

DRAFT

**Impacts Analysis/MSA Analysis
for the
Proposed Amendment to the Coastal Pelagic Species Fishery Management Plan
to Revise the Pacific Sardine Stock Definition**

November 2026

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List of Acronyms and Abbreviations

<i>Acronym or Abbreviation</i>	<i>Meaning</i>
ABC	acceptable biological catch
ACL	annual catch limit
ACT	annual catch target
B ₀	Unfished biomass
BSIA	best scientific information available
CCE	California current ecosystem
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
CWPA	California Wetfish Producers Association
DPS	distinct population segment
EA	environmental assessment
EO	Executive Order
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EFP	exempted fishing permit
EMSY	exploitation rate for deterministic equilibrium MSY
ESA	Endangered Species Act
FMP	fishery management plan
FMU	fishery management unit
FPA	final preferred alternative
HG	harvest guideline
iFPA	interim final preferred alternative
MAXCAT	maximum catch
MFMT	maximum fishing mortality threshold
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSE	Management strategy evaluation
MSST	minimum stock size threshold
mt	metric ton
MSY	maximum sustainable yield

NEPA	National Environmental Policy Act
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
PDO	Pacific Decadal Oscillation
PFMC	Pacific Fishery Management Council
PPA	Preliminary preferred alternative
ROA	range of alternatives
SAFE	Stock Assessment and Fishery Evaluation
SDC	status determination criteria
SFD	Sustainable Fisheries Division (NMFS WCR)
SSB	spawning stock biomass
SSC	Scientific and Statistical Committee
SSC-CPSSC	SSC CPS Subcommittee
SSP	southern subpopulation (of Pacific sardine)
SWFSC	Southwest Fisheries Science Center
U.S.	United States
WCR	West Coast Region (NMFS)

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. 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 across the west coast (Longo et al. 2025; Craig et al. 2025; Erisman et al. 2025). While the science supports findings that 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, rather than evidence of multiple distinct subpopulations.

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

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 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. The FMP amendment proposed in the Council's adopted range of alternatives for this action would update management provisions for Pacific sardine to ensure that reference points and control rules align with BSIA and the appropriate extent of the stock, to prevent overfishing and attain OY.

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, based on a review of literature, including newly published research on the population structure of Pacific sardine, describing a single population off the west coast.

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, which 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, ([Agenda Item J.1, Attachment 1, September 2026](#)), was first presented to the SSC CPS subcommittee (SSC-CPSSC), the CPSMT, and members of the CPSAS at a July 2026 joint advisory body meeting, 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 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 advisory body meeting, comprising the SSC-CPSSC, CPSMT, and representatives of the CPSAS, was held to develop initial recommendations for key FMP management provisions (reference points and control rules) for the proposed revised Pacific sardine stock definition (a U.S. stock). Meeting participants considered how to apply the management framework in the CPS FMP and prepared a final joint report including all recommendations from their review. This report was considered by the Council and its SSC at the September 2026 meeting ([Agenda Item J.1 Attachment 2, September 2026](#)) and informed the development of the ROA adopted by the Council for this action.

In September 2026, the Council adopted an ROA and PPA for the management provisions (reference points and control rules) for the U.S. Pacific sardine stock, completing the ROA for the proposed FMP Amendment to revise the Pacific sardine stock definition. The Council's stated objective in adopting the ROA and PPA was for the amendment to "[maintain] the current harvest approach and [adapt] it to the new science on stock structure." The Council adopted Alternative 1 for all actions within the FMP Amendment as their PPA including preferred options for MSST and CUTOFF parameters among those considered within the range. The Council also provided direction on next steps following this action, including requesting NMFS include efforts to improve scientific capacity for Pacific sardine in Mexico and requesting that additional analyses, such as a management strategy evaluation (MSE) or similar process, be conducted following the 2028 benchmark stock assessment for Pacific sardine, as resources allow.

1.1 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.

1.2 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 sardine extends beyond the U.S. West Coast EEZ; however, U.S. jurisdiction and management for CPS stocks does not extend beyond the EEZ.

1.2.1 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 on the West Coast can be found in the annual Stock Assessment and Fishery Evaluation (SAFE) document ([PFMC 2025a](#), incorporated herein by reference).

2.0 Description of Alternatives

The following ROA adopted by the Council represents the alternatives considered for an FMP amendment to revise the Pacific sardine stock definition in the FMU of the CPS FMP and apply all necessary management provisions for this stock. Attachment 3 proposes draft FMP text to amend the CPS FMP per the Council's PPA.

The proposed ROA does not include the following FMP management provisions that Council and NMFS Staff determined do not require attention under this action: essential fish habitat (EFH), incidental limits, guidance for directed fishery closures and seasonal allocation. These elements are either not requirements of a stock in an FMP (and therefore do not need to be revisited for a new stock), are defined for CPS more broadly within the FMP, or already reflect Pacific sardine in U.S. waters. The 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 values determined annually based on BSIA). These existing provisions within the CPS FMP that would not undergo revision under this action are therefore outside the scope of the analysis within this document

The rebuilding plan for NSP (Amendment 23 to the CPS FMP) would also be removed under the action alternative for this action, as the plan would not apply to the U.S. Pacific sardine stock defined under Alternative 1. If the Council goes forward with Alternative 1, the SDCs included within the amendment will be applied to determine overfishing and overfished stock status for the U.S. Pacific sardine stock, and a rebuilding plan would be developed if needed.

As described in Council and NMFS staff's review of Pacific sardine management provisions (Agenda Item J.1 Attachment 1 September 2026), the CPS FMP is designed to meet the requirements of the MSA and guidance of the NSs as well as CPS-specific management objectives via framework management, including both more intensive and less intensive management approaches (these approaches are further detailed in [Section 4](#) of the CPS FMP).

The Council's stated objective in adopting an ROA for management provisions was for the FMP amendment to maintain the Council's current management approach and adapt that approach to the newly available science on Pacific sardine stock structure. This intent builds upon the conclusions of the staff review and initial recommendations made by the joint advisory body meeting. The staff review and report of the joint advisory body meeting (described in Section 1 above), concluded that the CPS FMP's "more intensive" management framework and its control rules (as used for NSP), may be applied to the revised Pacific sardine stock to meet management objectives and cover the required elements for the revised stock. These elements include status determination criteria (SDC) to track overfished and overfishing status of the stock, as well as harvest control rules (HCRs) to prevent overfishing and attain OY and are further detailed in the references incorporated in Attachment 1. The action alternative applies the "more intensive"

management approach, including the related overfishing limit (OFL), acceptable biological catch (ABC), annual catch limit (ACL), and “general” harvest guideline (HG) control rule.

In September 2026, the ROA was broken into three “actions” to help simplify the discussion of the various required components of this amendment when the Council adopted an ROA. Within this breakdown of multiple components, illustrated in Figure 1, revising the stock under Action 1 necessitates the adoption of FMP provisions covered in Actions 2 and 3. Action 1 covers the stock definition (i.e., the iFPA), Action 2 covers the SDCs and related reference points and control rules (i.e., minimum stock size threshold [MSST], OFL, ABC) and Action 3 covers other control rules (i.e., ACL, HG) in the CPS FMP’s management framework (detailed in [Section 4 of the CPS FMP](#)).

In practice, as shown in Figure 1, final action will have one of two outcomes, given the adopted ROA: either “No Action”, a status quo alternative under which the NSP stock and its management provisions are retained, or “Alternative 1” which is comprised of Alternative 1 for Actions 1, 2, and 3 taken together, revising the stock definition and management provisions for Pacific sardine. This document will compare these two outcomes, representing the Council’s ROA and its components while describing the holistic impacts of each outcome.

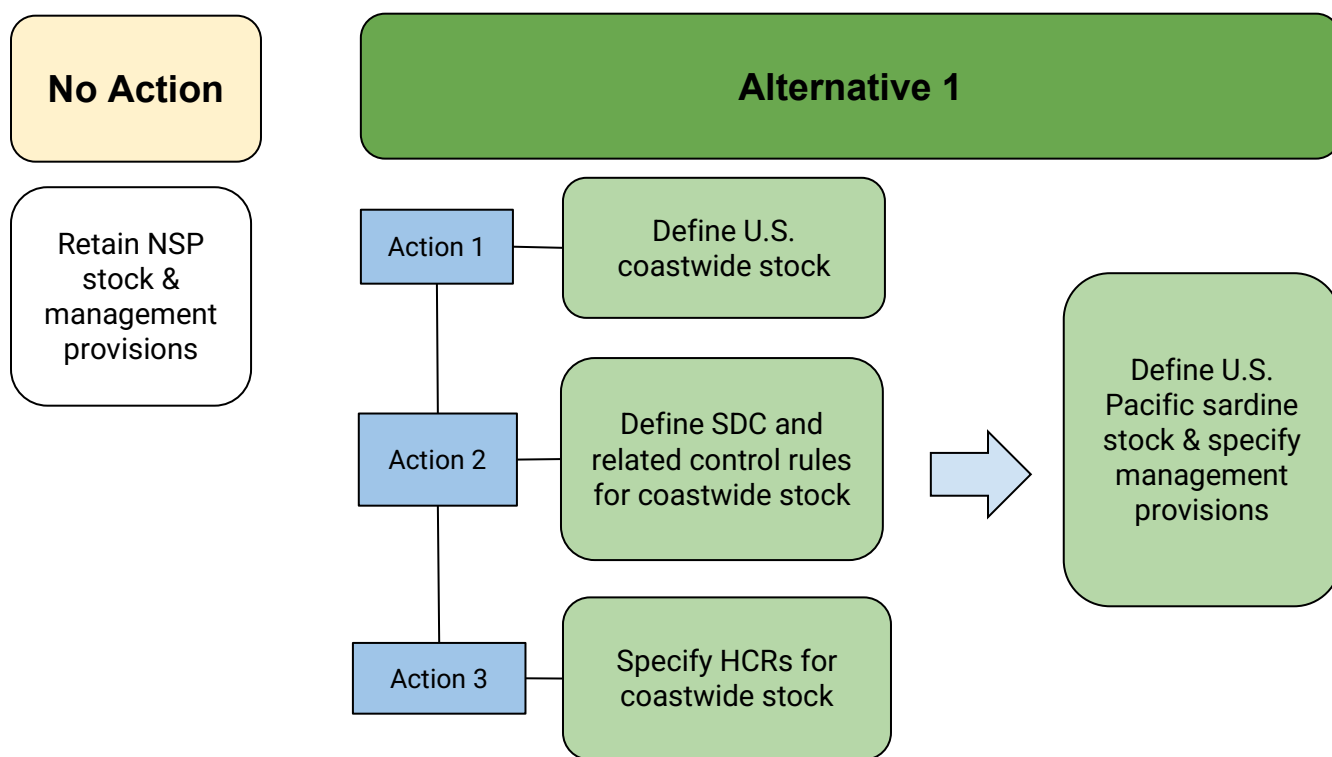


Figure 1. The ROA as organized by the No Action Alternative and Alternative 1, including all relevant components. In September 2026, Alternative 1 was broken into 3 actions to understand its components in September 2026 but comprises a single Alternative to define the U.S. coastwide stock and specify management provisions, as discussed throughout this document.

2.1 Range of Alternatives

No Action (status quo)

Action 1 – *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.*

Action 2 – *No status determination criteria or related reference points and control rules would be adopted for the U.S. stock of Pacific sardine*

Action 3 – *No HCR from the CPS FMP would be specified to be applied to the U.S. Pacific sardine stock.*

Together, these three actions comprise the No Action Alternative, in which status quo management of Pacific sardine would be retained: the Council would not define stocks or management provisions other than those currently defined in the CPS FMP. Only the NSP of Pacific sardine and its management provisions would continue to be defined. Going forward in this document, the No Action alternative and its impacts will be described holistically, rather than broken down into multiple “actions.”

Alternative 1 (Define a U.S. stock of Pacific sardine and specify FMP provisions)

Action 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 United States and Canada, and bounded in the south by the International Boundary between the United States and Mexico.)

Action 2 (PPA, with select option for MSST as noted) – *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	Option i: MSST = 65,000 mt age 1+ biomass or reasonable proxy Option ii. MSST = 150,000 mt age 1+ biomass or reasonable proxy

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.

b) Formulaic Specification of MSST (PPA)	$MSST = 10\%B_0 - 30\%B_0$ (where X% is determined upon BSIA), or other reasonable proxy
Overfishing SDC	Catch > OFL
OFL	$BIOMASS * E_{MSY} * DISTRIBUTION$
ABC	$BIOMASS * BUFFER * E_{MSY} * DISTRIBUTION$ Where BUFFER comprises P* and sigma
DISTRIBUTION	1

Note, the parameters within the control rules are also included within Alternative 1, 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 comprises the Council's risk policy (P* and sigma), and DISTRIBUTION, which is no longer applicable as it relates to scenarios where biomass estimates include portions of the population in foreign waters, which will not be the case for the new stock going forward.. 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 calculate the value of E_{MSY} (as detailed in Attachment 1), which is determined during the harvest specifications cycle through the BSIA framework including review by the SSC.

Action 3 (PPA, with select option for CUTOFF as noted) – HCR would be specified in the CPS FMP to be applied to the U.S. Pacific sardine stock, within the framework of the CPS FMP. 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 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 based on data available for the specifications cycle
ACT	Less than or equal to the ACL based on data available for the specifications cycle
Accountability measures	Recommended based on data available for the specifications cycle
HG	$H = (BIOMASS - CUTOFF) * FRACTION * DISTRIBUTION$ (not to exceed MAXCAT or ACL)

CUTOFF	Option i. 50,000 mt Option ii. 150,00 mt (PPA) Option iii. 314,400 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 under Action 2. 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.

Together, these three actions comprise Alternative 1, in which the stock definition for Pacific sardine is defined as a U.S. stock and management provisions under Actions 2 and 3 are specified for this stock in the FMP. Going forward in this document, Alternative 1 and its impacts will be described holistically.

2.2 No Action (status quo)

Overall, under No Action, the Council maintains the stock definition and status quo management for the “NSP” of Pacific sardine as currently specified in the CPS FMP (Section 1.2, Table 1-1). The stock definition under No Action is based on former assumptions that Pacific sardine off the west coast comprise multiple discrete subpopulations, of which the NSP is present in U.S. waters and targeted by the U.S. fishery. The SDC and related reference points and control rules (MSST, OFL, ABC) for NSP, as defined in Section 4.6.4 of the CPS FMP, would be maintained for that stock. The harvest control rules for NSP, including the HG control rule, as defined in Section 4.6.4 of the CPS FMP, would be maintained for that stock.

2.3 Alternative 1 (Define a U.S. stock of Pacific sardine and specify FMP provisions)

Overall, Alternative 1 would amend the CPS FMP (Section 1.2, Table 1-1) to define the stock of Pacific sardine in the FMU as the portion of the Pacific sardine population in U.S. waters, and specify management provisions, including reference points and control rules for this stock. In accordance with the MSA and NS1 guidelines. For select parameters (MSST and CUTOFF), the Council has adopted multiple options for consideration within the ROA under Alternative 1. All options under these actions retain the CPS FMP’s “more intensive” management framework, revising its control rules and reference points for a single, coastwide U.S. stock. This document will analyze the overall impacts of Alternative 1, including any comparisons between options, as appropriate. Noting that the options for MSST and CUTOFF overlap, this document will describe the impacts of each option in isolation; however, the final preferred option for MSST must be less than CUTOFF to be viable within the management framework.

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. A single U.S. stock of Pacific sardine would be defined as coastwide within the U.S. Exclusive Economic Zone (EEZ; 3 to 200 nautical miles offshore) bounded by the U.S.– Canada border to the north and the U.S.– Mexico border to the south.

The stock definition under Alternative 1 is consistent with the requirements of NS2 and NS3 to base conservation and management measures on BSIA and manage a stock of fish as a unit throughout its range (further explanation of compliance of Alternative 1 with NS2 and NS3 available in [Section 5](#)).

Alternative 1 would also amend the CPS FMP (Section 4.6.4) to establish SDCs and related reference points and control rules for the revised U.S. Pacific sardine stock, meeting requirements of the MSA and NS1 (further explanation available below and in Section 5). This Alternative provides measurable, objective criteria by which to monitor the stock status under the CPS FMP’s “more intensive” management framework, including the specific OFL and ABC formulas detailed below.

Status Determination Criteria (SDC)

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)) and NS1 guidance requires setting reference points, including SDC for determining whether a stock is overfished or subject to overfishing (50 CFR 600.310(b)(1)(ii)).

Overfished SDC

Overfished status pertains to a biomass of a stock and is usually determined by comparing biomass to the MSST or reasonable proxy, where the stock is overfished if it is below the MSST (50 CFR 600.310(e)(2)(i)(E)). MSST means the level of biomass below which the capacity of the stock or stock complex to produce MSY on a continuing basis has been jeopardized (50 CFR 600.310(e)(2)(i)(F)). Because MSST is defined in terms of reproductive potential and linked to the ability to produce MSY on a continuing basis, MSY-based reference points (Restrepo et al. 1998) are often used as both a default and a standard to strive for. Per NS 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 maximum fishing mortality threshold (MFMT) over the long-term, the requirements of internationally-managed stocks, or other considerations.

Under Alternative 1, the stock is considered overfished when the biomass is below the MSST specified in the FMP. Within the adopted ROA, there are several options for defining MSST. The Council adopted Option b as its PPA.

MSY cannot always be reliably calculated for a stock, and/or is not constant for stocks that exhibit life history characteristics of large recruitment fluctuations that are likely environmentally-driven. In such cases, alternatives exist such as depletion based estimates (e.g., an estimate of biomass in the absence of fishing, B_0). From a biological standpoint, life history characteristics are a primary consideration when selecting an appropriate MSST. A stock’s ability to increase back to the biomass that produces MSY is dependent on its life history, as well as potential environmental

covariates that may influence its life history, for example its recruitment success. Occurrence of regime shifts or periods of higher versus lower productivity can also be taken into account, for example by selecting a more recent or otherwise representative time period upon which to base MSST (Methot et al. 2025, Karp et al. 2019). In recognition that MSY is not constant and cannot be reliably calculated for Pacific sardine, given their life history, the Council has not used an MSY-based SDC for sardine to date.

The SDCs under Alternative 1 are consistent with NS guidance and NMFS technical guidance (Restrepo et al. 1998, Methot et al. 2025, Methot et al. 2025, Karp et al. 2019). Alternative 1 also incorporates concepts from a NMFS white paper informing the development of flexible status determination criteria consistent with BSIA ([NMFS 2024a](#)). The white paper guidance includes approaches such as using reasonable proxies for specified reference points and defining multiple methodologies for calculating reference points tailored to the circumstances and information available. Both approaches are incorporated under Alternative 1, specifically for MSST.

Among the numerous possibilities for specifying an MSST, the options within Alternative 1 are essentially a fixed-value MSST or depletion-based formulaic MSST (or a combination thereof, and including allowance for a reasonable proxy). The SDCs under Alternative 1, including options within the ROA, are consistent with the recommendations of the SSC-CPSSC (Agenda Item J.1 Attachment 2, September 2026), providing a reasonable range of options for consideration. Options a.i. (65,000 mt) and a.ii. (150,000 mt) are static specifications of MSST in which the stock is overfished when the best estimate of biomass falls below that static value. The Council's PPA is Option b, a formulaic specification of MSST in which $MSST = 10\%B_0 - 30\%B_0$ (where X% is determined upon BSIA), or other reasonable proxy. Under Option b, the MSST may be calculated via either the depletion-based formula, a percentage of unfished biomass (B_0), or a reasonable proxy, expressed in terms of spawning biomass or other measure of reproductive potential (NMFS 2024a). Using the formula, the MSST would be determined based on the best estimate of unfished biomass (typically produced within a stock assessment) and BSIA on the appropriate percentage considering life history and productivity, or a reasonable proxy based on BSIA and adopted by the SSC and Council. This option is derived from the recommendations of the SSC ([Agenda Item J.1 Supplemental SSC Report 1, September 2026](#)), which considered BSIA on the stock's life history and population dynamics.

Options

- a) **Static Value:** $MSST = X$ mt age 1+ biomass or reasonable proxy consistent with BSIA
 - Option a.i: $MSST = 65,000$ mt age 1+ biomass or reasonable proxy
 - Option a.ii: $MSST = 150,000$ mt age 1+ biomass or reasonable proxy
- b) **Formulaic (PPA):** $MSST = 10\%B_0 - 30\%B_0$ (where X% is determined upon BSIA), or other reasonable proxy

Option a - Static Value

Under option a, a static MSST is specified for the revised U.S. Pacific sardine stock. The Council adopted multiple options within the ROA under Alternative 1, including a value of 65,000 mt (Option a.i) and a value of 150,000 mt (Option a.ii). [CPS FMP Amendment 8](#) (1998) established a 50,000 mt MSST for the NSP. The 65,000 mt is derived from the joint advisory body meeting held in July 2026, where the SSC-CPSSC initially recommended a static-value MSST of 65,000 mt for a coastwide U.S. stock to reflect the expanded stock while also accounting for variability over recent years in the survey biomass in Southern California. The 150,000 mt is derived from

the CUTOFF parameter value utilized for the NSP, at a biomass below which the directed fishery is closed and the harvest guideline is zero. As noted before, the final preferred option for MSST must be less than CUTOFF to be viable within the management framework.

The Council's rationale for including these two values within the range was based on the SSC-CPSSC's discussion at their July 2026 meeting, in which they compared survey biomass estimates of Pacific sardine in U.S. waters and their designation into subpopulations by a habitat index model, considering the relative change in stock biomass that is expected to occur based on the expansion of the stock definition from NSP to all sardine in U.S. waters. Survey estimate data from 2018 to 2025 designating biomass between "northern" and "southern" subpopulations (Table 4) has varied greatly year-to-year, but on average was relatively equal between subpopulations. The total biomass estimate in U.S. waters has also remained relatively stable, despite variation in subpopulation designation. The 65,000 mt value (option a.i) is based on a smaller proportional designation of "SSP" within the U.S. sardine biomass estimate and high variability in how much biomass is designated as "SSP" year to year. The 150,000 mt value (option a.ii) is based on the maximum proportional designation of "SSP" within the U.S. sardine biomass estimate within the 2018–2025 time period. The very high inter-annual variation between subpopulation assignment, even when total stock biomass in U.S. waters does not change significantly, is an important consideration, further underscored by the lack of evidence for subpopulations; the northern and southern areas appear to have contributed similar amounts of biomass to the total U.S. biomass on average over the recent time period, although the southern area shows much higher interannual variability. An MSST of 65,000 mt would account for the expansion of the stock definition, but not allow a periodic low level of the highly variable southern portion of the stock to drive an overfished determination. On the other hand, an MSST of 150,000 would account for the maximum addition of "southern" biomass in a given year.

Table 4. Pacific sardine biomass values from the Integrated Survey/ CPS survey. Biomass estimates are in metric tons and for U.S. waters. Table produced during the meeting by SWFSC staff and included in the joint advisory body meeting report (July 2026; available as Agenda Item J.1 Attachment 2, September 2026).

Regional Biomass Survey Statistics (2015-2025)														
		Northern						Southern						Total
survey	year	biomass	sd	lower	ci_upper	cv	% of Total	biomass	sd	lower	upper	cv	% of Total	Total
1507SH	2015	14,795	12,390	254	43,883	84	43.1792037						56.820796	
1606RL	2016	33,731	23,196	2,325	95,306	69		323	166	0	672	51		
1706RL	2017	14,155	4,082	6,261	25,710	29								
1807RL	2018	25,148	16,782	3,617	62,439	67		33,093	14,516	8,957	65,417	44		58,241
1907RL	2019	33,632	6,333	20,613	48,339	19	69.312889	14,890	4,935	3,346	30,260	33	30.687111	48,522
2107RL	2021	47,721	19,811	12,719	92,322	42	38.3165789	76,823	21,371	18,243	137,177	28	61.683421	124,544
2207RL	2022	69,506	14,430	24,321	106,749	21	39.3583166	107,092	24,738	35,550	195,577	23	60.641683	176,598
2307RL	2023	77,252	36,044	14,344	182,477	47	48.4691061	82,132	19,278	17,881	182,702	23	51.530894	159,384
2407RL	2024	77,703	34,734	10,434	176,226	45	70.2368255	32,927	8,869	24,909	75,419	27	29.763175	110,630
2506SH	2025	66,640	37,436	3,434	185,846	56	76.8724982	20,049	5,939	2,267	42,663	30	23.127502	86,689
Total from 2018		397,602				average	55.1064883	367,006				average	44.893512	764,608

Overall, regardless of the specific value defined, a static approach would define a value based on information on the U.S. stock size available to date, life history of the stock, and capacity of the stock to return to MSY levels and would provide a reference point to track and determine stock status.

Option b - Depletion-Based Formula or Reasonable Proxy (PPA)

Option b is derived from a recommendation by the SSC on the best available approach to specify an MSST for the U.S. Pacific sardine stock (Agenda Item J.1 Supplemental SSC Report 1, September 2026). Based on this recommendation, a particular formulaic value based on unfished biomass depletion metrics (depletion-based formula, $\%B_0$ or proxy) is specified: $MSST = X\%B_0$ (where $X\%$ is between 10% and 30%, and $X\%$ and B_0 are determined based on the BSIA), or other reasonable proxy. Within this specification, the MSST may be calculated via either the depletion-based formula or a reasonable proxy, expressed in terms of spawning biomass or other measure of reproductive potential (NMFS 2024a).

A depletion-based approach was recommended as appropriate by the SSC-CPSSC and SSC (particularly compared to directly estimating B_{MSY}) for Pacific sardine given the species' life history characteristics, though it would still entail challenges, for instance fluctuations in estimates of B_0 , due to the dependency of the stock on environmental dynamics. Although a formulaic MSST approach was never pursued for NSP, several points from the work resulting from the 2016 workshop evaluating MSST approaches for CPS (Review and Re-evaluation of MSSTs for finfish in CPS FMP, NMFS 2016) were considered in the SSC's discussion and inform Option b. The 2016 workshop explored several methods for calculating MSST based on estimates of B_{MSY} and B_0 under longer-term 'equilibrium' conditions as well as dynamic B_0 . There was concurrence in the 2016 workshop report and SSC response ([Agenda Item E.1.a, Supplemental SSC Report 1, September 2016](#)) that, due to the dynamic nature of CPS populations and assessments, a framework (formulaic) approach could have advantages over a fixed-value MSSTs for coastal pelagic species by utilizing current information.

Based on the recommendation of the SSC, under Option b, MSST is set to a value between $B_{10\%}$ and $B_{30\%}$ (i.e., between 10% and 30% of B_0). This range accommodates uncertainty around $B_{20\%}$, which was identified as an appropriate MSST formula for NSP in the 2016 NMFS SWFSC Report on the Review and Re-evaluation of MSSTs for finfish in CPS FMP. Similar proportions have been used in the management of many CPS stocks globally, including Pacific herring in British Columbia under low productivity conditions (SSB_{30} , Forrest et al. 2023), U.S. Atlantic herring ($\frac{1}{2} B_{MSY}$ translated into about SSB_{15-20} based on 2022 and 2026 assessments; NOAA 2022, NOAA 2026), CPS in Southern Benguela, South Africa, including *Sardinops sagax* experiencing high fluctuations similar to Pacific sardine (B_{20} , Shannon & Shin 2013), and Australian sardine (*Sardinops sagax*, B_{20} , Stewart 2025). Within the range of 10-30%, the specific percentage of B_0 and the value of B_0 will be determined based on BSIA and considering factors that affect stock productivity and distribution. In the absence of the numerical parameters required to calculate an MSST from this formula, the SSC recommended MSST be set at a reasonable proxy, to be determined based on BSIA during the annual harvest specifications process. The inclusion of a reasonable proxy could accommodate the static approach of Option a without specifying a particular value in the FMP.

Overall, Option b is based on the life history of the stock and its capacity to return to MSY while employing concepts in the NMFS white paper on Flexible Status Determination Criteria Examples and their Application (NMFS 2024a) to bring more flexibility to the Pacific sardine SDC. Several Councils have adopted flexible SDC in their FMPs to enable more timely and efficient stock status determinations when the process might otherwise be delayed by the timeline required to amend an FMP (NMFS 2024a). This strategy is utilized to apply new BSIA from stock assessments or other processes, as intended by the regulations: “A Council should consider a process that allows SDCs to be quickly updated to reflect the best scientific information available” (50 CFR 600.310(e)(2)(ii)). For instance, reasonable proxies 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. 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. The Council’s Option b includes this flexibility by both specifying a depletion-based formula and by allowing for a reasonable proxy to be calculated if needed without specifying a particular static value to be used for MSST.

Note, Options a and b do not need to be mutually exclusive under final action (though Option a was not included in the Council’s PPA).

Overfishing SDC and Control Rules

Under Alternative 1, the stock is considered undergoing overfishing when the catch is greater than the OFL specified in the FMP. The ABC is a reference point that further buffers the OFL via a BUFFER comprising the Council’s risk policy, accounting for scientific and management uncertainty.

For the OFL and ABC control rule, under Alternative 1, the more-intensive control rules for the U.S. stock of Pacific sardine would be applied, setting the DISTRIBUTION parameter equal to 1:

$$\begin{aligned} \text{OFL} &= \text{BIOMASS} * E_{MSY} * \text{DISTRIBUTION} \\ \text{ABC} &= \text{BIOMASS} * E_{MSY} * \text{BUFFER} * \text{DISTRIBUTION} \end{aligned}$$

Where $\text{DISTRIBUTION} = 1$

Overall, the overfishing SDC and control rules under Alternative 1 represent the Council’s intent to apply the existing management framework in the CPS FMP, including the OFL and ABC, to the revised Pacific sardine stock. Alternative 1 also captures the recommendations of the SSC regarding overfishing SDC for the U.S. Pacific sardine stock (Agenda Item J.1 Supplemental SSC Report 1, September 2026).

Application of the OFL and ABC control rules, with DISTRIBUTION set to 1 was recommended by the SSC (Agenda Item J.1 Supplemental SSC Report 1, September 2026). 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. The control rules also retain use of E_{MSY} , or the exploitation rate for deterministic equilibrium maximum sustainable yield. A value

or formula is not currently specified for E_{MSY} in the OFL or ABC within the CPS FMP, as its value is established during the harvest specifications cycle through the BSIA framework including review by the SSC. Under Alternative 1, this process would not change. The approach for setting the ABC via a BUFFER comprised of the Council’s risk policy (determined by P^* and a σ (sigma) with a time varying component related to natural mortality) would also be maintained.

Harvest Control Rules (HCRs)

Alternative 1 would establish HCRs for the revised U.S. Pacific sardine stock to prevent overfishing, manage the stock to OY, and achieve the goals and objectives of the CPS FMP. Overall, the HCRs under Alternative 1 represent the Council’s intent to apply the existing management framework in the CPS FMP to the revised Pacific sardine stock. Additionally, consistent application of a single approach across reference points and control rules is intended by the CPS FMP, hence the consistent application of the “more intensive” management framework across reference points and control rules under Alternative 1.

Per the recommendations of the July 2026 joint advisory body meeting (Agenda Item J.1 Attachment 2, September 2026) and the CPSMT at their September 2026 meeting ([Agenda Item J.1 Supplemental CPSMT Report 1](#)), under Alternative 1 the more-intensive management approach in the CPS FMP would be applied, including the HG control rule and related parameters, which reduces the exploitation rate as the stock declines (Table 3, reproduced below for reference). Within the adopted ROA, there are several options for specifying the CUTOFF parameter in the HG. The Council adopted Option ii. (150,000 mt) as its PPA.

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 based on data available for the specifications cycle
ACT	Less than or equal to the ACL based on data available for the specifications cycle
Accountability measures	Recommended based on data available for the specifications cycle
HG	$H = (BIOMASS - CUTOFF) * FRACTION * DISTRIBUTION$ (not to exceed MAXCAT or ACL)
CUTOFF	Option i. 50,000 mt Option ii. 150,00 mt (PPA) Option iii. 314,400 mt
FRACTION	Equal to E_{MSY}

Per the recommendation of the CPSMT, when considering how to apply the framework of the CPS FMP to the U.S. Pacific sardine stock, the HG control rule 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*” (Agenda Item J.1 Attachment 2, September 2026). Under Alternative 1, the parameter values within the HG control rule (detailed in Table 3 above), previously utilized for NSP, are maintained for the U.S. Pacific sardine stock in order to achieve the above goals. The one exception is DISTRIBUTION, which Alternative 1 sets equal to 1, consistent with the OFL and ABC, as the revised stock only includes biomass within U.S. waters. Multiple values for CUTOFF were also adopted within the ROA under Alternative 1, to be considered, per the recommendations of the CPSAS ([Agenda Item J.1 Supplemental CPSAS Report 1](#)). These values are based on those that have been previously analyzed for the NSP under Amendment 8 (PFMC 1998) and in a 2014 MSE (Hurtado-Ferro & Punt 2014)².

Under Alternative 1, the annual process to set ACLs and an optional annual catch target (ACT) implemented by the Council for Pacific sardine in harvest specification cycles will continue 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.

2.4 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 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.

In adopting an iFPA, the Council considered recommendations from the SSC, CPSMT, and CPSAS ([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). The science is clear that while differences exist among sardine in different locations, they do not stem from multiple distinct subpopulations, as was previously hypothesized, but 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. Overall, there is a lack of evidence for multiple subpopulations. Therefore, Alternative 1 would align the stock definition with NS2 requirements that conservation and management measures be based on BSIA, ensuring assessments and SDC are specified appropriately and managers can accurately track overfished and overfishing status for the portion of the Pacific sardine population in U.S. waters.

² The 314,4000 mt value is derived from the B_0 calculated from the 2012 NSP stock assessment

Additionally, per NS3, to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination. 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). More broadly, Alternative 1 would appropriately define the stock in need of conservation and management in the EEZ within the management unit, meeting the core requirement defined at § 302(h)(1) of the MSA that the Council prepare an FMP for each fishery under its authority that requires conservation and management. The Council considered these requirements for defining a stock in an FMP over the course of their decision making on the stock definition in November 2025 and April 2026.

In September 2026, the Council adopted a PPA for the management provisions within the FMP Amendment, adding to the iFPA to comprise Alternative 1, with select parameter options. The PPA sets management provisions (reference points and control rules) for the U.S. stock of Pacific sardine, delineated coastwide, to meet the requirements of the stock in an FMP and to maintain the Council's current management approach for Pacific sardine while adapting that approach to the newly available science on Pacific sardine stock structure. The Council's PPA applies the "more intensive" management approach defined within Section 4.6.3 of the CPS FMP to continue use of this approach for management of Pacific sardine and adjust it to fit the revised stock definition. The Council stressed the importance of revising the stock definition and implementing management for the revised stock, noting that this amendment would adjust management to be consistent with BSIA, while also preventing further delays of applying scientific information to management of Pacific sardine, including stock assessments and status determinations for the newly defined coastwide stock. The Council noted that this path forward is conservative, and allows preservation of a viable, monitored live-bait fishery within science-based conservation limits.

Based on the recommendation of the SSC, the Council adopted Alternative 1 Option b as their PPA option for the overfished status under Alternative 1, setting a formulaic MSST based on unfished biomass depletion metrics, where MSST is set to a value between $B_{10\%}$ and $B_{30\%}$ (i.e., between 10% and 30% of B_0). Overall, Option b was adopted as the Council's PPA based on the SSC's recommendation regarding the applicability of the approach to sardine life history and the benefit of adding flexibility through specification of a range of percentages and the option to calculate a reasonable proxy. This range accommodates uncertainty around $B_{20\%}$, which was identified as an appropriate MSST value in the 2016 NMFS SWFSC Report on MSST options (NMFS 2016) for CPS finfish and is within the range utilized for other small pelagics and sardine globally (Agenda Item J.1 Attachment 3, September 2026). Further, the Council's adopted PPA includes the use of reasonable proxy, to allow for flexibility to specify MSST based on BSIA. The Council considered Option a, a static value MSST that would continue the current approach to defining MSST for Pacific sardine and provide an absolute lower bound for overfished status determination. However, it is not clear whether this approach would continue to reflect stock status as new information on the stock, such as information on recruitment, environmental conditions,

and life history, is produced over time. For this reason, and based on the information currently available, the SSC did not recommend specification of static value MSST at their September meeting (Agenda Item J.1 Supplemental SSC Report 1, see more below). The SSC did, however, recommend use of a reasonable proxy within the MSST specification that could be a static value (i.e., X mt) based on BSIA in a given year. Overall, Option b was adopted as the Council's PPA based on the SSC's recommendation regarding the applicability of the approach to sardine life history and the benefit of adding flexibility through specification of a range of percentages and the option to calculate a reasonable proxy. Because a new scientific understanding of the sardine population is driving this action, and because CPS, including Pacific sardine, undergo extreme, productivity regime shifts driven by environmental factors, the adaptable framework provided in Option b for Pacific sardine could provide the operational agility needed to manage the stock when necessary.

Regarding the overfishing status, the Council's PPA of Alternative 1 is consistent with the recommendations of the SSC, maintaining the existing control rules within the "more intensive" management approach but setting DISTRIBUTION equal to 1 because the revised stock definition includes all sardine in U.S. waters.

Based on the recommendations of the CPSMT, the Council adopted Alternative 1, including a CUTOFF of 150,000 mt (Option ii.) as their PPA. The PPA would maintain the more intensive management framework, including the HG for Pacific sardine and the following parameters:

- DISTRIBUTION set to one (1) in the HG control rule: The revised stock definition includes all Pacific sardine in U.S. waters.
- FRACTION in the HG set equal to E_{MSY} : FRACTION can change over time with E_{MSY} as new scientific information becomes available.
- Maintain CUTOFF in the HG calculation and apply 150,000 mt: Pacific sardine has historically experienced large fluctuations in abundance on decadal scales, even in the absence of fishing. Although it is not a requirement of the MSA or National Standards, the use of CUTOFF is valuable as a precautionary value to protect this stock from exploitation pressures during times of low abundance. In previous analyses, retaining the 150,000 mt cutoff effectively mitigated severe stock collapse risks during low-productivity cycles while avoiding the extreme commercial fishery disruptions that higher cutoffs (such as 314,400 mt) would trigger.
- Set MAXCAT to 200,000 mt: 200,000 mt was previously analyzed for NSP and found to stabilize the fishery and allow high levels of harvest over time when the population is large.

The Council also reiterated the ability to set precautionary ACLs, ACTs, and management measures in each harvest specifications cycle, as needed, within the framework set by the PPA.

2.5 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). 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 adopted 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, while also analyzing this action in comparison to No Action, which would maintain the status quo of managing NSP.

3.0 Affected Environment

This section describes each component of the Affected Environment: the sardine resource, the sardine industry, and species in the ecosystem that rely on sardine as forage.

The action does not affect the spatial distribution, intensity, or operations of fishing activities; therefore, impacts will not occur based on changes in fishing practices. As a result, this action has no impact on bycatch or direct protected species interactions. Bycatch and protected species interactions in the sardine fishery are already extremely low and this action proposes no changes to their monitoring or disposition. Similarly, this action has no impact on the EFH identified in the CPS FMP and proposes no changes to the EFH provisions of the FMP. Therefore, these are not included as components of the Affected Environment and will not be analyzed in this document.

3.1 Resource 1 - Pacific Sardine Resource

Pacific sardine (*Sardinops sagax*) are small schooling fish which can be found in the pelagic domain of nearshore and offshore areas, in the Gulf of California and in the California Current Ecosystem (CCE) from the tip of Baja California Sur to southeastern Alaska. In the north, sardines tend to appear seasonally, and the species' range tends to contract towards the south during periods of low abundance.

Pacific sardine, like other CPS, can achieve large biomass levels off the U.S. West Coast, and undergo boom and bust cycles even in the absence of commercial fishing. Analyses of fish scale deposits in deep ocean sediments off southern California found layers of sardine and anchovy scales, with nine major sardine recoveries and subsequent declines over a 1,700-year period (see Figure 2). These boom/bust cycles are heavily influenced by the interannual and intraannual climate cycles, such as the Pacific Decadal Oscillation (PDO), shaping the CCE. Although there is general scientific consensus that environmental conditions are a critical factor driving the population size of Pacific sardine, as well as how quickly it recovers from low levels, the specific environmental conditions and variables that are most important and the degree to which fishing may affect population fluctuations has long been investigated and is still debated (Clark & Marr, 1955; Baumgartner et al., 1992; Mantua et al., 1997; Minobe, 1997; Schwartzlose et al., 1999; McFarlane et al., 2002; Smith & Moser, 2003; Rykaczewski & Checkley, 2008; Field et al., 2009; MacCall, 2009; Lindgren, et al., 2013). Further, recent climate change-related events, such as marine heat waves in the eastern Pacific Ocean along the U.S. West Coast have altered the structure of the greater pelagic ecosystem (Peterson et al., 2017). No one environmental condition is the sole driver of population abundance. The Pacific sardine resource is intensively managed under the CPS FMP and the Council, involving an annual cycle of survey, assessment, and harvest specifications designed to respond to this natural variation in biomass, and management measures are considered to be relatively conservative as well as responsive to declines in the biomass. For example, an approximately 33 percent decline in biomass from 2012 to 2013 resulted in an approximately 60 percent decrease in allowable harvest from 2012 to 2013 and a subsequent 44 percent decline in biomass from 2013 to 2014 resulted in a 66 percent decrease in allowable harvest from 2013 to 2014. These reductions were primarily a result of the CUTOFF parameter in the HCR for Pacific sardine (150,000 mt age 1+ biomass), which was designed to keep more fish in the

ocean for reproductive purposes as the stock biomass declines and reduces allowable harvest in the directed fishery as biomass gets closer to 150,000 mt.

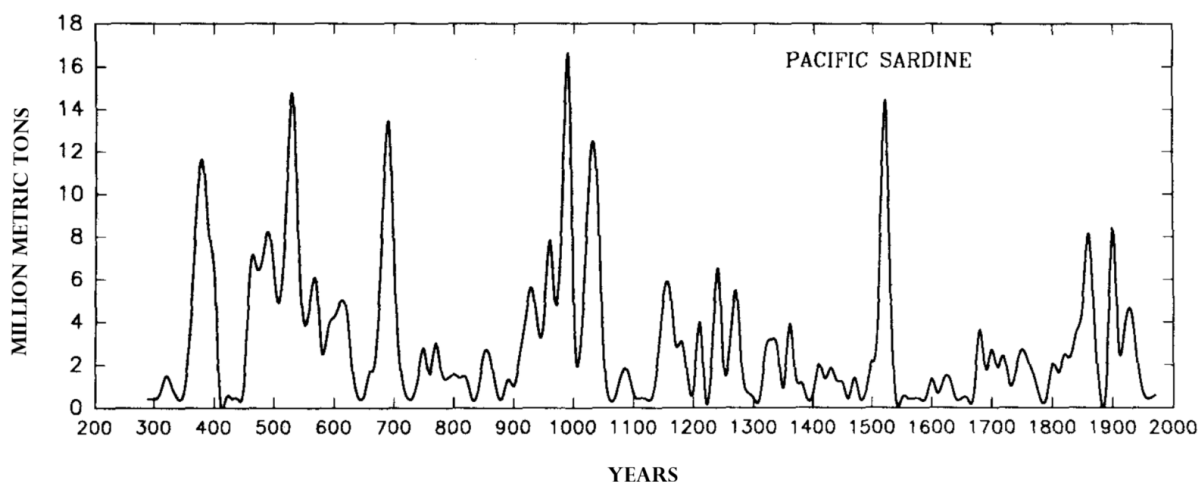


Figure 2. 1,700-year hindcast series of Pacific sardine biomasses off California and Baja California (figure reproduced from Baumgartner, Soutar, & Ferreira-Bartrina, (1992) and modified to exclude Northern anchovy).

As stated above, Pacific sardine is a transboundary species that also is distributed in Mexican and at times, Canadian, waters outside U.S. jurisdiction. Recent scientific literature shows that Pacific sardine comprise a single population across these jurisdictions. Consistent with the responsibilities within the U.S. jurisdiction under the MSA, this document and its analysis considers impacts on the Pacific sardine resource within U.S. waters.

More information on current Pacific sardine abundance and population trends over time is available in the current CPS SAFE Report (PFMC 2025a, incorporated by reference), and more information on their distribution and habitat can be found in Appendix D to the CPS FMP, as part of the description of essential fish habitat (PFMC 2026a, incorporated by reference).

3.2 Resource 2 – Pacific Sardine Industry

California’s Pacific sardine fishery (or “sardine industry”) began in the 1860s and peaked in 1936–1937, when landings in the three west coast states plus British Columbia reached a record 717,896 mt. In the 1930s and 1940s, Pacific sardine supported the largest commercial fishery in the western hemisphere, with sardines accounting for nearly 25 percent of all the fish landed in the United States by weight. Since then, the fishery has experienced several periods of closure and reopening in response to the previously described boom-and-bust nature of this environmentally-driven resource. The directed fishery for sardine has now been closed since the 2015–2016 fishing year, when the projected biomass of the “NSP” stock fell below the CUTOFF value of 150,000 mt.

While the primary directed fishery has historically been the largest component of Pacific sardine fisheries, what we call the “sardine industry” here also includes minor directed fisheries, live bait fisheries, and incidental catch of sardine in CPS and non-CPS fisheries, capturing diverse fishery participants that contribute to local economies of the West Coast.

The primary directed fishery is the main fishery that operates in Federal waters. Fishing opportunity in the primary directed fishery is determined by the output of the harvest guideline HCR, which has imposed a closure of the sardine fishery since the NSP Pacific sardine biomass fell below the CUTOFF of 150,000 mt in the 2015–2016 fishing year. Prior to its closure, the ex-vessel value of this fishery averaged over \$18.35 million annually (in 2023 dollars) from 2009 through 2014 (PFMC 2019).

Live bait and minor directed fisheries have continued to operate since the closure of the primary directed fishery. Live bait fisheries typically use various types of round haul gear such as purse seines to capture relatively small-sized CPS schools and deliver the catch alive to receiver vessels (or “live bait barges”) that have holding tanks or dockside net pens. Private and charter recreational vessels and commercial vessels then purchase live bait by the scoop from these receiver vessels or pens, as they depart for fishing trips. This sector supports the Southern California recreational fishery, which generated over \$510 million in value added impact to California in 2022 (National Marine Fisheries Service 2024). Between 2015 and 2023, live bait catches of Pacific sardine averaged 1,326 mt per year, making up 87 percent of total live bait catches in California. (see PFMC 2024a Appendix). While anchovy is also used as live bait, Pacific sardine makes up the vast majority, comprising an average of 86.56 percent from 2015 to 2023.

Amendment 16 of the CPS FMP also permitted minor directed commercial fishing on CPS finfish during the closure of a primary directed sardine fishery, which has allowed this sector to continue harvesting Pacific sardine since 2015. While this sector accounts for a very small portion of catch, it is an important source of income for some small ports and producers, especially while the primary directed fishery is closed. NMFS has also approved harvest via experimental fishing permits (EFPs) since the closure of the primary directed fishery, for instance allowing for the California Wetfish Producer’s Association (CWPA) to fish Pacific sardine in order to collect biological samples in the nearshore area. The fishery-dependent data collected by this program has been vital to supporting accurate estimates of stock biomass in the absence of a primary directed fishery.

Incidental fishing provides flexibility in fisheries that incidentally catch sardine, including CPS-fisheries and non-CPS fisheries. The CPS FMP allows up to 45 percent incidental landings of Pacific sardine when the stock is below the CUTOFF biomass and above the MSST, and no more than 20 percent when it is below MSST. From the closure of primary directed Pacific sardine fishing in the 2015–2016 fishing year through the 2018–2019 fishing year, an average of 300 mt of incidental sardine was landed annually in California (PFMC 2022b). These mixed landings averaged over \$1.8 million in value (PFMC 2022b). From the 2019–2020 fishing year through the 2022–2023 fishing year, an average of 179 mt incidental sardine was landed annually (PFMC 2024b). Incidental fishery mixed landings averaged \$4.3 million in value from 2019 to 2022 in California (PFMC 2022b). The Pacific whiting (hake) trawl fishery accounts for most non-CPS directed fishery incidental catch. Annual management measures for Pacific sardine include an incidental catch allowance of sardine for non-CPS directed fisheries, expressed as a limit in metric tons per landing. The limit has been up to 2 mt. Since 2015, when Pacific sardine biomass fell below CUTOFF or 150,000 mt, incidental landings in the Pacific whiting fishery have varied widely—ranging from less than 1 mt to nearly 30 mt in the 2021–2022 sardine fishing year. Excluding the 2020–2021 fishing year (30 mt), the whiting sectors caught 6.8 mt of Pacific sardine

on average during the 2015–2016 to 2022–2023 fishing years. In 2022, commercial landings of Pacific whiting across sectors totaled 577 million pounds and were valued at \$64 million.

The CPS FMP also recognizes the rights of treaty Indian tribes to harvest Pacific sardine and provides a framework for the development of a tribal fishery. Pacific Ocean waters and estuaries north of Point Chehalis, Washington, include the usual and accustomed (U & A) fishing areas of four treaty Indian tribes (as defined at 50 CFR 660.4) that may initiate their right to harvest Pacific sardine in any fishing year by submitting a written request to the NMFS Regional Administrator at least 120 days prior to the start of the fishing year. Tribal treaty fisheries are established via Government-to-Government consultation and could potentially include Pacific sardine harvest. The Quinault Indian Nation has exercised their rights to harvest Pacific sardine in their U & A Fishing Area off the coast of Washington State, pursuant to the 1856 Treaty of Olympia (Treaty with the Quinault).

More information on sectors, gear types, landings, revenue and participants in the sardine industry over time can be found in the latest CPS SAFE Report (PFMC 2025a, incorporated by reference).

3.3. Resource 3 - Predators of Sardine in the Ecosystem

Pacific sardine, along with other small pelagic fish, such as other CPS and other juvenile fish, are important to the complex trophic dynamics of the CCE. For example, Pacific sardine and anchovy are consumers of large quantities of primary production (phytoplankton) in the ecosystem, and of zooplankton, including early life stages of fish. At both juvenile and adult life stages, Pacific sardine, along with other small pelagic fish, such as other CPS and other juvenile fish, are also an important component of forage for myriad seabirds, pinnipeds, cetaceans, and other fish. Most Pacific sardine predators are generalists that are not dependent on the availability of a single species but rather on a suite of species, any one (or more) of which is likely to be abundant each year. Predators of sardine in the CCE are defined here as a component of the affected environment and because within the species that prey on sardine there is limited to no species-specific linkage, all predators (mammals, birds, fish, ESA-listed, non-ESA listed) will be considered holistically as the subject of analysis in Section 4.0 on Environmental Consequences.

Pacific sardine are prey for several commercially important marine fishes, such as Pacific salmonids, including endangered Chinook stocks, albacore tuna, Pacific whiting, as well as Pacific spiny dogfish and several shark species (Szoboszlai et al., 2015; PFMC 1998). They are also identified as components of EFH in the salmon, groundfish, and highly migratory species FMPs. Trophic interactions between CPS and higher-trophic-level fish are complex, and the extent to which predator populations are affected by CPS abundance and distribution is difficult to measure. The value of CPS as forage to adult predators versus the negative effects of predation from CPS (on larvae and juveniles of predator fish species) and competition (removal of phytoplankton, zooplankton, and other fish) is unknown.

Additionally, a number of seabirds are known to forage on Pacific sardine, including grebes, loons, petrels, albatrosses, pelicans, cormorants, gulls, terns, auks, and some raptors, including a small number of Endangered Species Act (ESA) listed species (PFMC 1998). The marbled murrelet, listed as threatened, is one example of an ESA-listed bird that has been known to consume Pacific

sardine. Similar to most of the seabirds that are known to eat Pacific sardine, marbled murrelets are known to consume many different prey species including CPS and, like many predators, are capable of prey switching, with uncertainty as to the relative importance of Pacific sardine in its diet (Burkett 1995; Becker & Bessinger, 2006; McShane et al., 2004; Szoboszlai et al., 2015). Anecdotal evidence documents how marbled murrelets' prey flexibility and opportunistic feeding strategies were essential to allowing the species to persist through Pacific sardine population crashes (Burkett, 1995).

Pacific sardine are also a component of forage for a variety of marine mammals, such as common dolphins, sea lions, harbor seals, and humpback whales (PFMC 1998), including several ESA-listed species. Importantly, sardine are prey for two distinct population segments (DPSs) of ESA-listed humpback whales that feed within the range of Pacific sardine—the Mexico DPS (ESA threatened) and Central America DPS (ESA endangered)—and were included in a list of small pelagic schooling fishes in the prey essential features used to designate these populations' critical habitat (see 86 FR 21082, April 21, 2021). Humpback whales, like other marine mammals in the CCE that prey on Pacific sardine, are generalist predators, and sardine are just one species within a complex of the primary prey that humpbacks consume: euphausiids and small pelagic schooling fishes such as northern anchovy, Pacific herring capelin, juvenile walleye pollock, Pacific sardine, and Pacific sand lance (see 86 FR 21082, April 21, 2021). Like the aforementioned predators of CPS, substantial data support that humpback whales are known to switch between target prey species depending on what is most abundant. Notably, the primary direct threats to these populations, as described in a recent Recovery Outline, are entanglement in fishing gear (not of the kind used in the sardine fisheries) and vessel strike (NMFS 2022a).

4.0 Environmental Consequences

This evaluation of Environmental Consequences compares the expected impacts of the No Action outcome against the preliminary preferred alternative (PPA), as follows:

No Action – Status Quo

- The Council would not define stocks other than those currently defined in the CPS FMP (Section 1.2, Table 1-1). Only the NSP of Pacific sardine would continue to be defined as a stock in the FMU and management provisions would remain as specified for the NSP

Alternative 1 (PPA) – Define a U.S. stock of Pacific sardine and specify FMP provisions

- 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.
- SDC would be adopted for the U.S. stock of Pacific sardine
- HCRs would be specified in the CPS FMP to be applied to the U.S. Pacific sardine stock, within the framework of the CPS FMP. During the annual harvest specifications process the Council may set harvest specifications based on these HCRs in order to prevent overfishing and achieve OY.
- There are several options for defining the MSST reference point and CUTOFF parameter within Alternative 1 that will be compared both within Alternative 1 and to No Action, in which MSST and CUTOFF have explicit specifications.

The impact of Alternative 1 (the action alternative) is expected to be limited, as management for Pacific sardine would continue under the same "intensive" management framework in the CPS FMP, and because the action is not expected to affect the spatial distribution, timing, effort, or operations of fishing activities. Annual catch limits will continue to fluctuate based on annual biomass estimates, and this action does not alter the Council and SSC's process of reviewing stock assessments or recommending harvest limits based on annual estimates, uncertainty, and socio-economic factors. Moreover, the degree of variability across annual biomass estimates is expected to remain comparable to what has historically been observed for NSP.

Overall, neither No Action nor Alternative 1, including all options under Alternative 1, are expected to have significant impacts on affected resources. Table 5 summarizes the expected relative direction of impacts on resources under each alternative.

Table 5. Expected impacts under the alternatives, including all options under Alternative 1, for the resources within the affected environment

Resource in the Affected Environment	Impacts from No Action	Impacts from Alternative 1
Sardine Resource	Not significant; Negative	Not significant; Positive
Pacific Sardine Industry	Not significant; Negative	Not significant; Positive
Predators in the Ecosystem	Not significant; Negative	Not significant; Positive

4.1 No Action

Overall, under No Action, current management of Pacific sardine as the NSP, including existing SDCs and control rules, would continue to occur through the FMP. No Action would disregard BSIA reviewed by the Council and its SSC and risk misaligned conservation and management measures for Pacific sardine stemming from a stock definition misaligned with population dynamics. No Action is likely to result in negative, but not significant, impacts to the sardine resource, the sardine industry, and predators of sardine in the ecosystem over the long term, as analyzed in the following sections.

4.1.1 Sardine Resource

Overall, the No Action Alternative—which maintains the current stock definition for Pacific sardine and management provisions defined in the CPS FMP for NSP—is likely to result in negative, though not significant, impacts to the sardine resource by failing to incorporate BSIA on population dynamics of the species into management of Pacific sardine. By ignoring the most up to date information on Pacific sardine population dynamics in U.S. waters, stock assessments and harvest specifications cannot reflect actual stock conditions, which can increase the risk of overfishing and prevent the attainment of optimum yield over time.

Managing Pacific sardine under a subpopulation assumption that is no longer supported by science misidentifies the stock in need of conservation and management and specifically results in a failure to accurately track stock status and prevent overfishing for Pacific sardine in U.S. waters. Basing SDCs on an invalidated subpopulation assumption prevents the accurate determination of stock status, OFLs, ABCs, and ACLs for the entire portion of the Pacific sardine population in U.S. waters. Over the long term, impacts of No Action are not significant but likely to be negative because biomass targets and catch limits would not be based on the latest scientific information on Pacific sardine in U.S. waters, increasing the risk of overfishing. Although the status quo management framework for Pacific sardine includes conservative management measures, like the BUFFER accounting for uncertainty in the ABC and the CUTOFF threshold in the HG, these safeguards alone cannot fully mitigate the risk posed by managing an inaccurately defined stock and would still be applied to an inaccurate stock biomass estimate.

4.1.2 Pacific Sardine Industry

Overall, the No Action Alternative is likely to result in negative, though not significant, impacts to the sardine industry by failing to incorporate BSIA on population dynamics of the species into management of Pacific sardine. As described in Section 3, Pacific sardine off the West Coast are highly important to the commercial sectors (primary directed, minor directed, and live bait) that target the species, as well as the California recreational sector that relies on live bait and the sectors that incidentally catch sardine. Managing Pacific sardine under a subpopulation assumption that is no longer supported by science creates misalignments between science and management by failing to incorporate BSIA into management of the stock targeted by the fishery. An increased risk of overfishing under No Action, described above, directly impacts the sardine industry through reduced catch across sectors, potential fishery closures, reduced allocations, and overall economic loss. Failing to manage in accordance with BSIA creates more uncertainty for fisheries and a long-term lack of stability, preventing the sardine industry from attaining OY.

Moreover, managing only a portion of the sardine resource available to the industry fails to meet the goals and objectives of the CPS FMP, including efficiency and profitability in the fishery, stability of catch, achieving OY, and accommodating existing fishery segments.

4.1.3 Predators of Sardine in the Ecosystem

Because predators of Pacific sardine are generalists capable of prey-switching and Pacific sardine are just one constituent of this forage base, and because environmental conditions are the primary drivers of the sardine population (see Section 3.1), the No Action alternative is not likely to have significant impacts on the predators of sardine in the ecosystem. However, the No Action Alternative is likely to result in negative, though not significant, impacts to the sardine resource by failing to incorporate BSIA on population dynamics of the species into management of Pacific sardine.

Boom and bust fluctuations in abundance observed in Pacific sardine are common in species that generally have higher reproductive rates, are shorter-lived, attain sexual maturity at younger ages, and have faster individual growth rates than species such as rockfish and many flatfish. Predators of sardine have therefore evolved in an ecosystem in which relative abundances of prey species frequently fluctuate. Consequently, as described in Section 3.3, most predators are generalists who are not dependent on the availability of a single species but rather on many species, any one (or

more) of which is likely to be abundant in a given year. Many of them also have other life history traits, such as long lifespans or adaptive reproductive strategies, that help mitigate against years of low prey availability. Trophic models have been used to examine the impacts of forage fish populations within these complex dynamics, and efforts are ongoing to refine our understanding of trophic linkages (Ruzicka et al., 2012; Koehn et al., 2016). Trophic modeling efforts have sometimes ignored important factors that need to be considered before drawing conclusions about any direct effects of the overall abundance of a particular forage fish population on its predators' populations (Hilborn et al., 2017).

Koehn et al. (2016) found that due to the broad distribution of predator diets, dynamic models would generally not predict widespread ecological effects from depleting individual forage fish species; rather, certain species aggregates—key forage assemblages, such as Pacific sardine and anchovy together—are the minimum unit on which food web models can predict impacts. So, to consider the effect of sardine management on predators, one must consider the fluctuations of other small pelagic fish populations that make up this prey base. For example, while the biomass of Pacific sardine is currently low, the central subpopulation of northern anchovy biomass is high (approximately 800,000 mt in 2019, 2,879,010 mt 2022, and 1,238,065 mt in 2025) (Stierhoff et al., 2020; Kuriyama et al., 2022; Stierhoff et al., 2026). While this specific scenario may not always be the case, it is an example of the variability of the forage in the system and why predators have adapted to consume multiple prey species (McClatchie et al., 2017). Moreover, other elements of the forage base for these predators remain protected under provisions of the CPS FMP. For instance, fishing for krill, one of the most important prey species in the ecosystem, is prohibited by the CPS FMP.; Amendment 12 (74 FR 33372, July 13, 2009) specifically took action to protect krill species from harvest in order to safeguard prey for marine predators. These are just some examples of other species that provide prey-switching opportunities and, therefore, varied forage availability in the ecosystem, making it unlikely that there would be a measurable difference or significant impact on sardine predators from either No Action or Alternative 1. This conclusion applies to all marine predators defined as the affected environment, including mammals, birds, fish, ESA-listed, and non-ESA listed species.

Additionally, the CPS FMP defines a management goal to provide adequate forage for dependent species. The HG control rule within the CPS FMP's management framework reduces the exploitation rate as the stock biomass declines and establishes a discretionary CUTOFF parameter to ensure the stock is not overexploited in years with low stock biomass. However, this framework, including the HG and CUTOFF defined in the CPS FMP, would not change under the No Action alternative, and would only be applied to the "NSP", failing to account for the full extent of the Pacific sardine population (i.e., the fishery resource and forage base) in U.S. waters. Therefore, as analyzed in 4.1.1 and 4.1.2, a failure to account for all Pacific sardine in need of conservation and management under No Action could result in an increased risk of overfishing and therefore negative, though not significant, impacts to all predators of sardine in the ecosystem, compared to Alternative 1.

4.2 Alternative 1 (Preferred Alternative, with select Options as PPA for MSST and CUTOFF)

Alternative 1 establishes a new stock definition for Pacific sardine—based on the most up to date scientific information available and a review of previous work on population dynamics—and specifies the SDC and HCRs in the FMP that necessarily accompany the stock. Overall, the impacts of Alternative 1 are not significant, but likely to be positive, as this alternative directly addresses the primary risk to the resources identified under No Action: the risk of inappropriate conservation and management measures stemming from a stock definition misaligned with population dynamics. Alternative 1 aligns the foundation of Pacific sardine management—the stock definition—with BSIA and is therefore likely to positively impact the sardine resource, the sardine industry, and predators of sardine in the ecosystem over the long term.

Alternative 1 is not expected to affect the spatial distribution, timing, effort, or operations of fishing activities; therefore, impacts related to changes in fishing practices are not expected under this action (see Section 3.0, Affected Environment). This action does not impact regional or seasonal allocation or fishery operations, and therefore the action alternative, compared to No Action, implies no greater risk of localized depletion or conflict between jurisdictions. Therefore, impacts of this action are largely administrative in nature and are related to the long term ability to achieve the CPS FMP’s goals and objectives, rather than any specific magnitude of removals of Pacific sardine. The overall intent of selecting Alternative 1 is to align sardine management measures with BSIA on stock dynamics, thereby increasing the effectiveness of resource management strategies and conservation efforts inherent to CPS management.

4.2.1 Sardine Resource

Under Alternative 1, impacts to the sardine resource are not significant, but likely to be positive by aligning management with BSIA, thereby reducing the risks and uncertainties associated with fishing pressure under a misaligned stock definition and assessment parameters. Establishing a stock management unit that accurately reflects biological population structure is a foundational principle of fisheries management to ensure the conservation of managed species.

Alternative 1 relies on the framework and precautions built into existing management for CPS, applies the “more intensive” management framework to a stock definition that reflects BSIA, and updates parameters where necessary. The “more intensive” framework defined in Section 4 of the CPS FMP exists to achieve CPS-specific management objectives aimed at responsible management of the resource. This framework involves an annual assessment and management cycle designed to quickly respond to the dynamic nature of the managed stock. Because Pacific sardine experience strong decadal shifts in productivity driven by environmental conditions, adaptive management measures in the CPS FMP that enable rapid incorporation of BSIA have an overall positive impact on the sardine resource. Within this framework and the specific control rules applied under Alternative 1, the OFL, ABC, ACL, ACTs, and HG are determined annually based on the best estimate of stock biomass. Under Alternative 1, these control rules and reference points would be adjusted to represent the Pacific sardine population present in U.S. waters. Therefore, relative to No Action, Alternative 1 is expected to have positive, but not significant, impacts on the sardine resource by reducing the risk of overfishing.

Alternative 1 also specifies overfished and overfishing SDC for the U.S. Pacific sardine stock. Establishing objective and measurable criteria by which to accurately monitor and determine stock

status for the portion of the Pacific sardine population in U.S. waters is essential to ensuring conservation of the resource. The application of the CPS FMP's more intensive control rules for the OFL and ABC, and specification of an MSST for the U.S. Pacific sardine stock are expected to positively impact the sardine resource by ensuring accurate tracking of stock status and enabling timely responses to overfishing or overfished conditions.

Under Alternative 1, the Council adopted multiple sub-options to explore a range for the overfished SDC, MSST: specifying MSST as a static value, either 65,000 mt (Option a.i) or 150,000 mt (Option a.ii), or specifying MSST as a depletion-based formula (Option b). All options are expected to have a positive impact on the sardine resource compared to No Action by preventing overfishing and supporting rebuilding of the whole U.S. Pacific sardine stock.

Both static options (a.i and a.ii) are greater than the MSST of 50,000 mt that would be retained under No Action, reflect an expansion and variability of the stock defined under Alternative 1 compared to status quo, and would establish an overfished level protective of and therefore beneficial to the U.S. Pacific sardine stock. An MSST of 65,000 mt (Option a.i) incorporates southern acoustic-trawl survey biomass (see Section 2.3) and provides a fixed, transparent rebuilding trigger that accounts for the expanded stock size in addition to the variability of stock movement and seasonality affecting presence in the survey data. Setting the MSST equal to 150,000 mt (Option a.ii) is highly conservative but overestimates the expansion of the stock biomass and risks prematurely triggering formal overfished determinations and mandatory rebuilding plans during periods when the stock is not in an overfished condition. Both Option a.i. and a.ii lack the dynamic responsiveness of a formulaic MSST to BSIA on stock productivity (Option b, PPA).

Option b, the Council's PPA, is also expected to have a positive impact on the sardine resource, compared to Options a and No Action. The formulaic definition for MSST as Option b under Alternative 1 is based on unfished biomass depletion metrics and would allow the SSC to annually recommend an appropriate value or reasonable proxy based on the latest stock assessment and BSIA. This approach would benefit the health of the sardine resource compared to No Action and Options a by reflecting BSIA on sardine life history and population dynamics and ensuring the overfished threshold adapts dynamically to shifting conditions, stock productivity, and new information on life history, granting the SSC and Council operational agility in recommending the best possible reference point based on BSIA from year to year. Finally, the formula for MSST under Option b includes a range of $10\%B_0 - 30\%B_0$ and is based on management of other CPS stocks with similar life histories globally, grounding this approach in proven methods for adequate resource conservation. Importantly, selecting the formulaic approach does not prevent the use of a static value if the SSC finds that it is a reasonable proxy representing BSIA in any given year. Overall, scaling MSST to a percentage of unfished biomass (B_0) represents best scientific practices for setting threshold points for small pelagics as it adjusts dynamically to stock productivity and would better reflect stock conditions and prevent overfishing compared to other options and the No Action alternative.

Finally, under Alternative 1, HCRs would be specified for the U.S. Pacific sardine stock. Taking this action would have a positive impact on the sardine resource compared to No Action by applying the appropriate framework for intensively managing a CPS stock and establishing

parameters reflective of the newly defined stock, effectively reducing the risk of management uncertainties or risk of overfishing. Application of this framework is expected to 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 (per the CPSMT contribution to the joint advisory body meeting report, Agenda Item J.1, Attachment 2, September 2026). Included under Alternative 1 are three sub-options regarding the CUTOFF term, representing a range of threshold values that would effectively safeguard a seed stock and reduce exploitation rates as biomass declines: 50,000 mt, 150,000 mt, and 314,000 mt. Establishing a CUTOFF term is designed specifically to protect the stock, thereby having positive impacts on the sardine resource. Previous analyses of CUTOFF values for NSP show that any of the sub-options for CUTOFF would positively impact the sardine resource, though none would have a significant impact compared to No Action. The 50,000 mt and 150,000 mt values considered by the Council were analyzed via the MSE supporting Amendment 8 to the FMP as well as a 2014 MSE (PFMC 1998, Hurtado-Ferro & Punt 2014). Within those analyses, a CUTOFF as low as 50,000 mt showed benefit to the stock, though 100,000 mt and 150,000 mt performed better than 50,000 mt in terms of preventing the stock from becoming overfished and supporting a faster rebuilding time. The 2014 MSE (Hurtado-Ferro & Punt) found that a 150,000 mt CUTOFF (the Council's PPA) and a 314,400 mt CUTOFF equally, effectively mitigated severe stock collapse risks during low-productivity cycles compared to a 50,000 mt CUTOFF. Although both analyses were based on modelling focused on NSP, at this point in time, it is unknown whether or how the results will vary from any future modelling on a revised U.S. stock definition. Modelling of NSP was primarily focused on sardine found in U.S. waters and at the time of these modelling efforts NSP and southern subpopulation were not being separated in a way that would impact modelling. Therefore, these analyses can provide relative insight into an evaluation of the tradeoffs between options for this parameter.

4.2.2 Pacific Sardine Industry

The commercial and recreational sectors relying on Pacific sardine, both targeted and incidental, represent a highly integrated, multi-species fishery complex operating across California, Oregon, and Washington. Taking action under Alternative 1 to define a new coastwide stock of Pacific sardine would likely have a positive, though not significant, impact on the sardine industry by aligning management of the fishery with BSIA on the biology of the target species reduces the risk of overfishing and improves opportunities to achieve optimum yield.

Defining the accompanying overfished and overfishing SDC for this new stock under Alternative 1 would have a positive impact on the sardine industry compared to No Action, as objective and measurable criteria would be based on BSIA to accurately track stock status for Pacific sardine in U.S. waters, ensuring the long term health of the stock and stable fishing opportunities.

As mentioned above, under Alternative 1, the Council adopted multiple sub-options to explore a range for the overfished SDC, MSST: specifying MSST as a static value, either 65,000 mt (Option a.i) or 150,000 mt (Option a.ii), or specifying MSST as a depletion-based formula (Option b). All options are expected to have a positive impact on the sardine industry compared to No Action by preventing overfishing and supporting rebuilding of the U.S. Pacific sardine stock. Between the Options under a, 65,000 mt (Option a.i) incorporates an understanding of the variability of stock

dynamics while setting the MSST to 150,000 mt (Option a.ii) is highly conservative, but overestimates the expansion of stock biomass (relative to NSP) and risks prematurely triggering formal overfished determinations and mandatory rebuilding plans during periods when the stock is not in an overfished condition. This outcome could be more limiting to the directed fishery and attainment of OY across the sardine industry, even when the stock is not at risk. Finally, Option b represents best scientific practices for setting threshold points for small pelagics as it adjusts dynamically to stock productivity and would better reflect stock conditions and prevent overfishing compared to other options and the No Action alternative. Compared to No Action, Option b would have positive impacts on the sardine industry by more accurately tracking stock status based on BSIA and responding to changes in productivity, allowing for both short term benefits when the stock can support fishing activity, and long term sustainability of the stock and sardine fisheries. Option b would avoid additional catch restraints on CPS fisheries and incidental sardine allowances within other fisheries (e.g., whiting) when the stock is not in an overfished condition, mitigating substantial economic disruptions compared to Options a.

Specifying HCRs and establishing parameters adjusted for the U.S. coastwide Pacific sardine stock under Alternative 1 is expected to positively, though not significantly, impact the sardine industry by reducing management uncertainty, preventing overfishing, and supporting the attainment of OY. The HCRs under Alternative 1 would apply the appropriate framework for intensively managing a CPS stock and establishing parameters reflective of the newly defined stock (e.g., DISTRIBUTION = 1), effectively reducing the risk of management uncertainties or risk of overfishing, and improving the ability to attain OY. Application of this framework is expected to best meet relevant goals and objectives in the CPS FMP, including promoting efficiency and profitability in the fishery, and stability of catch (per the CPSMT contribution to the joint advisory body meeting report, Agenda Item J.1, Attachment 2, September 2026). Establishing parameters scaled directly to the U.S. EEZ, such as setting DISTRIBUTION = 1 aligns harvest limits with the assessed biomass in U.S. waters.

Under Alternative 1, The HG control rule is applied to the U.S. Pacific sardine stock and 3 options are considered for the CUTOFF parameter within this control rule: 50,000 mt, 150,000 mt, and 314,400 mt. Every option for CUTOFF is expected to have a positive impact on the sardine industry as whole by effectively reducing exploitation as biomass declines and preemptively closing the directed fishery to protect a spawning stock base at low biomass, safeguarding the long term viability of the stock and sardine industry. However, there are tradeoffs between various CUTOFF values; an appropriate CUTOFF benefits the sardine industry by ensuring the long term viability of sardine fisheries, reducing frequency and duration of closures, and supporting stability of long term catch, while still meeting other objectives related to preventing overfishing and protecting forage availability.

As described in Sections 2 and 4.2.1, the three sub-options for CUTOFF were previously compared in the 1998 and 2014 MSEs (PFMC 1998, Hurtado-Ferro & Punt 2014). These MSEs provide a robust comparative framework for evaluating relative CUTOFF performance and tradeoffs. Overall, The 150,000 mt CUTOFF (Option ii., PPA) effectively mitigated severe stock collapse risks during low-productivity cycles while avoiding the extreme commercial fishery disruptions that higher CUTOFFs (such as 314,400 mt, Option iii.) would trigger, providing more benefits to the stock compared to 50,000 mt (option i.). The higher 314,400 mt CUTOFF did not offer

meaningful additional protection against stock collapse compared to 150,000 mt, but reduced fishery catch.

Overall the Council's PPA would have the greatest long term positive impact on the sardine industry, while protecting the stock as a whole from collapse, though, as with No Action, this impact is not expected to be significant.

4.2.3 Predators of Sardine in the Ecosystem

As analyzed in Section 4.1.3, because predators of Pacific sardine are generalists capable of prey-switching and Pacific sardine are just one constituent of this forage base, and because environmental conditions are the primary drivers of the sardine population (see Section 3.1), Alternative 1, like the No Action alternative, is not likely to have significant impacts on the predators of sardine in the ecosystem.

However, Alternative 1 is likely to have some positive, though not significant, impacts on predators of sardine in the ecosystem relative to No Action by updating the management of Pacific sardine in accordance with BSIA, thereby reducing the risk of overfishing the fishery resource and forage base. As stated in Section 4.2.1, the overall intent of Alternative 1 is to align sardine management measures with BSIA on stock dynamics, thereby increasing the effectiveness of resource management strategies and conservation efforts inherent to CPS management. Building on the relevant analysis provided throughout Section 4.2, this section offers more information specific to considering impacts on predators.

The CPS FMP explicitly prioritizes ecosystem forage needs in its goals and objectives, specifically in the "more intensive" harvest control rule framework prescribed under Alternative 1, which is designed to maintain stock biomass at levels substantially higher than traditional single-species MSY targets, reserving unharvested biomass to support ecosystem function.

Alternative 1 also defines an overfished SDC for the U.S. Pacific sardine stock, specifically benefiting predators by serving as a trigger to declare the stock overfished and mandate the implementation of a rebuilding plan. This enables NMFS to establish measures to prevent further depletion of the forage base and initiate stock recovery to levels capable of supporting both the trophic ecosystem demands and long-term yield of the stock. Alternative 1 presented three sub-options for specifying MSST: static 65,000 mt (Option a.i), static 150,000 mt (Option a.ii), or formulaic (Option b). Relative to the No Action alternative, any of the approaches to update MSST to reflect the new U.S. stock would provide positive, though not significant, impacts to predators of Pacific sardine. The static Options a.i (65,000 mt) and a.ii (150,000 mt) provide stable, transparent rebuilding triggers, but lack environmental responsiveness or ability to uptake BSIA.

A formulaic MSST (Option b) set between 10% and 30% of unfished biomass (or a reasonable proxy consistent with BSIA) would align reference points dynamically with changing environmental and productivity regimes. Pacific sardine undergo extreme decadal shifts in abundance, so a depletion-based metric would ensure that the overfished baseline scales proportionally with true stock capacity, providing a biologically meaningful threshold that protects forage availability during low-productivity cycles while avoiding overfished triggers during high-productivity regimes. Therefore, Option b, compared to Options a.i and a.ii, and compared to No

Action, is expected to have a positive impact on predators by accurately tracking and responding to stock status based on BSIA and responding to changes in forage productivity.

Under Alternative 1, specification of HCRs for the U.S. Pacific sardine stock would have positive impacts on predators of sardine compared to No Action by applying the appropriate framework for intensively managing a CPS stock and establishing parameters reflective of the newly defined stock, effectively reducing the risk of management uncertainties or risk of overfishing on the forage base. Application of this framework is expected to best meet relevant goals and objectives in the CPS FMP, including providing adequate forage for dependent species, and preventing overfishing (per the CPSMT contribution to the joint advisory body meeting report, Agenda Item J.1, Attachment 2, September 2026).

Under Alternative 1, The HG control rule is applied to the U.S. Pacific sardine stock and 3 options are considered for the CUTOFF parameter within this control rule: 50,000 mt, 150,000 mt, and 314,400 mt. Any option for CUTOFF is expected to have a positive impact on predators of Pacific sardine by effectively reducing exploitation as biomass declines and preemptively closing the directed fishery at low biomass to protect a spawning stock and forage base. By reserving a substantial proportion of the sardine biomass exclusively for ecosystem function and stock reproduction, CUTOFF ensures that directed fishing pressure halts well before the stock reaches a depleted state, supporting the ability of the forage base to recover and supporting the long term resilience of the stock. Based on the comparison of CUTOFF values via multiple MSEs (described in Sections above), a CUTOFF as low as 50,000 mt (Option i.) showed benefit to the stock, though 150,000 mt performed better in terms of preventing the stock from becoming overfished and supporting a faster rebuilding time (PFMC 1998). A 150,000 mt CUTOFF (the Council's PPA) and a 314,400 mt CUTOFF equally, effectively mitigated severe stock collapse risks during low-productivity cycles and while a 314,400 mt CUTOFF would theoretically provide the largest reserve of forage biomass in the ecosystem when prompting closure of the fishery, modeling showed that this CUTOFF level reduced fishery catch without providing significant additional benefits to the stock biomass when compared to the 150,000 mt threshold (Hurtado-Ferro and Punt 2014). Overall, both Options ii. and iii. would have positive impacts to predators compared to Option i. and would have no significant difference in impact to predators compared to No Action.

Overall, Alternative 1 is not expected to result in significant impacts to predators, similar to No Action, because predators of Pacific sardine are generalists capable of prey-switching and Pacific sardine are one constituent of this forage base, and because environmental conditions are the primary drivers of the sardine population. However, Alternative 1 may have some positive impacts on predators of sardine in the ecosystem as a result of aligning Pacific sardine management with BSIA, reducing the risk of overfishing, and establishing parameters relevant to the conservation of the sardine resource as biomass declines.

5.0 Magnuson-Stevens Act and FMP Considerations

5.1 Substantive Authority for Action

This action is consistent with the authority provided in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson Stevens Act) in Section § 302(h)(1) which requires

the Council to prepare an FMP for each fishery under its authority that requires conservation and management and Section § 301(a)(1-3) which requires that an individual stock of fish be managed as a unit throughout its range, to the extent practicable; that conservation and management measures prevent overfishing while achieving, on a continuing basis, optimum yield; and that conservation and management measures shall be based upon the best scientific information available.

5.2 Magnuson-Stevens Act National Standards

The MSA's implementing regulations at 50 CFR 600 Subpart D establish the National Standards guidelines to assist in the development and review of FMPs, amendments, and regulations prepared by the Councils and the Secretary to meet the requirements of §302(h)(1). National Standard 1 addresses preventing overfishing and achieving optimum yield. In this section, we discuss how each alternative is consistent with each of the 10 National Standards, where applicable. In taking final action, the Council must consider how to balance the National Standards.

Because this action involves defining a new stock in the CPS FMP, the Council must consider the "10 Factors" defined at 50 CFR 600.3005(c)(1)((i)-(x)) in determining whether the Pacific sardine stock, specifically all Pacific sardine in U.S. waters, requires conservation and management. As stated at 50 CFR 600.305(c)(1), "Magnuson-Stevens Act section 302(h)(1) requires a Council to prepare an FMP for each fishery under its authority that requires (or in other words, is in need of) conservation and management. 16 U.S.C. 1852(h)(1). Not every fishery requires Federal management... a Council should consider the following non-exhaustive list of factors when deciding whether additional stocks require conservation and management:"

- (i) The stock is an important component of the marine environment*
- (ii) The stock is caught by the fishery*
- (iii) Whether an FMP can improve or maintain the condition of the stock*
- (iv) The stock is a target of a fishery*
- (v) The stock is important to commercial, recreational, or subsistence users*
- (vi) The fishery is important to the Nation or to the regional economy*
- (vii) The need to resolve competing interests and conflicts among user groups and whether an FMP can further that resolution*
- (viii) The economic condition of a fishery and whether an FMP can produce more efficient utilization*
- (ix) The needs of a developing fishery, and whether an FMP can foster orderly growth*
- (x) The extent to which the fishery is already adequately managed by states, by state/Federal programs, or by Federal regulations pursuant to other FMPs or international commissions, or by industry self-regulation, consistent with the requirements of the Magnuson-Stevens Act and other applicable law*

When considering adding a stock to an FMP, evaluation of those factors most relevant to the context of the fishery may be sufficient. The 10 Factors, evaluated below, provide the basis to determine that the U.S. stock of Pacific sardine requires conservation and management and should thus be defined in the CPS FMP.

Factor (i) *The stock is an important component of the marine environment:*

Pacific sardine play a vital role in the California Current Ecosystem (CCE) as both key consumers of plankton and essential forage for a diverse array of wildlife, protected species, and commercially important fish, for example, seabirds, pinnipeds, cetaceans, salmonids, albacore tuna, Pacific whiting, and others (Szoboszlai et al., 2015; PFMC 1998, PFMC 2025a, PFMC 2026a). Recognizing their critical trophic value, the CPS FMP explicitly establishes the provision of adequate forage for dependent species as a management objective.

Factor (ii) *The stock is caught by the fishery and* **Factor (iv)** *The stock is a target of a fishery:*

Historically supporting the largest commercial fishery in the western hemisphere, Pacific sardine remains a key target species and important component of the broader West Coast sardine industry, despite experiencing pronounced, climate-driven boom-and-bust cycles. While the primary directed commercial fishery has been closed since 2015 due to a stock decline, fishermen continue to utilize the resource through minor directed operations, live bait harvesting for recreational fisheries, and limited incidental landings across CPS and non-CPS sectors.

Factor (iii) *Whether an FMP can improve or maintain the condition of the stock*

Because Pacific sardine exhibit extreme, climate-driven fluctuations in abundance and dynamic spatiotemporal distributions off California, Oregon, and Washington, managing the resource presents unique scientific challenges. Moreover, because the species occurs throughout the U.S. West Coast EEZ and is harvested by commercial fleets operating in federal waters, federal management under the CPS FMP provides the necessary coastwide framework to assess the stock, prevent overexploitation, implement recovery plans as needed, and maintain long-term stock productivity. Recognizing a U.S. stock of Pacific sardine, consistent with new scientific information on population dynamics will allow for management to account for the dynamics of the coastwide population, prevent overfishing, and facilitate recovery of the stock as needed.

Factor (v) *The stock is important to commercial, recreational, or subsistence users and* **Factor (vi)** *The fishery is important to the Nation or to the regional economy*

Though the primary directed fishery has been closed since 2015, as recently as 2009-2014, the ex-vessel value of the fishery averaged over \$18.95 million (adjusted to 2025\$) annually. Once the stock is large enough to support a directed fishery, it is expected to once again be an important part of commercial West Coast fisheries, providing economic benefits across the region to fishermen, processors, and communities. Currently, live bait and minor directed sectors sustain key economic activity, with sardine comprising over 86% of California's live bait harvest between 2015 and 2023—a critical input supporting a Southern California recreational fishing industry that generated over \$510 million in value-added impact in 2022 (NMFS 2024b). While the minor directed sector accounts for a very small portion of catch, it is an important source of income for some small ports and producers, especially while the primary directed fishery is closed.

Factor (vi) *The need to resolve competing interests and conflicts among user groups and whether an FMP can further that resolution*

Because Pacific sardine are harvested across three U.S. West Coast states by diverse fishery sectors (commercial, live bait, incidental), competing spatial, seasonal, and sector-specific allocation demands naturally arise. Federal management under the CPS FMP provides a unified, transparent

framework to balance these multi-state and cross-sector interests, establishing equitable harvest specifications, incidental catch allowances, and accountability measures that prevent user conflicts while conserving the coastwide resource. The CPS FMP specifies a temporal quota allocation system for Pacific sardine to mitigate competing interests and conflicts among user groups.

Factor (viii) The economic condition of a fishery and whether an FMP can produce more efficient utilization

Because Pacific sardine exhibit extreme, climate-driven boom-and-bust cycles that can severely influence fishing opportunities, achieving efficiency in the utilization of the resource requires a flexible, science-based framework that can respond rapidly to shifting abundance. Federal management under the CPS FMP optimizes resource utilization by establishing harvest control rules and annual assessment and specification cycles that prevent overexploitation, support stability of catch over time, and allow the fleet to capitalize on population surges when biomass recovers.

Factor (ix) The needs of a developing fishery, and whether an FMP can foster orderly growth
There is a well-established fishery for Pacific sardine and no further development is expected.

Factor (x) The extent to which the fishery is already adequately managed by states, by state/Federal programs, or by Federal regulations pursuant to other FMPs or international commissions, or by industry self-regulation, consistent with the requirements of the Magnuson-Stevens Act and other applicable law

The management of Pacific sardine is well established and cooperatively managed. While state management agencies regulate nearshore waters and monitor state-specific landings, the comprehensive management of a transboundary, coastwide species that spans the entire U.S. EEZ is best achieved through federal management under the CPS FMP. This approach ensures consistent, coastwide conservation and management that satisfies the requirements of MSA and the National Standards.

5.2.1 National Standard 1: Optimum Yield

National Standard 1: Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

Overall, the PPA (Alternative 1) would improve the FMP's alignment with NS1 compared to the No Action alternative because the stock definition would be appropriately aligned with the stock in need of conservation and management in the EEZ and the population dynamics of Pacific sardine, providing accurate information for NMFS to make status determinations and implement management measures for Pacific sardine.

The Council adopted Alternative 1 as a PPA to rectify the misalignment of the stock definition in the CPS FMP with updated scientific information on the resource in U.S. waters and to meet the requirements of the FMP and the National Standards. Alternative 1 specifies measures for the U.S. Pacific sardine stock that would maximize OY while preventing overfishing and supporting rebuilding, as needed. The specifications applied under the PPA would set an OFL, ABC, and HG

for the U.S. stock to ensure sustainable fishing mortality rates on the U.S. Pacific sardine stock. These specifications are designed to facilitate achieving OY through a balance of conservation and economic needs.

The FMP must also define stocks and delineate their boundaries in such a manner that NMFS is able to make status determinations for each stock in the FMP. SDC are used by NMFS to determine the overfished and overfishing status for CPS species in the fishery, consistent with requirements at 50 CFR 600.310(e)(2)(i)(A). Status determination is needed to understand if conservation and management measures achieve OY. Alternative 1 would define the Pacific sardine stock consistent with updated information on population dynamics, and establish an MSST and OFL, allowing NMFS to make overfished and overfishing status determinations for Pacific sardine. The FMP (§4.5) describes the use of MSST and the maximum fishing mortality threshold (MFMT) in status determination. Assessments calculate MSST, which may be used to inform overfished status determinations. The OFL formula may be applied using the best estimate of biomass to inform overfishing status determinations and used alongside management measures (including ABC and other control rules) to prevent overfishing and achieve OY. If status determinations, which are a key trigger to hold Councils accountable for meeting the requirements under NS1, are made at a scale that is mis-aligned with population structure of a species within the FMU, then management is more likely to fail to prevent overfishing, achieve OY, or support rebuilding when needed. Alternative 1 directly complies with these requirements by specifying overfished and overfishing SDC alongside harvest control rules for the U.S. Pacific sardine stock. In contrast, No Action would fail to meet the requirements of NS1, as it would not set SDC and HCRs for all Pacific sardine in U.S. waters

5.2.2 National Standard 2: Best Scientific Information Available

National Standard 2: Conservation and management measures shall be based upon the best scientific information available.

Relationship to National Standard 1 (50 CFR 600.305(e)) – ***National Standard 2*** (*see § 600.315*). Management measures and reference points to implement NS1 must be based on the best scientific information available. When data are insufficient to estimate reference points directly, Councils should develop reasonable proxies to the extent possible (also *see § 600.310(e)(1)(v)(B)*). In cases where scientific data are severely limited, effort should also be directed to identifying and gathering the needed data. SSCs should advise their Councils regarding the best scientific information available for fishery management decisions.

Overall, Alternative 1 (the PPA) directly complies with National Standard 2 by updating the Pacific sardine stock definition to reflect recent peer-reviewed research on Pacific sardine population dynamics revealing a single, panmictic population off the West Coast, following best practices for aligning stock definitions with population dynamics. In contrast, the No Action alternative violates National Standard 2 by retaining a management model based on an outdated and unsupported hypothesis of multiple Pacific sardine subpopulations, requiring artificial subpopulation partitioning that introduces scientific uncertainty into stock assessments and fails to accurately track stock status according to BSIA. By specifying SDC and HCRs for the U.S. Pacific

sardine stock and including the use of reasonable proxies (see discussion in Section 4), Alternative 1 ensures that conservation and management measures are grounded in BSIA.

5.2.3 National Standard 3: Management Units

National Standard 3: To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

Relationship to National Standard 1 (50 CFR 600.305(e)) –National Standard 3 (see [50 CFR § 600.320](#)). Reference points should generally be specified in terms of the level of stock aggregation for which the best scientific information is available (also see [§ 600.310\(e\)\(1\)\(ii\)](#) and [\(iii\)](#)).

NS3, which states that to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination, is pertinent to this action. The purpose of NS3 is to “induce a comprehensive approach to fishery management” wherein the geographic scope of the fishery and its management covers the entire range of the stocks of fish in need of conservation and management. Alternative 1 (the PPA) better satisfies NS3 compared to No Action by aligning the stock unit with the best information on the range and connectivity of Pacific sardine in U.S. waters, to the extent practicable. NS3 guidelines also explicitly recognize that international boundaries and jurisdictional constraints present practical challenges for comprehensive transboundary management. Specifically, 50 CFR § 600.320(e)(4) states that an FMP should include discussion of management activities of other countries having an impact on the fishery, and how the FMP's management measures are designed to take into account these impacts. One way that management measures can take into account these impacts is by “limiting the management unit’s scope to that portion of the stock found within U.S. waters,” which is the management approach proposed through this action. Although the Pacific sardine population, according to best available science, can range from the Gulf of California, Baja, around to the Pacific coast of Baja, Ca., through the U.S. waters, and into Canadian waters, this action defines the stock managed in the FMP as the portion of the Pacific sardine population occurring in U.S. waters. Defining the entire population of Pacific sardine as the stock in the FMP would be operationally impracticable, and inconsistent with National Standards 1 and 2; the entire population of Pacific sardine is not the level of stock aggregation for which the best scientific information is available. Sufficient catch, effort, abundance, and biological data from international waters are currently not available, nor are they likely to be in the foreseeable future, to reliably assess and specify reference points at the whole population level.

5.2.4 National Standard 4: Allocations

National Standard 4: Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be; (A) fair and equitable to all such fishermen, (B) reasonably calculated to promote conservation, and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

Neither the No Action alternative or the PPA discriminates between residents of different states. There is no proposed change to the allocation of fishing privileges through this action.

5.2.5 National Standard 5: Efficiency

National Standard 5: Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, except that no such measure shall have economic allocation as its sole purpose.

Neither the No Action alternative nor the PPA would change any management measures affecting the economic allocations and efficiencies described under National Standard 5 such as fishing effort, administrative costs, or enforcement costs.

5.2.6 National Standard 6: Variations and Contingencies

National Standard 6: Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

Relationship to National Standard 1 (50 CFR 600.305(e)) – National Standard 6 (see [§ 600.335](#)). Councils must build into the reference points and control rules appropriate consideration of risk, taking into account uncertainties in estimating harvest, stock conditions, life history parameters, or the effects of environmental factors.

Alternative 1 (the PPA) satisfies National Standard 6 by establishing a flexible, science-based management framework that explicitly accounts for the environmentally-driven variations and uncertainties inherent to Pacific sardine management. In particular, the specification of a formulaic MSST, or use of a reasonable proxy, to define the overfished threshold establishes a new flexibility that should enable adaptive management and timely responses to the condition of the newly defined stock. Other mechanisms allowing NMFS and the Council to respond to variations and contingencies are preserved in the CPS FMP and maintained by the No Action alternative.

5.2.7 National Standard 7: Costs and Benefits

National Standard 7: Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

Alternative 1, the PPA will maintain the current management approach defined for Pacific sardine in the FMP and will not modify any management measures that would change costs, duplicate regulations, or change the burden placed on user groups. The analyses provided throughout this document support the benefit of the action alternative, despite the administrative burden associated with implementing a revised FMP.

5.2.8 National Standard 8: Communities

National Standard 8: Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of National Standard 2, in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

Relationship to National Standard 1 (50 CFR 600.305(e)) – National Standard 8 (see § 600.345). National Standard 8 addresses economic and social considerations and minimizing to the extent practicable adverse economic impacts on fishing communities within the context of preventing overfishing and rebuilding overfished stocks as required under National Standard 1 and other MSA provisions. Calculation of OY as reduced from maximum sustainable yield (MSY) also includes consideration of economic and social factors, but the combination of management measures chosen to achieve the OY must principally be designed to prevent overfishing and rebuild overfished stocks.

Alternative 1 (the PPA) satisfies National Standard 8 by establishing a stock consistent with BSIA, thereby improving stock assessment and management measures, decreasing the risk of overfishing, and supporting the long-term viability of sardine fisheries to ensure sustained participation of the fishing community in commercial, live bait, and recreational sectors, as well as non-CPS fisheries that incidentally catch CPS. The No Action alternative, by contrast, maintains a subpopulation boundary that increases management uncertainty, reduces the ability to achieve OY, and therefore reduces the potential economic benefits that can be obtained from the sardine resource. Increased risk of overfishing under No Action may also lead to increased closures and heightened economic instability for fishing communities reliant on commercial and recreational sectors. The impacts of this action on the sardine industry are also analyzed in Sections 4.1.2 and 4.2.2.

5.2.9 National Standard 9: Bycatch

National Standard 9: Conservation and management measures shall, to the extent practicable, (A) minimize bycatch, and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

Neither the No Action alternative nor Alternative 1 affects the spatial distribution, intensity, or operations of fishing activities and, therefore, has no impacts on bycatch. Bycatch in the sardine fishery is already extremely low and this action proposes no changes to their monitoring or disposition.

5.2.10 National Standard 10: Safety of Life at Sea

National Standard 10: Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Neither the No Action alternative nor Alternative 1 are expected to change any aspect of conservation and management measures that could compromise the safety of human life at sea. A

description of safety at sea as it relates to the CPS fishery can be found in the CPS SAFE (PFMC 2025a, incorporated by reference).

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