5.a Supplemental SSC Report, November 2022. Available from https://www.pcouncil.org/documents/2022/11/h-5-a-supplemental-ssc-report-1-3.pdf/

Pacific Fishery Management Council (PFMC). 2023. Agenda Item E.8.a Supplemental SSC report 1, November 2023. Available from https://www.pcouncil.org/documents/2023/11/e-8-a-supplemental-ssc-report-1-2.pdf/

Pacific Fishery Management Council (PFMC). 2024. Coastal Pelagic Species Fishery Management Plan. Portland, OR. Available from pcouncil.org/documents/2023/06/coastal-pelagic-species-fishery-management-plan.pdf/

Pacific Fishery Management Council (PFMC). 2025a. Status of the Pacific Coast Coastal Pelagic Species Fishery and Recommended Acceptable Biological Catches. Stock Assessment and Fishery Evaluation. pcouncil.org/documents/2026/03/2025-cps-stock-assessment-and-fishery-evaluation-safe-document-november-2025.pdf/

Pacific Fishery Management Council (PFMC). 2025b. Agenda Item G.5 Attachment 1: Coastal pelagic species and management priorities discussion paper. April 2025. April 2025 briefing book - Pacific Fishery Management Council

Pacific Fishery Management Council (PFMC) 2025c. Agenda Item G.5.a Supplemental Scientific and Statistical Committee Report on Coastal Pelagic Species Science and Management Priorities. April 2025. https://www.pcouncil.org/documents/2025/04/g-5-a-supplemental-ssc-report-1-scientific-and-statistical-committee-report-on-coastal-pelagic-species-science-and-management-priorities.pdf/

Pacific Fishery Management Council (PFMC) 2025d. Agenda Item G.5.a Supplemental Coastal Pelagic Species Advisory Subpanel Report on Coastal Pelagic Species Science and Management Priorities. April 2025. https://www.pcouncil.org/documents/2025/04/g-5-a-supplemental-cpsas-report-1-cspas-report-on-science-and-management-priorities.pdf/

Pacific Fishery Management Council (PFMC) 2025e. Agenda Item G.5.a Supplemental Revised Coastal Pelagic Species Management Team Report on Coastal Pelagic Species Science and Management Priorities. April 2025. https://www.pcouncil.org/documents/2025/04/g-5-a-supplemental-cpsmt-report-1-cpsmt-report-on-science-and-management-priorities.pdf/

Pacific Fishery Management Council (PFMC) 2025f. Agenda Item J.3 Attachment 1: Reviewing the Fishery Management Unit in the CPS Management Plan and its Stock Definitions for Sardine off the U.S. West Coast. November 2025. https://www.pcouncil.org/documents/2025/10/j-3-attachment-1-reviewing-the-fishery-management-unit-in-the-cps-management-plan-and-its-stock-definitions-for-sardine-off-the-u-s-west-coast.pdf/

Pacific Fishery Management Council (PFMC) 2026. Analysis of the PPA Sardine stock Definition and Review of Next Steps for Revision of the Sardine stock definition in the Coastal Pelagic Species Fishery Management Plan. Agenda Item F.5, Attachment 1, April 2026, Pacific Fishery Management Council. Portland, Oregon. pcouncil.org/documents/2026/03/f-5-attachment-1-analysis-of-the-ppa-sardine-stock-definition-and-review-of-next-steps.pdf/

Restrepo, V.R., G.G. Thompson, P.M. Mace, W.L. Gabriel, L.L. Low, A.D. MacCall, R.D. Methot, J.E. Powers, B.L. Taylor, P.R. Wade, and J.F. Witzig. 1998. Technical guidance on the use of precautionary approaches to implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Tech. Memo. NMFS-F/SPO-31, 54 p. https://media.fisheries.noaa.gov/dam-migration/ns1-technical-guidance-1998-restrepo.pdf

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