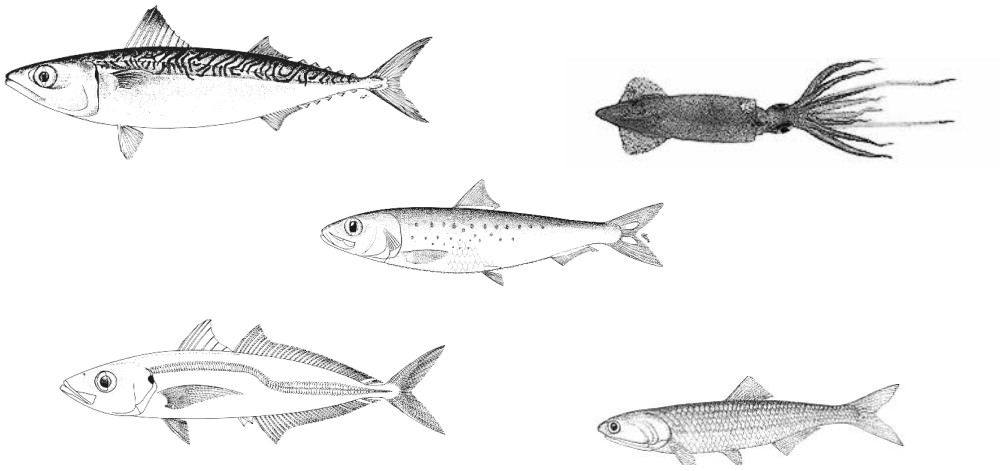
STATUS OF THE PACIFIC COAST COASTAL PELAGIC SPECIES FISHERY AND RECOMMENDED ACCEPTABLE BIOLOGICAL CATCHES

STOCK ASSESSMENT AND FISHERY EVALUATION 2024

INCLUDING INFORMATION THROUGH JUNE 2024



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LIST OF ACRONYMS AND ABBREVIATIONS

ABC acceptable biological catch
ACL annual catch limit
ACT annual catch target
BO Biological Opinion
BOEM Bureau of Ocean Energy Management
CalCOFI California Cooperative Oceanic Fisheries Investigations
CC California Current
CCLME California Current Large Marine Ecosystem
CDFW California Department of Fish and Wildlife
CFGC California Fish and Game Commission
Council Pacific Fishery Management Council
COP Council Operating Procedure
CPFV commercial passenger fishing vessel
CPS coastal pelagic species
CPSMT Coastal Pelagic Species Management Team
CSNA central subpopulation of northern anchovy
CUTOFF The lowest estimate of biomass at which directed harvest is allowed
CV coefficient of variation
EC ecosystem component species
ECFA Emerging Commercial Fishing Act
ESA Endangered Species Act
FMP fishery management plan
GLM generalized linear model
GT gross tonnage
HAPC habitat area of particular concern
HCR harvest control rule
HG harvest guideline
LE limited entry
LME large marine ecosystem
Magnuson Act Magnuson-Stevens Fishery Conservation and Management Act
MSA Magnuson-Stevens Fishery Conservation and Management Act
MSFMP Market Squid Fishery Management Plan
mt metric ton
NMFS National Marine Fisheries Service
NOAA National Oceanic and Atmospheric Administration
NSNA northern subpopulation of northern anchovy
NWFSC Northwest Fisheries Science Center (NMFS)
ODFW Oregon Department of Fish and Wildlife
OFL overfishing limit
OFWC Oregon Fish and Wildlife Commission
ONI Oceanic Niño Index
PDO Pacific Decadal Oscillation
PRD Protected Resources Division
PSMFC Pacific States Marine Fisheries Commission
SBRM standardized bycatch reporting methodology

Secretary U.S. Secretary of Commerce
SFD Sustainable Fisheries Division
SSC Scientific and Statistical Committee
SST sea surface temperature
st short ton
SWFSC Southwest Fisheries Science Center (NMFS)
SWR NMFS Southwest Region
USFWS U.S. Fish and Wildlife Service
WCR NMFS West Coast Region
WDFW Washington Department of Fish and Wildlife
YOY young-of-year

Introduction

The purpose of this report is to briefly summarize aspects of the coastal pelagic species (CPS) Fishery Management Plan (FMP) and to describe the history of the fishery and its recent management and amendments to the FMP and rules. This report includes information generally through calendar year 2023, and some sections include more recent information through June 30, 2024. The guidelines for FMPs published by the National Marine Fisheries Service (NMFS) require that a stock assessment and fishery evaluation (SAFE) report be prepared and reviewed annually for each species managed under this FMP: Pacific sardine (*Sardinops sagax*), Pacific mackerel (*Scomber japonicus*), northern anchovy (*Engraulis mordax*), jack mackerel (*Trachurus symmetricus*), market squid (*Doryteuthis opalescens*), and krill (*euphausiid spp.)*. Pacific herring (*Clupea pallasii*) and jacksmelt (*Atherinopsis californiensis*) were added as ecosystem component species, concurrent with Pacific Fishery Management Council (Council) approval of Amendment 13 to the CPS FMP. Shared ecosystem component species were subsequently added with Amendment 15. The SAFE report for Pacific Coast CPS fisheries was developed by the Council's Coastal Pelagic Species Management Team (CPSMT) from information contributed by scientists at NMFS, the Southwest and Northwest Fisheries Science Centers (SWFSC, NWFSC), California Department of Fish and Wildlife (CDFW), Oregon Department of Fish and Wildlife (ODFW), and Washington Department of Fish and Wildlife (WDFW). Included in this report are descriptions of landings, fishing patterns, estimates of the status of stocks, and acceptable biological catches (ABCs). The most recent stock assessments informing the management of CPS stocks are linked and described in Section 8. The ABC recommendations, together with social and economic factors, are considered by the Council in determining annual harvest guidelines and other management measures.

1. CPS MANAGEMENT

The CPS FMP builds on the *Northern Anchovy Fishery Management Plan*, which was implemented in September 1978. The Council began to consider expanding the scope of the northern anchovy FMP in 1990, with development of the seventh amendment to the FMP. The intent was to develop a greatly modified FMP, which included a wider range of coastal pelagic finfish and market squid. A complete draft was finished in November of 1993, but the Council suspended further work because NMFS withdrew support due to budget constraints. In July 1994, the Council decided to proceed with public review of the draft FMP. NMFS agreed with the decision on the condition that the Council also consider the options of dropping or amending the northern anchovy FMP. Four principal options were considered for managing CPS fisheries:

1. Drop the anchovy FMP (results in no Federal or Council involvement in CPS).
2. Continue with the existing FMP for anchovy (status quo).
3. Amend the FMP for northern anchovy.
4. Implement an FMP for the entire CPS fishery.

In March 1995, after considering the four options, the Council decided to proceed with option four, developing an FMP for the entire CPS fishery. Final action was postponed until June 1995 when the Council adopted a draft plan that had been revised to address comments provided by NMFS and the Council's Scientific and Statistical Committee (SSC). Amendment 7 was submitted to the U.S. Secretary of Commerce (Secretary) but rejected by NMFS Southwest Region (SWR) as being inconsistent with National Standard 7. NMFS announced its intention to drop the FMP for northern anchovy in a proposed rule published in the *Federal Register* on March 26, 1996 (61*FR*13148). The proposed rule was withdrawn on November 26, 1996 (61*FR*60254). Upon implementation of Amendment 8, the northern anchovy FMP was renamed the CPS FMP.

The following amendments to the CPS FMP and regulatory amendments are those that have been implemented since June 2023 through June 2024. For a complete listing of formal Council actions and NMFS regulatory actions since implementation of the CPS FMP, see prior SAFE documents at www.pcouncil.org/stock-assessments-and-fishery-evaluation-safe-documents/. The CPS FMP, as Amended through Amendment 2021 (April 2024), is available on the Pacific Fishery Management Council website: https://www.pcouncil.org/documents/2023/06/coastal-pelagic-species-fishery-management-plan.pdf/

1. FMP Amendments

1. Amendment 20 - Management Categories

Beginning in November 2018, the Council embarked on a process to consider removing the concept of categorizing CPS management unit species, specifically the nomenclature of "Active" and "Monitored." This action was prompted by a perceived lack of clarity regarding the meaning and use of the "Active" and "Monitored" stock management categories within the CPS FMP. Subsequently, the Council directed the CPSMT to prepare draft revisions to the CPS FMP in a manner that retains the management approaches for the CPS management unit stocks and describes how each stock is managed in a stock-specific manner, rather than through the use of categorical

assignments. Specifically, the intent was to remove references to the named management categories, but not to revise the manner in which the CPS stocks are managed.

The CPSMT brought draft amendment text to the Council in November 2021 in Agenda Item I.2.a, CPSMT Report 1, November 2021, which the Council adopted for public review and potential final action at the April 2022 meeting. The Council adopted the public review language from November 2021 as the final amendment language in April 2022. NMFS published a notice of availability (NOA) for Amendment 20 on March 23, 2023, with a comment period ending on May 8, 2023, and a proposed rule to implement Amendment 20 on April 6, 2023, with a comment period ending on May 22, 2023. NMFS approved Amendment 20 on June 16, 2023, and issued a final rule implementing Amendment 20, effective August 2, 2023.

2. Amendment 21 - Housekeeping

After the completion of Amendment 20, the Council initiated a "housekeeping" amendment in April 2022. This proposal was originally brought forth by the CPSMT in June 2019 during the development of Amendment 20. The proposed changes would not change the policy framework described in the FMP or management of the fishery. Amendment 21 would implement a number of non-substantive, administrative changes to the CPS FMP including defining acronyms upon first use, adding hyperlinks, removing repetitive language, and rearranging sections for clarity and logical sequence. In April 2023, the Council adopted the final FMP language changes. NMFS published a notice of availability of Amendment 21 on February 20, 2024, with a comment period ending on April 22, 2024. NMFS received no public comments on the notice and approved the amendment on May 20, 2024.

2. Regulatory Amendments

June 23, 2023. NMFS issued a final rule (88 FR 41040) to establish annual harvest specifications and management for Pacific sardine in waters of the U.S. west coast for the 2023-2024 fishing year. The annual biomass estimate of 27,369 mt was below the Cutoff value of 150,000 mt, which precluded opening of the primary directed fishery. NMFS set incidental catch allowances in other CPS fisheries to no more than 20 percent by weight and limited non-CPS fisheries to 2 mt per landing. The annual catch target (ACT) was set to 3,600 mt to allow for year-round harvest opportunity. NMFS implemented an annual catch limit (ACL) and ABC of 3,953 mt, and an overfishing limit (OFL) of 5,506. NMFS published a proposed rule for this action on May 16, 2023 (88 FR 41040), with a deadline for public comment by May 31, 2023.

December 15, 2023. NMFS issued a final rule (88 FR 86838) to implement harvest specifications for Pacific mackerel in U.S. west coast waters for the 2023-2024 and 2024-2025 fishing seasons. The allowable harvest levels include an HG and ACT for the 2023-2024 fishing season of 7,871 metric tons (mt) and 6,871 mt, respectively, and an HG and ACT for the 2024-2025 fishing season of 8,943 mt and 7,943 mt, respectively. If the fishery attains the ACT in either fishing season, the directed fishery will close, reserving the 1,000-mt difference between the harvest guideline and ACT as a set-aside for incidental landings in other CPS fisheries and other sources of mortality. The 2023-2024 OFL was set at 11,693 mt, and the ABC and ACL were set at 9,754 mt. The 2024-2025 OFL was set at 12,765 mt, and the ABC and ACL were set at 10,073 mt. NMFS published a

proposed rule for this action on September 29, 2023 (88 FR 67222) with a deadline for public comments by October 30, 2023.

April 19, 2024. NMFS issued a final rule (89 FR 28679) to revise the harvest specifications for the central subpopulation of northern anchovy (CSNA) in U.S. west coast waters. The OFL was set to 243,779 mt and the ABC to 60,945 mt. This final rule also maintains an ACL of 25,000 mt. Under current regulations, if the ACL for this stock is reached or projected to be reached in a fishing year (January 1-December 31), then the fishery will be closed until it reopens at the start of the next fishing year. NMFS published a proposed rule for this action on December 27, 2023 (88 FR 89358) with a deadline for public comment by January 26, 2024.

June 21, 2024. NMFS published proposed 2024-2025 Pacific sardine harvest specifications and management measures in the Federal Register (89 FR 52005).

2. CPS FISHERIES – HISTORY AND DESCRIPTION

The CPS fishery has been an economically valuable fishery for California, Oregon, and Washington for more than 100 years. Although both Pacific sardine and market squid have been the primary target species of commercial importance, participants in the fishery depend on landings from five species (i.e., Pacific sardine, northern anchovy, Pacific mackerel, Jack mackerel, and market squid) in the management group. Northern anchovy have also historically been economically valuable in times when sardine populations have shown decline. Northern anchovy is managed as two distinct subpopulations, the central subpopulation which is landed from waters off of the coast of California, and the northern subpopulation which is landed from waters off of the coast of Oregon and Washington.

1. Pacific Sardine

During the first half of the 20th century, areas of fishing for Pacific sardine included the waters off Vancouver Island, Canada; Grays Harbor, Washington; Astoria and Coos Bay, Oregon; San Francisco, Monterey, San Pedro, and San Diego, California; and Ensenada and Cedros Island, Mexico (Clark and Marr, 1955). Peaking in 1936-37, sardine 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 (PFMC 2020). The fishery eventually contracted, with successive closures in the late 1940s and early 1950s (Radovich 1982). Sardines were last landed in British Columbia in the 1947-1948 season, in Oregon and Washington in the 1948-1949 season, and in San Francisco Bay in the 1951-1952 season (Radovich 1982).

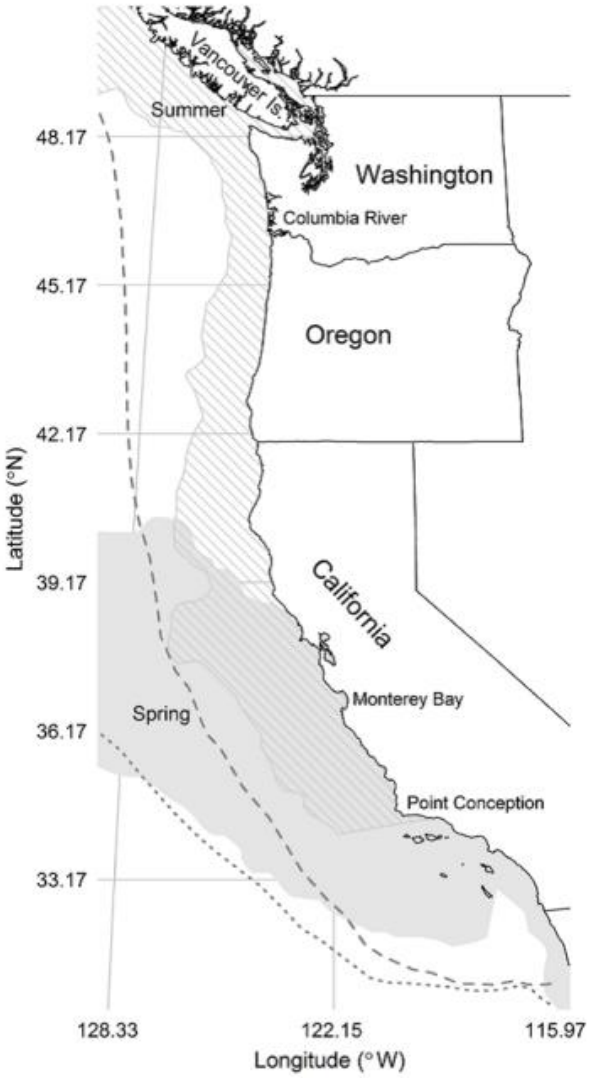

Figure 2-1. Conceptual spring (shaded region) and summer (hashed region) distributions of potential habitat for the northern stock of Pacific Sardine along the west coasts of Mexico, the United States, and Canada (Stierhoff et al. 2024)

The fishery for Pacific sardine operated off Oregon and Washington again starting in 1999. This fishery targeted the larger sardines prevalent in the Pacific Northwest, which were typically sold as bait for Asian longline tuna fisheries. A sardine fishery in British Columbia, Canada also operated in this time frame. Beginning in 2006, this fishery expanded into human consumption markets. However, after a peak in 2012, the coastwide sardine stock declined, and has been closed to directed commercial fishing since July 1st, 2015, after the stock biomass estimate fell below the CUTOFF value of 150,000 mt. See individual state descriptions below for more detailed information. While the primary directed fishery for Pacific sardine remains closed, 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- and in the commercial Albacore fishing in Oregon and Washington. Minor directed fisheries for Pacific sardine also still operate.

Figure 2-2. Historical timeline of CPS fisheries

1930s-1940s Pacific sardine support the largest commercial fishery in the U.S.	**1978** Northern Anchovy FMP created	**1999** Pacific Northwest Sardine fishery begins	**2015** Pacific Sardine Directed fishery closed when biomass reached < 150,000 mt
1940s-1950s Sardine population contracts	**1996** CPS FMP renamed and implemented	**2012** Recent peak in Pacific sardine catch	**2021** Amendment 18: Rebuilding plan for Pacific Sardine

2. Federal Limited Entry Fishery

The CPS limited entry (LE) fleet currently consists of 65 permits and 54 vessels (Table 2-1), operating under a Federal LE permit program. The LE vessels range in age from 5 to 76 years, with an average age of 41 years (Table 2-2). The capacity goal and transferability provisions established under Amendment 10 are based on calculated gross tonnage (GT) of individual vessels. Calculated GT serves as a proxy for each vessel's physical capacity and is used to track total fleet capacity. Calculated GT incorporates a vessel's length, breadth, and depth, which are consistent measures across vessel registration and U.S. Coast Guard documentation lists. As described at 46 CFR § 69.209, GT is defined as:

$$GT=0.67(length*breadth*depth)/100$$

Vessel dimension data were obtained from the U.S. Coast Guard database, and each vessel's calculated GT was attached to the permit under Amendment 10. Original GT endorsements (specified in Table 2-2) remain with the permit, regardless of whether the permit is transferred to a smaller or larger vessel.

GT values for the current fleet range from 26.4 GT to 182.5 GT, with an average of 83.7 GT (Table 2-2). The fleet capacity goal established through Amendment 10 is 5,650.9 GT, and the trigger for restricting transferability is 5,933.5 GT (Goal + 5 percent). The current LE fleet is 4,857.9 GT, well within the bounds of the capacity goal.

1. California Fisheries Overview

In the 1940s, more than 100 canneries and reduction plants from San Francisco to San Diego employed thousands of workers to process sardines. At its peak in the 1937-1938 season, the

fishing fleet numbered 379 vessels and averaged 268 vessels over the next decade (CA Fish Bulletin 74). In California, some present-day CPS vessels are remnants of that fleet. CPS finfish landed by the round haul fleet (fishing primarily with purse seine or lampara nets) are sold around the world in many product forms. For example, Pacific mackerel are typically sold to Asian and European, Middle Eastern and Baltic markets for human consumption or sold as crab bait. Sardines were largely exported for canning for human consumption, high value table consumption products, and long-line bait, or sold for tuna or animal feed. Individually quick-frozen sardine sold as 'zoo' food was considered a value-added product. Although the percent of CPS sold for tuna feed or bait fluctuated based on demand, fish size and oil content, product availability, etc., the percent sold in higher value categories was on an increasing trend prior to the closure of the directed fishery (Pleschner-Steele, pers comm, 2014). In addition to fishing for CPS finfish, many of these vessels fish for market squid, Pacific bonito, bluefin, and yellowfin tuna (which are fished primarily in California), and Pacific herring (fished primarily in Oregon/Washington).

1. California Sardine Fishery

California's sardine fishery began in the 1860s as a supplier of fresh whole fish. The fishery shifted to canning from 1889 to the 1920s in response to a growing demand for food during World War I. In the 1940s, the fishing fleet consisted of 376 vessels and more than 100 canneries and reduction plants, which employed thousands from San Francisco to San Diego, California.

The fishery declined and collapsed in the late 1940s due to extremely high catches and changes in environmental conditions and remained at low levels for nearly 40 years. The fishery declined southward, with landings ceasing in Canadian waters during the 1947-1948 season, in Oregon and Washington in the 1948-1949 season, and in the San Francisco Bay in the 1951-1952 season. The California Cooperative Fisheries Investigations (CalCOFI), a consortium of state and Federal scientists, emerged to investigate the causes of the sardine decline. 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 (Baumgartner et al. 1992). Sardines and anchovies both vary in abundance over periods of about 60 years. Warm-water oceanic cycles favor sardine recruitment and cold-water cycles favor anchovy recruitment, although recent warmer temperatures have called into question this relationship. The decline of the sardine fishery became a classic example of a "boom and bust" cycle, a characteristic of clupeid stocks.

In 1967, the California Department of Fish and Game (CDFG) implemented a moratorium that lasted nearly 20 years. The remaining vessels diversified into other coastal pelagic "wetfish" fisheries. Sardines began to return to abundance in the late 1970s, when the Pacific Decadal Oscillation (PDO) shifted to a warm cycle again, but this time fishery managers adopted a highly precautionary management framework. California's sardine fishery reopened in 1986 with a 1,000 short tons (st) quota, authorized by the Legislature when the biomass exceeded 20,000 mt. The sardine resource grew exponentially in the 1980s and early 1990s, with recruitment estimated at 30 percent or greater each year. In 1998, the sardine resource was declared "recovered," with a biomass estimated at slightly more than 1 million mt. The quota set by CDFG had increased to 43,545 mt, and it was virtually completely utilized.

In 1999, the new coastwide harvest guideline (HG) for sardine jumped to 186,791 mt, based on a 1999 biomass estimate of 1.58 million mt. In 2000, California harvested 53,611 mt. About 71 percent of the catch was exported, valued at $23.3 million, and approximately 17 percent of the catch went to canneries. However, the last cannery in southern California was sold in December

of 1999, leaving only one cannery remaining in Monterey, in a fishery that had employed more than 100 canneries and reduction plants statewide during the fishery's heyday in the 1930s and 1940s.

The sardine recovery appeared to level off during 1999-2002. By August 2002, the Northern fishery attained its allocation and was forced to close early. Northwest sardine interests lobbied the Council for an emergency reopening and revision to the allocation framework because thousands of tons of sardine were available and going unharvested in the Southern fishery.

In the early 2000s, the California fishery encountered an abundance of small sardines on traditional fishing grounds, for which markets were very limited. The larger fish appeared to move offshore in their northern migration, out of the range of California seiners who made most of their catches inside the 3-mile state boundary. The lack of canning-size sardines caused the last cannery in Monterey to sell its canning equipment. Still, sardines ranked among the top fisheries in California for volume and sixth in value with ex-vessel values ranging from $4.5 million to more than $5 million. With a main focus now on export markets, California shipped sardines to as many as 22 countries worldwide, and annual export values exceeded $20 million.

From 1998 to 2006, California sardine landings averaged 47,394 mt. In 2005, Oregon landings surpassed California for the first time since the fishery reopened. California caught nearly 81,000 mt of the 152,564 mt HG in 2007 – the highest landings since the 1960s. Ex-vessel value exceeded $8 million, and 66,896 tons of sardine were exported to 37 countries, with an export value of $40.4 million.

In 2008, the HG declined 42 percent, to 89,093 mt, and the sardine fishery closed early in all three allocation periods, with California catching 57,803 mt of the total. Beginning in 2008, California's sardine fishery was closed more than it was open, and it was closed early, during the peak fall season in all years but 2012 and 2013. In 2009, the annual HG was attained in 77 fishing days. California landings totaled 37,578 mt, with two-thirds of the catch in Monterey. California exported 33,909 mt to 35 countries. In 2010, California landings fell to 33,658 mt of the 72,039 mt quota, and 83 percent of the catch was landed in San Pedro. The 2010 summer period closed July 22, the fishery reopened on September 15 and closed for the year on September 24. The 2011 sardine fishery experienced another 30 percent reduction in HG, with only 50,526 mt allowed to be harvested of a 537,173 mt age 1+ biomass. California caught 27,714 mt in 83 total days of fishing opportunity.

In 2012, although the biomass and HG increased substantially (988,385 mt biomass and 109,409 mt HG), California landings continued declining to only 23,044 mt. Fishermen were unable to find sardines early in the year and then shifted their fishing to a banner squid season during the summer. There was further evidence of a natural sardine decline in 2013 as sardines disappeared from Canadian waters. The 2013 HG decreased 69 percent to 66,495 mt, and California harvested only 7,074 mt of sardines. Pacific mackerel landings surpassed sardine for the first time since 1993. In place of sardine, a decadal squid population explosion occupied the California purse seine fleet until 2015, when a major El Niño event sharply reduced squid availability. Since Federal management began in 2000, the sardine biomass has declined more than 70 percent since the 2006 high of 1.3 million mt, and harvest limits have fallen from a high of an HG of 186,971 mt in 2000 to an annual catch target (ACT) of 3,600 mt for the 2023-2024 season. The April 2015 biomass estimate fell below the CUTOFF value of 150,000 mt, and has remained below that value, thereby precluding a directed commercial fishery from 2015 to the present (see Section 8). Since the closure of the primary directed commercial fishery, an average of 1,976mt of sardine has been

landed in other l fisheries in California from the 2015-2016 to the 2023-2024 fishing seasons, mostly in the live bait fishery.

2. California Anchovy Fishery

Records of California landings of northern anchovy date back to 1916. Between 1916 and 1946, anchovy landings averaged 508 metric tons and were used mainly for reduction to meal and oil. Landings were low until scarcity of sardine landings caused processors to begin canning anchovies in large quantities in 1947, whereupon landings increased from 960 tons in 1946 to 9,464 tons in 1947. Anchovy landings declined again with the short resurgence of the sardine in 1951 but picked back up again when the sardine fishery collapsed in 1952. Over the next several years, anchovy landings fluctuated, and then began to decline in 1958 due to low consumer demand for canned anchovy and increased sardine landings. Beginning in 1965, the California Fish and Game Commission (CFGC) managed the U.S. fishery on the basis of a reduction quota, and separate reduction and non--reduction landings statistics have been kept ever since.

For many years, northern anchovy was harvested for reduction by a fleet of approximately 40 small purse seine vessels known collectively as the "wetfish" fleet. The fleet also fished for Pacific mackerel (*Scomber japonicus*), jack mackerel (*Trachurus symmetricus*), Pacific bonito (*Sarda chiliensis*), Pacific bluefin tuna (*Thunnus orientalis*), market squid (*Doryteuthis opalescens*), and Pacific sardine (*Sardinops sagax*). Reduction landings increased from 155 mt in 1965 to 24,810 mt in 1966 and ranged from 12,515 mt per year to 84,328 mt per year during 1966-1972. Landings increased to 118,432 mt in 1973 and ranged from 73,400 mt per year to 141,586 mt per year during 1973-1977. In response to decreases in fish meal prices, landings declined to an annual average of 46,500 mt during 1979-1982. Landings intended for processing into fish meal and oil have been extremely low after1983, largely due to low ex-vessel prices and reduced consumer demand, rather than low anchovy abundance (Thomson et al. 1989).

Live bait vessels are mostly distributed in Southern California to serve the sport fishing markets, and fish for a variety of species, including anchovy, sardine, mackerel, squid, white croaker, and queenfish. Anchovies comprised approximately 85 percent of the live bait catch up to 1991. From 1965 to 1991, the anchovy live bait catch ranged from 3,572 to 6,978 mt per year and averaged 5,198 mt annually (2014 SAFE, Table 6-12). Other anchovy landings averaged about 1,973 mt per year from 1965 to 1991.

From 2013 to 2023, anchovy live bait catch ranged from 114 to 1,142 mt and averaged 358 mt per year comprising about 20 percent of total live bait catch, while commercial landings of anchovy have averaged 8,034 mt annually.

The fishery is far different now from historic times. Today there is virtually no reduction capacity in California, which is one reason why landings have averaged less than 10,000 mt a year since the mid-1980s (see Section 8.3). However, the anchovy fishery is still a very important part of the CPS fishery, as it is the primary fishery locally available in Monterey when squid is not available, and the directed sardine fishery is closed. When markets are available, the major processors in Monterey rely on anchovy to sustain the boats and processing crews, particularly during periods when squid is not available. The volume of fish landed is tied to the fish size availability, with larger fish preferred. As many as 1,000 people may rely directly on anchovy in the Monterey area, with three large processors and about 12 vessels that fish and process anchovy, along with the allied trucking and packing industry. The anchovy fishery takes place in a very limited area, close to port. There are vast unfished areas where anchovy is abundant that are beyond the short travel distances that maintain quality of product.

3. California Other Finfish Fisheries

Pacific mackerel is a targeted fishery in California but landings since the 1980s and 1990s have declined from averaging over 20,000 mt to less than 5,000 mt since 2000. Jack mackerel is currently an incidental fishery to other CPS landings in California, with landings less than 2,000 mt since 2001, compared to historic highs in the tens of thousands of metric tons between the 1940s and 1980s.

4. California Market Squid Fishery

In 2001, legislation transferred the authority for management of the market squid fishery to the CFGC. Legislation required that the CFGC adopt a market squid fishery management plan (MSFMP) and regulations to protect and manage the resource. In August and December of 2004, the CFGC adopted the MSFMP, the environmental documentation, and the implementing regulations, which went into effect on March 28, 2005, just prior to the start of the 2005-2006 fishing season on April 1.

The goals of the MSFMP are to provide a framework that will be responsive to environmental and socioeconomic changes and to ensure long-term resource conservation and sustainability. The tools implemented to accomplish these goals include: (1) setting a seasonal catch limit of 107,048 mt (118,000 st) to prevent the fishery from over-expanding; (2) maintaining monitoring programs designed to evaluate the impact of the fishery on the resource; (3) continuing weekend closures that provide for periods of uninterrupted spawning; (4) continuing gear regulations regarding light shields and wattage used to attract squid; (5) establishing a restricted access program that includes provisions for initial entry into the fleet, permit types, permit fees, and permit transferability that produces a moderately productive and specialized fleet; and (6) creating a seabird closure restricting the use of attracting lights for commercial purposes in any waters of the Greater Farallones National Marine Sanctuary. Under this framework, the MSFMP provides the CFGC with specific guidelines for making management decisions. The CFGC has the ability to respond to changes in the market squid population off California and implement management strategies without the need for a full plan amendment. The MSFMP framework structure was also designed to achieve the goals and objectives of the Marine Life Management Act and to be consistent with the management outlined in CPS FMP Amendment 10.

Under the restricted access program in the MSFMP, a permit is needed to participate in the fishery. Qualification for different types of permits and transferability options was based on participation in the fishery (2000-2003). In 2023, 69 vessel permits, 30 light boat permits, and brail (netted scoop) permits were issued. Of the 69 vessel permits issued, 60 vessels made commercial landings in 2023. Thirty-four vessels made 80 percent of the landings (by tonnage) in 2023-2024 Of the 47 brail permits issued, 11 brail vessels landed squid. Market squid vessel permits allow a vessel to attract squid with lights and use large purse seine nets to capture squid. Brail permits allow a vessel to attract squid with lights and use brail gear to capture squid. Light boat permits only allow a vessel to attract squid with lights (30,000 watts, maximum). In 2014, revised regulations went into effect clarifying the take of squid incidentally after a closure of the directed market squid fishery. These regulations require incidental landings of squid to contain 10 percent or less of squid and 2 tons or less of squid, when landed with another targeted species. CDFW revised commercial squid logbooks in 2016, to improve formatting and instructions as well as improve quality of the logbook data collected.

The California market squid fishery is strongly affected by the environmental and atmospheric conditions of the California Current. California market squid are extremely sensitive to the warm water trends of El Niño. Historically, overall catches have decreased during strong El Niño but then rebounded with the increased upwelling of cooler water during La Niña phases. For example, for years 2012-2015, average sea surface temperature (SST) in southern California was warmest in 2015, which corresponds to the lowest southern California landings. Conversely, average SST for both northern and southern California waters were cooler in 2012, corresponding to higher southern California landings.

The marine heatwave beginning in 2014, coupled with early El Niño signals, pushed the squid fishery north, as reflected in the geographic distribution of 2014 landings. With recent warm waters due to El Niño, overall California landings decreased significantly beginning with the 2015-2016 market squid fishing season (the season runs from April 1 to March 31 of the following year). Following the marine heatwave, both La Niña and El Niño conditions existed from 2016-2024 and landings have been variable during those years.

5. California Live Bait Fishery

Throughout much of the 20th century, CDFW monitored the harvest of CPS finfish in the California live bait fisheries by requiring live bait logs. Northern anchovy and Pacific sardine are the main species targeted in this fishery, with a variety of other nearshore or CPS taken incidentally. An estimated 20 percent of this harvest is sold to private fishing vessels, with the remainder to the commercial passenger fishing vessel (CPFV) fleet, where payment to the bait haulers is on a percentage basis of the CPFV revenues (Thomson et al. 1994). An example of the first Live Bait Log from 1939, termed a "Daily Bait Record" as printed for the State of California, Department of Natural Resources, and Division of Fish and Game can be found in Alpin (1942). The data collected were self-reported daily estimates of the number of "scoops" taken and sold by the fishermen, by species. Although this variety of data does not lend itself readily to rigorous scientific analysis, there are at least 74 years of data available, collected in a reasonably uniform manner that can serve as an index to this low volume, high value fishery.

Studies conducted by CDFW, NMFS, and others have examined this fishery, generally with a focus on the dominant species taken over a given period. As in the directed commercial CPS fisheries, the local availability of each CPS to the bait fleet changes periodically. Problems with the live bait data such as conversion factors for scoops of live fish to weight, the economics of the fishery, the character of the fleet, and compliance rates in submitting logs have been addressed in various agency reports (Maxwell 1974; and Thomson et al. 1991, 1992, 1994).

Alpin (1942) describes the earliest implementation of the live bait log program in 1939, which followed a pilot program of verbal interaction with the fishermen that established four categories describing the variation in abundance or availability of CPS to the recreational industry.

Live bait logs have been at different times mandated by state law or submitted to the CDFW on a voluntary basis. In the early 1990s, sardine became more prevalent in the bait fishery, and quotas were imposed on their annual take pursuant to management efforts to recover the sardine population off California. In 1995, CDFW lifted quotas restricting the quantity of sardines that the live bait industry could harvest. The sardine population along the California Coast was increasing toward a "recovered" level, as anchovy showed a decline, and sardines became the preferred live bait over anchovy. With the sardine quota lifted, the level of scrutiny on the harvest of the live bait industry lessened. Beginning in 2019, CDFW required the live bait industry to report catches using electronic fish tickets, and logs are no longer used for catch records.

1. Species Composition

The ratio of anchovy to sardine in the southern California live bait harvests shifts significantly as the populations of these two fish expand and contract over periods of years or decades. Much of the early reported harvest consisted of anchovy, following the collapse of the sardine fishery in the 1940s. Between 2013 and 2023, the proportion of anchovy to sardine in the total reported harvest ranged from a high of 42 percent anchovy to 58 percent sardine in 2014, to as low as 7 percent anchovy to 93 percent sardine in 2018 and 2020 (Table 2- 3).

Market squid are also taken as live bait in Southern California. However, the amount of market squid harvested and the value of the fishery has been uncertain, as there were no permitting and reporting requirements except for squid permit holders who reported live bait on their squid fishing logs. Current records indicate that a total of about 33 mt of market squid were sold as live bait from 2019-2023. During this period, market squid sold as live bait had an average ex-vessel value of over $3,000/mt.

2. Logbook Information

Until 2000, the CDFW Live Bait Log (Title 14, Section 158, California Code of Regulations: DFG 158, October 1989) required only the estimated scoops taken daily of either anchovy or sardine be reported, and a check mark be made if certain other species were taken, with space for comments related to fishing. Other species noted, but not consistently enumerated in the live bait harvest, include white croaker (*Genyonemus lineatus*), queenfish (*Seriphus politus*), Pacific and jack mackerels, and various small fishes collectively known as "brown bait" that could include juvenile barracuda (*Sphyraena argentea*), Osmerids, Atherinids, and market squid. Estimates of ancillary catch data have been documented in earlier reports, and in CPS FMP Amendment 9. Beginning in 2000, the live bait logs were no longer mandatory but submitted on a voluntary basis. In 2015, CFDW met with live bait and CPFV fishery participants to increase participation in the log program and discuss improving the log form to better describe live bait catch. In fall of 2015, a revised log form was issued to bait haulers, and by 2016 was used by all log submitters. The new form called for reported catch in pounds, not scoops, to better standardize reporting.

The CDFW Pelagic Fisheries and Ecosystem Program presently archives the CDFW live bait logs. Preliminary estimates of the reported total live bait harvest in California through 2015 have been appended to previously reported estimates from Thomson et al. (1991, 1992, 1994) (2022 SAFE, Table 4-12). Since 2013, sardine (northern subpopulation) biomass estimates have sharply declined. Consequently, all sources of sardine mortality, including live bait catch, have received renewed attention.

6. California Minor Directed Fisheries

Beginning in 2018 with the implementation of Amendment 16 to the CPS FMP, minor directed fishing of CPS stocks otherwise closed to directed fishing has been permitted, with a daily limit of 1 mt per vessel. The first full fishing year for sardine under this new provision in 2018-2019 had 60 mt landed, while 105 mt were landed in 2023-2024.

2. Oregon Fisheries Overview

A variety of CPS fisheries have operated in waters off Oregon dating back to the early 1900s with the sardine fishery. The sardine fishery has been subject to resource availability. When the sardine biomass declined, that early fishery ended in 1948, but then revived in 1999 when sardine were

again found in harvestable quantities. The directed commercial sardine fishery in Oregon closed again in 2015 when the resource again declined and has remained closed since that time. There has also been limited harvest of other CPS finfish including Pacific mackerel and northern anchovy over the years, but these were never of similar magnitude to the sardine fishery in terms of participation, harvest, or economic importance. A market squid fishery occurred in the early 1980s, with landings also occurring in the 1990s, but this fishery was sporadic due to limited resource availability for harvest. There has been a more substantial fishery for market squid that has developed beginning in 2016. These fisheries, as well as the limited live bait, together with minor directed fisheries for CPS are described below.

1. Oregon State Limited Entry Sardine Fishery

The Pacific sardine fishery off Oregon started in 1935, but there are recorded landings of sardine in Oregon dating back to 1928. The catch dropped off in the 1940s with 1948 being the last year of directed fishery landings until 1999 when the fishery was revived. Pacific sardine was managed as a developmental fishery from 1999 to 2005. In 2004, the sardine industry asked ODFW to remove Pacific sardines from the developmental species list and create an LE system for the fishery.

ODFW began work with the Developmental Fisheries Board and the industry to develop alternatives for the fishery. In December 2005, the Oregon Fish and Wildlife Commission (OFWC) moved the Pacific sardine fishery from a developing fishery into a state-run LE fishery system. Twenty Oregon permits were initially established and made available to qualifying participants for the 2006 fishery. The OFWC amended an LE permit eligibility rule in August 2006, which resulted in an immediate addition of six permits for a total of 26 LE sardine fishery permits.

In April 2009, the OFWC enacted a number of rule changes for the Pacific sardine fishery. First, the OFWC modified the requirement for minimum landings of sardines into Oregon to qualify for permit renewal that was enacted in 2006. These minimum landing requirements for permit renewal were effective only when the Federal coastwide maximum HG for the fishing year exceeded 100,000 mt. The minimum landing requirements themselves, either a minimum of ten landings of at least five mt each or landings totaling at least $40,000 ex-vessel price, were not changed. Next, the OFWC eliminated a rule that became effective in 2008, which specified that permit holders must either own or operate a vessel that is permitted. The OFWC also established a lottery system for sardine permits. If the number of permits issued falls below 24, a lottery may be held the following year, but the total number issued shall not exceed 26 LE permits. A new rule defined catching vessels and limited catch sharing to catching vessels with state LE sardine permits. In 2012, the OFWC eliminated the landings requirements for permit renewal. The number of LE sardine permits issued dropped from 26 to 25 in 2008, to 24 in 2014, and has declined to 21 permits issued in 2021, 2022, and 2023.

The Pacific sardine fishery in Oregon operates as a day fishery with vessels based primarily in Astoria where processing plants for sardines operate. Many vessels utilize aircraft to assist in locating schools of sardines and setting their nets when weather permits. Weather and tides are major factors in fishing operations and timing of vessels transiting in and out of the Columbia River.

The directed sardine fishery coastwide, including Oregon, has been closed since July 1, 2015 because that year's stock assessment estimated the biomass to be less than the CUTOFF value of 150,000 mt and subsequent stock assessment estimates have remained under the CUTOFF value. With the long closure of the directed fishery, processing capacity for sardines has declined as plants have closed or converted to processing other species (ODFW observation, 2020).

Permanent regulations for the sardine fishery were extended in June 2016 to cover other CPS fisheries in order to add more protection to bycatch species, reduce the potential for wastage of CPS, and increase regulatory consistency. These rules applied to purse seine fishing for CPS, including anchovy in the ocean and in the Columbia River. They require a purse seine logbook to be maintained, prohibit a reduction fishery, allow pumping of catch (up to 20 percent) from another vessel's seine, require dipnetting of salmon and groundfish from the seine before pumping, and added mackerels to the list of prohibited species in the Cape Perpetua Seabird Protection Area. In addition, for all CPS except market squid, a grate with at least 2 3/8 inches between the bars must be placed over the intake of the hold to sort out larger species of fish**.**

2. Oregon Anchovy Fishery

State developmental fishery permits for harvesting anchovy were issued from 1995 to 2009. All developmental fisheries in Oregon had a limited number of permits available and landing requirements for permit renewal, but the number of permits and landing requirements differed by target species. In 2009, Oregon issued 4 of the 15 developmental fishery permits available for the anchovy fishery. In December 2009, all developmental fisheries programmatic activities including permitting were suspended due to lack of funding. The OFWC moved the anchovy fishery to a Category C developmental fishery, those that are managed under a state or Federal FMP which has established permit and/or gear limitations. Because the Federal CPS FMP does not have permit restrictions for vessels operating north of 39° N. latitude, the ocean fishery for northern anchovy is now an open access fishery off Oregon limited to legal gear under the CPS FMP and state regulations. Until recent years, northern anchovy were infrequently targeted during open periods for the sardine fishery. These anchovies were sold either as bait or processed as a local specialty product for human consumption. A significant fishery began to develop in 2015 and increased substantially in 2016. These landings were sold overseas mainly for human consumption with lesser amounts sold for bait. Landings of anchovies have declined in recent years.

2023

Anchovy were not targeted by CPS fisheries in Oregon in 2023. Landings of anchovy in Oregon totaled less than 10 pounds in 2023. All anchovy were landed as bycatch by non-CPS fisheries.

3. Oregon Other Finfish Fisheries

Jack mackerel have not been a CPS fishery target species in Oregon, and they rarely show up as incidental catch in CPS fisheries targeting other species. Pacific mackerel have been landed in Oregon both as a target species for a brief period in the early 2010s when the sardine fishery was winding down and as incidental catch in other CPS fisheries. Both species were landed in Oregon in 2023 as incidental catch and bycatch, primarily in the whiting fishery, but also in other non-CPS fisheries.

4. Oregon Market Squid Fishery

In Oregon, market squid fishing dates back to the 1980s with most fishery activity associated with strong *El Niño* conditions, but with some targeting in other years when sufficient market squid are available. The first Oregon fishery for market squid after this species became part of the CPS FMP occurred in 2014. In 2014, targeted fishing by fewer than three vessels landed less than 0.5 mt. No market squid were landed in 2015. In 2016 the fishery off Oregon landed 1,260 mt of market squid in 83 vessel-days during May to June. Oregon adopted permanent rules in 2016 for the market squid and other CPS fisheries as mentioned above. There were no Oregon market squid landings in 2017. In 2018, 3,203 mt of market squid were landed by 11 boats. Participation in the fishery increased to 23 boats making landings totaling 2,386 mt in 2019. The total ex-vessel value was approximately $2.9 million. Oregon had the highest landings and most vessels making landings on record in 2020, with 4,656 mt landed by 40 vessels using seine gear for an ex-vessel value of approximately $6.0 million. Landings and participation have declined in the most recent three years, with no catch of market squid in CPS fisheries in 2023 and only trace amounts landed as bycatch in non-CPS fisheries.

Oregon Fish and Wildlife Commission Actions

In June of 2021 the OFWC adopted a minor rule change for the market squid fishery that brought the regulations regarding the rib line into alignment with net manufacturing practices. In February of 2022 the OFWC adopted rule changes specific to gear used in the fishery and set a control date of January 1, 2022, for use if the OFWC should decide to move the market squid fishery to a LE system in the future. Information on OFWC meetings including agendas, meeting materials, minutes, and recording can be found at https://www.dfw.state.or.us/agency/commission/minutes/.

5. Oregon Live Bait and Minor Directed Fisheries

Historically, commercial capture of CPS for live bait has primarily occurred in the Umpqua River estuary where Pacific sardine, northern anchovy, and a number of other species not under Federal management may be taken by beach seine and sold as bait, most of which is sold as live bait. Landings of Pacific sardine in this fishery in Oregon totaled 2.9 mt, 0.5 mt, and 0.1 mt in the 2020-2021, 2021-2022, and 2022-23 fishing years respectively. No northern anchovy were landed in this fishery in 2021, 2022, or 2023.

In 2009, the OFWC implemented rules to allow capture of northern anchovy in a limited number of Oregon estuaries. All other species must be released unharmed. This harvest of anchovy is limited to commercial vessels that use the anchovy as live bait in commercial fishing operations on the catching vessel. The gear used to capture anchovy is restricted to purse seines with a maximum length of 50 fathoms (300 ft), lampara nets, and hook and line. This live bait fishery for anchovy is open from July 1 to October 31. Fishers intending to fish for anchovy in this manner must notify Oregon State Police with the vessel name, fishing location, and estimated time of the activity 12 hours prior to fishing activity. Information on live bait catch must be recorded in logbooks provided by ODFW. No attempts to harvest anchovy in estuaries for use as live bait by commercial fishing vessels occurred in 2023.

3. Washington Fisheries Overview

Generally harvested with a variety of "round haul" gears elsewhere, only purse seines, lampara nets, and dip nets are authorized for targeted commercial harvest of sardine, mackerel, and anchovy in Washington. Incidental catch does occur with other gears, e.g., trawl nets. Recreational gears include jig, dip net, and cast net, but the latter gear is only legal for sardine and anchovy in Washington.

Sardines were first harvested in Washington in 1936 and through the heyday of the "cannery row" era, up to 1950 (PMFC 1948). Then, due to a combination of less favorable environmental conditions (sardine prefer warmer water temperatures) and over-exploitation, the population began to collapse and contracted to its range in southern California. The California fishery closed in 1968. A population rebound was evident by the 1990s and sardine were again observed as far north as British Columbia (McFarlane 2005). The latter part of the 1990s saw continued expansion of sardine into waters off Oregon and Washington in sufficient numbers to spur interest in commercial fishing once again. In contrast, mackerel did not garner similar attention and has been harvested only incidentally by fishers targeting sardine.

Northern Anchovy have long supported a small-scale, but important fishery on the Washington coast. Aside from some experimental attempts at canning and preservation in the 1940's, this fishery has and continues to primarily provide bait for other high-value fisheries such as commercial albacore tuna and recreational fisheries (PMFC 1948).

1. Sardine

Pacific sardines are the primary coastal pelagic species harvested in large-scale fisheries in Washington waters, although the sardine fishery has been closed since 2015. From 2000 through 2009, participation in the sardine fishery was managed under Washington's Emerging Commercial Fishery Act (ECFA), which provides for the harvest of a newly-classified species or harvest of a classified species in a new area or by new means. The ECFA offers two choices for fishery-permit designations: trial, which does not limit the number of participants or experimental, which does limit participation and prohibits the transfer or sale of the permit. From 2000 through 2002, WDFW managed the purse seine fishery for sardine under the trial designation to a state HG of 15,000 mt.

The Pacific Northwest sardine fishery saw a rapid expansion of catch between the years 1999 to 2002 when landings increased from 771 mt to 15,820 mt. In response to this situation, WDFW engaged in an extensive public process to address management needs in the fishery. In 2003, following this public process, a formal Sardine Advisory Board (Board) was created, and the WDFW Director, in collaboration with the Board, advanced the sardine fishery designation from trial to experimental as provided for under the ECFA. The number of experimental fishery permits was capped at 25. The experimental fishery program continued through June 2009. Besides limiting participation, WDFW also restricted the amount of sardines sold for reduction to a 15 percent season cumulative total by weight by individual vessel.

During the 2009 Washington State legislative session, WDFW proposed legislation to establish a commercial license limitation program specifically for the harvest and delivery of Pacific sardines into the state. The legislation was passed into law in July 2009, establishing 16 permanent licenses. In addition, the new law provides criteria for the issuance of temporary annual licenses at the discretion of the WDFW Director. In combination, the number of permanent and temporary annual

licenses cannot exceed 25. The law did not set any vessel capacity restrictions for the Washington limited entry fishery.

After the creation of the sardine license in July 2009, licenses could be transferred (sold). To maintain a sardine license, yearly renewal is required and is accomplished by paying an annual fee. In 2010 and 2012, a single temporary annual license was also issued. All 16 Washington permanent licenses were available for renewal in 2023-2024 season. No temporary permits were issued.

Washington State waters (0-3 miles) are closed to directed commercial sardine fishing. Fishing for or possessing sardine taken with any commercial gear is prohibited January 1 through March 31. However, fishing opportunities are typically limited until late spring or early summer, due to adverse weather and/or too few fish. When a directed fishery is authorized, in some years the coast-wide period (January 1 – June 30) allocation is attained before April 1, while in others, sardine abundance offshore is not sufficient to support commercial activity until early or mid-June. Pacific sardines are the targeted catch in the Washington fishery, but anchovy, mackerel, and squid may be incidentally retained and landed.

To document bycatch levels in the Pacific sardine fishery, WDFW conducted a five-year observer program from 2000 through 2004 (see Section 4.3.2). Overall observer coverage in this program was in excess of 25 percent of trips and results showed bycatch of non-targeted species in the Washington sardine fishery to be relatively low. A mandatory state logbook program has been in place since the fishery began in 2000. The logbook requires skippers to report incidental catch and bycatch. The logbook data is maintained in electronic format at the WDFW regional office at Montesano, Washington.

Subject to the Pacific sardine moratorium on the directed sardine fishery, no directed sardine purse seine landings were made into Washington during the 2023-2024 fishing year. Landings from other fisheries included 0.42 mt mostly by the Pacific whiting fishery in 2023-2024.

2. Anchovy

Anchovy fisheries in Washington are conducted primarily to provide live bait for recreational and commercial fisheries. Smaller amounts of anchovy are sold as packaged bait to recreational fishermen. In 2010, WDFW adopted permanent rules restricting northern anchovy catch and disposition. These rules were intended to accommodate the traditional bait fishery and discourage the development of high-volume fisheries for anchovy. The rules limit the catch, possession, or landing of anchovy to 5 mt daily and to 10 mt weekly. In addition, the rules limit the amount of anchovy taken for reduction (or the conversion of fish to products such as fish meal or fertilizer) to 15 percent of a landing by weight. In 2023, the directed anchovy fishery landed 34.1 mt, a portion of which was immediately used as bait in the tuna fishery.

Unlike the directed fisheries for Pacific sardine and Pacific mackerel, Washington regulations allow directed fishing for anchovy in state waters (0-3 miles) of the Pacific Ocean, the Lower Columbia River, Willapa Bay and Grays Harbor. See also 2.1.3.5 Washington State Live Bait Fishery.

3. Other finfish

In 2016, WDFW authorized a trial directed mackerel purse seine fishery under Washington's ECFA, which provides for the harvest of a newly classified species or harvest of a classified

species in a new area or by new means. The ECFA offers two choices for fishery-permit designations: trial, which does not limit the number of participants; or experimental, which does limit participation and prohibits the transfer or sale of the permit. The primary purpose for initiating this trial fishery is to improve opportunity for coastal commercial purse seine fishers by increasing the flexibility to balance fishing efforts across the assemblage of mackerel and sardine.

No vessels participated in the Pacific mackerel directed fishery during the 2023-2024 fishing season. However, two trial licenses – which are valid for a calendar year – were issued in 2023.

There were no directed fishery landings during the 2023-2024 season for Pacific or jack mackerel. Incidental landings of Pacific mackerel totaled 57.3 mt in 2023-2024 and jack mackerel totaled 232.3 mt in 2023, all from the Pacific whiting fishery.

4. Squid

Squid species in Washington historically have not been commercially targeted or incidentally landed by CPS fisheries. The abundance of market squid off Washington has not been sufficient to support a commercial-directed fishery. However, three purse seine squid licenses with endorsements (permits) to fish state waters as well as Federal waters were issued for the calendar year 2023. The interest in the license was primarily to provide the flexibility to deliver, into Washington, squid harvested off Oregon.

There were no directed landings of squid in 2023. Incidental landings of market squid totaled 9.5 mt in 2023, all from the Pacific whiting fishery. This is an increase compared to the 2022 calendar year when 3.0 mt were landed in the Pacific whiting fishery.

5. Live Bait

Northern anchovy support important baitfish fisheries on the Washington Coast (ocean, lower Columbia River, Grays Harbor, and Willapa Bay). Distinguished by gear type, fisheries for anchovy include a lampara gear fishery and a seine gear fishery. The lampara-gear fishery is primarily composed of albacore tuna fishers that catch and hold anchovy in onboard live-wells to meet their own bait needs. The purse-seine fishery harvests and holds live bait in dockside net pens for retail sale to recreational and commercial fishers. The fishery occurs in Federal waters (3-200 miles), inside three miles (state waters) on the southern Washington coast, as well as within the estuaries of Grays Harbor and Willapa Bay, and in the lower Columbia River.

Except for herring, which is under a license limitation program, participation in baitfish fisheries is not limited. About two dozen baitfish-lampara gear licenses and two or three baitfish-purse seine licenses are issued annually.

Since 2007, WDFW has required fishers to document all forage fish used for bait in another fishery on the fish receiving ticket for the target species. Although all Washington anchovy landings are reported on fish tickets, no distinction is made between anchovy destined for packaged product versus anchovy destined for use as live bait. In the past, landings from the lampara gear fishery were typically reported by the scoop and converted to weight upon data entry; this practice has shifted with pounds being reported directly by the fisher. Incidentally caught species include other forage fish species (e.g., sardine, herring) which have species-specific landing limits. The bycatch of non-forage fish species is not documented but includes rare encounters with sturgeon by purse seine gear. Since fish quality is paramount in the live bait fishery, fishermen avoid encountering

non-forage fish species; any that are encountered are released quickly. To protect out-migrating salmon, regulations include seasonal closures of Grays Harbor and Willapa Bay.

In 2023, the number of fishery participants was largely unchanged from previous years. Licenses to target anchovy are non-limited and gear-specific, and gear type denotes the target fishery. Five licenses were issued for purse-seine gear (baitfish fishery) and 18 licenses for lampara gear (used by albacore tuna fishers to catch bait for personal use in the albacore tuna fishery). Actual landings were reported by three purse-seine gear and one lampara gear vessels.

WDFW conducted weekly port visits to collect biological samples from purse-seine gear landings and also maintained contact with dealers to monitor the fishery. Based on anecdotal reports, anchovy were heavily distributed shore-ward, continuing a pattern in recent years. In 2023, directed fishing by purse seine vessels based at Westport fished Grays Harbor and Willapa Bay, and in the adjacent nearshore. Albacore tuna vessels reported fishing in Grays Harbor for personal-use bait.

At 34.1 mt, Washington total anchovy landings for 2023, including purse seine and lampara gears, were down approximately 24 percent compared to 2022 (44.6 mt), and 46 percent compared with 2021 (62.8 mt). Purse seine landings spanned May through early October.

4. Treaty Tribe Fisheries

The CPS FMP recognizes the rights of treaty Indian tribes to harvest CPS stocks 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 fishing areas of four treaty Indian tribes which may initiate their right to harvest CPS stocks 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 season.

Treaties between the United States and Pacific Northwest Indian Tribes reserve the rights of the Tribes to take fish at usual and accustomed fishing grounds. The Council's CPS FMP, as amended by Amendment 9 and codified in NMFS regulations (50 CFR 660.518), outlines a process for the Council and NMFS to consider and implement tribal allocation requests for CPS.

The Quinault Indian Nation has exercised their rights to harvest Pacific sardine and northern anchovy in their Usual and Accustomed Fishing Area off the coast of Washington State, pursuant to the 1856 Treaty of Olympia (Treaty with the Quinault). The Quinault Usual and Accustomed Fishing Area is defined in §660.4 and represents an area directly off Westport/Grays Harbor, Washington, and waters to the north of this area along with the Grays Harbor estuary. There have been no Quinault Indian Nation landings of sardines or anchovies since 2017.

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3. REFERENCE POINTS AND MANAGEMENT FRAMEWORK

The most recent version of the CPS FMP can be found at https://www.pcouncil.org/fishery-management-plan-and-amendments/ and contains a description of reference points and the management framework, including harvest control rules, for CPS. Additionally, the process for setting harvest specifications can be found in Section 4.8 of the CPS FMP.

1. Rebuilding Programs

Management of overfished CPS stocks must include a rebuilding program that can, on average, be expected to result in recovery of the stock to maximum sustainable yield levels in ten years. It is

impossible to develop a rebuilding program that would be guaranteed to restore a stock to the maximum sustainable yield level in ten years, because CPS stocks may remain at low biomass levels for more than ten years even with no fishing. The focus for CPS is, therefore, on the average or expected time to recovery based on realistic projections. If the expected time to stock recovery is associated with unfavorable ecosystem conditions and is greater than ten years, then the Council and the Secretary may consider extending the time period as described at 50 CFR § 600.310(j).

Rebuilding programs for CPS are an integral part of the general control rule but may be developed or refined further in the event that biomass of a CPS stock reaches the overfished level.

Active CPS rebuilding programs include Pacific sardine, via Amendment 18, approved by NMFS June 24, 2021. On April 22, 2024, the U.S. District Court for the Northern District of California in *Oceana, Inc.*, v. *Raimondo, et al.* determined the rebuilding plan violated the Magnuson-Stevens Fishery Conservation and Management Act (MSA) by relying on conservation and management measures, rather than acceptable harvest control rules such as ABC or ACL to achieve the rebuilding targets outlined in MSA. Other elements of the rebuilding plan, including the 150,000 rebuilding target as well as T_{MAX}, T_{MIN}, T_{TARGET} were not vacated. In a June 28, 2024 order, the U.S. District Court for the Northern District of California vacated portions of the rebuilding plan for Pacific sardine, ordering NMFS to prepare and implement a compliant rebuilding plan and conduct the necessary NEPA analysis by June 1, 2025 (*Oceana, Inc. v. Raimondo*, 21-cv-05407-VKD (N.D. Cal. Jun. 28, 2024)).

4. BYCATCH, DISCARD MORTALITY, AND INCIDENTAL CATCH

Fishery management plans prepared by a fishery management council or by the Secretary must, among other things, establish a standardized bycatch reporting methodology (SBRM) to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures to the extent practicable and in the following priority:

1. Minimize bycatch.
2. Minimize the mortality of bycatch that cannot be avoided.

The MSA defines bycatch as "fish which are harvested in a fishery, but which are not sold or kept for personal use and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program" (16 USC 1802).

CPS vessels fish with round haul gear (purse seine or lampara nets). These are encircling type nets, which are deployed by a skiff around a school of fish or part of a school. The end of the float line is then attached back to the vessel. With purse seines, the bottom of the net (the lead line) is then pulled closed. Lampara nets do not purse the bottom. The area including the free-swimming fish is diminished by bringing one end of the net aboard the vessel. When the fish are crowded near the fishing vessel, pumps are lowered into the water to pump fish and water into the ship's hold. Another technique is to lift the fish out of the net with netted scoops (e.g., stocking brails). Round haul fishing results in little unintentionally caught fish, primarily because the fishermen target specific schools, which typically consist of one species, as CPS school with similarly sized fish. The most common incidental catch in the CPS fishery is another coastal pelagic species (e.g., Pacific mackerel incidental to the Pacific sardine fishery). If larger fish are in the net, they can be released alive before pumping or brailing by lowering a section of the cork-line or by using a dip-net. The load is pumped out of the hold at the dock, where the catch is weighed and incidentally

caught fish can be observed and sorted. Because pumping at sea is so common, any incidental catch of small fish would not be sorted at sea. Grates can be used to sort larger non-CPS from the catch and are mandatory in Oregon. At-sea observers have recorded discard since the year 2000 off the states of Oregon, Washington, and California. Incidental harvest of non-prohibited larger fish are often taken home for personal use or processed.

Historically, market squid have been fished at night with the use of powerful lights, which cause squid to aggregate, allowing fishermen to pump squid directly from the sea or to encircle them with a net. California actively manages the market squid fishery in waters off California and has developed an FMP for the state-managed fishery. Management measures pertinent to bycatch include establishing a prohibition on use of lights in the Greater Farallones National Marine Sanctuary to eliminate the potential of future negative interactions with seabirds.

Additionally, several circumstances in the fishery tend to reduce bycatch:

1. Most of what would be called bycatch under the MSA is caught when round haul nets fish in shallow water over rocky bottom. Fishermen try to avoid these areas to protect their gear. Also, they may be specifically prohibited from fishing in these areas due to closures.
2. South of Pt. Buchon, California, many areas are closed to round haul nets under California law and the FMP, which reduces the chance for bycatch.
3. In California, a portion of the sardine caught incidentally by squid or anchovy harvesters can be sold. In Washington, all incidentally caught CPS can be sold when another CPS is targeted, e.g., Pacific mackerel can be sold when fishing is directed at Pacific sardine or vice versa, or Pacific sardine can be sold when fishing targets northern anchovy.
4. A provision in the CPS FMP allowing landings of less than five tons without an LE permit should reduce regulatory discard, because those fish can be landed without penalty. LE permits otherwise are required south of Point Arena, California.
5. Virtually all fish caught incidentally in this fishery are either used for bait, for personal use, or released alive.

All three states have a number of regulations with measures that together comprise the SBRM for CPS fisheries (Table 4-1). These include:

- landings made by commercial fishing vessels must be recorded on fish landing receipts (“fish tickets”);
- commercial fishing vessels are subject to having their catch sampled;
- commercial fishing vessels in most CPS fisheries must accommodate observers during fishing trips if requested; and
- logbooks are required for most CPS fisheries.

These programs support management of CPS fisheries and stock assessments through the collection and processing of biological and catch data. The objectives of the monitoring programs are to: (1) collect biological data, such as size and otoliths for ageing from commercially landed fish to support research and stock assessments; and (2) collect catch, including bycatch, data via fish receiving tickets, commercial fisheries logbooks, and species composition sampling, to support fisheries monitoring and in-season management decision-making.

Commercial CPS landings are required to be recorded on state fish tickets (Table 4-1). State fish ticket programs provide a continuous, consistent, and long-standing reporting mechanism for CPS

SBRM. Catch weight by sorted species category, vessel identification number, and other data elements are required on fish tickets. Fish tickets are produced and issued by the individual states but have been designed and evaluated to ensure they meet record-keeping requirements and/or needs in coordination with state and Federal managers through the Pacific States Marine Fisheries Commission (PSMFC). State fish receiving tickets document landed catch including bycatch (fish landed but not sold, i.e., zero value) and following in-house processing and quality control are reported to the PSMFC Pacific Fisheries Information Network (PacFIN, http://pacfin.psmfc.org).

Commercial CPS landings are sampled in port by state personnel, who confirm species identification, collect species composition data, otoliths for ageing, lengths, and other biological data. Each state mandates access to landed catch by authorized state personnel for sampling (Table 4-1). The design of the fishery monitoring programs may vary between states and within each state program by fishery or region, but they serve the same purpose and are intended to meet the objectives consistent with SBRM and the CPS FMP. The various strategies reflect the specific fishery and its characteristics of operation, the coverage needed to accomplish sampling objectives, and agency staffing resources.

Likewise, each state fishery logbook or Federal program functions separately. Unlike fish receiving tickets, there is no central repository for CPS logbook data. The data collected through logbook programs are maintained by the state or Federal agency. Logbook data provides supplemental bycatch information because most catch is landed in CPS fisheries. When vessels are required to maintain and submit logbooks, they must accurately record information such as: date, identification of catcher vessel, time, position, sea depth, and catch by species of each haul or set; retained and released catch amounts, gear information, if applicable; information on other parties receiving fish or fish products; and any other information deemed necessary. Washington mandates logbooks for directed sardine or mackerel fishing but has not implemented a program for anchovy given the small size of the fishery. Oregon mandates logbooks for all CPS fisheries. Logbooks are not currently required for CPS finfish fisheries in California; however, they are required for the market squid fishery.

CPS are generally not targeted by recreational harvesters, and catch of CPS is minimal and a miniscule proportion of CPS total catch. Recreational fishing for CPS is typically done with hook-and-line gear, or small hand-deployed cast nests and therefore includes very minimal amounts of bycatch. CPS are typically targeted recreationally on a very limited scale for use as bait or personal consumption.

Washington, Oregon, and California state regulations require access to recreational catches upon request by authorized personnel (Table 4-1). In Washington, recreational sampling programs focus on salmon and groundfish and typically do not collect data on CPS because catch is minimal. Oregon sampling of recreational fishing activity also focuses on salmon and groundfish for the same reasons. The California recreational fishery sampling program surveys recreational fishermen to determine which fish they are targeting and makes note of discarded fish. State monitoring programs collect, process, and report recreational fishing data to the PSMFC Recreational Fishery Information Network (RecFIN, http://www.recfin.org)

Areas of uncertainty in bycatch data produced by these reporting and monitoring systems depend on the data source. Fish tickets will not capture fish released at sea, fish purchasing personnel may misidentify less familiar species, state fish ticket coding systems may use more general categories and not support full reporting to species, or fish may be too degraded to identify accurately. Dockside fishery monitoring programs are typically designed to sample only a percentage of total landings, although they are designed to produce data that is representative of the fishery (i.e.,

random sampling). These fishery monitoring programs may prioritize the collection of biological data (e.g. length, weight, otoliths) as a primary function and not have species composition sampling or verification of species sorting and identification as a key objective since observer programs have determined that the numbers or volume of bycatch is low. Logbook programs provide valuable information but are dependent on the vessel captain to fully and accurately document observed bycatch. The quality of the data depends on the captain's or vessel crew's skill and diligence in identifying and enumerating or estimating bycatch.

Table 4-1. CPS Fishery Reporting and Data Collection Regulations by Authority

Reporting or Data Collection Procedure	**Washington** Administrative Code (WAC)	**Oregon** Administrative Regulations (OARs)	**California** Code of Regulations (CCR)	**Federal**
Fish Landing Receipts	WAC 220-305-030 Chapter 220-352	OAR 635-006-0210	14 CCR § 190	§660.505
Fishery Monitoring- Sampling	WAC 220-305-070 WAC 220-356-040 WAC 220-360-320	OAR 635-001-0035 635-006-0136 635-011-0100	14 CCR § 105.5	§660.505
Logbook	WAC 220-356-040 WAC 220-360-320	OAR 635-004-0376 635-005-0930	14 CCR § 190 14 CCR § 149	
Observers	WAC 220-356-040 WAC 220-360-320	OAR 635-006-0140	14 CCR § 105.5	§660.519
Bycatch and Fishing Gear Restrictions	WAC 220-356-040	OAR 635-004-0378 OAR 635-004-0235		§660.506 §660.511 50 CFR§ 660.520

1. Federal Protection Measures

NMFS regularly conducts Endangered Species Act (ESA) section 7 consultations to ensure that species listed as threatened or endangered are not adversely affected by federally managed fisheries. Since 1999, the NMFS West Coast Region (WCR) Sustainable Fisheries Division (SFD) has conducted numerous formal and informal consultations with the WCR Protected Resource Division (PRD), U.S. Fish and Wildlife Service (USFWS), and other Federal agencies regarding CPS fisheries. In all informal consultations, the PRD concurred with the SFD that the CPS fishery is not likely to adversely affect protected resources. In all formal consultations on the Pacific sardine fishery specifically, no jeopardy determinations were made.

NMFS WCR SFD initiated a Section 7 consultation with NMFS WCR PRD on the continued prosecution of the Pacific sardine fishery under the CPS FMP. In a Section 7 biological opinion (BO) dated December 21, 2010, NMFS determined that fishing activities conducted under the CPS FMP and its implementing regulations are not likely to jeopardize the continued existence of any endangered or threatened species under the jurisdiction of NMFS or result in the destruction or adverse modification of critical habitat of any such species. Specifically, the current status of the Lower Columbia River Chinook, Snake River fall Chinook, Upper Willamette Chinook, Puget Sound Chinook, Lower Columbia River coho, and Oregon coast coho were deemed not likely to be jeopardized by the Pacific sardine fishery. Additionally, NMFS determined that the potential for direct incidental take of other ESA-listed salmon, marine mammals, sea turtles, green sturgeon, abalone, or steelhead, through the harvest of sardines in the purse seine fishery was discountable, and the potential indirect adverse effects of sardine harvest on ESA-listed species were insignificant.

NMFS also initiated an ESA Section 7 consultation with USFWS regarding the possible effects of implementing Amendment 11 to the CPS FMP. USFWS concurred with NMFS and determined that implementing Amendment 11 may affect but was not likely to adversely affect: the endangered tidewater goby, the threatened western snowy plover, the Santa Ana sucker, the endangered short-tailed albatross, the endangered California brown pelican, the endangered California least-tern, the threatened marbled murrelet, the threatened bald eagle, the threatened bull trout, and the candidate Xantus's murrelet. Formal consultation, however, was deemed necessary on the possible effects to the southern sea otter. The resulting BO signed June 16, 2006, concluded that fishing activities conducted under Amendment 11 and its implementing regulations were not likely to jeopardize the continued existence of the otter. As a result of this BO, new reporting requirements and conservation measures were implemented within the CPS FMP to provide further protection for southern sea otters.

These reporting requirements and conservation measures require all CPS fishermen and vessel operators to employ avoidance measures when sea otters are present in the fishing area and to report any interactions that may occur between their vessel and/or fishing gear and otters. Specifically, these new measures and regulations are:

1. CPS fishing boat operators and crew are prohibited from deploying their nets if a southern sea otter is observed within the area that would be encircled by the purse seine.
2. If a southern sea otter is entangled in a net, regardless of whether the animal is injured or killed, such an occurrence must be reported within 24 hours to the Regional Administrator, NMFS West Coast Region.
3. While fishing for CPS, vessel operators must record all observations of otter interactions (defined as otters within encircled nets or coming into contact with nets or vessels, including but not limited to entanglement) with their purse seine net(s) or

vessel(s). With the exception of an entanglement, which will be initially reported as described in #2 above, all other observations must be reported within 20 days to the Regional Administrator.

1. California Coastal Pelagic Species Pilot Observer Program

NMFS SWR (prior to merging with the NMFS Northwest Region) initiated a pilot observer program for California-based commercial purse seine fishing vessels targeting CPS in July 2004 with hopes of augmenting and confirming bycatch rates derived from CDFW dockside sampling. SWR personnel trained the first group of CPS observers in mid-July in Long Beach, California. Frank Orth and Associates, a private contractor, hired and provided observers for training and subsequent deployment. Six observers who had previous experience in other SWR-observed fisheries attended and completed the course. The training course emphasized a review of ongoing observer programs (drift gillnet, pelagic longline) and introduction to the soon-to-be observed fisheries (purse seine, albacore hook-and-line). The training curriculum included vessel safety, fishing operations, species identification, and data collection.

Data from this program have been compiled through 2008. A total of 107 trips by vessels targeting CPS (228 sets) were observed from July 2004 to January 2006. Incidental catch and bycatch data collected during this time were categorized by target species of the trip (i.e., Pacific sardine, Pacific mackerel, market squid, or anchovy). Additionally, from January 2006 to January 2008 a total of 199 trips (426 sets) were observed. For information on the observer program's methods and data, please see the 2021 SAFE Document (PFMC 2021).

2. Fishery South of Pigeon Point

Information from at-sea observations by the CDFW and conversations with CPS fishermen suggest that bycatch south of Pigeon Point is not significant in these fisheries. However, some individuals have expressed concern that game fish and salmon might constitute significant bycatch in this fishery. This is a reasonable concern, because anchovy and sardine can be forage for these predators, but there is no data to confirm significant bycatch of these species. CDFW port samples indicate minimal incidental catch in the California fishery (Tables 4-2 - 4-4). The behavior of predators may help to minimize bycatch, as they tend to dart through a school of prey rather than linger in it, and easily avoid encirclement with a purse seine.

CDFW port samplers collect information from CPS landings in Moss Landing and ports to the south. Biological samples are taken to monitor the fish stocks, and port samplers report incidentally caught fish. Reports of incidental catch by CDFW port samplers confirm small and insignificant landings of bycatch at California off-loading sites (Tables 4-2 - 4-4). These data are likely representative of actual bycatch, because (as noted) fish are pumped from the sea directly into fish holds aboard the vessel. Fishermen do not sort catch at sea or what passes through the pump. Unloading of fish also occurs with pumps. The fish are either pumped into ice bins and trucked to processing facilities in another location, or to a conveyor belt in a processing facility, where fish are sorted, boxed, and frozen.

From 1985 through 1999, there were 5,306 CDFW port samples taken from the sardine and mackerel landings. From 1992 to 1999, incidental catch was reported on only 179 occasions, representing a 3.4 percent occurrence. Up to 1999, reports of incidental catch were sparse, and prior to 1992 none were reported. Earlier incidents of bycatch may not have been noted because the harvest of anchovy and sardine was small, and only since 1995 did the harvest of sardine

increase substantially. The incidental catch reported are primarily marketable species that do not meet the definition of bycatch in the MSA. During this period, unless an incidental species represented a significant portion of the load (at least a whole percentage point) the amount of the incidental catch was not recorded. Of the incidental catch reported from 1992 to 1999, the two most prevalent species were market squid at 79 percent, and northern anchovy at 12 percent incidence within samples (not by load composition). CDFW port samples provide useful information for determining the significance of bycatch in the CPS fishery off California (south of Pigeon Point).

In 2001, California wetfish port samplers began tallying undocumented incidental catch observed during landings in greater detail and listed the occurrence of species in each sampled landing. The port sampling program records bycatch observed (i.e., presence or absence evaluations), but actual amounts of incidental catch have not been quantified to date. In 2011, bycatch data were recorded by estimates of pounds observed in an offload at northern California ports. Offloading facilities in northern California allow observations and estimates of bycatch amounts compared to southern California ports. These observations are summarized in Table 4- 2 for the 5 years between 2019 and 2023. The dynamic of the 2008 sardine fishery changed due to a decrease in the annual HG. Since then, fishing activity no longer took place year-round but was truncated within each allocation period. This may have affected the types and frequencies of organisms observed during the offloading process of sardine. The most commonly occurring flora and fauna in wetfish landings during 2023 were Pacific sanddab, kelp, jellyfish, white croaker, surfgrass, jacksmelt, plainfin midshipman, California halibut, Dungeness crab, butterfish (Pacific pompano), California lizardfish, and English sole. Since the closure of the directed commercial sardine fishery starting in the 2015-2016 season, opportunistic sampling (non-directed fishery samples) has occurred whenever sardine is found incidentally to another directed CPS catch.

Larger fish and animals are typically sorted for market, personal consumption, or nutrient recycling in the harbor. To document bycatch more fully at sea, including marine mammal and bird interactions, National Oceanic and Atmospheric Administration Fisheries placed observers on a number of California purse seine vessels beginning in the summer of 2004, under a pilot program that continued until 2008 (see Sec. 4.1.1).

1. Incidental Catch Associated with the Market Squid Fishery

Because market squid frequently school with CPS finfish, mixed landings of market squid and incidentally caught CPS finfish occur intermittently (Table 4- 3).

Although non-target catch in market squid landings is considered minimal, the presence of incidental catch (species that are landed along with market squid that are not recorded through landing receipt processes [i.e., not sold] as is typically done for incidentally caught species) has been documented through CDFW's port sampling program. During 2023, incidental catch consisted of 55 species (Table 4-4). Like previous years, most of this catch was other pelagic species, including Pacific sardine, northern anchovy, Pacific mackerel, and jack mackerel. However, kelp, jellyfish, and pyrosomes were also observed frequently.

3. Fishery North of Point Arena

The Pacific sardine fishery north of Point Arena began again in 1999 after more than a 50-year hiatus. North of 39° N. latitude (approximately Point Arena, California) is open access, while south of this latitude, the CPS Limited Entry program is in effect (per Section 3.5 of the CPS FMP).

Oregon and Washington closely monitor these fisheries and collect information about landings. Information on bycatch and incidental catch from Oregon and Washington is summarized in Table 4- 5 through Table 4- 7. The directed sardine fishery has been closed since 2015, with landings limited to small amounts of incidental harvest and minor directed fisheries.

1. Oregon

CPS vessels landing in Oregon primarily targeted Pacific sardine until the directed fishery closed in 2015. Oregon's LE sardine permit rules stipulate that an at-sea observer be accommodated aboard vessels when requested by ODFW. ODFW does not have personnel dedicated to observe and document bycatch of non- target species on sardine vessels and available state personnel were unable to conduct onboard observations of any CPS fishery vessels during the 2014 through 2015-2016 fisheries. Also, no Federal observers were placed on the vessels. To reduce bycatch, the state requires the use of a grate over the intake of the hold to sort out larger species of fish, such as salmon or mackerel. The grate size spacing can be no larger than 2-3/8 inches between bars. Oregon rules require seine gear logbooks that record incidental catch including salmonids and other species. In 2015 Oregon extended these requirements for sardine fishing to purse seine fishing for all CPS, including jacksmelt and Pacific herring, except the grate is not required for the market squid fishery.

With adoption of CPS FMP Amendment 13 in September 2011, Pacific herring, which occur in waters off all three states, and jacksmelt, which typically occur only in waters off California, were designated as "ecosystem component species", as defined in National Standard 1 guidelines. The incidental catch and bycatch of these two species are required to be reported in the SAFE document.

2022-2023

The directed sardine fishery was closed, and no directed mackerel fishing was pursued; thus, there was no bycatch of salmon, EC species, or other species in these fisheries (Table 4- 7).

Market squid has been the main CPS fishery target in Oregon since 2016. Bycatch in this fishery has included a wide array of species that totaled 4.4 mt in 2021 (Table 4- 8). The majority of landed bycatch species was less than 0.1 mt with several exceptions. There was 2.9 mt of jellyfish bycatch, 0.4 mt of Dungeness crab landed, 0.3 mt of English sole, and 0.2 mt of market squid that was not sold and thus was bycatch. Thus, 3.8 (86.4 percent) of the 4.4 mt of bycatch was made up of just four species with the majority of that being jellyfish. Bycatch in the market squid fishery in 2022 totaled 1.4 mt. Of the 31 landed bycatch species or species groups all except 3 totaled less than 0.1 mt. Sablefish made up the majority of landed bycatch totaling 0.7 mt, followed by Pacific sardine and jellyfish at 0.2 mt each, so those 3 species made up 79 percent of the landed bycatch in 2022. There were no landings of market squid in 2023.

Incidental catch in the market squid fishery occurred only in 2022 with 32.3 mt of Pacific mackerel and 25.5 mt of Pacific herring being landed and sold.

2. Washington

From 2000 through 2004, WDFW required fishers to carry at-sea observers, and to provide financial support for this observer effort. Bycatch information was collected in terms of species, amount, and condition; observers noted whether the fish were released or landed, and whether

alive, dead, or in poor condition. During the five-year period of the program, overall observer coverage averaged over 25 percent of both total landed catch and number of landings made. Based on observer data, the bycatch of non-targeted species in the Washington sardine fishery was relatively low. Due to low bycatch levels, as well as a WDFW commitment to industry that the observer fee would only be assessed until bycatch in the sardine fishery could be characterized, the mandatory observer program was suspended at the conclusion of the 2004 season.

A comparison of logbook and observer data from 2000 to 2004 indicated that logbook data, in general, tended to under-report bycatch by 20 to 80 percent (Culver and Henry, 2006). For this reason, salmon bycatch in the Washington sardine fishery for years subsequent to the observer program is calculated by multiplying total sardine catch and the observed five-year average bycatch rates. Bycatch and mortality estimates of incidentally captured salmon by year and species are shown in Table 4- 5.

2023-2024

The directed sardine fishery was closed, and no directed mackerel fishing was pursued; thus, there was no incidental catch or bycatch of salmon, EC species, or other species in these fisheries (Table 4-9). No incidental catch was reported on fish receiving tickets in the anchovy bait fishery in 2023. However, dockside sampling collected species other than anchovy, including small amounts of herring, Pacific sardine, and juvenile salmon.

4.4 Section References

Culver, M., and C. Henry, 2006. Summary Report of the 2005 Experimental Purse Seine Fishery for Pacific Sardine (*Sardinops sagax*). Washington Department of Fish and Wildlife, Montesano, Washington. 11 pp.

5. SAFETY AT SEA CONSIDERATIONS

The safety of fishing activities is an important management concern. Round haul fisheries operating off the Pacific Coast are often limited by environmental conditions, most notably inclement weather. Previous concerns have been raised about older vessels participating in the fishery regarding their safety and seaworthiness. Implementing time/area closures or restricting transferability could impact safety by making it more difficult to replace an older vessel with a newer, safer vessel, or by promoting fishing during hazardous weather conditions. This concern in part is addressed by Amendment 10 to the CPS FMP (January 2003), which allows LE permits to be transferred to another vessel and/or individual.

Prior to the closure of the directed Pacific sardine fishery in 2015, there were safety concerns resulting from the derby-style fishery where vessels compete for a share of the seasonal HG over a short period of time. Such derby fisheries can create unsafe conditions, as season duration is compressed, and competition increases.

The directed Pacific sardine fishery has been closed since the start of the 2015-2016 season, when the biomass estimate fell below the CUTOFF value of 150,000 mt. Although some allowance has been made for incidental catch of sardines in other CPS fisheries, Tribal catch, live bait, and other minor sources of mortality, the commercial fishery was essentially shut down again for the 2022-2023 and the 2023-2024 seasons.

There were four lives lost in West Coast commercial fisheries during 2023, which is lower than the average from the preceding ten-year period (4.7 lives lost per year). There were also at least 9

vessels that were a total loss due to grounding or sinking and several serious injuries. The following is an excerpt from the U.S. Coast Guard report to the Council in April 2024 (H.2.a, Supplemental USCG Report 1)) on U.S. West Coast safety incidents from the previous year:

> "In 2023, approximately 22% of commercial fishing vessels boarded had some type of discrepancy involving safety gear carriage requirements or other federal safety regulations (reversing an upward trend of 17% in 2021 and 24% in 2022). Approximately 5% of all commercial fishing vessels boarded had their voyages terminated at sea or were issued a Captain of the Port Order during a post-SAR boarding in port for existence of especially hazardous conditions. Especially hazardous conditions, which are defined in Section 46 of the Code of Federal Regulations can include the lack of adequate immersion suits, lack of adequate firefighting equipment, and other conditions having the possibility of presenting an immediate threat to a vessel and its crew."

6. ECONOMICS

This chapter is based on the CPS SAFE Portal (https://reports.psmfc.org/pacfin/f?p=501:2101:7220875343901), which is developed and maintained by the Pacific Fisheries Information Network and provides a point of public access to CPS fisheries landings, ex-vessel revenues and participation data.

This Chapter is organized into sections. In addition to this introductory section, there are several Highlights sections. The Highlights sections provide fishery specific information, including a brief description of the fishery; catch, revenues, and participation trends; and average landings composition by species. These sections include annual CPS landings and annual revenue information stratified by species, gear, and region. All revenue is adjusted for inflation to 2023$. Each section has a series of sub-sections. Each subsection includes figures presenting the information and a brief description of the material covered. Each figure may be downloaded as a *.png file from the CPS SAFE portal. Tables of data since 2015 for each section can be found in the Appendix to this report.

1. Data Considerations

PacFIN (https://pacfin.psmfc.org) is the sole source for data for this chapter. The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act sets forth information confidentiality requirements that stipulate that the government cannot make public any data that can be linked to individual people or businesses.

- All shoreside commercial landings and revenues are reported, regardless of whether they originate from targeted, incidental, or other categories of commercial fishing.
- All annual statistics utilize the calendar year. The fishing season does not correspond to the annual calendar year for some fisheries.
- All aggregates with fewer than three vessels or dealers are considered confidential and are removed from reporting.
- Landings and revenue data from the California live-bait fishery were incorporated into the PacFIN in 2019. Fishery statistics from the period prior to 2019 do not include the live-bait fishery, fishery statistics from 2019 and later include the live-bait fishery.

2. CPS Revenue, Landings, and Participation

Figure 6-1 and Figure 6-2 below show landings in metric tons and inflation-adjusted ex-vessel revenue from species managed under the Council's four FMPs. For CPS this has varied from $20.97 million to $90.65 million during this period. As a portion of total West Coast ex-vessel revenue (including species not managed under Council FMPs) this equates to between 0.9 percent and 3.8 percent.

Figure 6-3 below shows revenues and landings for the shore-based commercial CPS fishery. In 2023, CPS revenues totaled roughly $32.60 million, and CPS landings totaled roughly 30,303 metric tons.

Figure 6-4 below shows the number of participant vessels and dealers that are engaged in the CPS fishery. In 2023 there were 178 vessels and 83 dealers participating in the CPS fishery with either positive landings revenues or landing expenditures, respectively.

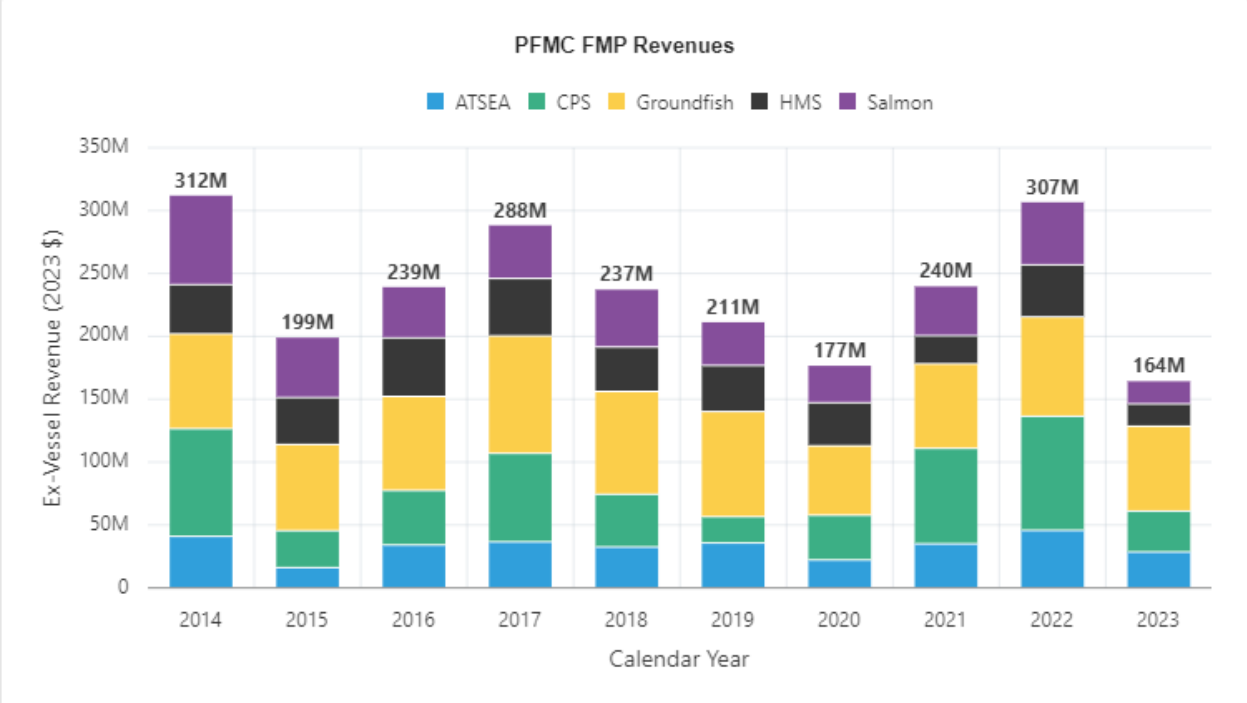

Figure 6-1. Ex-vessel revenues by FMP group (at-sea whiting separated from groundfish, $2023), 2014-2023.

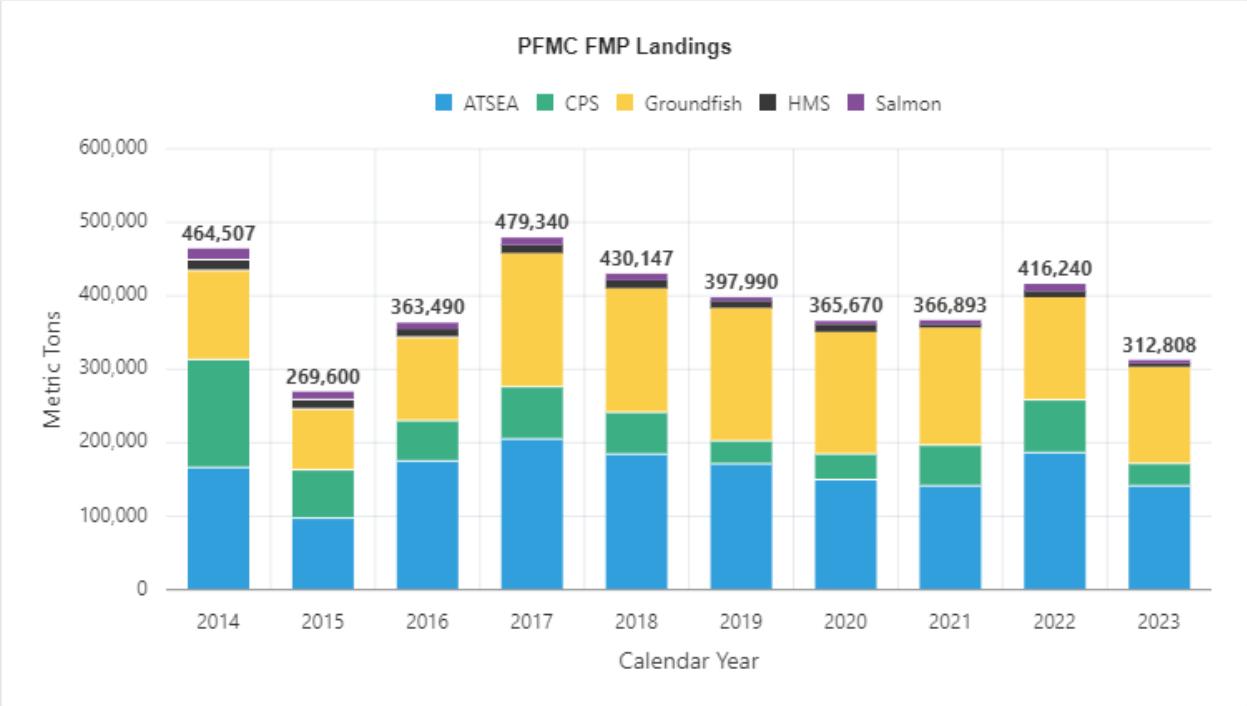

Figure 6-2. Landings (mt) by FMP group (at-sea whiting separated from groundfish), 2014-2023.

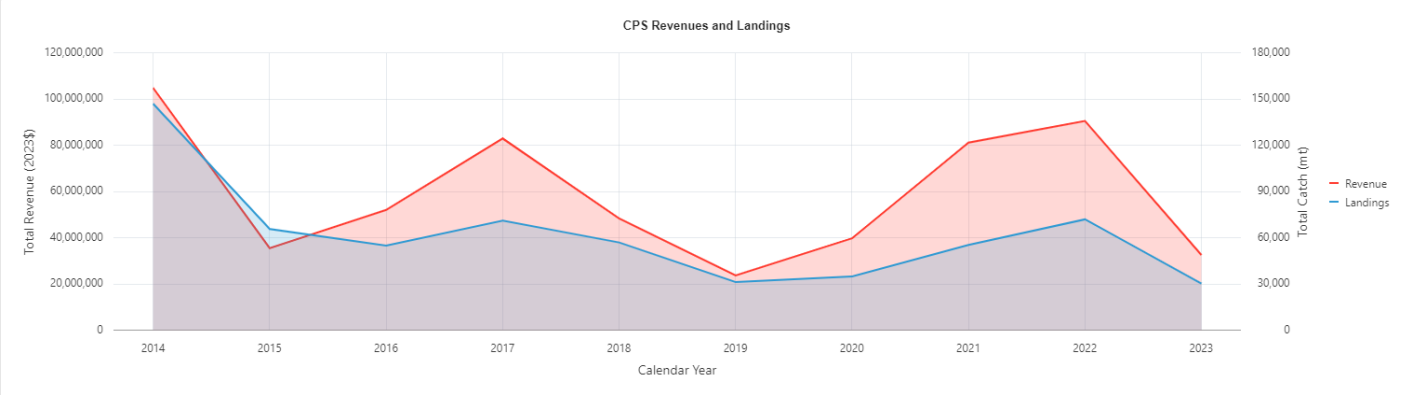

Figure 6-3. CPS Ex-vessel revenue ($2023) and landings (mt) from 2014-2023.

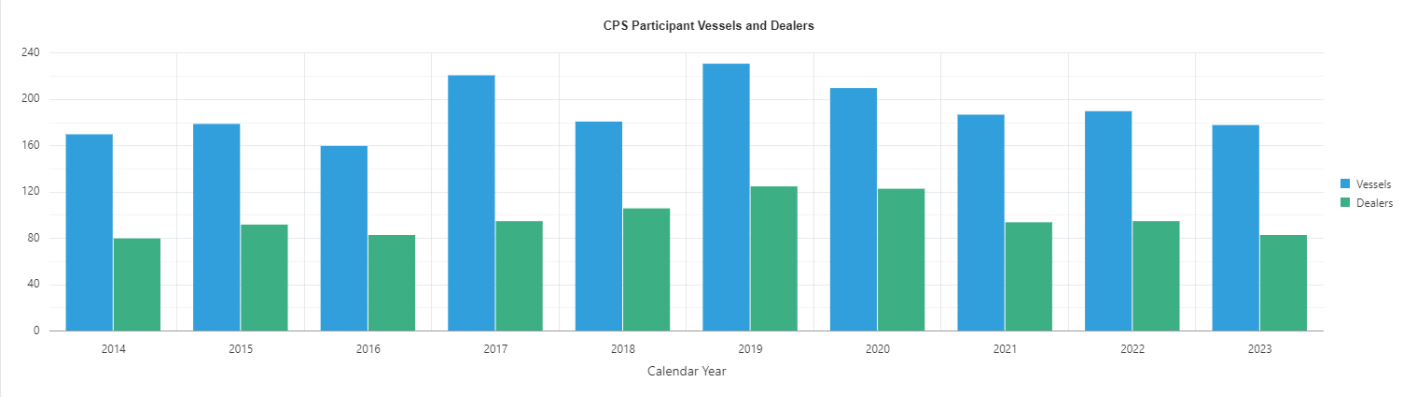

Figure 6-4. Number of participant vessels and dealers for CPS fisheries, 2014-2023.

3. Species Highlight

1. Overview

Although both market squid and Pacific sardine have been the primary target species of commercial importance in the CPS fishery since 2014 participants in the fishery also depend on landings from the other species (i.e., northern anchovy, Pacific mackerel, and Jack mackerel) in the management group (Figure 6-5). Northern anchovy is managed as two distinct subpopulations, the central subpopulation which is landed from waters off of the coast of California, and the northern subpopulation which is landed from waters off of the coast of Oregon and Washington. Depending on the species, the fishing season is based on both a calendar year and fishing season (Pacific mackerel and Pacific sardine).

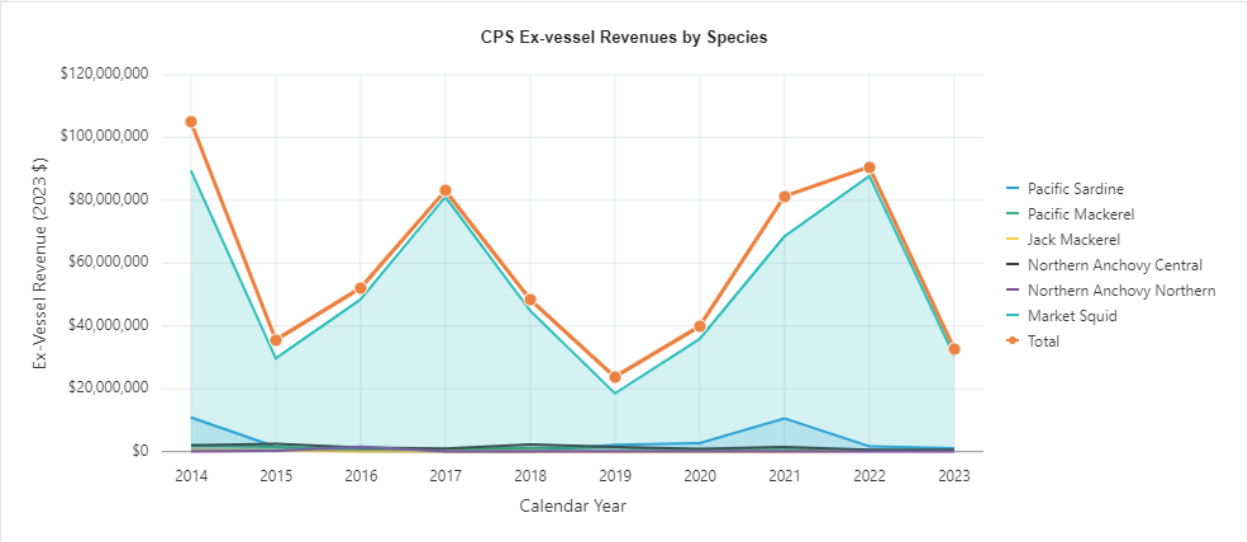

Figure 6-5. CPS Ex-Vessel Revenue ($2023, adjusted for inflation) by Species, 2014-2023

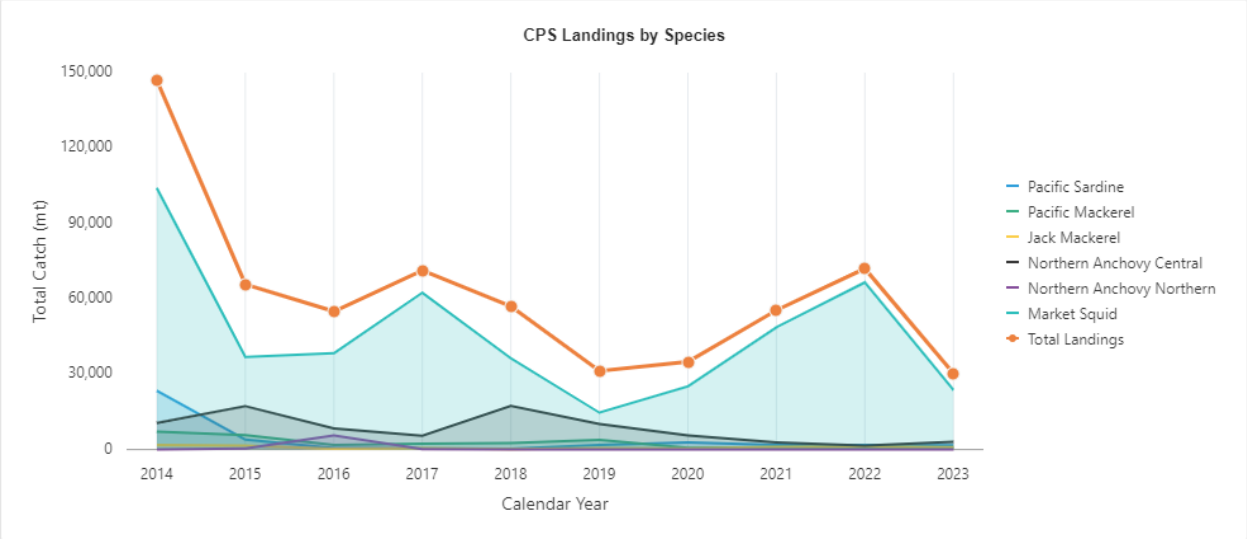

Figure 6-6. CPS Landings (mt) by Species, 2014-2023

2. Pacific Sardine

The primary directed fishery for Pacific sardine has remained closed since July 1st, 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- and in the commercial Albacore fishing in Oregon and Washington. After a peak in 2012, the coastwide sardine stock declined, and has been closed to directed commercial fishing since 2015. The live-bait and minor directed fisheries for Pacific sardine still operate.

Pacific sardine ex-vessel revenues for California, Oregon, and Washington totaled $1.06 million in the 2023 calendar year. Pacific sardine landings totaled 1,713 metric tons in 2023. As a percentage of CPS totals, Pacific sardine landings accounted for 3.3% of CPS revenues and 5.7 percent of CPS landings in 2023.

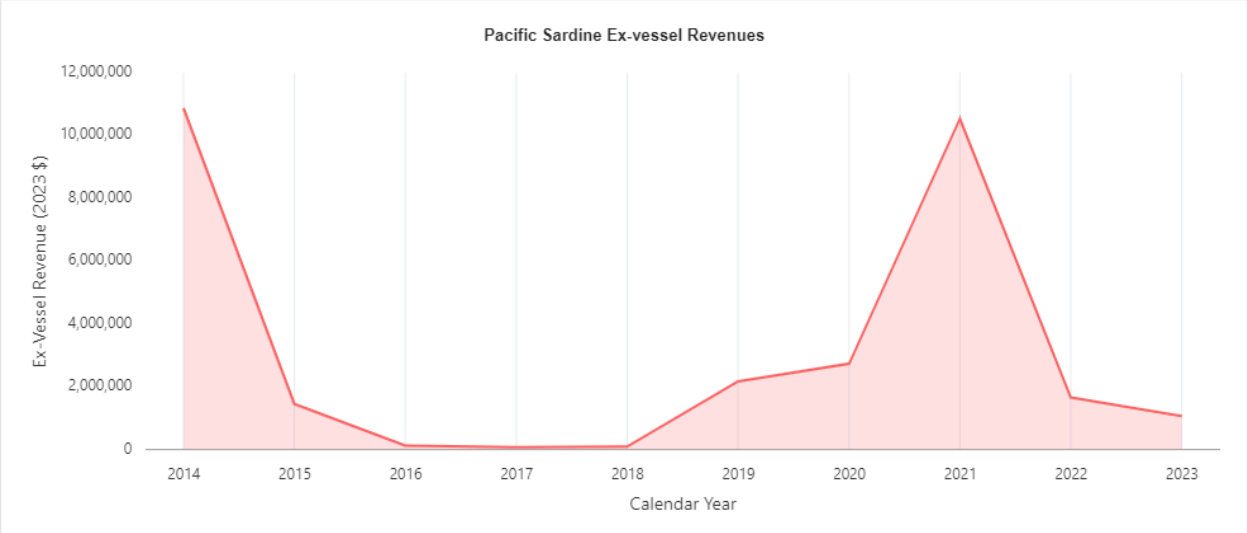

Figure 6-7. Pacific Sardine Ex-Vessel Revenue ($2023), 2014-2023

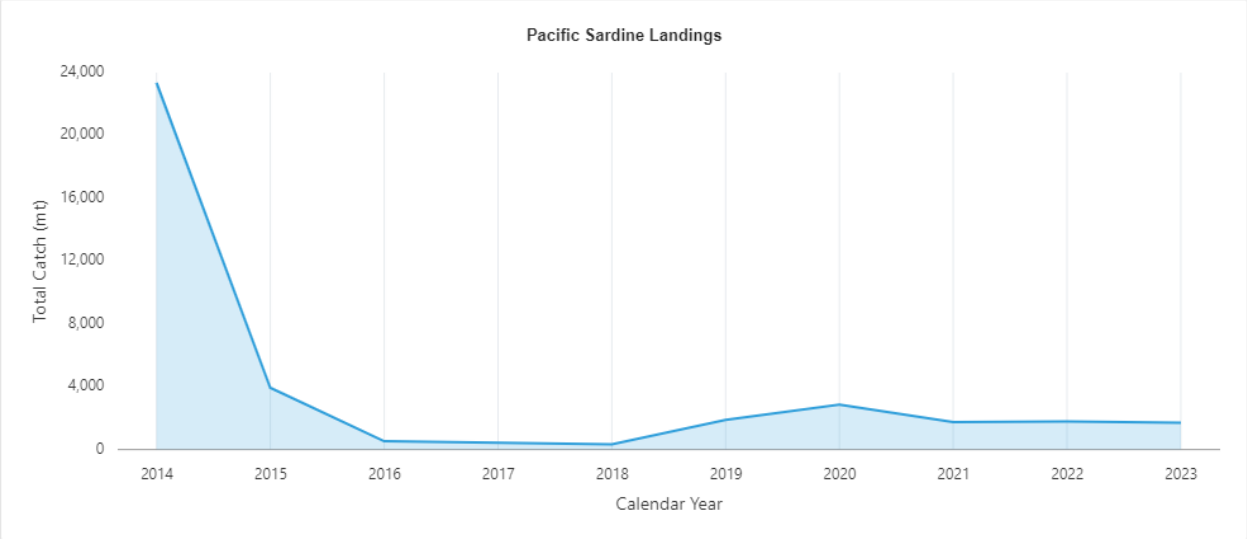

Figure 6-8. Pacific Sardine landings (mt), 2014-2023

3. Pacific Mackerel

Pacific Mackerel ex-vessel revenues for California, Oregon, and Washington totaled $397,997 in 2023 calendar year. Pacific Mackerel landings totaled 753 metric tons in 2023. As a percentage of CPS totals, Pacific Mackerel landings accounted for 1.2 percent of CPS revenues and 2.5 percent of CPS landings in 2023. The Pacific mackerel fishing season does not correspond to the annual calendar year.

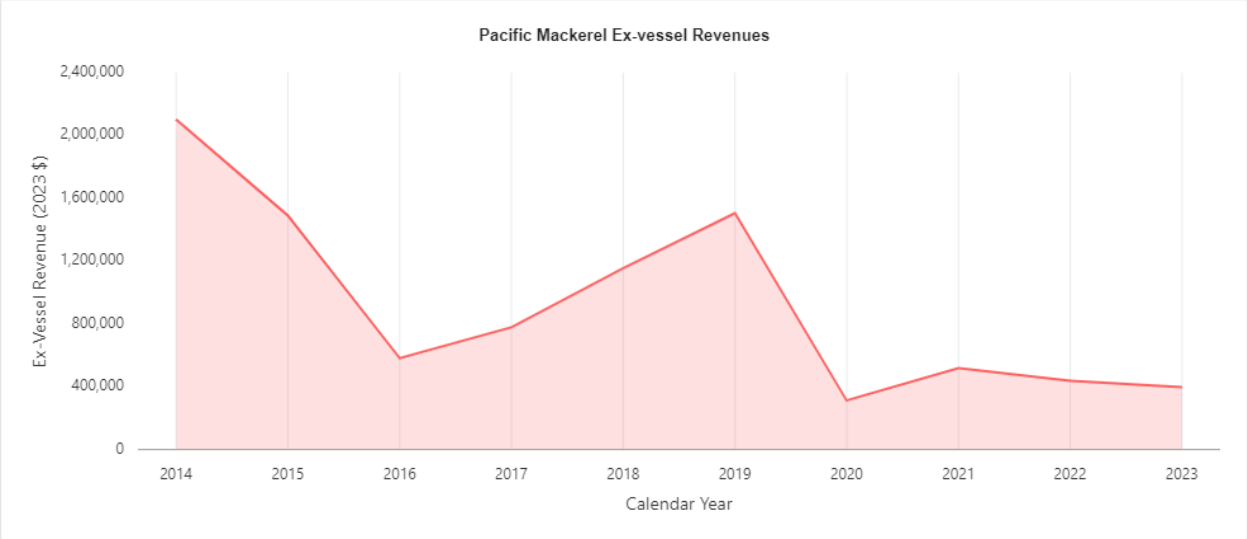

Figure 6-9. Pacific mackerel ex-vessel revenue ($2023), 2014-2023

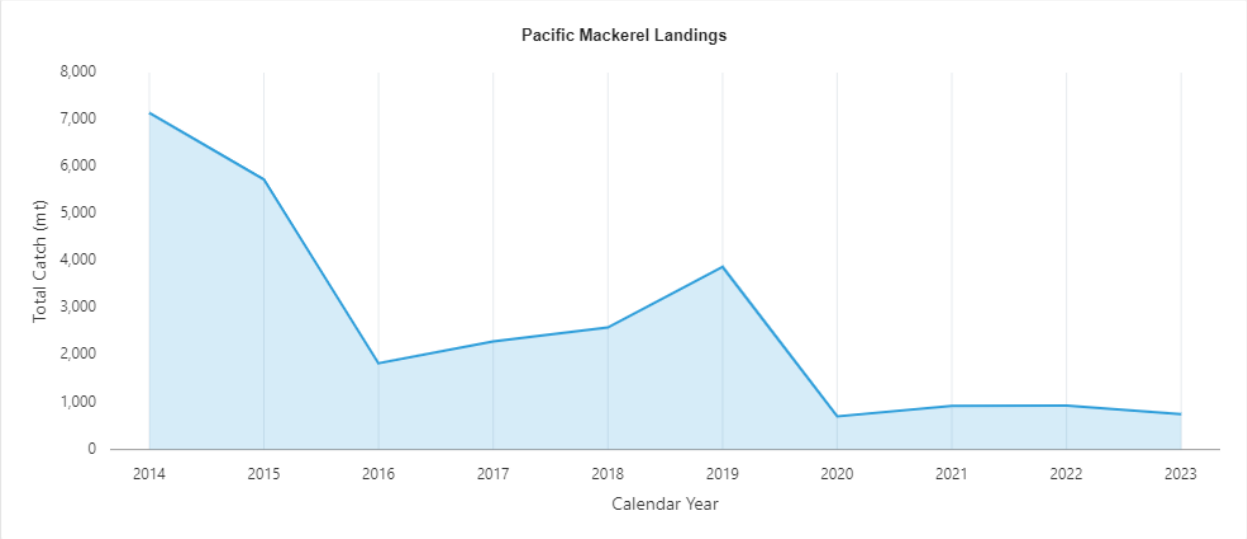

Figure 6-10. Pacific mackerel landings (mt), 2014-2023

4. Jack Mackerel

Jack Mackerel ex-vessel revenues for California, Oregon, and Washington totaled $138,467 in 2023. Jack Mackerel landings totaled 973 metric tons in the 2023 calendar year. As a percentage of CPS totals, Jack Mackerel landings accounted for 0.4 percent of CPS revenues and 3.2 percent of CPS landings in 2023.

There is no current fishery targeting Jack Mackerel in Oregon or Washington. Landings there are from incidental catch in fisheries targeting other species.

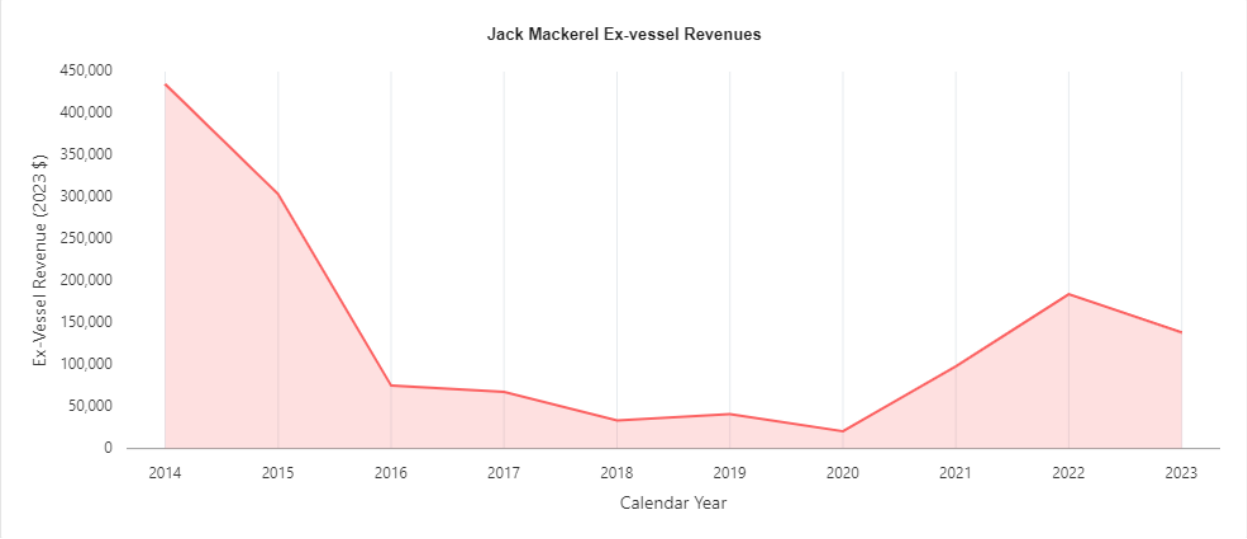

Figure 6-11. Jack mackerel ex-vessel revenue ($2023), 2014-2023

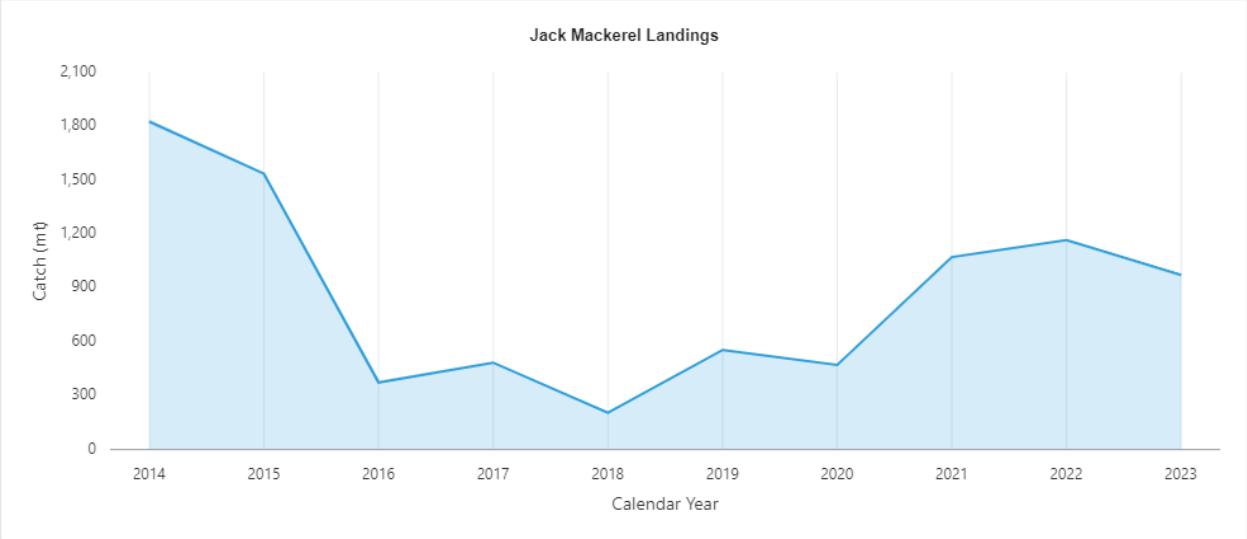

Figure 6-12. Jack mackerel landings (mt), 2014-2023

5. Northern Anchovy Central Subpopulation

Northern anchovy central subpopulation ex-vessel revenues for California totaled $575,911 in the 2023 calendar year. Northern anchovy central subpopulation landings totaled 3,123 metric tons in 2023. As a percentage of CPS totals, Northern anchovy central subpopulation landings accounted for 1.8 percent of CPS revenues and 10.3 percent of CPS landings in 2023.

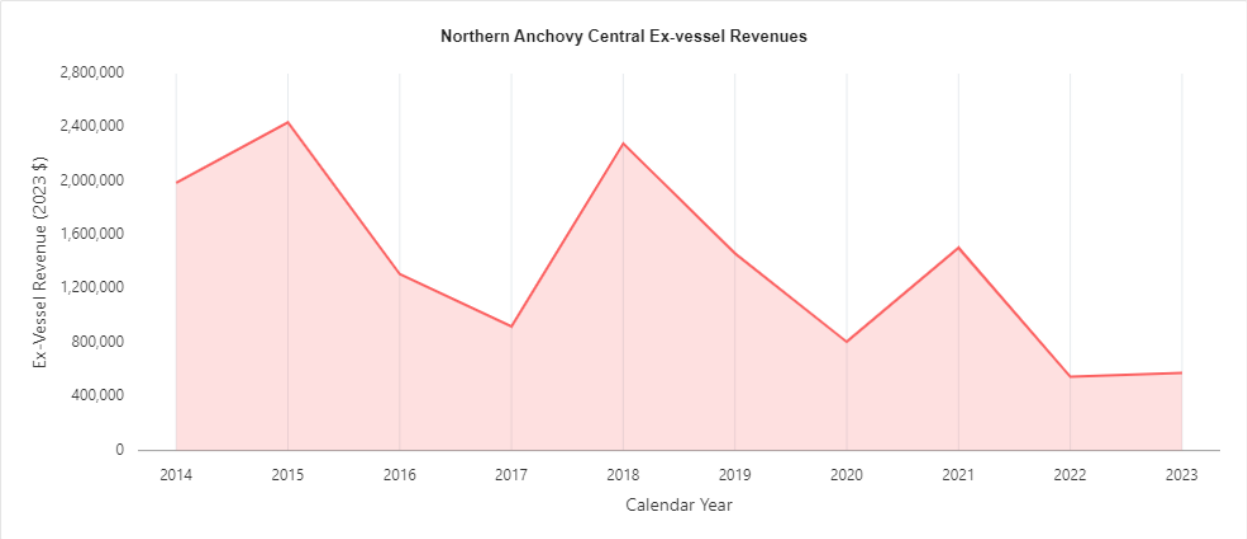

Figure 6-13. Central subpopulation of Northern Anchovy Ex-vessel Revenue ($2023), 2014-2023

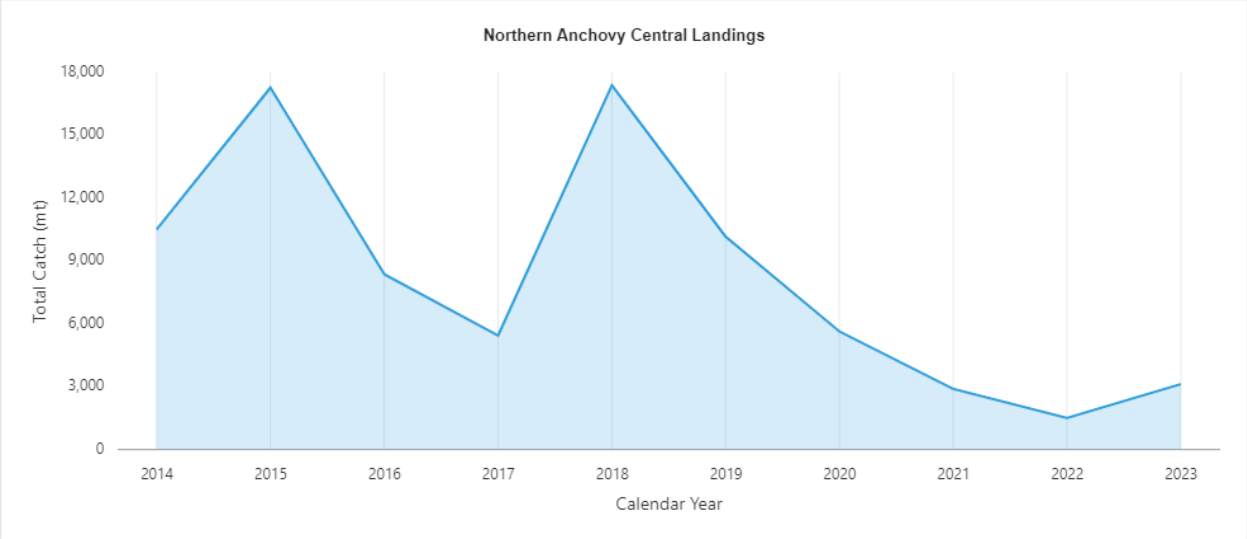

Figure 6-14. Central subpopulation of Northern Anchovy Landings (mt), 2014-2023

6. Northern Anchovy Northern Subpopulation

Northern anchovy northern subpopulation ex-vessel revenues for Oregon and Washington totaled $29,985 in the 2023 calendar year. Northern anchovy northern subpopulation landings totaled 31 metric tons in 2023. As a percentage of CPS totals, Northern anchovy northern subpopulation landings accounted for 0.1 percent of CPS revenues and 0.1 percent of CPS landings in 2023.

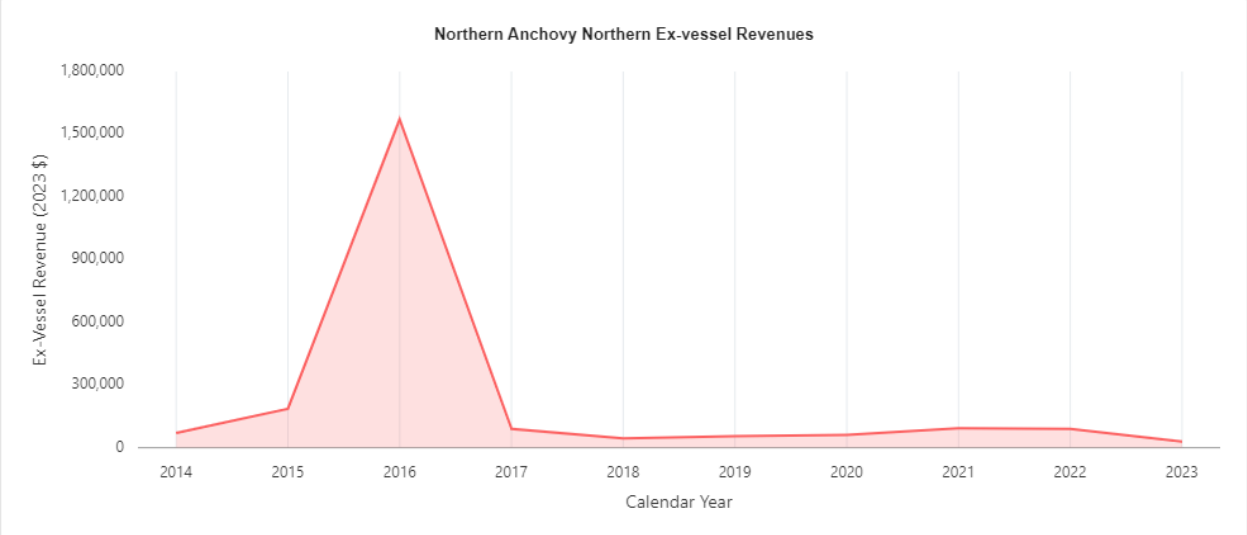

Figure 6-15. Northern subpopulation of Northern Anchovy Ex-vessel Revenue ($2023), 2014-2023

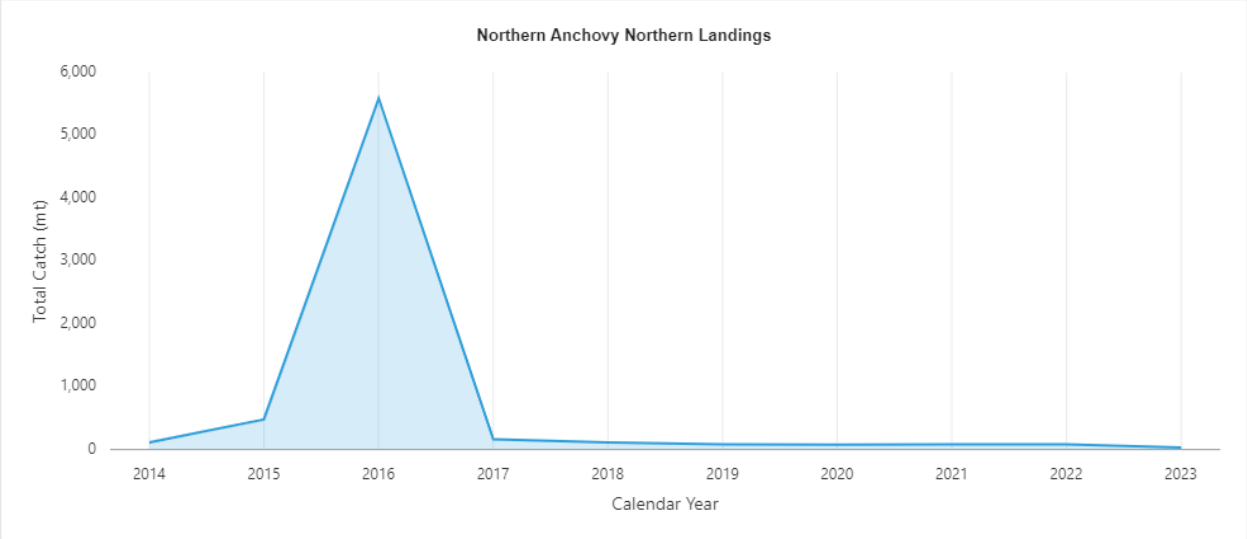

Figure 6-16. Northern subpopulation of Northern Anchovy landings (mt), 2014-2023

7. Market Squid

Market squid ex-vessel revenues for California and Oregon totaled $30.40 million in the 2023 calendar year. Market squid landings totaled 23,709 metric tons in the 2023 calendar year. As a percentage of CPS totals, market squid landings accounted for 93.2 percent of CPS revenues and 78.2 percent of CPS landings in 2023.

Market squid currently accounts for the majority of CPS landings and revenues. While the fishery has traditionally focused on fishing grounds off of southern California, it has more recently expanded into northern California and Oregon waters. There is no current directed fishery for market squid in Washington state.

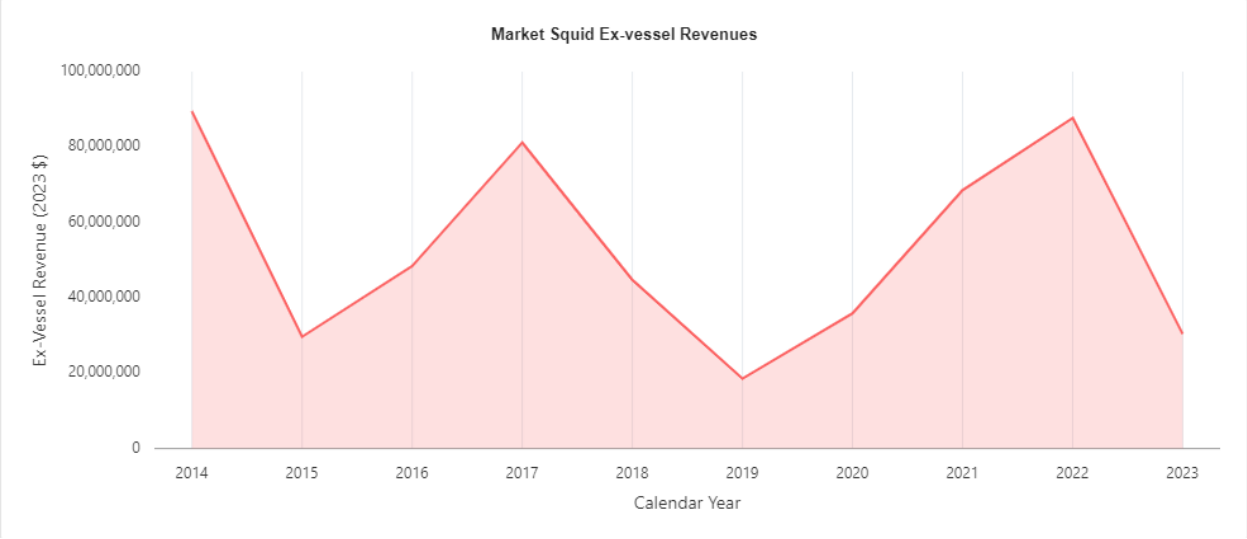

Figure 6-17. Market squid ex-vessel revenue ($2023), 2014-2023

Figure 6-18. Market squid landings (mt), 2014-2023

4. Regional Highlights

1. Overview

The CPS fishery operates throughout the West Coast of the United States. In this section the West Coast is subdivided into the following regions: southern California, northern California, Oregon, and Washington.

Figure 6-19 reports the annual West Coast CPS ex-vessel revenues (2023$) for the period 2014 to 2023. Revenues are provided for the aggregate CPS fishery, as well as by region. Figure 6-20 reports the annual West Coast total landings (MT) of CPS for the period 2014 to 2023. Landings are provided for the aggregate CPS fishery, as well as by region.

Region is defined by PACFIN_PORT_CODE and AGENCY_CODE as follows: southern California includes port codes from San Diego in the south to Morro Bay in the north, northern California includes port codes from Monterey in the south to Crescent City in the north, and Oregon and Washington are state-specific.

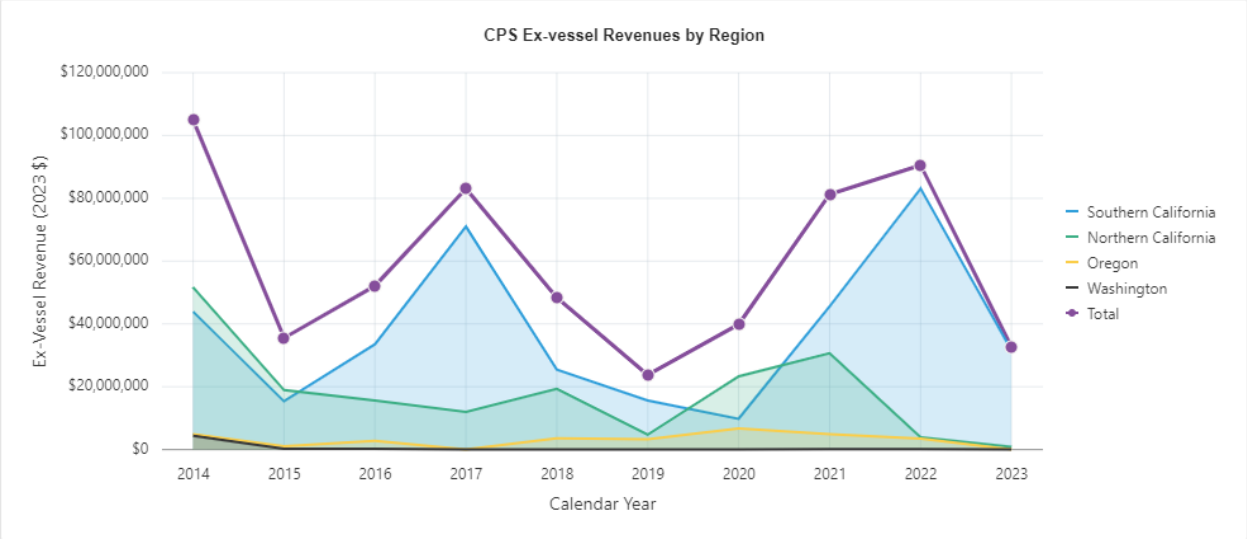

Figure 6-19. CPS Ex-Vessel Revenue ($2023) by Region, 2014-2023

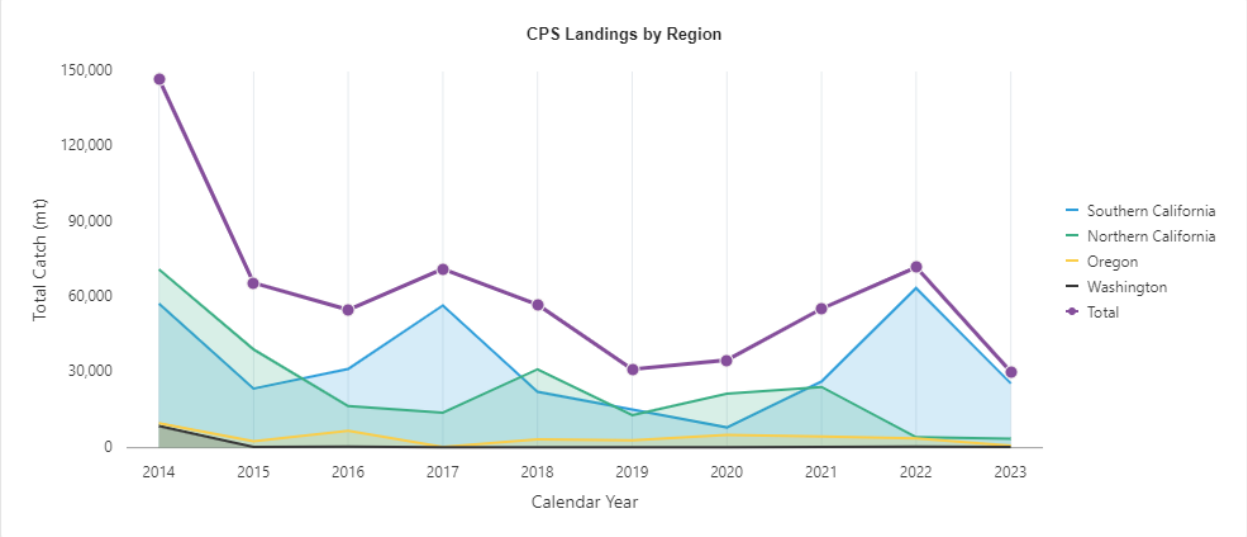

Figure 6-20. CPS Landings (mt) by Region, 2014-2023

2. Southern California

Southern California had total CPS revenues of $31.62 million and landings of 25,625 metric tons in 2023. During the 2023 fishing year, Southern California accounted for 97.0 percent of West Coast revenues and 84.6 percent of West Coast landings.

CPS target species in Southern California include Pacific sardine, northern anchovy central subpopulation, and market squid.

Southern California includes port codes from San Diego in the south to Morro Bay in the north.

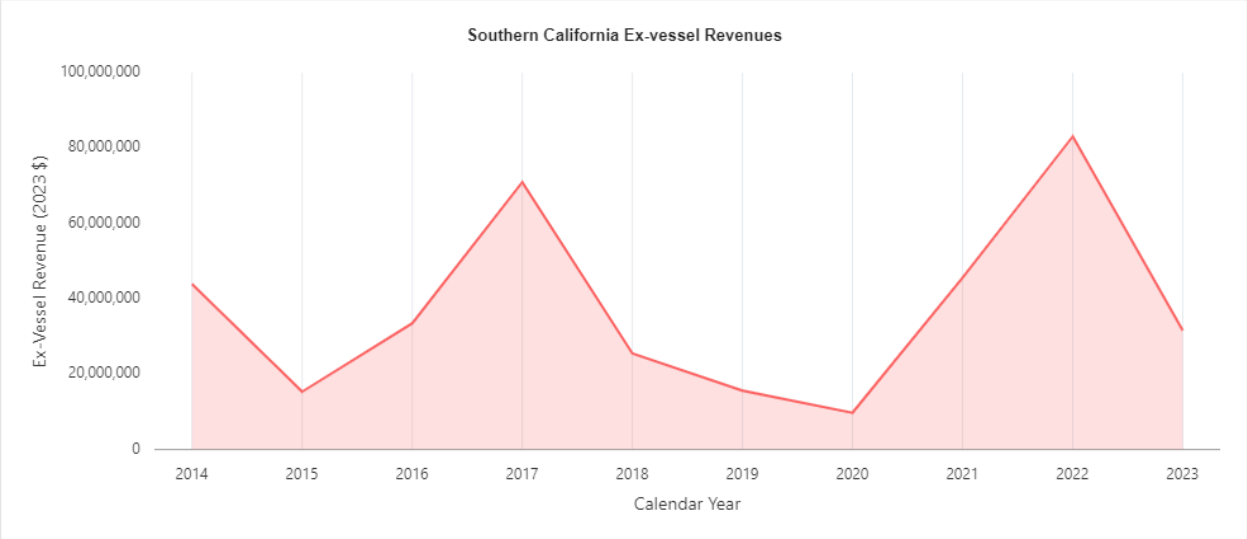

Figure 6-21. CPS Ex-Vessel Revenue ($2023) in Southern California, 2014-2023

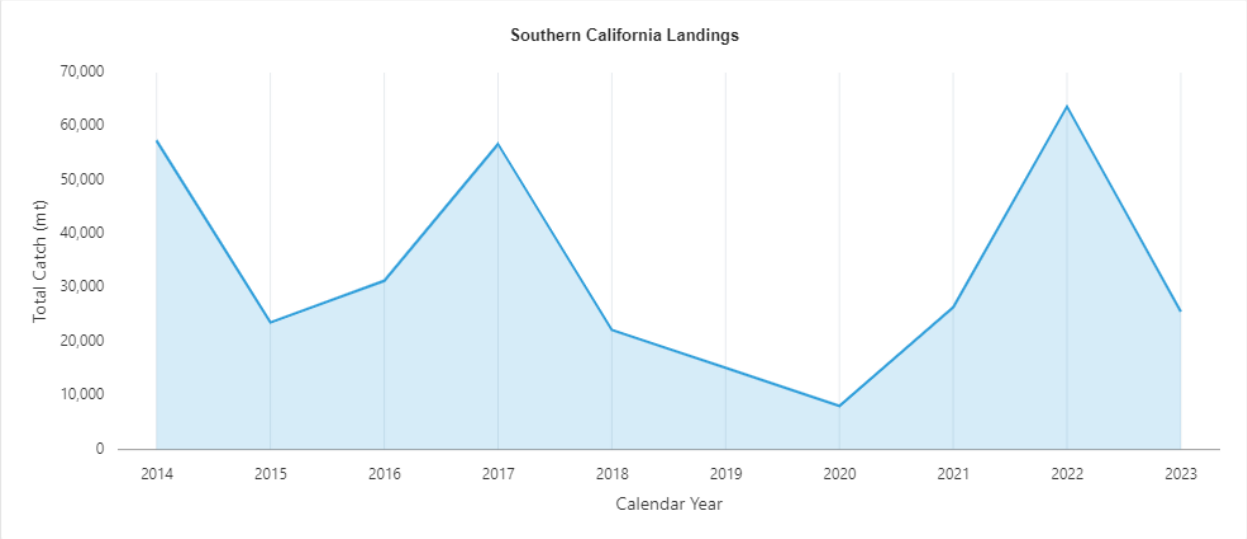

Figure 6-22. CPS landings (mt) in Southern California, 2014-2023

3. Northern California

Northern California had total CPS revenues of $895,615 and landings of 3,574 metric tons in 2023. During the 2023 fishing year, Northern California accounted for 2.7 percent of West Coast revenues and 11.8 percent of West Coast landings.

CPS target species in Northern California include Pacific sardine, northern anchovy central subpopulation, and market squid.

Northern California includes port codes from Monterey in the south to Crescent City in the north.

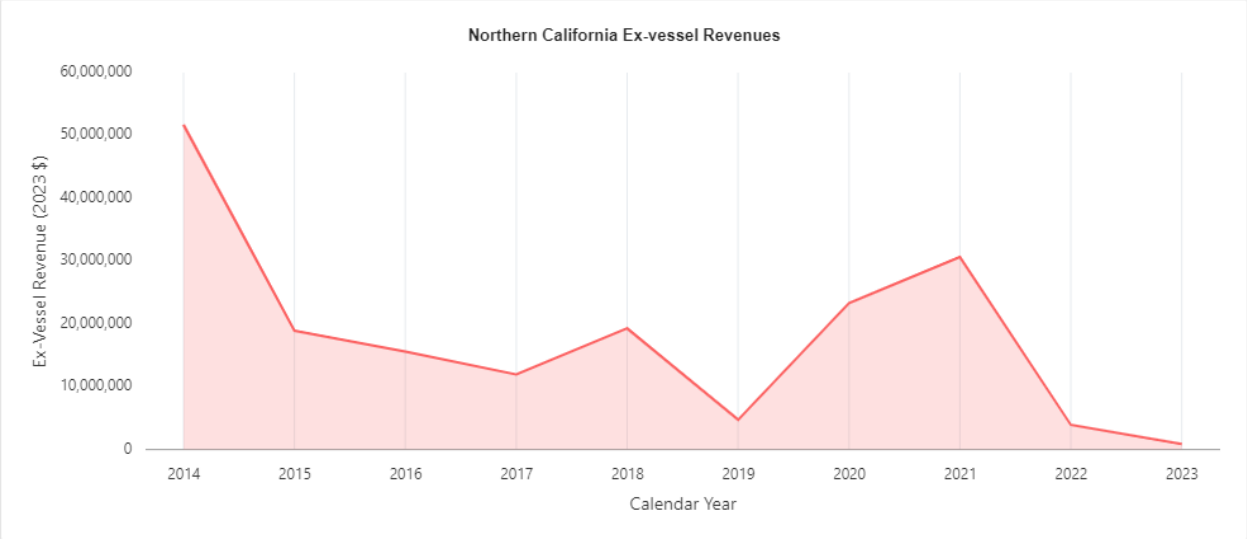

Figure 6-23. CPS Ex-Vessel Revenue ($2023) in Northern California, 2014-2023

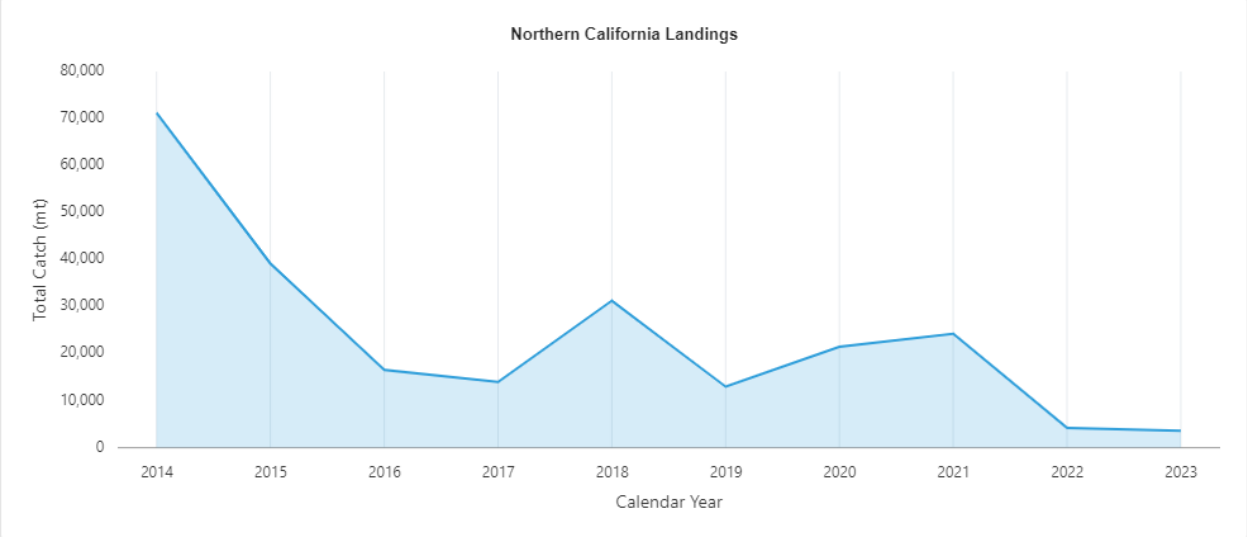

Figure 6-24. CPS Landings (mt) in Northern California, 2014-2023

4. Oregon

Oregon had total CPS revenues of $28,788 and landings of 783 metric tons in 2023. During the 2023 fishing year, Oregon accounted for 0.1 percent of West Coast revenues and 2.6 percent of West Coast landings. CPS target species in Oregon state include Pacific sardine, northern anchovy northern subpopulation, and market squid.

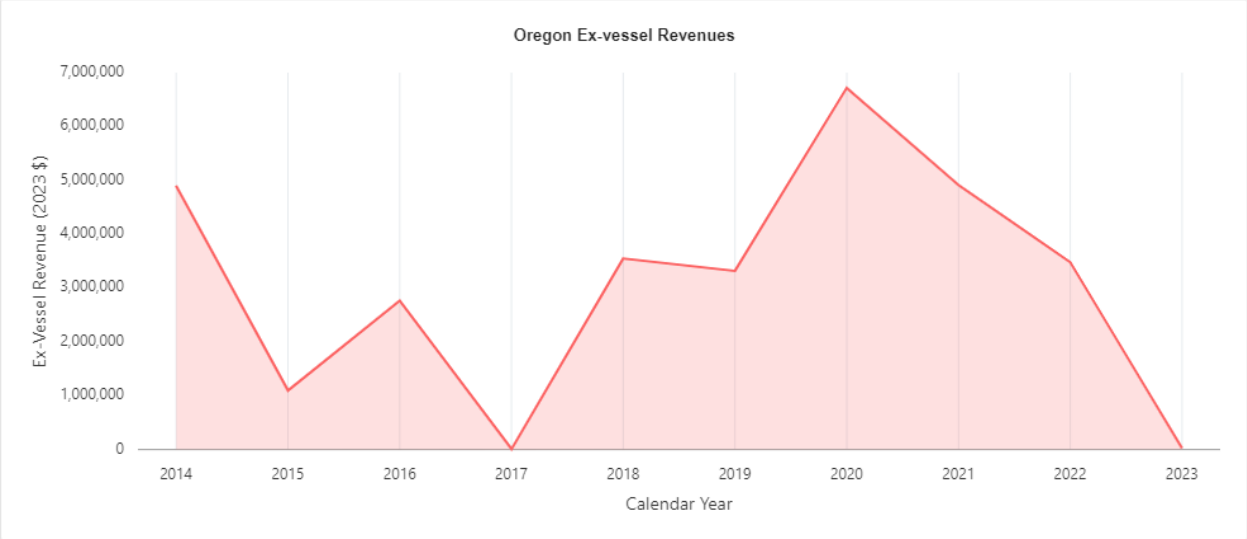

Figure 6-25. CPS Ex-Vessel Revenue ($2023) in Oregon, 2014-2023

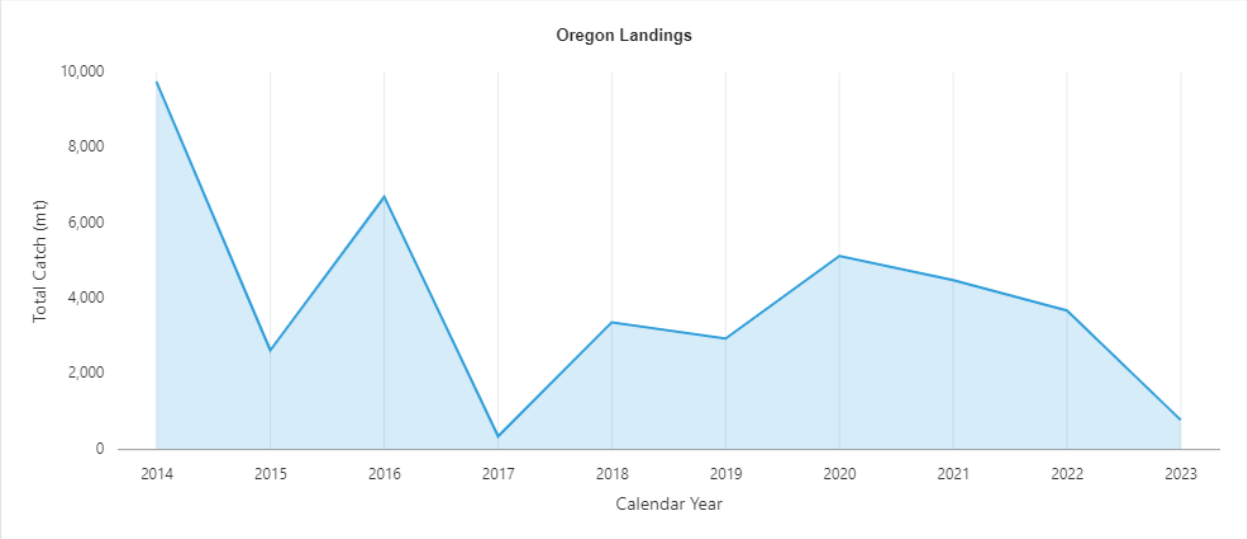

Figure 6-26. CPS Landings (mt) in Oregon, 2014-2023

5. Washington

Washington had total CPS revenues of $62,088 (2023$) and landings of 321 metric tons in 2023. During the 2023 fishing year, Washington accounted for 0.2 percent of West Coast revenues and 1.1 percent of West Coast landings.

CPS target species in Washington state include Pacific sardine and northern anchovy northern subpopulation.

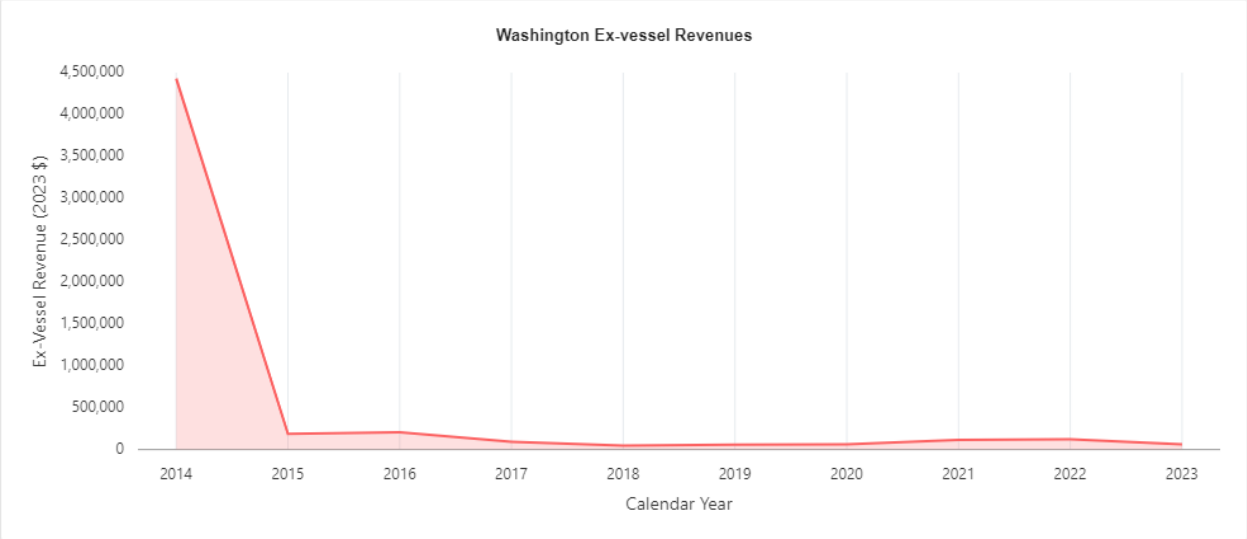

Figure 6-27. CPS Ex-Vessel Revenue ($2023) in Washington, 2014-2023

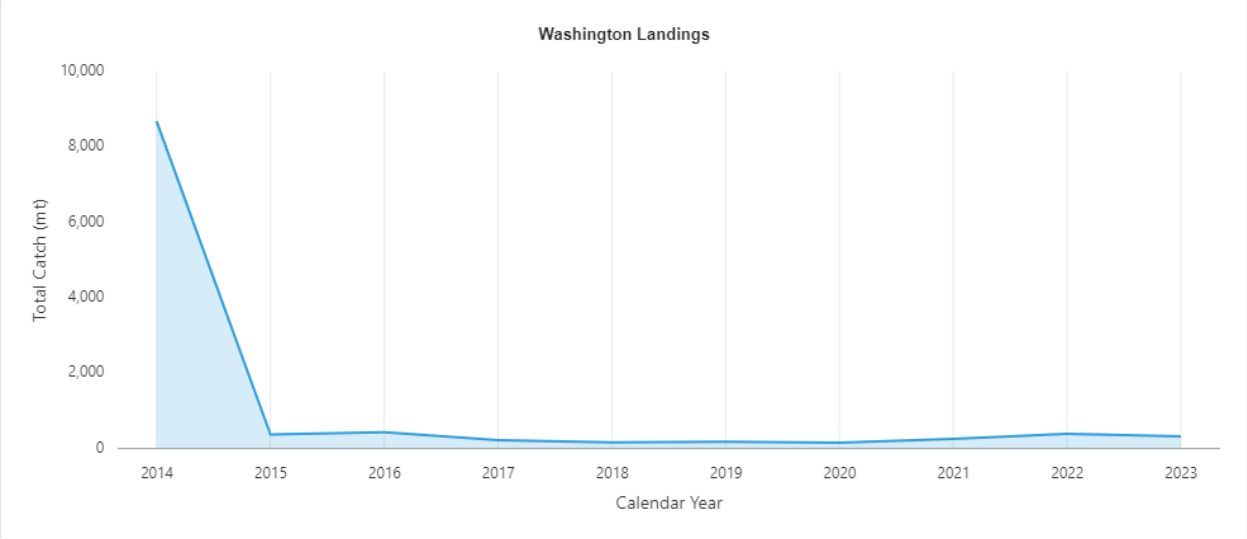

Figure 6-28. CPS Landings (mt) in Washington, 2014-2023.

5. Gear Highlights

1. Overview

The West Coast CPS fishery lands coastal pelagic species with multiple gear types. The primary gear utilized in the CPS fishery consists of purse seine gear. In this section these gear types are subdivided into lampara / round haul net / seine net, and an "other" group which includes: dip net gear, trawl gear, hook and line gear, and other or miscellaneous gear types. Note, all shoreside landings and revenues are reported, regardless of whether they originate from targeted, incidental, or other categories of landings. For example, CPS landings made by vessels using trawl gear in

federal waters are incidental catch as these vessels are targeting other species because trawl gear is not a legal gear type for targeting CPS in these waters.

Figure 6-29 reports the annual West Coast CPS ex-vessel revenues (2023$) for the period 2014 to 2023. Revenues are provided for the aggregate CPS fishery, as well as by gear category. Figure 6-30 reports the annual West Coast total landings (mt) of CPS for the period 2014 to 2023. Landings are provided for the aggregate CPS fishery, as well as by gear category.

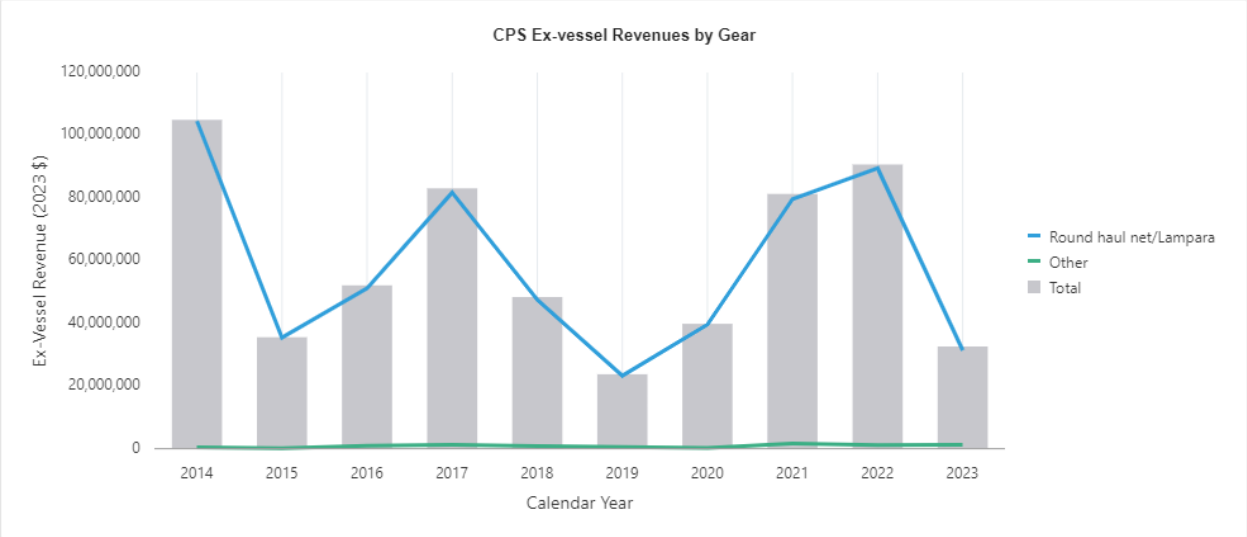

Figure 6-29. CPS Ex-Vessel Revenues ($2023) by Gear Group, 2014-2023.

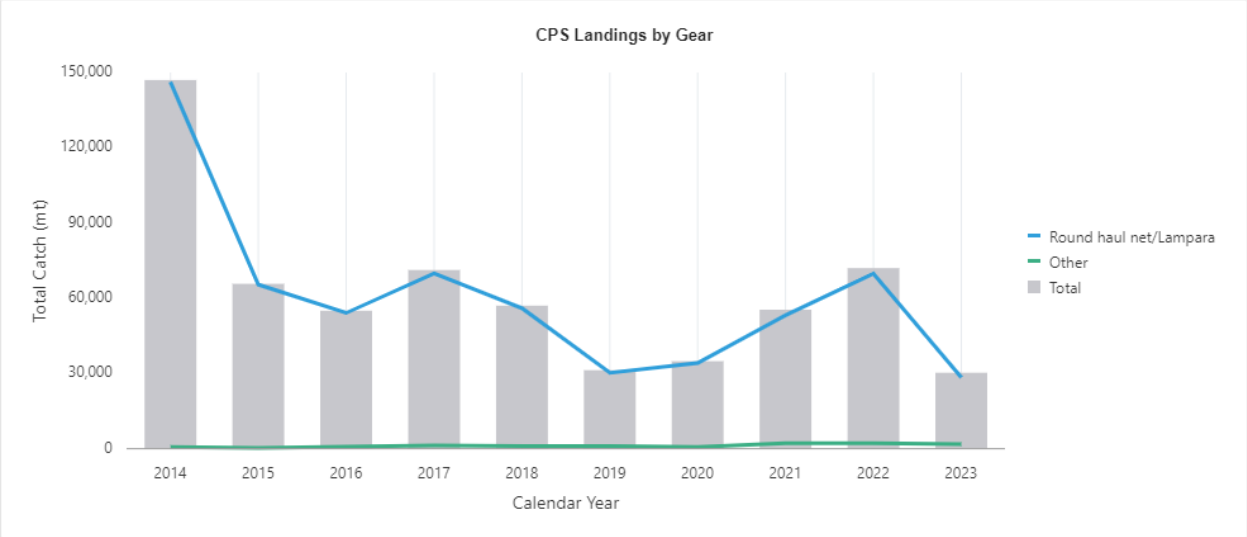

Figure 6-30. CPS Landings (mt) by Gear Group, 2014-2023.

2. Round haul net/Lampara

West Coast CPS revenues using Round haul net/Lampara in 2023 totaled $31.38 million (2023$) with 28,428 metric tons in landings. This represents 96.2 percent and 93.8 percent of West Coast CPS revenues and landings, respectively.

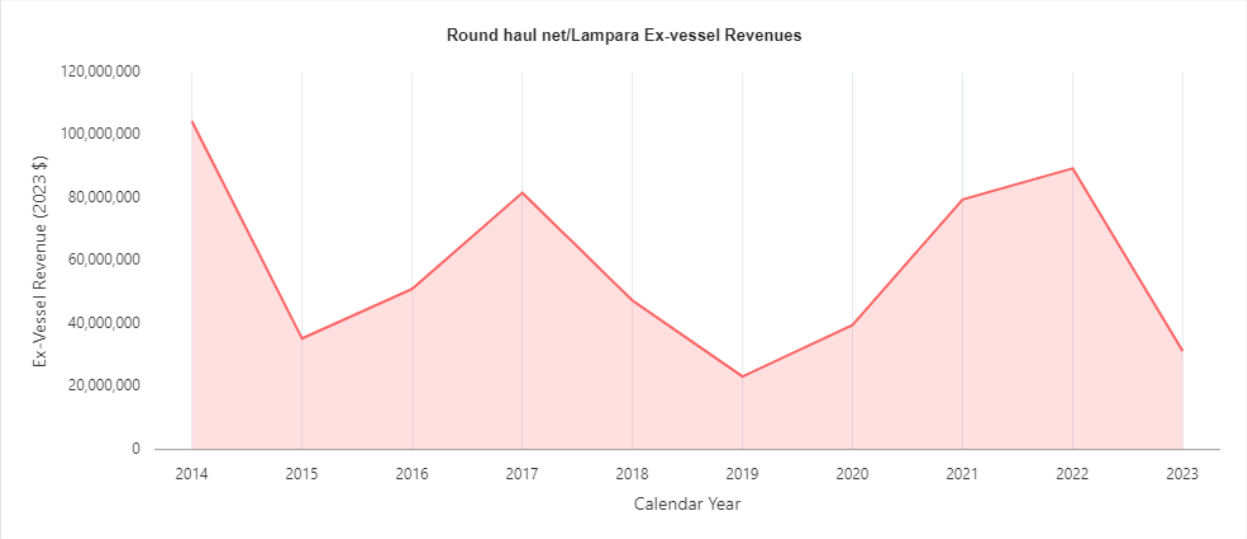

Figure 6-31. CPS Ex-Vessel Revenues ($2023) by round haul net/lampara gear, 2014-2023.

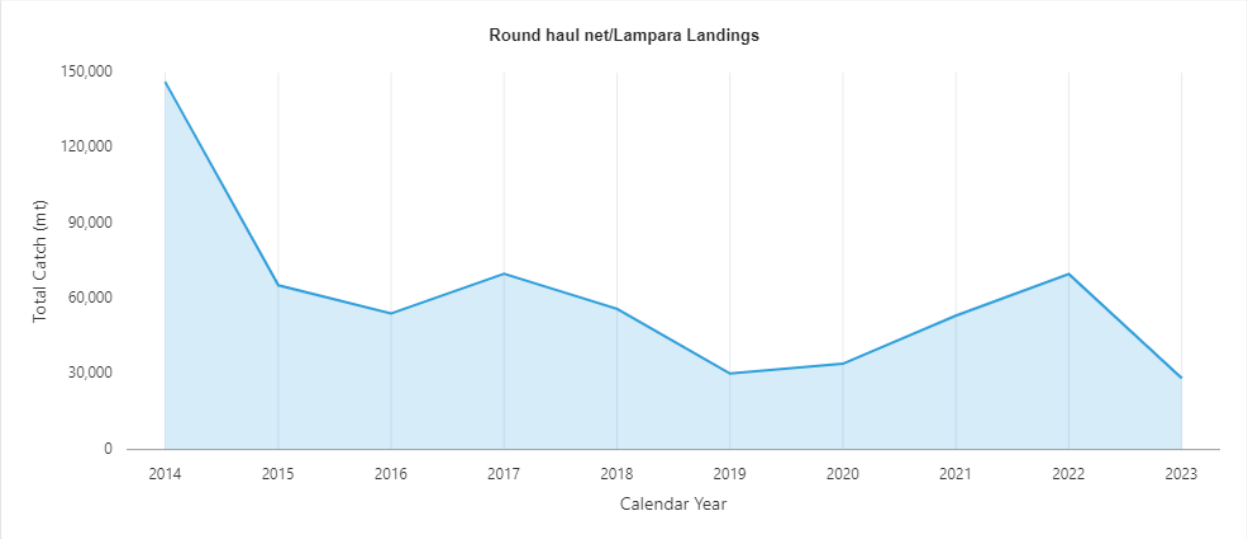

Figure 6-32. CPS Landings (mt) by round haul net/lampara gear, 2014-2023.

3. Other

West Coast CPS revenues using gear from the "Other" category in 2023 totaled $1.23 million (2023$) with 1,875 metric tons in landings. This represents 3.8 percent and 6.2 percent of West Coast CPS revenues and landings, respectively.

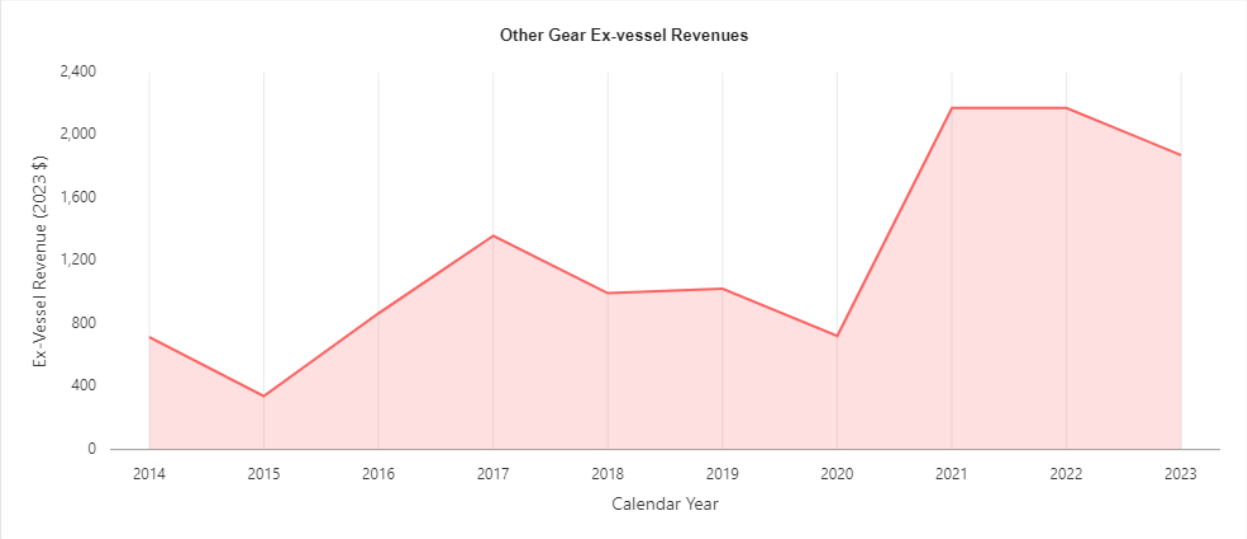

Figure 6-33. CPS Ex-Vessel Revenues ($2023) by other gear types, 2014-2023.

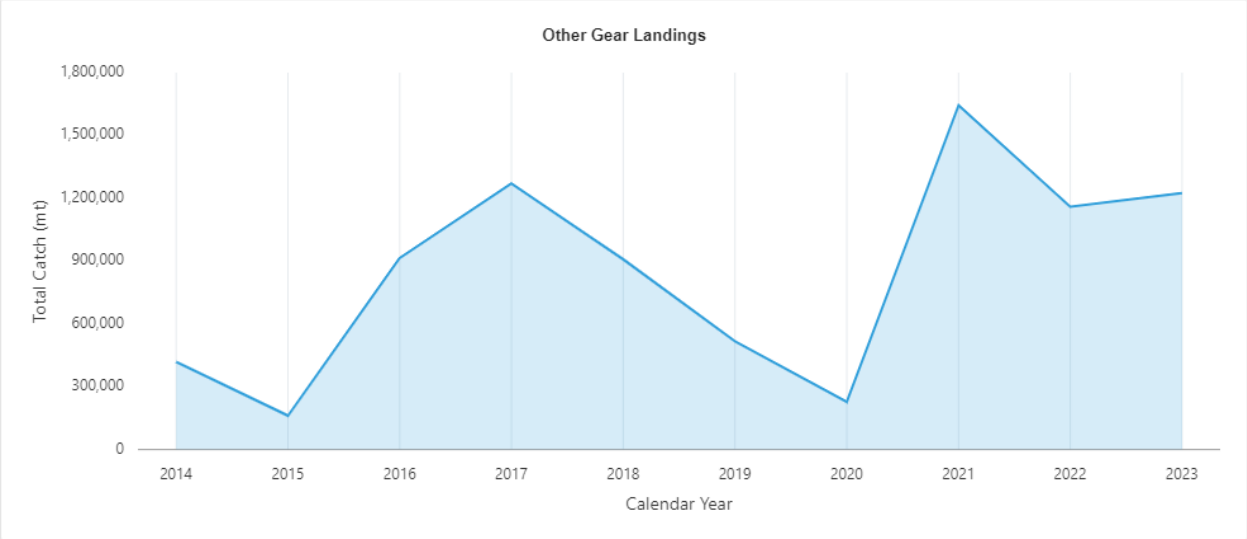

Figure 6-34. CPS Landings (mt) by other gear types, 2014-2023.

6. Participant Highlights

1. Overview

This section reports on the level and degree of participation by vessels and dealers / processors in the West Coast CPS fishery. Dealers are defined as processor companies or buyers that process or receive the delivery of fish. Principal vessels and dealers are defined as participants for which a majority of ex-vessel revenues in the case of vessels or ex-vessel revenue expenditures in the case of dealers correspond to the pertinent fishery (e.g. CPS, CPS finfish, or CPS market squid).

CPS West Coast landings of finfish and market squid were made by 178 vessels and delivered to 83 dealers in the 2023 calendar year. Of the vessels landing CPS finfish and market squid in 2023, there were 20 principal vessels receiving a majority share of their 2023 ex-vessel revenues from

finfish, 62 principal vessels receiving a majority share of their 2023 ex-vessel revenues from CPS finfish, and 96 vessels receiving a positive 2023 ex-vessel revenues from additional CPS. Vessels with non-revenue generating CPS landings are not reported on in this section.

The distribution over the vessel fleet of the annual revenue share attributed to CPS landings for the five-year period of 2019 to 2023 is presented. Roughly 39 percent of the vessel-years (year of the completion of construction of a vessel) observed made 90 percent or more of their annual revenues from CPS landings, while roughly 47 percent of the vessel-years observed made less than 10 percent of their annual revenues from CPS landings. The remaining roughly 14 percent of the vessel-years had over 10 percent or more and under 90 percent of their annual revenues from CPS landings.

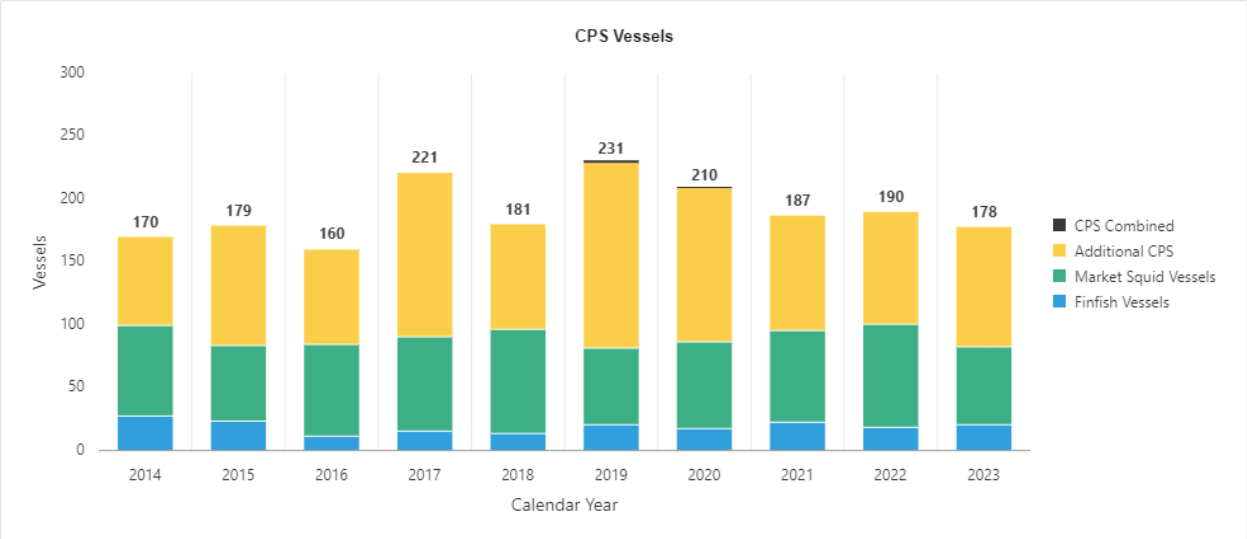

Figure 6-35. Number of CPS vessels by majority revenue share category, 2014-2023.

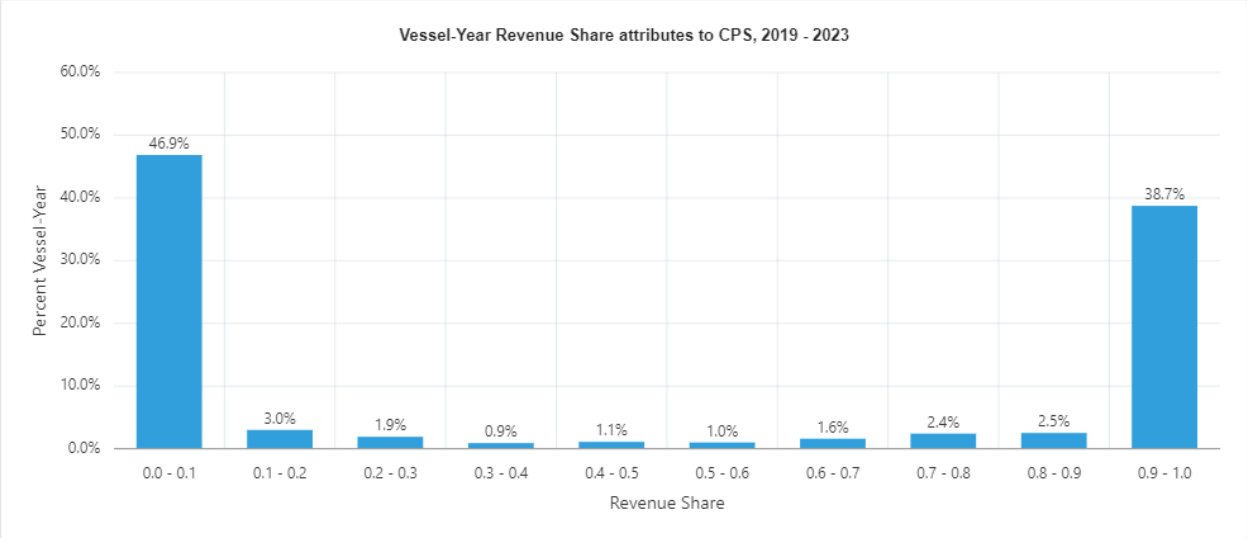

Figure 6-36. Vessel-Year revenue share attributed to CPS landings, 2019-2023.

2. Finfish Vessels

CPS West Coast landings of finfish were made by a total of 151 vessels in 2023. CPS finfish revenues accounted for the majority of annual vessel revenues for 20 vessels in 2023; another 131 vessels earned positive revenues from landings of CPS finfish that accounted for less than 50 percent of their annual revenues.

The distribution over the vessel fleet of the annual revenue share attributed to CPS finfish landings for the five-year period of 2019 to 2023 is presented. Roughly 9 percent of the vessel-years observed made 90 percent or more of their annual revenues from CPS finfish landings, while roughly 78 percent of the vessel-years observed made less than 10 percent of their annual revenues from CPS finfish landings. The remaining roughly 13 percent of the vessel-years had over 10 percent or more and under 90 percent of their annual revenues from CPS finfish landings.

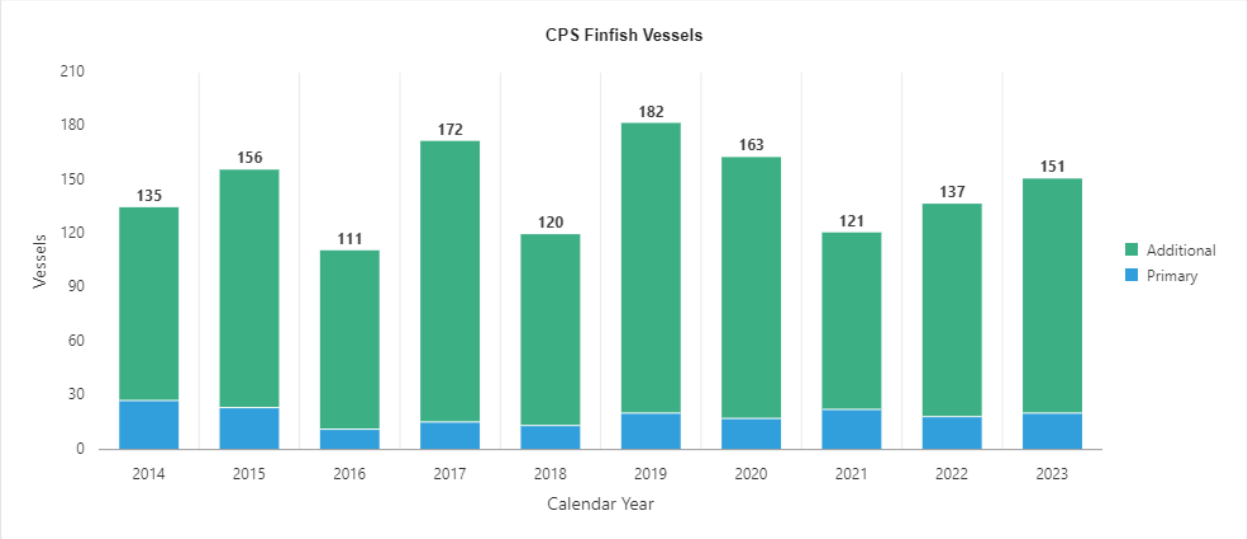

Figure 6-37. Number of CPS finish vessels by majority revenue share category, 2014-2023.

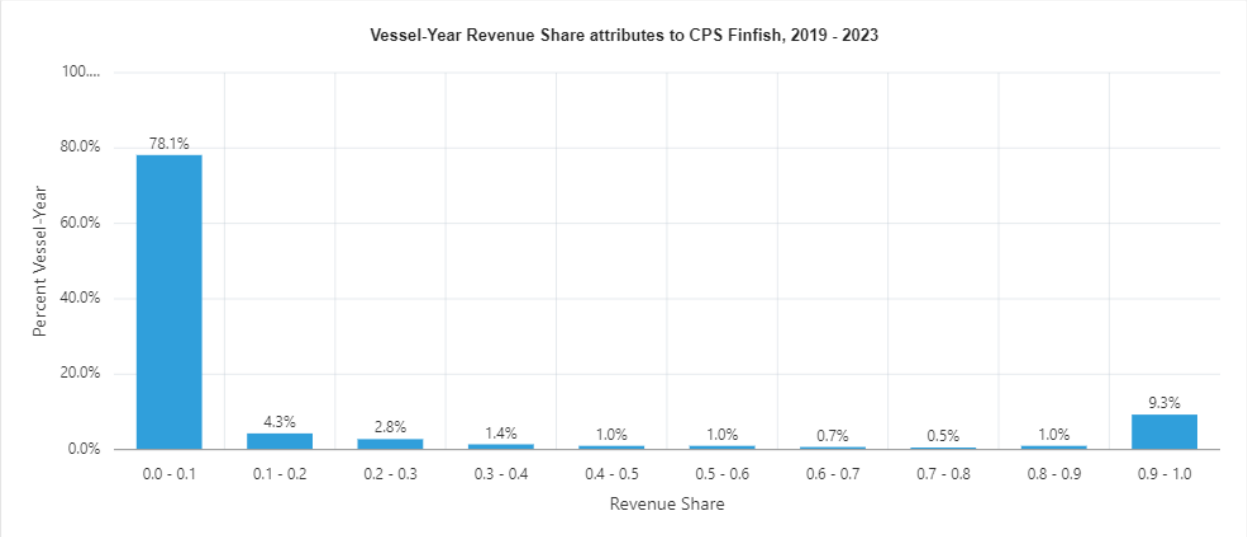

Figure 6-38. Number of CPS finfish vessel-year revenue share attributed to CPS finfish, 2019-2023.

3. Market Squid Vessels

CPS West Coast landings of market squid were made by 75 vessels in 2023. CPS market squid revenues accounted for the majority of annual vessel revenues for 62 vessels in 2023; another 13 vessels earned positive revenues from landings of CPS market squid that accounted for less than 50 percent of their annual revenues.

The distribution over the vessel fleet of the annual revenue share attributed to CPS market squid landings for the five-year period of 2019 to 2023 is presented. Roughly 59 percent of the vessel-years observed made 90 percent or more of their annual revenues from CPS market squid landings, while roughly 13 percent of the vessel-years observed made less than 10 percent of their annual revenues from CPS market squid landings. The remaining roughly 28 percent of the vessel-years had over 10 percent or more and less than 90 percent of their annual revenues from CPS market squid landings.

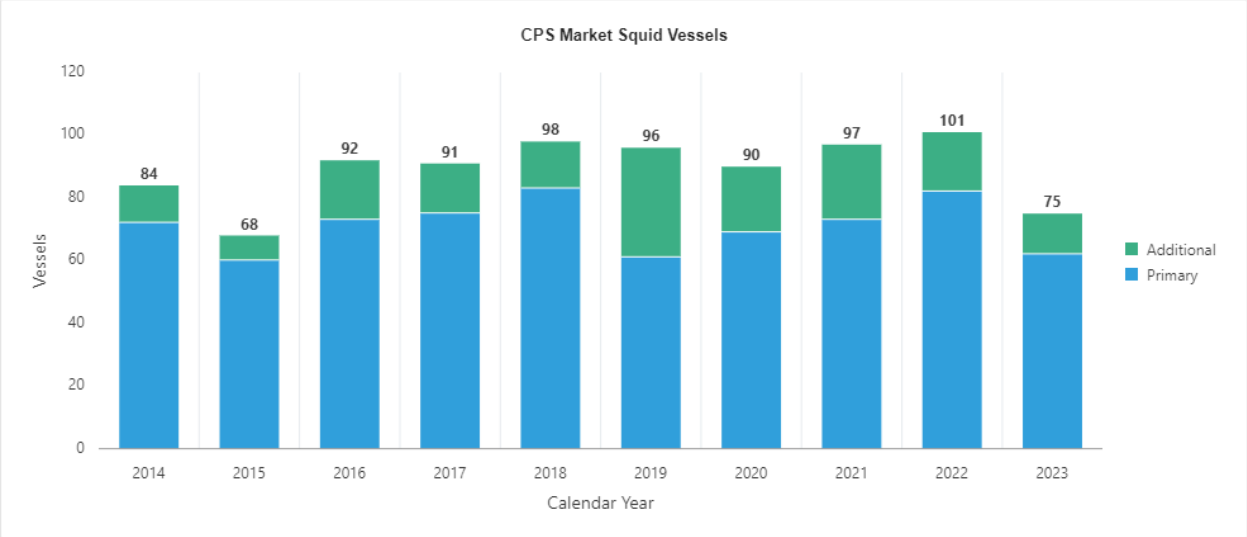

Figure 6-39. Number of CPS market squid vessels by majority revenue share category, 2014-2023.

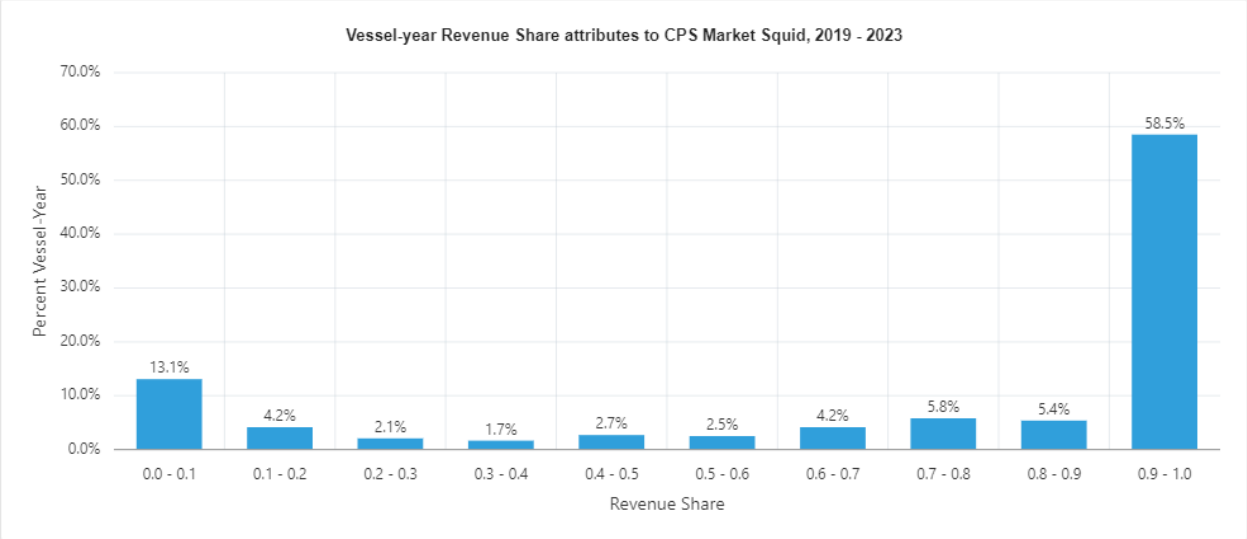

Figure 6-40. Number of CPS market squid vessel-year revenue share attributed to CPS finfish, 2019-2023.

4. CPS Dealers

CPS West Coast purchases of CPS finfish and market squid were made by 84 dealers in 2023. CPS revenues accounted for the majority of annual landings purchases for 39 dealers in 2023; another 45 dealers made purchases CPS finfish that accounted for less than 50 percent of their annual landings expenditure.

The distribution over dealers of the annual landings expenditures share attributed to CPS landings for the five-year period of 2019 to 2023 is presented. Roughly 29 percent of the dealer-years observed made 90 percent or more of their annual landings expenditures from CPS landings, while roughly 59 percent of the dealer-years observed made less than 10 percent of their annual landings expenditures from CPS landings. The remaining roughly 12 percent of the dealer-years had over 10 percent and under 90 percent of their annual landings expenditures from CPS landings.

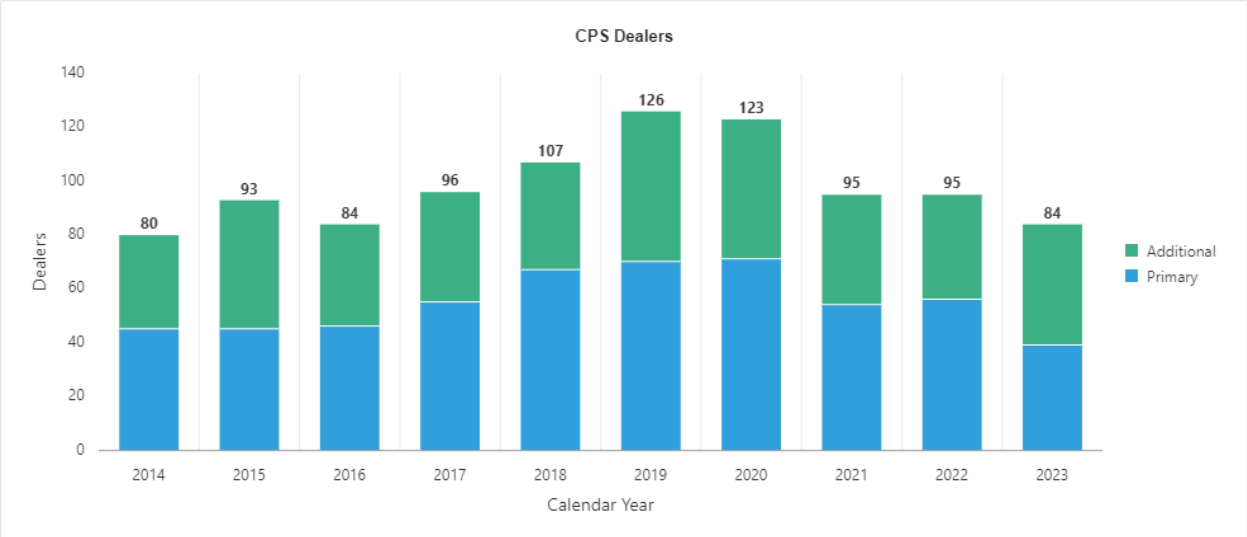

Figure 6-41. Number of CPS dealers by majority revenue share category, 2014-2023.

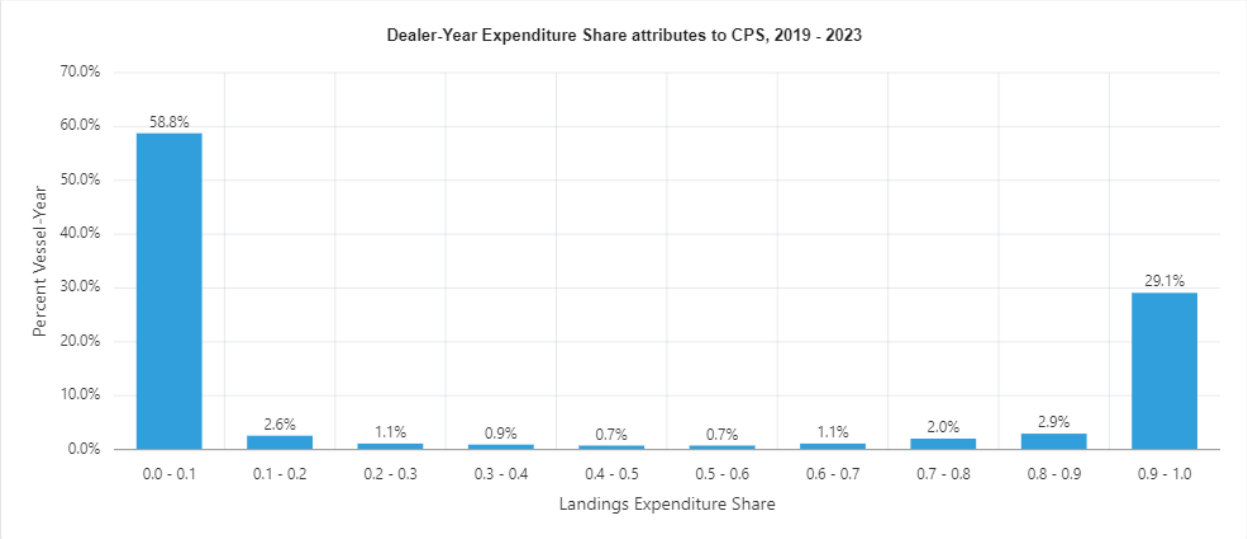

Figure 6-42. Number of CPS dealer-year revenue share attributed to CPS, 2019-2023.

7. ECOSYSTEM CONSIDERATIONS

1. Introduction

There is a growing national interest in augmenting existing single-species fisheries management approaches with ecosystem-based fishery management principles that could place fishery management decisions and actions in the context of a broader scope. National Oceanic and Atmospheric Administration (NOAA)/NMFS Science Centers around the country are working to improve the science behind ecosystem-based fishery management including status monitoring and reporting on ecosystem health (Levin et al. 2009). A yearly update on the state of the California Current Ecosystem has been provided to the Council every spring by NOAA since first outlined in the 2013 Fishery Ecosystem Plan (Section 1.4). Some of this ecosystem information is also presented here. Additional information has been contributed by J. Field and K. Sakuma (SWFSC) and the Peterson Zooplankton Lab (NWFSC).

This section provides a summary of ecosystem trends and indicators being tracked by NOAA and other scientists that are related to CPS. Additionally, Appendix A of Amendment 8 to the CPS FMP (available on the Council's website) provides a review of the life cycles, distributions, and population dynamics of CPS and discusses their roles as forage. Appendix D provides a description of CPS essential fish habitat (EFH) that is closely related to ecosystem health and fluctuation. The council completed a review of the CPS EFH in 2023, which at the time of publication, had not yet been transmitted to NMFS (See Section 10). Research efforts into ecosystem functions and trophic interactions will improve our knowledge base and CPS management decisions.

2. Description of the California Current Large Marine Ecosystem (CCLME)

The California Current (CC) (Figure 7-1) is formed by the bifurcation of the North Pacific Current. At approximately Vancouver Island, Canada, the southern branch of the North Pacific Current

becomes the California Current, and flows southward along the West Coast to mid-Baja, Mexico. The California Current flows southward year-round offshore from the shelf break to ~200 miles. Coastal currents over the continental shelf flow southward during the summer upwelling season, but northward during the winter downwelling season. The California Undercurrent flows northward year-round, at depths of ~ 200-400 m over the continental slope.

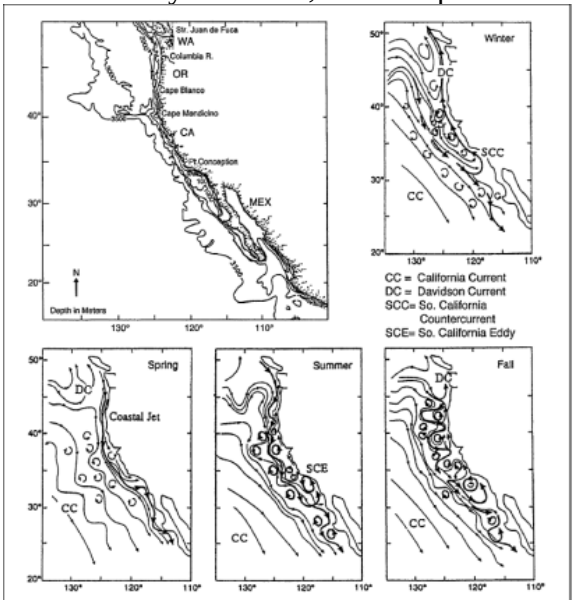

Figure 7-1. Seasonal variation of large-scale currents along the West Coast with bathymetry illustrating the dynamic conditions in the CCLME. The California Current (CC) flows southward year round offshore from the shelf break to several hundred kilometers. Along the shelf break, several other currents are found, including the Davidson Current (DC), Southern California Countercurrent (SCC), and the Southern California Eddy (SCE). Seasonal panels from Strub and James 2000.

The California Current also defines the outer boundary of the California Current Large Marine Ecosystem (CCLME) that is delineated by bathymetry, productivity, and trophic interactions. The LME is an organizational unit to facilitate management of an entire ecosystem and recognizes the complex dynamics between the biological and physical components. NOAA's ecosystem-based management approach uses the LME concept to define ecosystem boundaries.

The CCLME is characterized as often having very high biological productivity (>250 mg C/m^2/day) that is stimulated by the addition of nutrients that are either upwelled along the coast, the shelf break or advected in surface currents from the Gulf of Alaska into the northern region or beginning of the California Current (Ware and Thomson 2005, Hickey and Banas 2008). The biological productivity is reflected in the extensive nearshore kelp beds, large schools of CPS (e.g., sardine, anchovy, squid, etc.) and groundfish (Pacific hake) that, in turn, support large populations of marine mammals, sea birds, and highly migratory species (e.g., tuna, sharks, billfish).

The CCLME is heavily influenced by climate at intraannual and interannual time scales. Each year, the coastal winds and currents shift from poleward in the winter to equatorward in the summer. These equatorward winds force the surface waters offshore which are replaced by the upwelling of cool, nutrient-rich water from depth. This upwelling of nutrient-rich water, concurrent with increased solar radiation in the spring, leads to a dramatic increase in productivity. This transition from winter downwelling to summer upwelling is called the Spring Transition. The timing of the Spring Transition and the difference from the long-term mean are determined by the NMFS' Newport, OR laboratory for 45° N 125°. The physical spring transition is based on the

cumulative upwelling index and is identified as the spring minima value. The spring transition falls on April 13 (Day 103) on average but can occur from early March to early June. Anomalies (Figure 7-2).

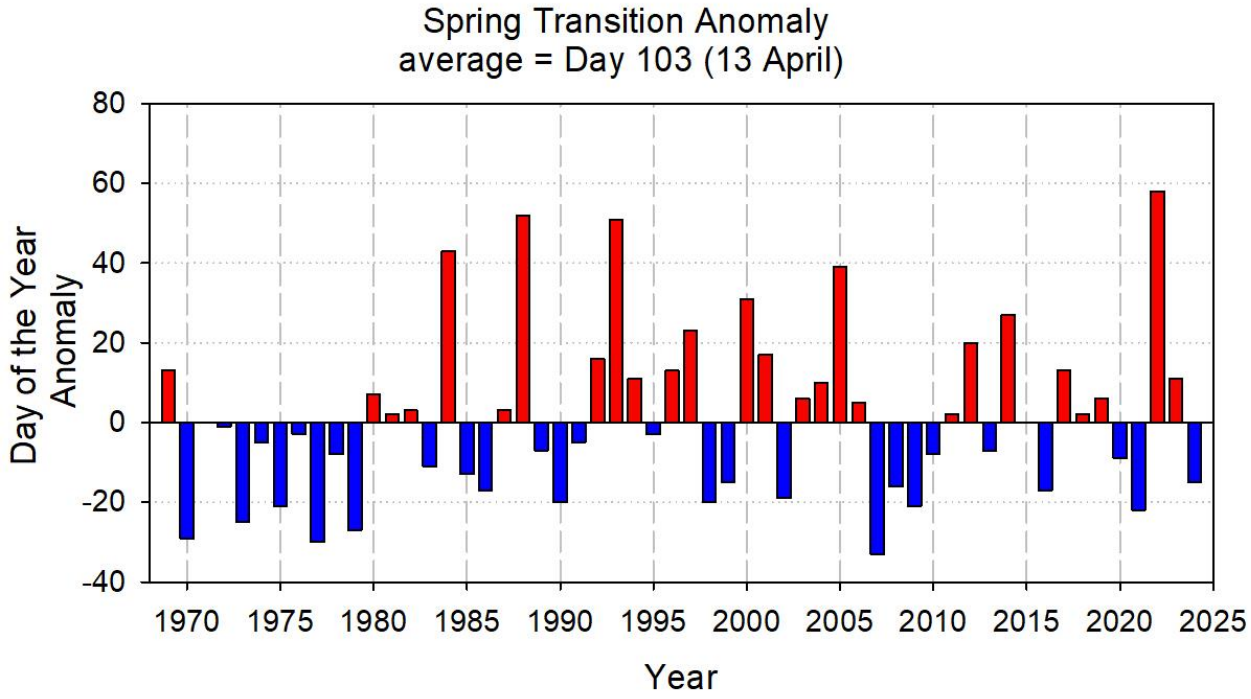

Figure 7-2. Anomaly of the date of the spring transition off Oregon. Peterson Zooplankton Lab, NOAA, NMFS, NWFSC.

The connection between the Spring Transition and CPS is presently not known but it is suspected to affect recruitment of Pacific herring, smelt, northern anchovy and other CPS.

On interannual time scales, the CCLME and the entire Pacific Ocean are affected by basin scale processes such as El Niño/La Niña (Figure 7-3) and those causing phase changes of the PDO (Figure 7-4).

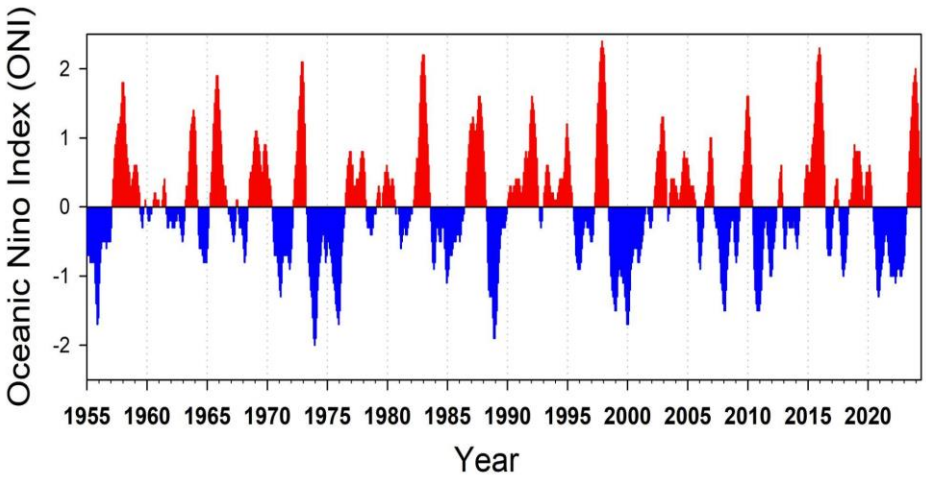

Figure 7-3. Oceanic Niño Index anomalies. Red indicates warm or El Niño conditions and blue cool La Niña conditions.

During El Niño events, the pycnocline deepens and warm fresh surface waters inhabit the shelf, increasing water column stratification which in turn reduces primary productivity (Fisher et al. 2015). During La Niña conditions the productivity of the California Current is usually enhanced by the addition of cool, nutrient-rich waters from the north, and increased effective upwelling. These El Niño Southern Oscillation events affect the abundance and distribution of several CPS stocks.

Changes in the strength of the Aleutian low-pressure system in winter drives the PDO (Mantua et al. 1997; Figure 7-4). During the negative phase of the PDO, the intensity of the Aleutian Low decreases and the North Pacific High increases, leading to increased southward wind stress and increased equatorward flow in the California Current (Bi et al. 2011, Keister et al. 2011). Conversely, when the PDO is positive, the strength of the Aleutian Low increases, resulting in increased poleward and onshore flow. The PDO was mostly negative (warm in the central North Pacific Ocean and cool near the west coast of the Americas) from 1946-1976 and mostly positive from 1977-1998. Since 1998, the PDO has fluctuated between positive and negative phases every five to six years.

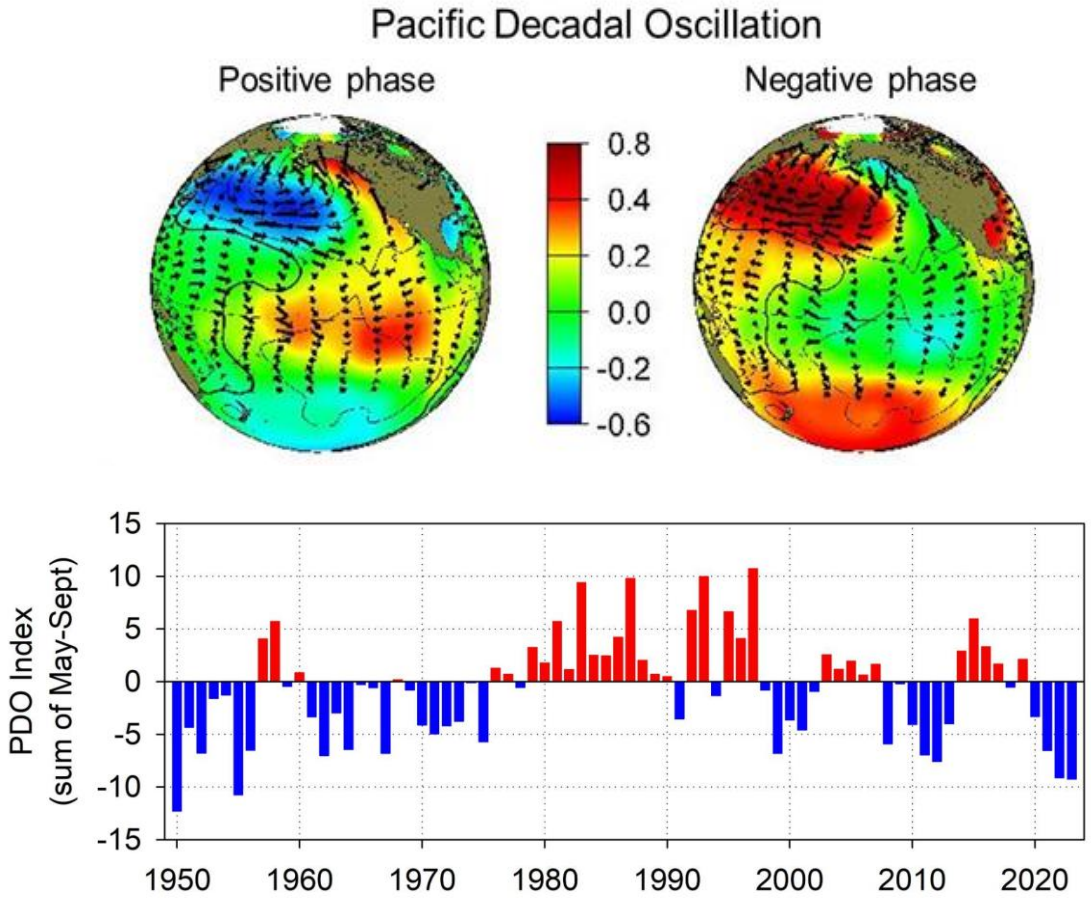

Figure 7-4. Time series of shifts in sign of the Pacific Decadal Oscillation Index (PDO) 1925 through 2023. Values are averaged over the months of May through September. Red bars indicate positive (warm) years; blue bars negative (cool) years. http://www.nwfsc.noaa.gov/research/divisions/fed/oeip/ca-pdo.cfm

The effects of the PDO on fisheries are mixed. In general, the warm phase of the PDO is associated with warm ocean temperatures off the West Coast and reduced landings of coho and Chinook salmon, while the cool phase is associated with higher salmon landings (Mantua et. 1997). For sardine, positive PDO indices seem to correlate with high landings along the CCLME, while anchovy landings have been generally reduced under positive PDO (Figure 7-5) (Takasura et al. 2008). Work by Zwolinski and Demer (2013) indicated that sardine recruitment is strongly linked to adult condition and the PDO prior to spawning. Others have found that environmental conditions during spawning, such as sea surface temperatures (Lindegren and Checkley 2013) and wind stress curl-driven upwelling (Rykaczewski and Checkley 2008) are important for larval sardine survival and recruitment. Until a good understanding of the oceanographic/ecological mechanisms that affect the productivity of sardine and anchovy stocks is achieved, this correlation, which is essentially based on one cycle of the PDO, must be viewed with caution. Zwolinski and Demer (2012) highlighted the similarity between recent oceanographic conditions and past conditions (1930's) when the CCLME sardine population crashed after a change in the PDO. However, MacCall et al. (2012) noted that management/harvest rates were much different in the 1930s. In 2019 Zwolinski and Demer reported that the correlation between the PDO and Pacific sardine had weakened. It is also worth noting that both the physical and the ecological meanings

of climate indices that have been utilized for the North Pacific may be changing, and correlations found in the past may be breaking down as the relationships are non-stationary (Litzow et al. 2020).

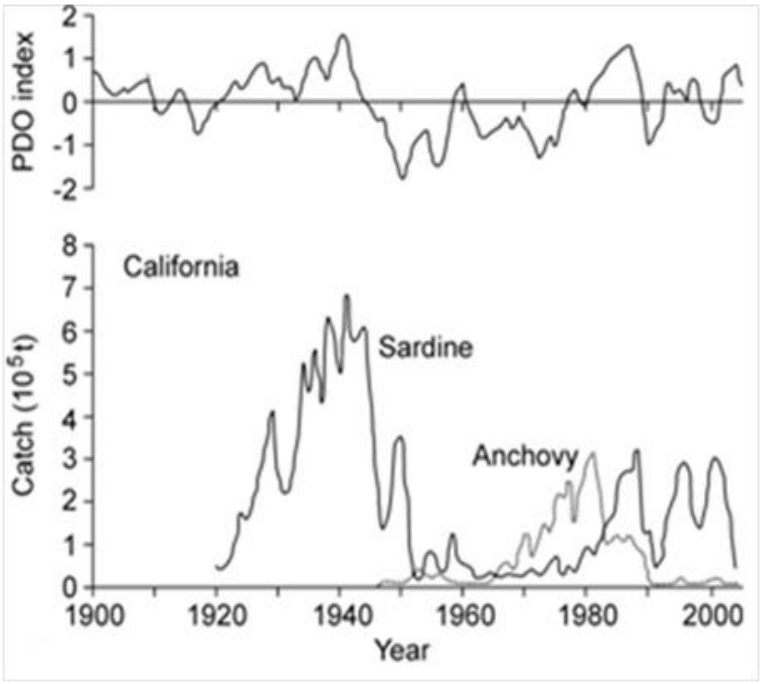

Figure 7-5. The relationships between Pacific sardine and northern anchovy landings in California and the PDO. From Takasura et al. 2008.

Like all marine ecosystems, the CCLME is very complex, and despite over 70 years of research from the CalCOFI surveys, understanding and predicting recruitment success for any fishery including CPS remains elusive. However a recent paper by Koenigstein et al (2022) using model projections offers a more mechanistic explanation of population fluctuations with food availability tied to low-upwelling favorable winds and El Nino events. They tie these to both production of eggs and starvation of larvae and juveniles. In light of the complexity, ecological indicators are used as surrogates of ecosystem health and status of fisheries. Preliminary physical indicators and sentinel species are being used to provide information as part of an ongoing Integrated Ecosystem Assessment of the CCLME and to forecast salmon returns in the northern California Current.

Finally, climate change is a significant threat to the CCLME. While ocean temperatures had been relatively cool from 2007 to 2013, reduced ocean mixing from winter storms led to anomalously warm conditions in the NE Pacific beginning in the fall of 2013 (Bond et al. 2015). These warm ocean conditions, termed "the Blob", combined with a strong El Niño that developed at the equator in 2015 and led to unprecedented and persistent warming from 2013 – 2016 greatly altering the pelagic ecosystem of the California Current (Auth et al. 2017, Peterson et al. 2017). A number of marine heatwaves of different spatial extent and duration have occurred since then. More information can be found at https://www.integratedecosystemassessment.noaa.gov/regions/california-current/california-current-marine-heatwave-tracker-blobtracker. Furthermore, ocean acidification appears to already be having an effect on certain plankton and perhaps forage fish feeding and recruitment in the CCLME. For example, Bednarsek et al. (2014) revealed that ocean acidification in some areas of

the CCLME has been great enough to dissolve the shells of the pelagic snail (*Limacina helicina*), an important prey for forage fish and pink salmon in some years.

3. Current Climate and Oceanographic Conditions

1. Spring Transition off Oregon and El Niño/Southern Oscillation

In 2024, the spring transition off Oregon occurred slightly earlier than the long-term average (Figure 7-2) The Oceanic Niño Index (ONI) had been negative since the Fall of 2020, but transitioned to an El Niño in early 2024 (Figure 7-3).

2. Pacific Decadal Oscillation

The PDO remained negative into 2024 (Figure 7-6). Conditions have been more favorable for anchovy and juvenile salmon than Pacific sardine (Chavez et al. 2003, Peterson et al. 2014, Auth et al. 2017).

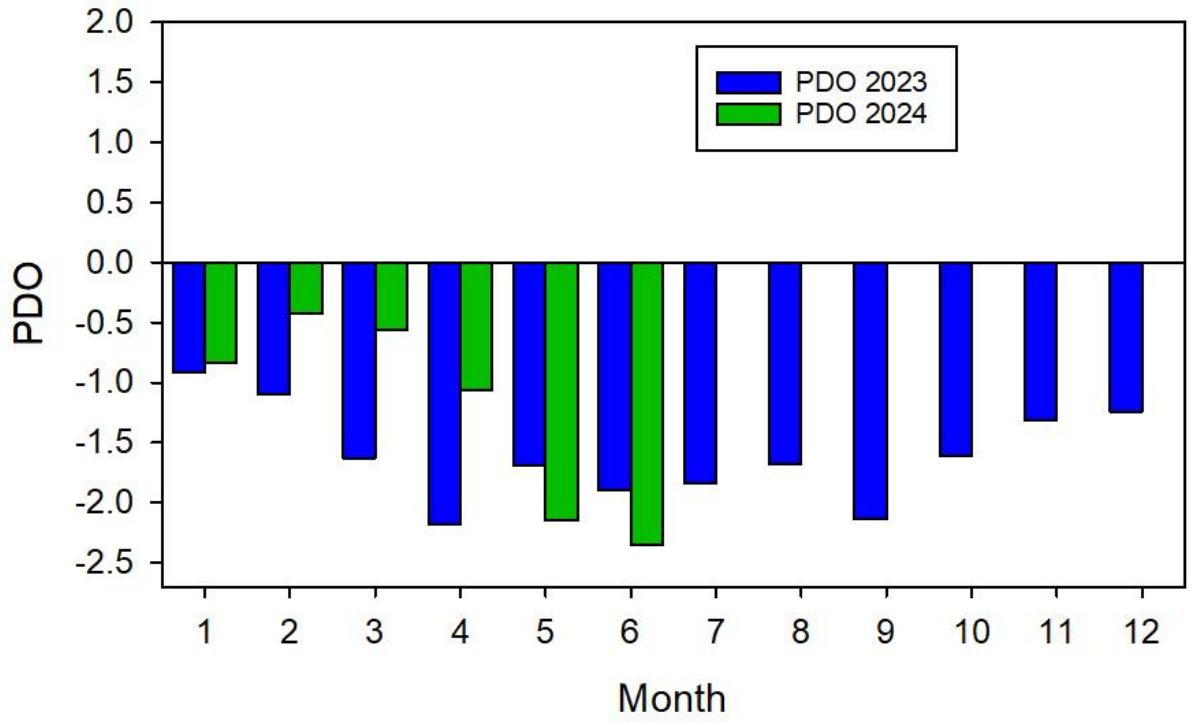

Figure 7-6. Monthly Pacific Decadal Oscillation index values in. http://jisao.washington.edu/pdo/

3. Columbia River Flows

The Columbia River provides the largest source of freshwater entering the California Current. As such, it has a large effect on the oceanography and biological resources on the region (Hickey et al. 2009; Litz et al. 2013). The mouth of the Columbia River has often been the center of the sardine fishing off the Pacific Northwest, as sardines and other CPS actively congregate and feed

in the biological rich plume habitat (Peterson and Peterson, 2009). In July 2024 flows were below the 27-yr average of 207,000 cubic feet/second (Figure 7-7).

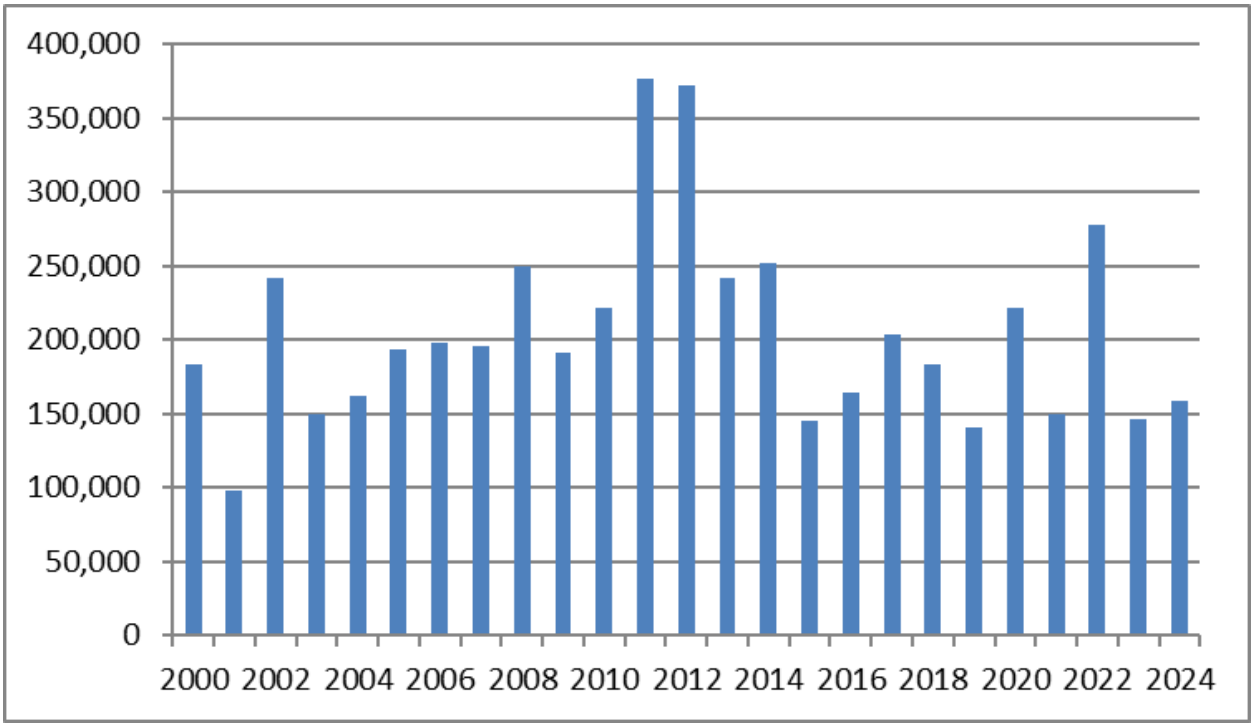

Figure 7-7. Average Columbia River flows (cubic feet/second) in July.

4. Trends in Ecosystem Indicators

1. Sea Surface Temperatures

Sea surface temperatures (SST) have been reported to affect the abundance/productivity of sardine, anchovy and other CPS (Chavez et al. 2003; Jacobson et al. 2001, 2005). Until the start of a strong upwelling season, SST in 2024 was relatively warm in most of the CCLME (Figure 7-8). Strong upwelling kept a heatwave in the NE Pacific (Figure 7-8, orange-red) from intruding into coastal waters during the summer. More on marine heatwaves in the NE Pacific can be found at https://www.integratedecosystemassessment.noaa.gov/regions/california-current/cc-projects-blobtracker.

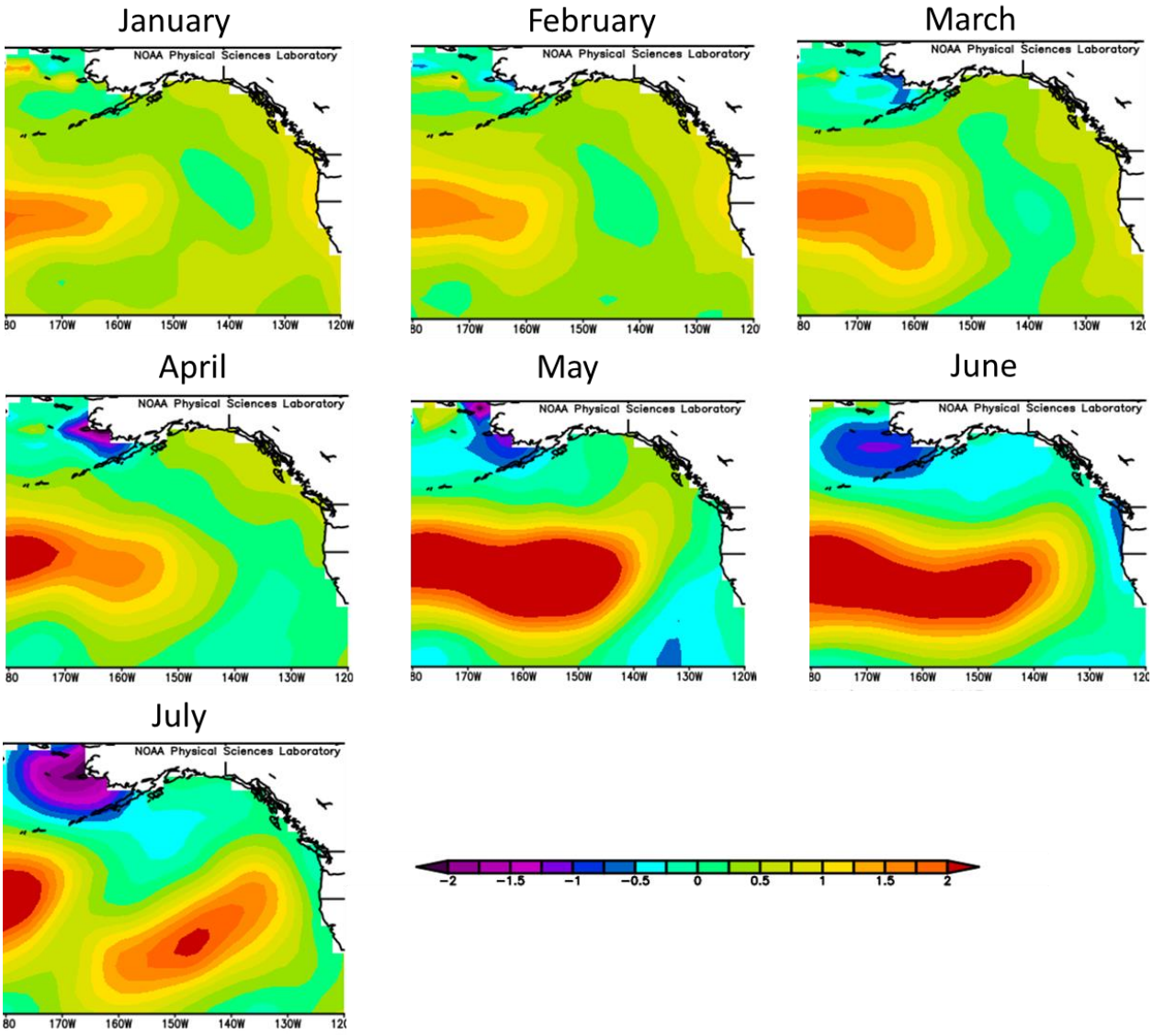

Figure 7-8. Monthly sea surface temperature anomalies in 2024. NOAA OISST V2 data provided by the NOAA/OAR/ESRL PSD, Boulder, CO, USA, http://www.esrl.noaa.gov/psd/.

2. Copepods

Copepod species biomass, measured by NMFS, NWFSC off Newport, OR, reflects the biological response and lag to local and large scale physical forcing and is highly correlated to the PDO (https://www.fisheries.noaa.gov/west-coast/science-data/2023-summary-ocean-ecosystem-indicators). During a positive phase of the PDO and an El Niño, northward transport delivers subtropical water to the northern California Current system and the biomass of southern copepod species increases. During negative phases of the PDO, equatorward transport delivers subarctic water and boreal copepod species to the Northern CC, increasing their biomass. "The Blob" intruded the Oregon shelf in September 2014, drastically changing the pelagic ecosystem and the copepod community, which was dominated by subtropical species. In summer of 2018 and 2019 equatorward transport finally delivered northern copepod species to the Oregon shelf, and in 2020-

2023 the biomass anomaly was back to levels observed before the marine heat wave, a good sign for this prey base of coastal pelagics in the northern region of the California Current. The copepod communities in 2024 were typical of El Niño conditions (Figure 7-9).

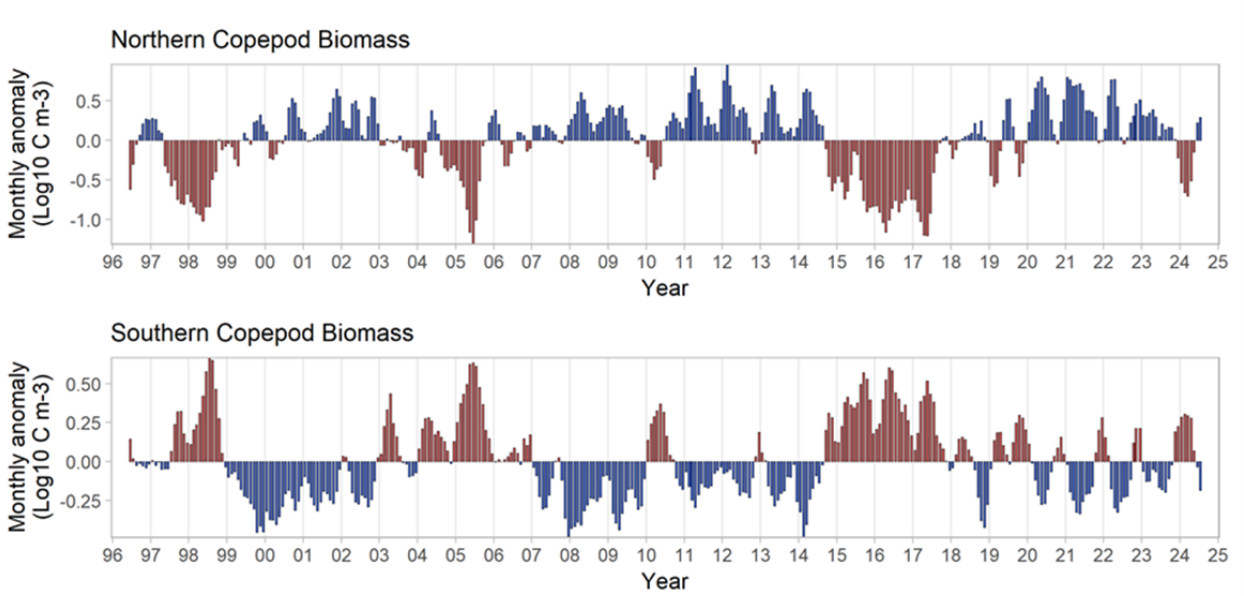

Figure 7-9. Three-month running mean of anomalies of biomass of northern and southern copepod taxa recorded off Newport, OR at NH05: Peterson Zooplankton Lab, NOAA, NMFS, Newport, OR.

3. Coastal pelagic fishes and invertebrates

Catches of young-of-year (YOY) groundfish have been enumerated from central California in late Spring (typically May through mid-June) since 1983 from the Rockfish Recruitment and Ecosystem Assessment Survey (RREAS), with catches of most other forage taxa reliably estimated from 1990 onward. The survey was expanded to sample most California marine waters starting in 2004 (Sakuma et al. 2016, Santora et al. 2021), and a comprehensive list of additional forage taxa that are also encountered is available in either of those manuscripts. The NWFSC Pre-recruit/NCC survey has included a nighttime trawling component using identical gear and methods since 2011. The taxa reported here are both among the most frequently encountered forage species in this survey, and among the most important forage taxa for higher trophic level predators. Catches were standardized by using a Bayesian delta-GLM to estimate year effects while accounting for spatial and temporal covariates, and to estimate approximate 95 percent confidence limits (see Ralston et al. 2013, Santora et al. 2021b).

The following summary from the RREAS was taken from the 2024 Ecosystem Status Report presented to the council in March 2024 with permission by John Field (SWFSC):

The 2023 survey effort in the "Core Area" was comparable to previous years apart from 2020. Standardized anomalies of log-transformed catch indices of key forage taxa in 2023 suggest continued high abundance of adult northern anchovies, while YOY anchovy continued to decline below the time series average (Fig. H.2. Catches of Pacific sardine showed a modest increase in the central region to slightly above average level. The anchovy and sardine results in this region are consistent with findings from a coastwide acoustic-trawl CPS survey in 2023.

The survey observed high abundances of YOY rockfish and YOY Pacific hake in 2023. YOY rockfish catches were at the highest level since the 2015-16 marine heatwave, and there was a notable increase in juvenile groundfish diversity as well. Krill abundance declined after several years of increasing; coastwide RREAS data indicate that krill abundance has been generally higher in northern areas relative to southern areas in recent years. Myctophids (lanternfishes) also declined to the below long-term average levels observed in recent years. Catches of market squid were slightly less abundant in 2023 and near the long-term average, while octopus abundance remained at below-average levels. Similar to 2022, the cumulative results of these trends indicate a fairly productive ecosystem, with anchovy continuing to dominate the forage community but with a greater abundance of alternative forage, and with very few taxa being at low abundance levels.

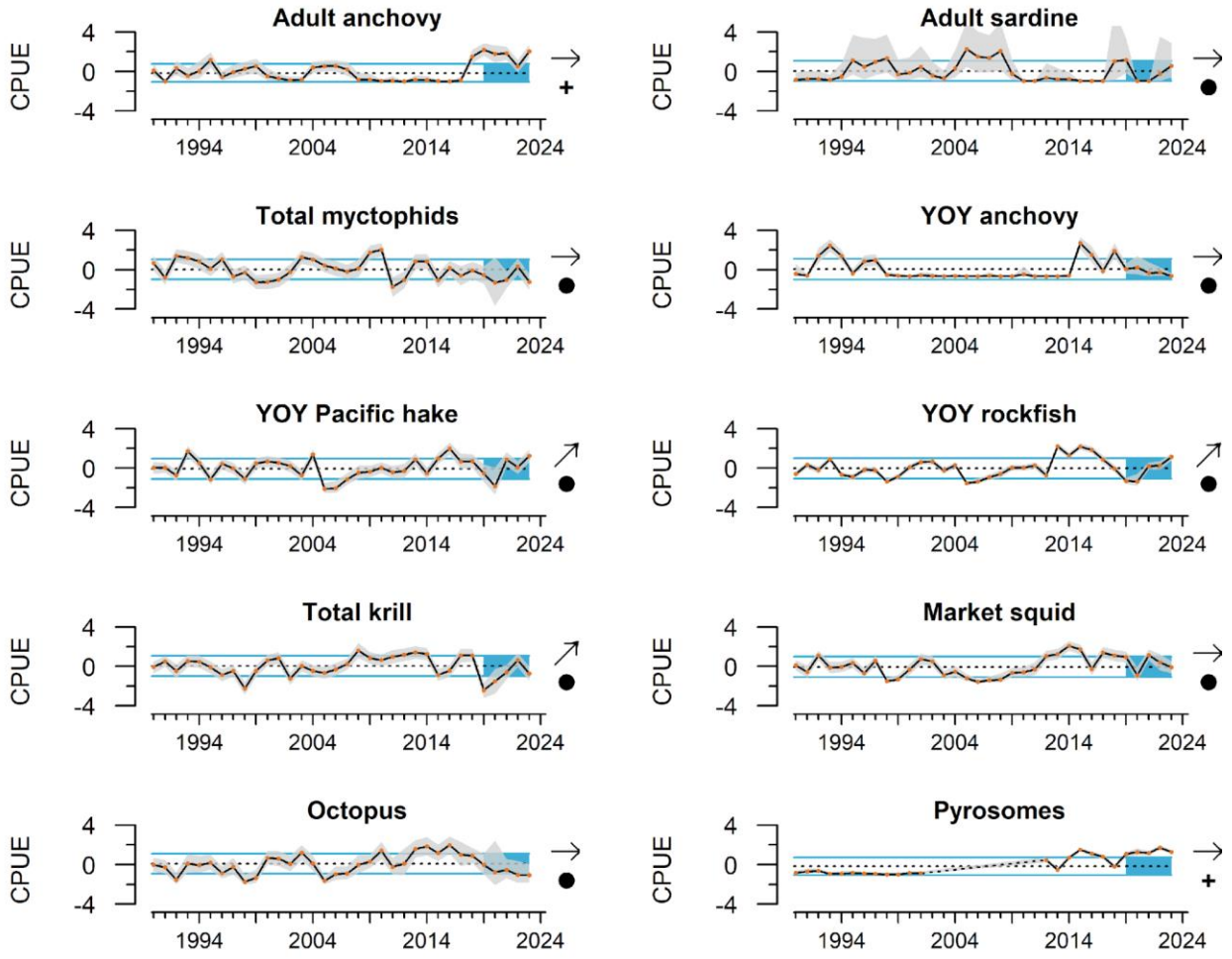

Figure 7-10. CPUE (delta-GLM index and 95% CL) anomalies of a subset of key forage groups in the core area of the Rockfish Recruitment Ecosystem Assessment survey in the Central CCE, 1990-2023.The blue shaded area is the most recent 5 years of data. Arrows indicate if the recent 5-year trend is positive (↗), neutral (→), or negative (↘). Symbols indicate if the recent 5-year mean is above the upper blue line (+), within the blue lines (●), or below the lower blue line (−).

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8. STOCK ASSESSMENT MODELS, STOCK STATUS, AND MANAGEMENT RECOMMENDATIONS

Pacific sardine, Pacific mackerel, and the CSNA are formally assessed through Council proceedings annually, biennially, or periodically through a framework. Over the years, seasonal closures and allocations, harvest guidelines, incidental landing allowances, and other management controls have been used for these stocks. Other CPS (northern subpopulation of northern anchovy, jack mackerel, and market squid) are monitored to ensure their stocks are stable, but annual stock assessments and Federal fishery controls are not used on an annual basis. Ecosystem component species (Pacific herring and jacksmelt) are not considered part of the CPS fishery but are categorized in the FMP as EC species. EC species do not require specification of reference points, but incidental catch of EC species should be monitored for indications of change in status of their vulnerability to the fishery. Krill are listed under the prohibited harvest species category, and there is no directed take allowed.

Finally, while this document focuses on U.S. fisheries, many CPS stocks are characterized by expansive ranges depending on oceanographic conditions and thus, catch information from both Mexico and Canada are of interest.

Distribution and biomass of CPS in California Current can be found in the 2023 acoustic trawl

NOAA technical memorandum NMFS-SWFSC ; 703.

1. Pacific sardine

During periods of higher abundance, Pacific sardine can be encountered by fisheries anywhere between British Columbia, Canada, and the Gulf of California, Mexico. In periods of lower abundance, the distribution of Pacific sardine is thought to be patchier and more restricted (Yau 2023). The northern subpopulation, managed through the CPS-FMP, is captured as far south as Ensenada, Baja California, where both the southern and northern subpopulations are considered to overlap across the year. Due to recent warm oceanic conditions, the vast majority of sardines landed during 2015 to 2023 were likely from the southern subpopulation (Yau 2023, Kuriyama et al. 2024). Ensenada sardine landings (combined subpopulations) totaled 158,183 mt in calendar

year 2023 (preliminary data), which is similar to landings from 2022 (152,918) and the highest value going back to 2013 (Table 8- 1). Harvest of Pacific sardine by the Ensenada (Mexico) fishery is not yet regulated through a quota system, but there is a minimum legal size requirement of 150 mm standard length and measures are in place to control fleet capacity.

Canadian sardine landings increased substantially after 2007 (1,522 mt), peaking at 22,223 mt in 2010. However, the Canadian fishery has found no sardine since 2013 and the fishery has been under a continued moratorium. The U.S. sardine fishery is regulated using a quota-based management approach based on outcomes from annual stock assessments. From 2000 to 2007, landings were typically lower than the recommended harvest limits. Due to a series of lower quotas, the U.S. fishery was subjected to in-season closures during 2008 to 2011, 2013, and 2014, with the directed fishery closing in 2015 once the estimated stock biomass dropped below the CUTOFF value of 150,000 mt. The U.S. directed sardine fishery remained under a moratorium during the 2022-23 and 2023-24 management years. During 2023-24, incidental, minor directed, live bait, and EFP sardine landings in California totaled 1,773 mt. Oregon landed 1 mt, and Washington landed additional tonnage for which the data are considered confidential (Table 8- 2). U.S. landings (northern and southern subpopulations) totaled 1,774 mt during the 2023-24 fishing years, respectively (Table 8- 2). EFP catch is summarized in Table 8- 3.

In order to resolve some assessment uncertainties, no Pacific Sardine stock assessment occurred in 2023. Therefore, the 2022 stock assessment update (Kuriyama et al. 2022) provided the most recent data summarizing the status of the Pacific sardine northern subpopulation off the U.S. Pacific Coast, British Columbia, and northern Baja California (Ensenada), Mexico to inform management in the 2023-2024 fishing year. The 2022 stock assessment update provided a stock biomass (age 1+) estimate of 27,369 mt on July 1, 2022, reflecting a continuing trend of low productivity in the northern subpopulation. The summer 2023 survey estimate for the total biomass of the northern stock of Pacific sardine was 14,103 mt ($CI_{95\%}$ = 7,337-22,981 mt, CV = 30 percent; Stierhoff et al. 2024). The northern subpopulation of Pacific sardine is still below the minimum stock-size threshold (50,000 mt). A rebuilding plan was developed by the CPSMT in 2020 and adopted by the PFMC in September 2020 (86 FR 14401). The plan was approved by NMFS on June 14, 2021.

1. Pacific Sardine Harvest Control Rules for 2023-2024

In April 2023, the Council used the 2022 sardine stock assessment update (Kuriyama et al. 2022) to set harvest specifications for the 2023-24 management year beginning July 1, 2023. Stock biomass from that assessment (27,369 mt, Kuriyama et al. 2022) was used to calculate all HCRs.

The OFL and ABC for 2023-24 were based on the previous F_{MSY}[1] for the three-year running average of CalCOFI SST for 2019-21 (16.04 °C; E_{MSY}=0.2313) and a Year-2 buffer. HCR formulas for the 2023-24 management year were calculated as follows:

OFL = BIOMASS * F_{MSY} * DISTRIBUTION,

ABC = BIOMASS * $BUFFER_{P\text{-}star}$ * F_{MSY} * DISTRIBUTION,

[1] In November 2014, the Council adopted a revised temperature-recruitment relationship, established a new temperature index, and adopted a revised FRACTION range. The new temperature-recruitment relationship is EMSY = -18.46452 + 3.25209(T) - 0.19723(T2) + 0.0041863(T3). The new temperature index is the California Cooperative Oceanic Fisheries Investigations (CalCOFI) time series, and the revised harvest FRACTION range is 5-20%. These are described in the November 2014 Council briefing book materials.

HG = (BIOMASS – CUTOFF) * FRACTION * DISTRIBUTION,

Where: BIOMASS = 27,369 mt; E_{MSY} = 0.2313, and FRACTION = 0.20; DISTRIBUTION = 0.87; $BUFFER_{P\text{-}star\ 0.4\ (Cat\ 2)}$ = 0.718; and CUTOFF = 150,000 mt.[2]

Using the control rules for 2023-24, the Council adopted an OFL of 5,506 mt, an ABC/ACL of 3,953 mt, and an ACT of 3,600 mt (Table 8- 2). The ACT was established to allow for incidental catch, directed tribal harvest, live bait, research, and other minor sources of mortality. The Council also adopted the following management accountability measures regarding catch:

- Up to 670 mt of sardine to support exempted fishing permit research;
- Incidental sardine landing limit in other CPS fisheries of 20 percent;
- If landings in the live bait fishery attain 2,500 mt of sardine, a per-landing limit of 1 mt of Pacific sardine per trip will apply to the live bait fishery;
- If the ACT of 3,600 mt is attained, a per-trip limit of 1 mt of Pacific sardine applies to all CPS fisheries; and
- An incidental per-landing allowance of 2 mt of Pacific sardine in non-CPS fisheries until the ACL is reached.

2. Pacific mackerel

In June 2023, the Council adopted the most recent benchmark assessment update (Kuriyama et al. 2023) for specifying management measures during the 2023-24 and 2024-25 fishing seasons, which run July 1-June 30 each season. Stock biomass (age-1+ biomass) steadily declined from the mid-1980s to the early 2000s, at which time the population began to increase moderately in size. However, in historical terms, the population remains at a relatively low abundance level, due primarily to oceanographic conditions, given limited fishing pressure over the last decade has likely not compromised this species' biology. Recent estimates of stock size are related to assumptions regarding the dynamics of the fish (biology, recruitment, etc.) and fishery operations over the last several years, which generally confound long-term abundance forecasts for this species (Kuriyama et al. 2023). It is important to note that exploitation of this stock has changed considerably over the last several decades (i.e., during the 1990s), the directed fisheries off California had average annual landings of roughly 18,000 mt, whereas since that period, average yearly landings have decreased substantially (Table 8- 4). This pattern of declining yields in recent years generally characterized all of the U.S. Pacific mackerel fishery sectors, including recreational sectors, where reduced landings were observed starting in 2020 in California (Table 8- 5). The Pacific mackerel landings from the commercial fishery of Mexico can be found in Table 8-1, with preliminary landings in 2023 being at 2,083 mt. U.S. commercial landings in the 2023-24 fishing year were 777 mt, still well below the ACT and ABC (Table 8-4). Harvest of Pacific mackerel by the Mexico fishery is not regulated by quotas, but there have been minimum legal size limits (e.g., 25.5 cm) imposed in the past. International management agreements between the U.S. and Mexico regarding transboundary stocks, such as Pacific mackerel, have not been developed to date.

1. Pacific Mackerel Harvest Specifications for 2023-24 and 2024-25

The Council adopted the 2023 benchmark assessment (Kuriyama et al. 2023) to establish an OFL and other annual specifications for both the 2023-24 and the 2024-25 fishing years (Table 8- 4). Should the directed fishery realize the ACT, the directed fishery will close and shift to an

[2] FRACTION is the fraction of the biomass above CUTOFF that can be taken by the fishery

incidental-only fishery for the remainder of the fishing year, up to 1,000 mt, with a 45 percent incidental landing allowance when Pacific mackerel are landed with other CPS, and a 3 mt per-landing limit when landed in non-CPS fisheries.

HCR formulas for the 2023-24 and 2024-25 management years were calculated as follows:

OFL = BIOMASS * F_{MSY} * DISTRIBUTION,

ABC = BIOMASS * $BUFFER_{P\text{-}star}$ * F_{MSY} * DISTRIBUTION,

HG = (BIOMASS – CUTOFF) * FRACTION* DISTRIBUTION,

Where: $BIOMASS_{23\text{-}24}$ = 55,681; $BIOMASS_{24\text{-}25}$ = 60,785 FRACTION = 0.30; DISTRIBUTION = 0.70; $BUFFER_{P\text{-}star\ 0.45\ (Catr\ 2)}$; and CUTOFF = 18,200 mt.

3. Central subpopulation of northern anchovy

The CSNA ranges from approximately Point Reyes, California, to Punta Baja, Baja California (Kuriyama et al. 2022). The most recent complete assessment for the CSNA was described in Kuriyama et al. (2022). Prior to that, the most recent assessment was Jacobson et al. (1995). California landings of northern anchovy began to increase in 1964, peaking in 1975 at 143,799 mt. After 1975, landings declined. From 1983 to 1999, landings did not exceed 6,000 mt per year. From 2000 to 2022, northern anchovy landings averaged 7,849 mt for California, with the greatest landings in 2001 (19,277 mt). CDFW began commercial sampling of anchovy in 2014; however, there remains little biological data for this species in recent decades, from either fishery or survey data collection efforts. Through the 1970s and early 1980s, Mexican landings increased, peaking at 258,745 mt in 1981. Mexican landings decreased to less than 2,324 mt per year during the early 1990s, with a spike of 17,772 mt in 1995, primarily during the months of September through November. Catches of northern anchovy in Ensenada remained at less than 5,000 mt through 2014, where landings drastically increased to 26,145 in 2015 and remained generally high, with the highest landing observed in the past 10 years in 2023 at 89,032 mt (Table 8- 1).

Prior to the 2021 benchmark assessment, the default HCRs and overfishing specifications were used to manage CSNA, with the OFL being set to 100,000 and ABC/ACL set to 25,000 until 2018. In 2019, NMFS set the OFL at 94,290 mt, and the ABC/ACL at 23,573 mt pursuant to a Court-ordered deadline. In 2020, NMFS issued a new rule in response to a 2020 court decision (*Oceana, Inc. v. Ross et al.*), implementing an OFL of 119,153 mt, an ABC of 29,788 mt, and an ACL of 25,000 mt to start in 2021 (Table 8- 6).

In 2021, the Council approved a new framework for managing the CSNA that would include periodic assessments as well as periodic checks of biomass estimated from survey work. The management framework is pictured in Figure 8-1, which includes the proposed parameter values that define the long-term biomass as the arithmetic 10-year average based on the most recent assessment and the short-term biomass as the arithmetic 3-year average based on the most recent survey estimates. The basics of the framework are that assessments will be conducted every 8 years, and that both the catch levels and the survey estimates are evaluated every 2 years to determine if adjustments to harvest parameters should be made or if the assessment schedule should be adjusted. Assessments would also determine the E_{MSY} for the stock. Thus, the stock management would remain long term with more frequent checks on stock status and harvest parameters. The framework and flowchart were incorporated into Council Operating Procedure (COP) 9 Schedule 3 in November 2021.

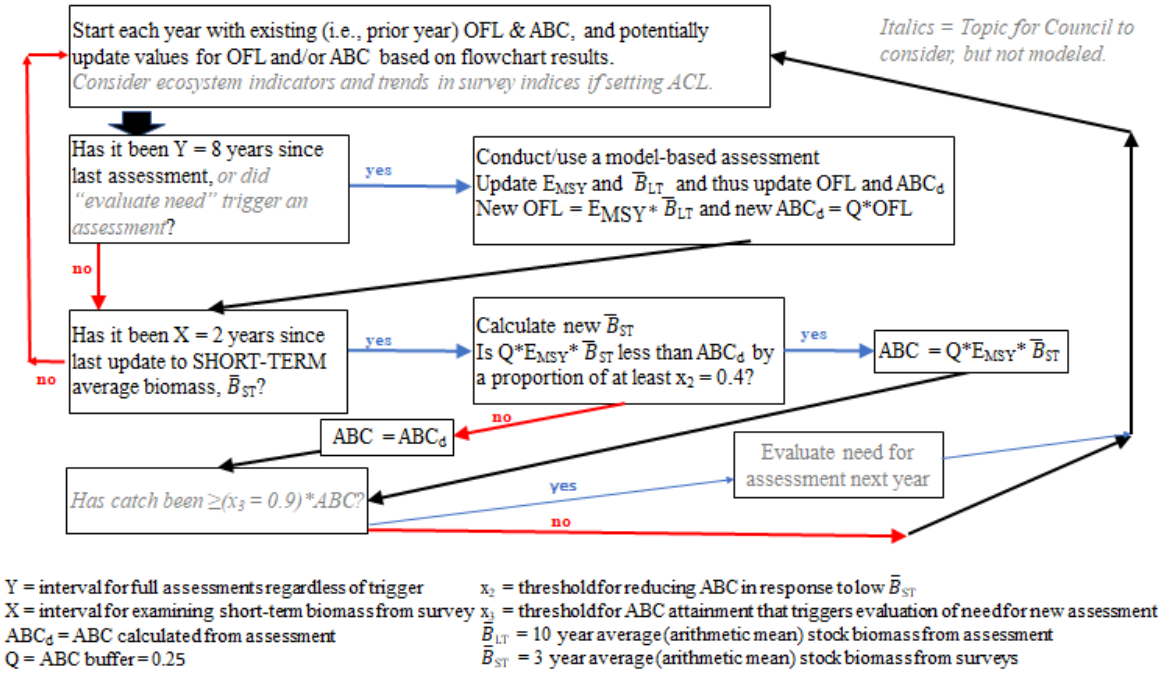

Figure 8-1. Flowchart depicting the proposed framework for managing the central subpopulation of northern anchovy with the parameter values proposed to be utilized.

1. Central Subpopulation of Northern Anchovy Harvest Specifications starting in 2022

The Council adopted a benchmark assessment for CSNA (Kuriyama et al. 2022) and utilized the COP 9 framework and flowchart for periodically evaluating harvest reference points. The 10-year average biomass provided by the SSC for the entire stock is 603,025 mt. To calculate the portion of the stock in U.S. waters the DISTRIBUTION term of 82 percent is applied resulting in a B_{LT} of 494,480 mt. The E_{MSY} value from the assessment is 0.493, and the ABC buffer, or Q parameter, is 0.25. HCR formulas for the 2022-29 management year were calculated as follows:

$$OFL = E_{MSY} * B_{LT} = 0.493 * 494{,}480 = 243{,}779 \text{ mt}$$

$$ABC_d = Q * OFL = 0.25 * 243{,}779 = 60{,}945 \text{ mt}$$

The Council adopted the OFL and ABC calculated above and adopted an ACL of 25,000.

The average U.S. short-term biomass was 2,423,018 mt (values from Stierhoff et al. 2023a, 2023b, and presentation by Yau, 2024). When multiplied by Q*E_{MSY} (0.25*0.493), the resulting value was greater than ABC_d (60,945 mt) by a proportion of at least 0.4 and catch in 2022 (1,507 mt) and 2023 (3,135 mt) was less than 90 percent of the ABC_d. Neither of the two thresholds to trigger changes were met in April 2024, so no changes to CSNA management are necessary.

4. Other CPS

The remaining species within the CPS FMP include the northern subpopulation of northern anchovy, jack mackerel, and market squid. The default control rules, and overfishing specifications are used unless otherwise specified. OFL, ABC, and ACLs can be revised based on the best available science as recommended by the SSC and as adopted through the annual harvest specification process and will be reported in the CPS SAFE.

Under the default HCR, the ABC is set to 25 percent of the OFL until the SSC recommends an alternate value based on best available science. ACLs are set for multiple years until new information becomes available.

1. Northern Subpopulation of Northern Anchovy

The northern subpopulation of northern anchovy (NSNA) ranges from Haida Gwaii, British Columbia, to Cape Mendocino, California. NMFS publishes biomass estimates for this stock based on the summer Acoustic-Trawl survey. The most recent published biomass estimate was 11,356 mt in 2023 (Stierhoff et al. 2024). From 2000-2019, landings in Oregon and Washington, where most NSNA are landed, averaged 191 mt and 427 mt, respectively (Table 8-7). In Washington, the peak occurred in 2009 (810 mt). In Oregon, the peak in northern anchovy landings occurred in 2016 with 6,313 mt landed. In late summer/fall of 2016, a substantial effort occurred inside the Columbia River, resulting in the anomalously large 2016 Oregon catch. WDFW began conducting northern anchovy sampling beginning in 2015 and for NSNA, the OFL is set at 39,000 mt, ABC and ACL is 9,750 mt, and the ACT is 1,500 mt.

8.4.2 Jack Mackerel

Jack mackerel has not been significantly targeted on the West Coast, and most landings are caught incidentally to other fisheries. Regular stock assessments or efforts to collect biological information on jack mackerel have not been a priority. The SWFSC Acoustic-Trawl survey, which began in 2006, could potentially be used to provide abundance estimates in the future, but to date the demand for this exercise has not been great. Management efforts to collect fishery-dependent age composition data, such as the CDFW Port Sampling Program, are in place for Pacific sardine and Pacific mackerel, but not for jack mackerel, aside from samples taken prior to 1995.

Jack mackerel is managed on a calendar year basis. Landings of jack mackerel reached a maximum of 25,984 mt in 1982 to a low of 94 mt in 2011. Since the Pacific sardine directed fishery closed in 2015, most landings of jack mackerel in Oregon and all landings in Washington are currently incidental or bycatch in non-CPS fisheries, whereas California landings are typically incidental catch from CPS fisheries.

In 2010, in accordance with the reauthorized MSA, the Council adopted new management benchmarks for jack mackerel. The OFL value is based on past studies and the ABC value accounts for a 75 percent uncertainty buffer in the OFL, and the ACL is set equal to the ABC. For Jack mackerel, the OFL is set at 126,000 mt, and ABC and ACL is 31,000 mt.

8.4.3 Market Squid

The market squid life cycle is less than one year and exempt from the requirement to apply an ACL but is still required to adopt OFL and ABC values or proxies. The bulk of market squid landings occur in California, although sporadic landings occur in Oregon. The Egg Escapement

Method has been used as an assessment tool, to evaluate population dynamics and biological reference points (MSY-related) regarding this species (Section 2.1.1.4 and Dorval et al. 2008, 2013). The CDFW manages the market squid fishery in California through a state-based management plan including a seasonal catch limit and various spatial/temporal constraints such as weekend closures, area and time closures to address seabird issues, and harvest replenishment areas within MPAs (CDFG 2005, CDFW 2021). The fishery control rules currently in place under the California MSFMP are thought to preclude the need for Federal management. However, if fishery operations change substantially in the future (e.g., spatially expands, harvests high amounts of immature squid), additional management measures could be considered.

In 2010, the Council approved benchmarks for market squid, which remain in place until changed by the Council. For market squid, OFL and ABC are currently an Fmsy proxy resulting in egg escapement ≥ 30%, with no ACL (exempt).

1. California's Market Squid Fishery

In 2001, legislation transferred the authority for management of the market squid fishery to the CFGC. Legislation required that the CFGC adopt an MSFMP and regulations to protect and manage the squid resource (CDFW 2021). In August and December of 2004, the CFGC adopted the MSFMP, the environmental documentation, and the implementing regulations, which went into effect on March 28, 2005, just prior to the April 1 start of the 2005/2006 fishing season.

The fishing permit season for market squid extends from April 1 through March 31 of the following year. During the 2023-2024 season, 27,004 mt were landed, a 47 percent decrease from the 2022-2023 season (51,121 mt). The total ex-vessel value decreased from $84.5 million in 2022 to $30.4 million in 2023. The median ex-vessel price per metric ton of market squid in 2023 was $1,200.

5. Prohibited Harvest Species

Amendment 12 to the CPS FMP was approved by the Secretary of Commerce in 2009. Amendment 12 prohibits the directed harvest of krill species. The amendment described EFH for krill and set an ACL equal to zero.

6. Ecosystem Component and Shared Ecosystem Component Species

In June 2010, the Council added Pacific herring (*Clupea pallassi*) and jacksmelt (*Atherinopsis californiensis*), two species not under Federal management, to the EC category of the CPS FMP. Several criteria should be met for a species to be included in the EC category (MSA Section 660.310(d)(5)(i)). These are 1) be a non-target stock/species; 2) not be subject to overfishing, approaching overfished, or overfished and not likely to become subject to overfishing or overfished in the absence of conservation and management measures; and 3) not generally retained for sale or personal use within the CPS fishery, although "occasional" retention is not by itself a reason for excluding a species from the EC category. Identifying and including EC species in an FMP is not mandatory but may be done for a variety of purposes, including data collection, for ecosystem considerations related to specification of OY for the associated fishery, as considerations in the development of conservation and management measures for the associated fishery, and/or to address other ecosystem issues.

A 2010 review of bycatch species in CPS fisheries confirmed that incidental catch and bycatch in CPS fisheries is dominated by other CPS and that bycatch/incidental catch of non-CPS is

extremely low. However, jacksmelt and Pacific herring are infrequently caught with CPS gear and were therefore added to the FMP under Amendment 13 to ensure continued monitoring of incidental catch and bycatch of these species through sampling and logbook programs. This information will continue to be reported in the SAFE report. The Council intends to continue and expand its consideration of ecological factors when developing status determination criteria and management measures for CPS management unit species. These considerations will evolve as improved information and modeling of ecological processes become available and will likely include predator/prey relationships and the overall status and role of forage species including these two EC species.

In 2015, the Council took final action to protect unfished and unmanaged forage fish species through Comprehensive Ecosystem-Based Amendment 1, an initiative of the Council's Fishery Ecosystem Plan. These "Shared Ecosystem Component Species" were incorporated into each of the Pacific Council's FMPs. A directed fishery may not proceed for any of these stocks until and unless the Council has had an adequate opportunity to both assess the scientific information relating to any proposed directed fishery and consider potential impacts to existing fisheries, fishing communities, and the greater marine ecosystem.

Common Name	Scientific Name
Round herring	*Etrumeus teres*
Thread herring	*Opisthonema libertate, O. medirastre*
Mesopelagic fishes	Families: *Myctophidae, Bathylagidae, Paralepididae, and Gonostomatidae*
Pacific sand lance	*Ammodytes hexapterus*
Pacific saury	*Cololabis saira*
Silversides*	*Atherinopsidae*
Smelts	*Osmeridae*
Pelagic squids	Families: *Cranchiidae, Gonatidae, Histioteuthidae, Octopoteuthidae, Ommastrephidae* except Humboldt squid (*Dosidicus gigas*), *Onychoteuthidae, and Thysanoteuthidae*

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9. EMERGING ISSUES

This section describes current and potential issues that may need to be addressed relative to FMP species and management in general.

1. Pacific Sardine

There are unresolved research questions for Pacific sardine. First, there is ongoing work on stock structure. The SWFSC held a stock structure workshop in November 2022. Results from the workshop that include abstracts from presentations have been published as a NOAA Tech Memo: https://repository.library.noaa.gov/view/noaa/48944. Work underway at the SWFSC recognizes the current understanding of stock structure for Pacific sardine is a working hypothesis that will require reevaluation as more information becomes available. Second is with regards to revisiting the HCR parameter that links stock productivity to ocean temperature. The SSC has acknowledged uncertainties regarding the use of the CalCOFI temperature index-based EMSY values used in the HCR for Pacific sardine each April since 2021, and in April 2024 recommended revisiting the analysis and assumptions informing the HCR , given evidence that the adopted relationship between sardine productivity and ocean temperatures is not currently valid. While the MSA requires attainment of long term MSY for all fisheries, neither the MSA, nor implementing regulations, require the adoption of an environmentally based E_{MSY} in particular. There is ongoing work to develop a methodology using best available science to set appropriate harvest control rules. The SSC also recommended that the Council consider identifying management approaches for the southern subpopulation given its inferred increased presence in U.S. waters, which impacts the DISTRIBUTION term in the HCR formulas. Lastly, the court order to vacate portions of the Amendment 18 rebuilding plan for Pacific sardine, which requires implementation of a compliant rebuilding plan for the Pacific sardine by June 1, 2025, may impact Council work on managing this stock.

10.ESSENTIAL FISH HABITAT

Recognizing the importance of fish habitat to the productivity and sustainability of U.S. marine fisheries, in 1996 Congress added new habitat conservation provisions to the Magnuson Fishery Conservation and Management Act of 1976, the Federal law that governs U.S. marine fisheries management. The re-named Magnuson-Stevens Fishery Conservation and Management Act (MSA) mandated the identification of EFH for managed species as well as measures to conserve and enhance the habitat necessary to fish to carry out their life cycles. The MSA requires cooperation among NMFS, the Councils, fishing participants, Federal and state agencies, and others in achieving EFH protection, conservation, and enhancement. Congress defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10)). The EFH guidelines under 50 *CFR* 600.10 further interpret the EFH definition as follows:

> *"Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the*

managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle."

The Councils and NMFS are expected to periodically review the EFH components of FMPs. Each FMP should include a procedure to review and update EFH provisions if newly available information warrants revision of EFH. The schedule for this review should be based on an assessment of the quality of both the existing data and expectations for when new data will be available. Such a review of information should be conducted at least once every five years (50 *CFR* 600.815).

1. Process for periodic review of CPS EFH

EFH reviews conducted by the Pacific Council are typically divided into two phases. The first phase is focused on new information related to species biology, migration, prey, habitat needs, distribution, and human activities that may adversely affect EFH. If the Council concludes that revisions to the existing EFH provisions are not warranted, the review is concluded. However, should the Council determine that new information warrants changes to the current EFH provisions, the Council may embark on a second phase, during which specific changes to EFH provisions are developed for Council, Advisory Body, and public consideration. The most recent EFH review was initiated in 2020 and after some delay due to the Covid pandemic, was concluded in 2023. Detailed descriptions of EFH components can be found in the CPS FMP and the new EFH Appendix, once approved.

Objectives

The overarching objectives for all EFH reviews are to ensure that the EFH provisions in the Council's FMPs are consistent with the best scientific information available, and to ensure a transparent and efficient science-based process for review of new information and consideration of any potential changes to EFH provisions.

The specific objectives of Phase 1 of the CPS EFH review are 1) to evaluate published and unpublished scientific literature and reports, information from interested parties, and previously unavailable or inaccessible data, and 2) to make a recommendation to the Council as to whether the body of new information warrants consideration of changes to EFH provisions. As part of Phase 1, the Council may issue a call for information to support the review. Phase 2 objectives would be identified only if the Council moves forward after considering the Phase 1 report.

Current Status

The Council completed its most recent EFH review in June 2023. The following describes the Council's final recommendations regarding EFH. At the time of publication, the FMP amendment with the revised EFH information had not yet been transmitted to NMFS. The review concluded in 2023 resulted in several modifications to CPS EFH:

- New species/assemblage groupings (market squid placed in a separate group from finfish)
- New maps
- New EFH Appendix
- Updated fishing impacts description
- Updated list of non-fishing activities, impacts, and conservation measures

2. Description of EFH

The CPS fishery includes four finfish species, market squid, and krill:

- Pacific sardine (*Sardinops sagax*)
- Pacific (chub) mackerel (*Scomber japonicus*)
- Northern anchovy (two stocks) (*Engraulis mordax*)
- Jack mackerel (*Trachurus symmetricus*)
- Market squid (*Doryteuthis opalescens*)
- Krill (*Euphasiid spp*.)

In determining EFH for CPS, the estuarine and marine habitat necessary to provide sufficient CPS production to support a sustainable fishery and a healthy ecosystem was considered. Using Level 1 information, (i.e., presence/absence distribution data) EFH for CPS is primarily based upon a thermal range bordered within the geographic area where a CPS occurs at any life stage, where the species of CPS has occurred historically during periods of similar environmental conditions, where a CPS has been associated with both pelagic waters and benthic substrates (e.g., market squid), or where environmental conditions do not preclude colonization by the CPS. EFH for CPS is derived from distributional data (presence/absence), oceanographic data (e.g., sea surface temperatures), relationships between oceanographic variables (e.g., temperature, salinity, chlorophyll a), and other published information.

The specific description and identification of EFH for each species or assemblage accommodates the fact that the geographic range of all CPS varies widely over time in response to the temperature of the upper mixed layer of the ocean, and to atmospheric/climatic events such as the El Niño Southern Oscillation (ENSO), Pacific Decadal Oscillation (PDO), and marine heat waves (e.g., Chasco et al. 2022, McClatchie et al. 2018, Muhling 2020, Lilly and Ohman 2021, Santora et al. 2011a, van Noord and Dorval, 2017b, Zwolinski and Demer 2012).

A detailed description of EFH for CPS as adopted by the Council in June 2023 can be found in Agenda Item G.3, Attachment 2, June 2023. Once approved by NMFS, it will be included as an appendix to the FMP.

Essential fish habitat for west coast CPS was first established in December 1998, with the issuance of Appendix D to Amendment 8 of the Northern Anchovy Fishery Management Plan. With the forthcoming amendment to the CPS FMP related to the June 2023 Council action, a new appendix to the FMP will contain the identification and description of CPS EFH, information on life history and habitat needs, fishing and non-fishing effects on CPS EFH, and potential conservation and enhancement measures.

The description for the finfish assemblage is as follows:

> *The east-west geographic boundary of EFH for the finfish assemblage is defined to be all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington (including U.S. waters of the Salish Sea and Puget Sound) offshore to the limits of the EEZ and above the thermocline where the sea surface temperatures range between 10° to 26°C. The northern distributional range of CPS finfish is dynamic and variable due to the seasonal cooling of the sea*

surface temperature, hence in some seasons the 10°C isotherm can be north of the U.S. EEZ. Similarly, the southern distributional range can extend south of the U.S. EEZ where sea surface temperatures are consistently below 26° C. Therefore, the southern extent of EFH for CPS finfish is the U.S.-Mexico maritime boundary, whereas the northern extent is the U.S.-Canada maritime boundary.

The description for market squid is as follows:

The east-west geographic boundary of Market Squid EFH is defined to be from the shoreline seaward to the extent of the 5.8 percent market squid distribution probability (Figure 2), including waters to a depth of 300 meters, and where the sea surface temperature is between 7° and 24°C along the coasts of California, Oregon, and Washington. This definition includes U.S. waters of Puget Sound and the Salish Sea and excludes other estuarine waters on the Pacific Coast. Market squid EFH also includes soft, sandy substrates 13 m to 93 m of depth for spawning adults and the egg capsule stage. The southern extent of EFH for Market Squid is the U.S.-Mexico maritime boundary, and the northern extent of Market Squid EFH is the U.S.-Canada maritime boundary

Krill species were added to the CPS FMP in 2006, and EFH for krill was issued in 2008. The two most prevalent species of krill are *Euphausia pacifica* and *Thysanoessa spinifera*, although nine other krill species are also included in the FMP. All are prohibited from harvest on the U.S. West Coast. The two species (*E. pacifica* and *T. spinifera*) form large aggregations of moderate density, while the other species are typically more dispersed. EFH is identified individually for *E. pacifica* and *T. spinifera*, and then collectively for the other krill species. The following descriptions are taken from the June 2023 action and anticipated amendment to the CPS FMP.

Euphausia pacifica EFH
The east-west geographic boundary for E. pacifica EFH, including larvae, juveniles and adults, is defined as U.S. West Coast EEZ waters from the shoreline, excluding estuaries except for the Salish Sea and Puget Sound, to the 1000 fm (1,829 m) isobath, from the surface to 400 m deep. The north-south geographic boundary extends from the U.S. – Canada maritime boundary to the U.S. – Mexico maritime boundary

Thysanoessa spinifera EFH
The east-west geographic boundary for T. spinifera EFH, including larvae, juveniles and adults, is defined as U.S. West Coast EEZ waters from the shoreline, excluding estuaries except for the Salish Sea and Puget Sound, to the 500 fm (914 m) isobath, from the surface to 100 m deep. The north-south geographic boundary extends from the U.S.- Canada maritime boundary to the U.S.-Mexico maritime boundary

Other krill species EFH
The east-west geographic boundary for other krill species EFH, including larvae, juveniles and adults, is defined as U.S. West Coast EEZ waters from the shoreline, excluding estuaries except for the Salish Sea and Puget Sound, to the 1000 fm (1,829 m) isobath, from the surface to 400 m deep. The north-south geographic boundary extends from the U.S. – Canada maritime boundary to the U.S. Mexico maritime boundary.

New Information

The recent EFH review included development of a detailed literature review and summary (April 2021 E.3.a CPSMT Report 1), consultation with the CPSMT, the Habitat Committee, and other subject matter experts. The New EFH Appendix includes detailed descriptions of the new information, and numerous new references.

3. Habitat Areas of Particular Concern

The implementing regulations for the EFH provisions of the MSA (50 CFR part 600) encourage the FMCs to identify specific types or areas of habitat within EFH as "habitat areas of particular concern" (HAPC), based on one or more of the following considerations: (1) the importance of the ecological function provided by the habitat; (2) the extent to which the habitat is sensitive to human-induced environmental degradation; (3) whether, and to what extent, development activities are, or will be, stressing the habitat type; and (4) the rarity of the habitat type. The intended goal of identifying such habitats as HAPCs is to provide additional focus for conservation efforts. While the HAPC designation does not add any specific regulatory process, it highlights certain habitat types as ecologically very important. This designation is manifested in EFH consultations where federally permitted projects with potential adverse impacts to HAPC are more carefully scrutinized during the consultation process.

During the most recent EFH review, the CPSMT discussed the potential for establishing HAPCs for CPS FMP species. The CPSMT agreed that because of the dynamic distribution and lack of association with spatially discrete geographic areas, CPS finfish are not good candidates for establishing HAPCs. The CPSMT developed an alternative for Council consideration of a HAPC for market squid, based on the association with physical habitats. However, noting that squid spawning occurs throughout the California Current Ecosystem, is not limited to the areas encompassed by the proposed HAPCs, and that there is a lack of sufficient information on which to base HAPCs, the Council determined that the available information was insufficient to recommend designating HAPCs as part of the review completed in 2023.

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Appendix A: 2024 SAFE Tables

List of Tables:

	Fishery, January 1-June 30, 2014. The directed fishery for sardines has been closed since June 30, 2015.
4-7	Recorded incidental catch (mt) in Oregon sardine fishery since 2013 (from fish ticket data). Excludes species landed under an Exempted Fishery Permit. There were no sardine fishery landings in Oregon during the 2014 Interim Fishery, January 1-June 30, 2014. The directed fishery for sardines has been closed since June 30, 2015.
4-8	Recorded bycatch landings from fish tickets in the Oregon market squid fishery from 2016 to 2023. Note that no coastal pelagic species (CPS) fishery market squid landings were made in 2017 or in 2023. All CPS species and ecosystem components (EC) species that were recorded as bycatch are listed in the table. Additional species and species groups for which more than 0.05 mt of bycatch was landing in any given year are also listed individually. The "Other species" category includes all species for which no yearly total was greater than 0.05 mt in any given year. The number of "other species" recorded as bycatch varied each year, with the minimum being 10 in 2018 and the maximum being 29 in 2020.
4-9	Directed Sardine Fishery Incidental Catch (metric tons) from fish tickets in Washington.
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6-5	Participant count (vessels and dealers) by CPS category (market squid, finish, combined), 2014-2023.
8-1	Commercial landings (metric tons) of CPS in Ensenada, Baja California, Mexico since 20131. Sardine landings include both southern and northern subpopulations.
8-2	U.S. Pacific sardine landings (PacFIN) and harvest guidelines (HG) in metric tons since 2011 under the federal CPS-FMP. Landings include both the southern and northern subpopulations. The fishery year was January 1 – December 31, until 2014 when it was changed to a July 1 – June 30 fishing year. *Data has been withheld from this row for confidentiality purposes, and for the U.S. total, the presence of the confidential flag indicates that data from at least one state has been withheld.
8-3	Total landings (mt) of sardines and other coastal pelagic species, and number of vessels and processors that participated under Exempted Fishing Permits in California from 2018-2023. (Sources: Northwest Aerial Sardine Survey, LLC; * NMFS WCR; CWPA, CDFW). No EFPs were issued during 2017.
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8-5	RecFIN estimated recreational harvest of Pacific (chub) mackerel by all modes, water areas, and trip types by state (metric tons), since 2013.
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8-7	Northern subpopulation of northern anchovy (NSNA) landings in the U.S. (metric tons) by calendar year since 2011. *Data has been withheld from this row for confidentiality purposes.
8-8	Jack mackerel landings (PacFin) in California, Oregon, and Washington (metric tons) by calendar year since 2011. *Data has been withheld from this row for confidentiality purposes, and for the U.S. total, the presence of the confidential flag indicates that data from at least one state has been withheld.

Table 2-1. Coastal pelagic species 2024 federal limited entry permit vessel listing with calculated gross tonnage (GT) values for each vessel.

Vessel Name	Permit No.	Coast Guard Number/Vessel ID	Calculated Vessel GT[/1]	Permit GT Endorsement	Permit Transfer Allowance[/2]
PROVIDER	1	572344	70.1	63.8	70.2
MERVA W[/3]	2	532023	82.9	43.5	47.9
INVINCIBLE	3	1244073	101.4	98.4	108.2
BARBARA H	4	643518	121.1	121.1	133.2
KAREN MARIE	5	593871	64.8	82.0	90.2
CACHALOT	6	654091	106.8	98.1	107.9
SAN PEDRO PRIDE	7	549506	182.5	160.7	176.8
FERRIGNO BOY	8	602455	139.3	139.3	153.2
KING PHILIP	9	1061827	156.9	162.0	178.2
SEA WAVE	10	951443	115.0	206.9	227.6
UNASSOCIATED	11	—	—	56.2	61.8
OPTIMUS	12	1244552	89.0	114.8	126.3
OCEAN ANGEL III	13	OR108ADL	82.0	141.9	156.1
TRITON	14	CF7218UH	92.2	89.3	98.2
SAINT JOSEPH	15	633570	84.4	84.4	92.8
—	16	—	—	137.5	151.3
RISING SPIRIT	17	WN0416RK	60.2	61.9	68.1
ST KATHERINE	18	542513	59.9	63.8	70.2
PACIFIC JOURNEY	19	OR661ZK	107.8	124.6	137.1
UNASSOCIATED	20	—	—	111.9	123.1
SPERANZA MARIE	21	643138	77.0	77.0	84.7
OCEAN ANGEL	22	OR868ADK	74.2	63.5	69.9
MONA LISA	23	288532	34.3	97.7	107.5
OCEAN ANGEL I	24	584336	63.8	63.8	70.2
PRODIGAL SON	25	CF8034XL	68.1	68.1	74.9
PAMELA ROSE[/4]	26	693271	61.9	23.8	26.2
LAKE BAY	27	563965	58.9	58.8	64.7
MINEO BROS.[/5]	28	CF0163TF	104.0	73.4	80.7
UNASSOCIATED	29	—	—	42.0	46.2
MINEO BROS.[/5]	30	CF0163TF	104.0	40.8	44.9
SEA VENTURE	31	WN4232NW	118.2	340.2	374.2
EL DORADO[/6]	32	690849	79.1	54.9	60.4
SEA PRINCESS	33	630024	81.1	194.0	213.4
SOUTHERN PACIFIC	34	CF0504VJ	70.6	125.6	138.2
ENDURANCE	35	613302	42.0	42.0	46.2
EL DORADO[/6]	36	690849	79.1	27.0	29.7
CALOGERA A	37	984694	85.7	85.3	93.8
EILEEN	38	252749	119.9	138.0	151.8
PAMELA ROSE[/4]	39	693271	61.9	61.9	68.1
NEW STELLA	40	598813	71.8	71.8	79.0
TRAVELER	41	661936	44.0	44.0	48.4
RISING STAR	42	1081263	44.8	41.5	45.7
OCEAN ANGEL II	43	622522	176.6	149.5	164.5

CRYSTAL SEA	44	1061917	142.2	137.0	150.7
TRIONFO	45	625449	96.8	79.2	87.1
RELENTLESS	46	CF2009TK	78.3	85.0	93.5
HEAVY DUTY	47	655523	84.4	84.4	92.8
NATALIE ROSE	48	685870	107.2	107.2	117.9
LADY J	49	647528	60.3	40.7	44.8
UNASSOCIATED	50	—	—	50.2	55.2
BUENA VENTURA	51	CF2159VH	55.6	72.3	79.5
ANTOINETTE W	52	606156	37.0	37.0	40.7
CAPE BLANCO	53	648720	158.2	158.2	174.0
SOUTHERN COAST	54	CF2514UP	84.1	126.5	139.2
NAVIGATOR	55	596222	38.8	40.4	44.4
CRYSTAL BAY	56	1293821	89.8	86.3	94.9
MERVA W/3	57	532023	82.9	54.4	59.8
OCEAN LEADER	58	CF6337RZ	81.9	91.1	100.2
LONG BEACH CARNAGE	59	955501	38.4	38.0	41.8
PACIFIC KNIGHT	60	CF7321UH	63.1	63.4	69.7
VALKYRIE	61	957532	41.0	40.9	45.0
UNASSOCIATED	62	—	—	39.7	43.7
UNASSOCIATED	63	—	—	86.3	94.9
ANGELS GATE	64	CF1927VH	53.7	54.5	60.0
BOUNTY	65	629721	26.4	26.4	29.0

/1 Vessel Gross Tonnage GT=0.67(Length*Breadth*Depth)/100. See 46 CFR 69.209.
/2 Maximum transfer allowance is based on permit GT + 10%.
/3 Vessel Merva W is associated with permits 2 and 57
/4 Vessel Pamela Rose is associated with permits 26 and 39
/5 Vessel Mineo Bros is associated with permits 28 and 30
/6 Vessel El Dorado is associated with permits 32 and 36

Table 2-2. Vessel age and calculated gross tonnage (GT) for the initial and current Federal limited entry fleet.

	Initial Fleet	Current Fleet
Number of Vessels	65	54
Average Vessel Age	35 years	41 years
Range of Ages	12 to 66 years	6 to 77 years
Average GT	71.3	83.7
Range of GT	12.8 to 206.9	26.4 to 182.5
Sum of Fleet GT	4,635.9	4,857.9
Capacity Goal (GT)[1/]	---	5,650.9
Transferability Trigger	---	5,933.5

/1 Established in Amendment 10 to the CPS FMP.

Table 2- 3. Estimates (mt) of Pacific sardine and northern anchovy live bait harvest in California, and the ratio of anchovy to sardine in reported live bait catch in California, 2013-2023. Values are in metric tons. 2013-2018 data are from CDFW live bait logs. For 2013-2015, values are converted from reported scoops with the assumption that 1 scoop = 12.5 lbs. Beginning in 2016, revised log forms include reported estimated catch in lbs. All live bait catch reported on electronic landing receipts beginning 2019.

Year	Anchovy	Sardine	Total	Proportion Anchovy	Proportion Sardine
2013	745	1,849	2,594	0.29	0.71
2014	1,142	1,562	2,704	0.42	0.58
2015	731	1,996	2,727	0.27	0.73
2016	266	1,208	1,474	0.18	0.82
2017	143	1,442	1,584	0.09	0.91
2018	114	1,531	1,644	0.07	0.93
2019	91	1,075	1,166	0.08	0.92
2020	92	1,197	1,288	0.07	0.93
2021	258	1,173	1,431	0.18	0.82
2022	206	1,175	1,380	0.15	0.85
2023	153	1,136	1,289	0.12	0.88

Table 4- 2. Percent frequency of occurrence of bycatch in observed loads of Pacific sardine, Pacific mackerel, and northern anchovy landings, by California ports, 2019-2023. Table values represent the presence of a species in observed loads for that year. A blank cell indicates that no individuals of that species were observed during that year (CDFW Wetfish Sampling Database). (Collection of northern anchovy samples began in 2014). Note that because of a different reporting methodology, this table is not directly comparable to Tables 4-6 and 4-7 before the 2021 SAFE.

	Total All Ports						San Pedro/Terminal Island						Monterey/Moss Landing				
Category/Common Name	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Finfish																	
Anchovy, northern	1.3	10.3	2.6	6.3	9.7				2.6		6.5		1.3	10.3		6.3	3.2
Barracuda, California	1.3		2.6				1.3		2.6								
Bass, kelp			2.6						2.6								
Bonito, Pacific	1.3	1.3					1.3	1.3									
Butterfish (Pacific pompano)	9.0	2.6		12.5	9.7			1.3					9.0	1.3		12.5	9.7
Combfish, Longspine	1.3	2.6					1.3	2.6									
Croaker, white	3.9	5.1	2.6	12.5	12.9								3.9	5.1	2.6	12.5	12.9
Cusk eel, basketweave		1.3												1.3			
Eel		1.3												1.3			
Eel, spotted cusk-		1.3			3.2									1.3			3.2
Fish, unspecified			2.6		3.2										2.6		3.2
Flatfish, unspecified	2.6	7.7	5.1	6.3	3.2			2.6	2.6		3.2		2.6	5.1	2.6	6.3	

Flyingfish	1.3		2.6				1.3		2.6								
Grunion, California		1.3	2.6						2.6					1.3			
	Total All Ports						**San Pedro/Terminal Island**						**Monterey/Moss Landing**				
Category/Common Name	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Halfmoon	1.3												1.3				
Halibut, California		3.9	7.7	6.3	9.7			1.3	7.7		6.5			2.6		6.3	3.2
Halibut, Pacific		1.3												1.3			
Herring, Pacific	1.3				3.2								1.3				3.2
Herring, round	5.1	2.6		6.3			5.1	1.3		6.3				1.3			
Jacksmelt	10.3	6.4	5.1	12.5	9.7								10.3	6.4	5.1	12.5	9.7
Kelpfishes		1.3												1.3			
Lingcod					3.2												3.2
Lizardfish, California			2.6		9.7				2.6								9.7
Mackerel, jack	16.7	19.2	30.8	18.8	3.2		6.4	2.6	15.4	18.8			10.3	16.7	15.4		3.2
Mackerel, Pacific	15.4	30.8	12.8	50.0	9.7		1.3	11.5	10.3	43.8	6.5		14.1	19.2	2.6	6.3	3.2
Mackerel, unspecified	1.3												1.3				
Midshipman, plainfin	5.1	5.1	5.1		9.7								5.1	5.1	5.1		9.7
Midshipman, Specklefin		1.3						1.3									

Midshipman, unspecified	1.3			6.3	3.2								1.3			6.3	3.2
Perch-like, unspecified		1.3												1.3			
Rockfish, bocaccio		3.9												3.9			
Rockfish, unspecified		7.7												7.7			
Sablefish					3.2												3.2
	Total All Ports						**San Pedro/Terminal Island**						**Monterey/Moss Landing**				
Category/Common Name	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Salmon, coho	1.3												1.3				
Sanddab	1.3	1.3						1.3					1.3				
Sanddab, longfin		1.3						1.3									
Sanddab, Pacific	7.7	9.0	7.7		35.5								7.7	9.0	7.7		35.5
Sanddab, speckled	3.9		5.1		3.2		1.3		2.6				2.6		2.6		3.2
Sardine, Pacific	65.4	43.6	38.5	31.3	38.7		5.1	1.3	2.6	6.3			60.3	42.3	35.9	25.0	38.7
Scorpionfish, California		1.3	2.6					1.3	2.6								
Sculpin, staghorn		1.3		6.3	3.2									1.3		6.3	3.2
Shad, American		2.6												2.6			
Skate, thornback		3.9			3.2			1.3			3.2			2.6			
Sole, Dover	1.3	1.3						1.3					1.3				

Sole, English	1.3		2.6		9.7								1.3		2.6		9.7
Sole, sand		1.3												1.3			
Sole, slender	1.3												1.3				
Sole, tongue	1.3	2.6	5.1		6.5		1.3	1.3	2.6					1.3	2.6		6.5
Sole, unspecified					3.2												3.2
Sunfish, ocean		5.1			3.2									5.1			3.2
Surfperch, pink					6.5												6.5
Surfperch, shiner					6.5												6.5
	Total All Ports						**San Pedro/Terminal Island**						**Monterey/Moss Landing**				
Category/Common Name	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Surfperch, Spotfin		1.3												1.3			
Surfperch, unspecified		1.3						1.3									
Surfperch, white		1.3			3.2									1.3			3.2
Topsmelt	1.3			6.3									1.3			6.3	
Tonguefish	2.6			6.3	3.2					6.3	3.2		2.6				
Turbot, hornyhead	1.3	1.3						1.3					1.3				
Whitefish, ocean	1.3						1.3										
Whiting, Pacific	2.6												2.6				

Elasmobranchs																	
Ratfish, spotted	1.3			6.3									1.3			6.3	
Ray, bat	1.3	3.9		12.5	6.5			1.3		6.3			1.3	2.6		6.3	6.5
Ray, Pacific electric	9.0	7.7	7.7		3.2								9.0	7.7	7.7		3.2
Ray, unspecified					6.5												6.5
Shark, shortfin mako	1.3						1.3										
Skate, big		1.3		6.3	3.2									1.3		6.3	3.2
Skate, California		1.3			3.2									1.3			3.2
Skate, unspecified		1.3			6.5									1.3			6.5
Stingray	3.9	1.3					3.9	1.3									
Invertebrates																	
	Total All Ports						**San Pedro/Terminal Island**						**Monterey/Moss Landing**				
Category/Common Name	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Anemones		2.6												2.6			
Crab Shells	3.9	1.3											3.9	1.3			
Crab, claws	1.3	1.3						1.3					1.3				
Crab, Dungeness	2.6	3.9	2.6		9.7			2.6	2.6				2.6	1.3			9.7
Crab, pelagic red	1.3												1.3				

Crab, rock unspecified				6.3												6.3	
Crab, shore	1.3			6.3	3.2								1.3			6.3	3.2
Crab, Swimming unspecified		2.6						2.6									
Crab, unspecified		2.6	2.6	6.3	3.2			1.3	2.6					1.3		6.3	3.2
Jellyfish	43.6	43.6	25.6	18.8	19.4								43.6	43.6	25.6	18.8	19.4
Mussel	1.3						1.3										
Octopus, unspecified	2.6	1.3	2.6										2.6	1.3	2.6		
Pyrosome	41.0	37.2	12.8	37.5	6.5					25.0			41.0	37.2	12.8	12.5	6.5
Salps	7.7	1.3											7.7	1.3			
Sand dollar	1.3	6.4			3.2								1.3	6.4			3.2
Sea stars		2.6												2.6			
Shrimp, Black-Spotted Bay					3.2												3.2
Shrimp, red rock					3.2						3.2						
Shrimp, Target		2.6	7.7					2.6	7.7								
	Total All Ports						**San Pedro/Terminal Island**						**Monterey/Moss Landing**				
Category/Common Name	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Shrimp, unspecified		1.3	2.6		3.2				2.6					1.3			3.2
Squid Egg Cases	1.3	1.3			3.2								1.3	1.3			3.2

Squid, market	59.0	39.7	23.1	31.3	16.1		1.3	1.3	2.6	6.3	3.2		57.7	38.5	20.5	25.0	12.9
Tunicates				6.3												6.3	
Worms, marine					3.2												3.2
Marine Plants																	
Algae, marine	7.7	2.6	2.6				7.7	2.6	2.6								
Kelp	57.7	48.7	30.8	12.5	29.0		10.3	7.7	23.1	6.3	9.7		47.4	41.0	7.7	6.3	19.4
Kelp, Bull	1.3												1.3				
Kelp, Feather Boa	1.3				3.2		1.3										3.2
Kelp, Giant		5.1	7.7		3.2						3.2			5.1	7.7		
Sea lettuce		1.3												1.3			
Surfgrass	23.1	10.3	18.0		9.7		3.9	1.3	2.6				19.2	9.0	15.4		9.7
	2019	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Total Observed	54	65	33	25	51		19	29	22	9	10		42	51	20	22	46

Table 4- 3. Incidental catch reported on California landing receipts with greater than fifty percent market squid (by tonnage per landing) from the 2019-2020 through 2023-2024 season for round haul gear.

	2019-2020		2020-2021		2021-2022		2022-2023		2023-2024	
Common Name	Number of Landings	Metric Tons	Number of Landings	Metric Tons	Number of Landings	Metric Tons	Number of Landings	Metric Tons	Number of Landings	Metric Tons
Anchovy, northern	39	15	30	6	24	6	22	5	38	8
Mackerel, jack	116	16	48	5	60	11	63	13	37	5
Mackerel, Pacific	173	67	102	30	62	21	84	42	252	68
Sardine, Pacific	359	115	275	111	239	177	265	145	351	169

Table 4-4. Percent frequency of occurrence of bycatch in observed loads of California market squid from 2019-2023. Table values represent the presence of a species in observed loads for that year. A blank cell indicates that no individuals of that species were observed during that year (CDFW Market Squid Port Sampling Database). Note that because of a different reporting methodology, this table is not directly comparable to Table 4-8 before the 2021 SAFE.

	Total All Ports						San Pedro/Terminal Island						Ventura/Port Hueneme						Monterey/Moss Landing				
Common Name/Category	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Finfish																							
Anchovy, northern	25.0	31.3	31.4	19.5	8.1		12.3	45.5	26.3	24.6	8.8				19.2	8.7			52.6	29.1	42.1	16.1	
Barracuda, California	2.8	2.4	1.4	0.8			3.5	4.6	3.5	1.5			7.7							1.8			
Bass, barred sand				0.8						1.5													
Bass, giant sea	1.9						3.5																
Bass, kelp	1.9	1.2	0.7		1.6		3.5	4.6	1.8		1.8												
Bass, striped	0.9			0.8			1.8			1.5													
Blackfish, Sacramento					1.6						1.8												
Blacksmith			0.7	2.4	3.2				1.8	4.4	3.5												
Bonito, Pacific	2.8	2.4	0.7	1.6	1.6		5.3			2.9	1.8				3.9					3.6			
Butterfish (Pacific pompano)	16.7	16.9	13.6	17.1	3.2		1.8		5.3	2.9	3.5				3.9	17.4			44.7	25.5	26.3	48.4	
Cabezon			0.7																		1.8		
Combfish, Longspine		2.4	1.4																	3.6	3.5		
Corbina, California			0.7						1.8														
Croaker, unspecifed	0.9																		2.6				

Croaker, white	5.6	6.0	5.7	6.5												4.4			15.8	9.1	14.0	22.6	
Eel	0.9						1.8																
Eel, spotted cusk-			0.7	0.8	1.6					1.5	1.8										1.8		
Fish, unspecified		1.2	7.1	1.6	1.6				1.8	2.9	1.8			16.7							15.8		
	Total All Ports						**San Pedro/Terminal Island**						**Ventura/Port Hueneme**						**Monterey/Moss Landing**				
Common Name/Category	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Flatfish, unspecified	17.6	14.5	13.6	8.1	4.8		19.3	13.6	17.5	14.5	5.3		7.7						18.4	16.4	15.8		
Flounder, arrowtooth	0.9						1.8																
Flounder, starry	1.9																		5.3				
Flyingfish	0.9		1.4	5.7	3.2		1.8			10.1	3.5				7.7								
Fringehead, Sarcastic	0.9	2.4	0.7				1.8	9.1													1.8		
Greenling, Painted			0.7																		1.8		
Grunion, California			0.7		1.6						1.8										1.8		
Halfmoon		2.4	0.7		6.5			9.1	1.8		5.3						20.0						
Halibut, California	7.4	4.8	2.1	10.6	1.6		12.3	13.6		11.6	1.8				3.9				2.6	1.8	3.5	16.1	
Halibut, Pacific		1.2																		1.8			
Herring, Pacific	1.9		2.1	1.6			1.8												2.6		5.3	6.5	
Herring, round	11.1	1.2	2.9	4.1	4.8		17.5	4.6	7.0	7.3	5.3								5.3				

Jacksmelt	18.5	37.4	30.0	24.4	1.6			4.6			1.8				34.6	8.7			52.6	54.6	57.9	90.3	
Kelpfishes		1.2																		1.8			
Lingcod		1.2	2.1	0.8																1.8	5.3	3.2	
Lizardfish, California					1.6						1.8												
Mackerel, jack	47.2	33.7	27.9	49.6	37.1		71.9	27.3	24.6	49.3	38.6			16.7	53.9	21.7	20.0		26.3	38.2	19.3	71.0	
Mackerel, Pacific	52.8	48.2	21.4	53.7	58.1		68.4	59.1	26.3	58.0	61.4		38.5	33.3	42.3	26.1	20.0		34.2	45.5	7.0	64.5	
Midshipman, plainfin	3.7	14.5	11.4	6.5			7.0		1.8	7.3					7.7					21.8	22.8	9.7	
Midshipman, Specklefin			2.1	1.6	1.6				1.8	1.5	1.8				7.7	4.4							
Midshipman, unspecified	2.8			1.6	1.6					2.9	1.8								7.9				
	Total All Ports						**San Pedro/Terminal Island**						**Ventura/Port Hueneme**						**Monterey/Moss Landing**				
Common Name/Category	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Mullet, striped					1.6						1.8												
Perch-like, unspecified	0.9						1.8																
Pomfret, Pacific				0.8						1.5													
Queenfish				0.8						1.5													
Rockfish, black		1.2						4.6															
Rockfish, blue		1.2																		1.8			
Rockfish, bocaccio	0.9	3.6	2.1	1.6															2.6	5.5	5.3	6.5	

Rockfish, canary			0.7																		1.8		
Rockfish, chilipepper			0.7																		1.8		
Rockfish, unspecified	2.8	1.2	3.6	3.3	1.6		5.3		8.8	5.8	1.8									1.8			
Sablefish		1.2	0.7	4.9																1.8	1.8	19.4	
Salmon			0.7																		1.8		
Salmon, Chinook	1.9	6.0	0.7															5.3	9.1	1.8			
Salmon, coho			1.4																	3.5			
Sanddab	6.5	1.2	3.6	3.3					1.8				15.4	16.7	15.4	13.0			13.2			3.2	
Sanddab, longfin	0.9	1.2			1.6		1.8				1.8								1.8				
Sanddab, Pacific	11.1	27.7	27.1	21.1	1.6		5.3	22.7		1.5	1.8				11.5	17.4		23.7	32.7	61.4	67.7		
Sanddab, speckled	4.6	3.6	4.3	4.9	1.6		3.5	4.6			1.8							7.9	3.6	10.5	19.4		
Sardine, Pacific	74.1	71.1	58.6	67.5	54.8		87.7	68.2	52.6	58.0	56.1		30.8	66.7	73.1	73.9	40.0		68.4	72.7	57.9	83.9	
Scallop, unspecified		1.2						4.6															
Scorpionfish, California	9.3	9.6	2.9	16.3	17.7		17.5	36.4	7.0	29.0	19.3												
	Total All Ports						**San Pedro/Terminal Island**						**Ventura/Port Hueneme**						**Monterey/Moss Landing**				
Common Name/Category	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Sculpin, staghorn		1.2	1.4	3.3											3.9					1.8	1.8	12.9	
Sculpin, unspecified	0.9	2.4	0.7				1.8	9.1							3.9								

Shad, American		1.2	0.7	1.6											3.9					1.8		6.5	
Sheephead, California				0.8						1.5													
Silversides					1.6												20.0						
Smelt, night		3.6	2.1																	5.5	5.3		
Sole, butter			1.4																		3.5		
Sole, C-O		1.2		0.8																1.8		3.2	
Sole, Dover			0.7	0.8						1.5											1.8		
Sole, English	4.6	6.0	7.9	8.9					1.8							4.4			13.2	9.1	17.5	32.3	
Sole, fantail	0.9				1.6		1.8				1.8												
Sole, petrale		1.2	0.7																	1.8	1.8		
Sole, rex		1.2																		1.8			
Sole, rock					1.6						1.8												
Sole, sand	1.9	1.2	2.1	6.5															5.3	1.8	5.3	25.8	
Sole, slender	0.9																		2.6				
Sole, tongue	0.9			0.8			1.8															3.2	
Sole, unspecified	0.9		0.7		1.6		1.8				1.8										1.8		
Sunfish, ocean		3.6	0.7	4.9						8.7					3.9					5.5			
Surfperch, pink		1.2	2.1	0.8																1.8	5.3	3.2	

Surfperch, shiner	0.9	1.2		0.8														2.6	1.8		3.2	
	Total All Ports						**San Pedro/Terminal Island**						**Ventura/Port Hueneme**						**Monterey/Moss Landing**				
Common Name/Category	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Surfperch, Striped			0.7																		1.8		
Surfperch, unspecified			2.1	0.8																	5.3	3.2	
Surfperch, white		1.2																		1.8			
Topsmelt	1.9	4.8	0.7	0.8			1.8	13.6		1.5									2.6	1.8	1.8		
Turbot	1.9		2.1	1.6			1.8			2.9					3.9				2.6		3.5		
Turbot, curlfin	1.9																		5.3				
Turbot, diamond	1.9		0.7				3.5								3.9								
Turbot, hornyhead	3.7	9.6	8.6	8.9	1.6		1.8	9.1		2.9	1.8								7.9	10.9	21.1	29.0	
Turbot, spotted	0.9	1.2		0.8			1.8			1.5										1.8			
Whitefish, ocean					1.6						1.8												
Whiting, Pacific				0.8																		3.2	
Wrasse, rock				0.8	1.6					1.5	1.8												
Elasmobranchs																							
Ratfish, spotted				3.3																		12.9	
Ray, bat	3.7		2.9	10.6	9.7		5.3			15.9	10.5				11.5	4.4			2.6		1.8	3.2	

Ray, Pacific electric	8.3	13.3	9.3	8.9						2.9									23.7	20.0	22.8	29.0	
Ray, unspecified			0.7	0.8						1.5											1.8		
Shark Eggs		1.2		1.6												8.7				1.8			
Shark, horn	6.5		2.1	2.4			12.3		5.3	4.4													
Shark, spiny dogfish				1.6																		6.5	
Shark, thresher			0.7						1.8														
	Total All Ports						**San Pedro/Terminal Island**						**Ventura/Port Hueneme**						**Monterey/Moss Landing**				
Common Name/Category	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Skate, big	2.8	6.0		3.3															7.9	9.1		12.9	
Skate, California	2.8	1.2	1.4	0.8						1.5									7.9	1.8	3.5		
Skate, Long-nosed	1.9	1.2																	5.3	1.8			
Skate, unspecified		1.2	2.1	0.8	1.6						1.8									1.8	5.3	3.2	
Stingray	0.9	1.2	2.1				1.8	4.6	5.3														
Stingray, Pelagic				0.8						1.5													
Invertebrates																							
Abalone	0.9						1.8																
Anemones		3.6	0.7	0.8												4.4				5.5	1.8		
Barnacle				0.8						1.5													

Chiton, unspecified			0.7	0.8																1.8	3.2	
Clam, rosy razor		1.2						4.6														
Clam, unspecified		1.2		0.8						1.5									1.8			
Crab Shells	8.3	15.7	12.1	8.9												4.4		23.7	23.6	29.8	32.3	
Crab, box	1.9						3.5															
Crab, claws	2.8	2.4	5.0	2.4						1.5								7.9	3.6	12.3	6.5	
Crab, Decorator	0.9	2.4		0.8			1.8	4.6		1.5				16.7								
Crab, Dungeness	5.6	9.6	17.1	7.3										16.7		4.4		15.8	12.7	42.1	25.8	
Crab, hermit		1.2	0.7						1.8					16.7								
Crab, pelagic red	3.7						1.8						7.7					5.3				
Crab, Purple Globe			0.7	0.8					1.8							4.4						
	Total All Ports						**San Pedro/Terminal Island**						**Ventura/Port Hueneme**						**Monterey/Moss Landing**			
Common Name/Category	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Crab, red rock	5.6	3.6	5.7	4.1										16.7	15.4				15.8	3.6	7.0	16.1	
Crab, rock unspecified	0.9	2.4	1.4	2.4				4.6								8.7			2.6	1.8	3.5	3.2	
Crab, Sheep				0.8						1.5													
Crab, shore		1.2	1.4	3.3																1.8	3.5	12.9	
Crab, Slender			2.1																		5.3		

Crab, spider			0.7	0.8	1.6						1.8				3.9	4.4							
Crab, Swimming unspecified	12.0	7.2	2.1	0.8			21.1	27.3	5.3	1.5			7.7										
Crab, unspecified	6.5	12.1	7.9	7.3	3.2		12.3	9.1	8.8	13.0	3.5									14.6	10.5		
Eel, wolf (wolf-eel)		1.2	0.7																	1.8	1.8		
Invertebrate Unspecified			0.7																		1.8		
Jellyfish	35.2	49.4	37.9	29.4	9.7		19.3	31.8	5.3	14.5	10.5		7.7		7.7	8.7			68.4	61.8	84.2	71.0	
Lobster, California spiny	1.9	6.0	0.7	1.6	1.6		3.5	22.7		2.9	1.8				3.9								
Mussel	6.5	1.2	2.1	0.8	6.5		10.5	4.6	5.3	1.5	7.0								2.6				
Nudibranch	0.9																		2.6				
Octopus, unspecified	2.8	2.4	1.4	0.8				4.6	1.8										7.9	1.8	1.8	3.2	
Prawn, spot	0.9	1.2	4.3	1.6			1.8							16.7	23.1	8.7							
Pyrosome	27.8	31.3	16.4	28.5	24.2		38.6	54.6	22.8	36.2	26.3		23.1		11.5	21.7			13.2	25.5	12.3	16.1	
Salps	6.5	3.6	4.3	4.9	8.1		3.5		10.5	7.3	8.8								13.2	5.5		3.2	
Sand dollar	0.9	1.2	1.4																2.6	1.8	3.5		
Sea cucumber, giant red				1.6	1.6					2.9	1.8												
Sea cucumber, unspecified	1.9	3.6	2.9	3.3	1.6		3.5	13.6	7.0	4.4	1.8					4.4							
	Total All Ports						**San Pedro/Terminal Island**						**Ventura/Port Hueneme**						**Monterey/Moss Landing**				
Common Name/Category	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**

Sea hare		1.2		2.4				4.6		4.4													
Sea slug			2.9						1.8												5.3		
Sea stars		2.4	3.6	2.4					1.8	2.9						4.4				3.6	7.0		
Sea urchin, purple			1.4																		3.5		
Sea urchin, white				0.8						1.5													
Shrimp, bay			0.7	0.8					1.8							4.4							
Shrimp, Black-Spotted Bay			1.4																		3.5		
Shrimp, coonstriped				0.8																		3.2	
Shrimp, mantis		1.2						4.6															
Shrimp, Target	3.7	7.2	2.1	4.1	6.5		7.0	27.3	5.3	7.3	7.0												
Shrimp, unspecified	0.9		3.6				1.8														8.8		
Snail, sea		2.4	0.7	2.4	1.6			9.1		4.4	1.8				3.9								
Snail, tegula	1.9			1.6			3.5			2.9													
Squid Egg Cases	31.5	45.8	30.0	35.0	1.6		22.8	40.9	17.5	37.7			15.4	33.3	26.9	26.1	20.0		50.0	49.1	43.9	35.5	
Tunicates		1.2												16.7									
Turkish Towel			1.4																		3.5		
Whelk, Kellet's	0.9						1.8																
Marine Plants																							

Agar	1.9						3.5																
Algae, marine	21.3	13.3	20.0	9.8	9.7		40.4	50.0	35.1	14.5	10.5											14.0	6.5
Gorgonians (sea fans)	0.9																		2.6				
	Total All Ports						**San Pedro/Terminal Island**						**Ventura/Port Hueneme**						**Monterey/Moss Landing**				
Common Name/Category	**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Grass, eel	3.7	2.4	2.9	5.7	1.6		7.0		1.8	10.1	1.8			33.3	7.7							1.8	
Kelp	60.2	73.5	35.7	62.6	56.5		61.4	77.3	61.4	66.7	61.4		38.5	50.0		30.4				65.8	74.6	26.3	77.4
Kelp, Acid			3.6	0.8											3.9							7.0	3.2
Kelp, Bull	1.9	2.4					3.5	9.1															
Kelp, Feather Boa	7.4	6.0	6.4	7.3	1.6		10.5	18.2	7.0	7.3						4.4	20.0			5.3	1.8	8.8	9.7
Kelp, Giant	11.1	4.8	22.9	4.1	6.5		21.1	9.1	1.8	5.8	3.5			16.7	15.4		40.0				1.8	47.4	3.2
Sea lettuce			0.7		1.6						1.8											1.8	
Surfgrass	35.2	57.8	34.3	22.0	4.8		42.1	59.1	28.1	21.7	1.8		15.4	50.0	3.9	13.0	40.0			31.6	58.2	54.4	29.0
	2019	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**		**2019**	**2020**	**2021**	**2022**	**2023**
Total Observed	89	93	109	103	55		63	43	43	66	52		12	16	32	29	9		46	66	74	54	6

Table 4- 5. Expanded salmonid bycatch in Pacific sardine fisheries in Oregon and Washington, 2012-2021[4]

	Oregon[1]							Washington[2]						
	Chinook		Coho		Total		Grand Total	Chinook		Coho		Total		Grand Total
	(live)	(dead)	(live)	(dead)	(live)	(dead)		(live)	(dead)	(live)	(dead)	(live)	(dead)	
2015-2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2014/15					17	7	24	44	146	27	166	71	312	383
2014[3]					0	0	0	6	21	4	24	10	45	55
2013					117	81	198	207	683	125	779	332	1,462	1,794

1 Oregon salmon bycatch data for 2002-2015 are from logbooks. No sardine fishery landings were made in Oregon during January 1-June 30, 2014.
2 Washington totals calculated from observed 2000-2004 observed bycatch rates.
3 January 1, 2014 – June 30, 2014.
4 The directed sardine fishery has been closed since June 30, 2015.

Table 4- 6. Reported logbook catches of non-target species caught in Oregon sardine fishery since 2013. There were no sardine fishery landings in Oregon during the 2014 Interim Fishery, January 1-June 30, 2014. The directed fishery for sardines has been closed since June 30, 2015.

Species	2013	2014 Interim Fishery	2014 - 2015	2015 - 2023
Blue Shark	0	0	0	-
Thresher Shark	0	0	0	-
Unknown Shark	0	0	0	-
Salmonids	198 59 alive; 41 dead	0	24 71 alive; 29 dead	-
Mackerel	569,650 lbs	0	1,146,300 lbs	-
Anchovy	15,000 lbs	0	0	-
Herring	3,000 lbs	0	0	-
Hake	0	0	0	-
Squid	0	0	200 lbs	-
Jellyfish	0	0	0	-
Dogfish	0	0	0	-
Shad	2 lbs	0	0	-

Table 4- 7. Recorded incidental catch (mt) in Oregon sardine fishery since 2013 (from fish ticket data). Excludes species landed under an Exempted Fishery Permit. There were no sardine fishery landings in Oregon during the 2014 Interim Fishery, January 1-June 30, 2014. The directed fishery for sardines has been closed since June 30, 2015.

Species	2013	2014 Interim Fishery	2014 - 2015	2015 - 2023
Pacific mackerel	435.6	0	1,008.1	-
Jack mackerel	60.1	0	245.0	-
Pacific herring	0	0	0	-
Northern anchovy	12.5	0	0	-
American shad	0.02	0	0.001	-
Sablefish	0.01	0	0	-

Table 4- 8. Recorded bycatch landings from fish tickets in the Oregon market squid fishery from 2016 to 2023. Note that no coastal pelagic species (CPS) fishery market squid landings were made in 2017 or in 2023. All CPS species and ecosystem components (EC) species that were recorded as bycatch are listed in the table. Additional species and species groups for which more than 0.05 mt of bycatch was landing in any given year are also listed individually. The "Other species" category includes all species for which no yearly total was greater than 0.05 mt in any given year. The number of "other species" recorded as bycatch varied each year, with the minimum being 10 in 2018 and the maximum being 29 in 2020.

Species	2016 (mt)	2017 (mt)	2018 (mt)	2019 (mt)	2020 (mt)	2021 (mt)	2022 (mt)	2023 (mt)
American shad	0.12	0	0	0	0.005	0.001	0.002	0
Pacific herring	0.002	0	2.62	0.89	1.44	0.1	0.1	0
Pacific sardine	3.18	0	0	0.04	0.06	0.1	0.2	0
Northern anchovy	131.40	0	0	0.002	0.01	0	0	0
Chinook salmon	0.02	0	0.01	0.01	0.06	0.009	0.03	0
Eulachon	0.007	0	0	4.5×10^{-4}	0.03	0.001	0	0
Smelt spp.	0.25	0	0	0	0.08	0.3	0.008	0
Pacific pomfret	0.06	0	0	0	0	0	0.002	0
Pacific saury	0	0	0.001	0	0	0.0005	0	0
Jacksmelt	0	0	0	0	0.002	0	0	0
Jack mackerel	0.04	0	0	0.003	9.1×10^{-4}	0.009	0.005	0
Pacific mackerel	1.18	0	0	0.002	0.003	0.002	0.003	0
Sablefish	0	0	0	0	0	0	0.7	0
English sole	0	0	0.008	0.02	0.94	0.1	0.002	0
Sand sole	0	0	0	0.07	0.09	0.04	0.01	0
Jellyfish	4.5×10^{-4}	0	0.002	0.70	0.10	2.9	0.2	0
Dungeness crab	0.33	0	0.83	0.23	1.24	0.4	0.08	0
Market squid	12.60	0	3.03	0.00	6.85	0.2	0.0009	0
Squid, other sp.	0	0	0	0.005	0	0.07	0.004	0
Sand dollars	0	0	0.006	0.48	0.02	0.02	0	0
Other species	0.06	0	0.07	0.12	0.44	0.1	0.1	0

Total Bycatch	**149.25**	**0**	**6.58**	**2.57**	**11.37**	**4.4**	**1.4**	**0**

Table 4- 9. Directed Sardine Fishery Incidental Catch (metric tons) from fish tickets in Washington.

	2013	2014 Interim	2014-2015	2015-2023
Arrowtooth Flounder	0.02			Fishery closed
American Shad	0.02			
Chinook	0.12		<0.01	
Chum				
Coho	0.08		0.01	
Mackerel	195.95			
Misc	0.01			
Northern Anchovy				
Pacific Herring	<0.01			
Pink Salmon	<0.01			
General Shark				
Sole Rex	<0.01			
Spiny Dogfish	<0.01			
Starry Flounder				

Table 6- 1. CPS Ex-Vessel Revenue ($2023) by Year and Species

Year	Pacific Sardine	Pacific Mackerel	Jack Mackerel	N. Anchovy Central	N. Anchovy Northern	Market Squid	Total CPS
2014	$10,848,269	$2,096,693	$434,201	$1,984,162	$69,823	$89,217,505	$104,650,655
2015	$1,450,343	$1,486,865	$303,140	$2,431,387	$185,694	$29,636,726	$35,494,156
2016	$126,549	$580,476	$74,907	$1,308,839	$1,568,838	$48,355,937	$52,015,546
2017	$72,812	$777,802	$67,478	$921,326	$90,205	$81,069,270	$82,998,892
2018	$92,488	$1,154,859	$33,538	$2,280,102	$44,863	$44,783,814	$48,389,664
2019	$2,171,101	$1,506,636	$41,096	$1,465,051	$55,390	$18,550,831	$23,790,106
2020	$2,731,371	$313,109	$20,786	$808,843	$61,173	$35,933,369	$39,868,652
2021	$10,526,969	$518,307	$98,175	$1,506,659	$92,576	$68,536,962	$81,279,649
2022	$1,661,725	$438,430	$184,336	$548,671	$89,790	$87,738,670	$90,661,622
2023	$1,062,482	$397,997	$138,467	$575,911	$29,985	$30,397,164	$32,602,006

Table 6- 2. CPS Landings (MT) by Year and Species

Year	Pacific Sardine	Pacific Mackerel	Jack Mackerel	N. Anchovy Central	N. Anchovy Northern	Market Squid	Total CPS
2014	23,343.00	7,148.00	1,828.00	10,512.00	112.00	104,074.00	147,016.00
2015	3,930.00	5,731.00	1,538.00	17,286.00	479.00	36,806.00	65,770.00
2016	522.00	1,830.00	374.00	8,368.00	5,590.00	38,352.00	55,037.00
2017	433.00	2,299.00	484.00	5,450.00	164.00	62,412.00	71,241.00
2018	338.00	2,591.00	205.00	17,402.00	113.00	36,374.00	57,023.00
2019	1,888.00	3,875.00	555.00	10,165.00	83.00	14,718.00	31,283.00
2020	2,865.00	705.00	472.00	5,636.00	76.00	25,119.00	34,873.00
2021	1,750.00	926.00	1,073.00	2,902.00	81.00	48,695.00	55,427.00
2022	1,777.00	935.00	1,167.00	1,507.00	81.00	66,549.00	72,016.00
2023	1,713	753	973	3,123	31	23,709	30,303

Table 6- 3. CPS Ex-Vessel Revenue ($2023) by Gear Group

Year	Round haul Lampara Seine	Dip Net	Trawl	Hook and Line	Unknown	Total
2014	$104,233,343	$272,313	$51,654	$49,763	$43,581	104,650,654
2015	$35,328,071	$74,484	$44,750	$5,662	$36,154	35,489,121
2016	$51,102,580	$881,134	$14,801	$3,093	$13,901	52,015,509
2017	$81,717,108	$1,204,139	$17,526	$20,472	$28,100	82,987,345
2018	$47,480,498	$839,809	$9,266	$1,868	$57,397	48,388,838
2019	$23,273,217	$374,915	$57,372	$48,399	$36,093	23,789,996
2020	$39,640,628	$184,922	$10,190	$7,775	$25,064	39,868,579
2021	$79,630,181	$1,522,020	$69,542	$3,408	$49,244	81,274,395
2022	$89,500,008	$867,501	$192,603	$3,044	$97,465	90,660,621
2023	$31,376,338	$1,045,945	$62,018	$259	$117,045	$32,601,605

Table 6- 4. CPS Landings (MT) by Gear Group

Year	Round haul Lampara Seine	Dip Net	Trawl	Hook and Line	Unknown	Total
2014	146,300	303	316	56	42	147,017
2015	65,399	70	257	1	11	65,738
2016	54,169	673	173	18	4	55,037
2017	69,871	942	407	5	7	71,232
2018	56,028	707	224	0	64	57,023
2019	30,259	323	652	36	14	31,284
2020	34,150	170	545	3	6	34,874
2021	53,251	1,046	1,122	2	5	55,426
2022	69,841	652	1,512	2	10	72,017
2023	28,428	785	1,073	0	17	30,303

Table 6- 5. Participant count (vessels and dealers) by CPS category (market squid, finish, combined), 2014-2023.

Year	Market Squid Vessels	Finfish Vessels	CPS Combined	Additional CPS	Total CPS Vessels	Principal CPS Dealers	Total CPS Dealers
2014	72	27	-	71	170	29	80
2015	60	23	-	96	179	25	92
2016	73	11	-	76	160	27	83
2017	75	15	-	131	221	27	95
2018	83	13	1	84	181	40	106
2019	61	20	2	148	231	43	125
2020	69	17	1	123	210	45	123
2021	73	22	-	92	187	34	94
2022	82	18	-	90	190	33	95
2023	62	20	-	96	178	24	83

Table 8- 1. Commercial landings (metric tons) of CPS in Ensenada, Baja California, Mexico since 2013[1]. Sardine landings include both southern and northern subpopulations.

Calendar Year	Pacific Sardine	Northern Anchovy	Pacific Mackerel	Jack Mackerel	Market Squid
2013	51,413	2,428	327	0	16,707
2014	90,396	539	975	0	2,978
2015	37,468	26,143	1,418	0	63
2016	66,069	5,008	9,880	0	294
2017	130,463	15,725	902	0	55
2018	63,770	42,171	12,468	0	30
2019	94,414	35,138	2,353	0	71
2020	149,504	9,989	5,420	0	7
2021	123,698	38,030	784	0	748
2022	152,918	41,269	7,380	0	63
2023	136,365	75,027	2,069	0	1,696

[1]Data for 2013-2022 from CONAPESCA fisheries database:

(https://www.gob.mx/conapesca/documentos/anuario-estadistico-de-acuacultura-y-pesca

Table 8- 2. U.S. Pacific sardine landings (PacFIN) and harvest guidelines (HG) in metric tons since 2011 under the federal CPS-FMP. Landings include both the southern and northern subpopulations. The fishery year was January 1 – December 31, until 2014 when it was changed to a July 1 – June 30 fishing year. *Data has been withheld from this row for confidentiality purposes, and for the U.S. total, the presence of the confidential flag indicates that data from at least one state has been withheld.

					HARVEST LIMITS		
Management year	CA	OR	WA	U.S. Total	OFL	ABC/ACL	ACT
2013	7,146	26,288	30,461	63,895	103,284	94,281	66,495
2014 (Jan-Jun)	5,647	0	908	6,555	59,214	54,052	6,966
2014-15	3,754	9,920	6,907	20,581	39,210	35,792	23,293
2015-16	164	1	*	165	13,227	12,074	7,000
2016-17	514	3	85	602	23,085	19,236	8,000
2017-18	280	3	0	283	16,957	15,479	8,000
2018-19	1,115	11	*	1,126	11,324	9,436	7,000
2019-20	2,076	9	<1	2,085	5,816	4,514	4,000
2020-21	2,494	3	*	2,498	5,525	4,288	4,000
2021-22	1,760	9	*	1,769	5,525	3,329	3,000
2022-23	1,610	7	*	1,617	5,506	4,274	3,800
2023-24	1,773	1	*	1,774	5,506	3,953	3,600

Table 8- 3. Total landings (mt) of sardines and other coastal pelagic species, and number of vessels and processors that participated under Exempted Fishing Permits in California from 2018-2023. (Sources: Northwest Aerial Sardine Survey, LLC; * NMFS WCR; CWPA, CDFW). No EFPs were issued during 2017.

Species	2018	2019	2020	2021	2022	2023
Pacific Sardine	103.5	476.9	1,121.3	390.8	265.4	270.0
Pacific Mackerel	5.6		0.2	.01	26.9	2.7
Jack Mackerel					1.1	26.9
Northern Anchovy		129.4	112.7	10.7	112.6	217.6
Jacksmelt						
Kingfish						
Number Vessels	4	5	5	6	6	6
Number Processors	2	3	3	4	4	5

Table 8- 4. Pacific mackerel harvest specifications and commercial landings (PacFIN) in the U.S. (metric tons) by July-June management years since 2011-12.

		HARVEST LIMITS			
Management year	U.S. Landings	OFL	ABC/ACL	HG	Directed/ACT
2013-14	11,858	57,316	52,358	52,538	39,269
2014-15	5,335	32,992	30,138	29,170	24,170
2015-16	4,368	25,291	23,104	21,469	20,469
2016-17	2,495	24,983	22,822	21,161	20,161
2017-18	1,438	30,115	27,510	26,293	25,293
2018-19	2,317	27,662	25,269	23,840	22,840
2019-20	3,841	14,931	13,169	11,109	10,109
2020-21	605	11,772	10,289	7,950	6,950
2021-22	934	12,145	9,446	8,323	7,323
2022-23	892	9,644	7,501	5,822	4,822
2023-24	777	11,693	9,754	7,871	6,871
2024-25		12,756	10,073	8,943	7,943

Table 8- 5. RecFIN estimated recreational harvest of Pacific (chub) mackerel by all modes, water areas, and trip types by state (metric tons), since 2013.

Calendar year	CA	OR	WA	Total
2013	108.67	0.27	0.00	108.94
2014	153.47	0.14	0.00	153.61
2015	306.95	0.59	0.00	307.53
2016	180.41	0.10	0.00	180.51
2017	260.86	0.18	0.00	261.04
2018	193.21	0.36	0.00	193.57
2019	138.45	0.56	0.00	139.01
2020	55.55	0.04	0.00	55.60
2021	82.61	0.20	0.00	82.81
2022	59.72	1.19	0.00	69.91
2023	44.86	1.15	0.30	46.01

Table 8- 6. Central subpopulation of northern anchovy (CSNA) harvest specifications and commercial landings (PacFIN) in the U.S. (metric tons) by calendar year since 2012-13. From 2013 through 2021, the default control rules and overfishing specifications were used to manage CSNA. *Beginning in 2022, CSNA is managed using a framework and flowchart, with frequent checks on stock status and harvest parameters, but remain on a long-term management. The next benchmark is set to occur in 2029 unless adjustments are made using the framework.

		HARVEST LIMITS		
Management year	U.S. Landings	OFL	ABC	HG/ACL
2013	2,601	100,000	25,000	25,000
2014	2,488	100,000	25,000	25,000
2015	6,019	100,000	25,000	25,000
2016	10,512	100,000	25,000	25,000
2017	17,286	100,000	25,000	25,000
2018	8,368	94,290	25,000	25,000
2019	5,450	94,290	23,573	23,573
2020	17,402	94,290	23,573	23,573
2021	10,165	119,153	29,788	25,000
2022*	5,636	243,779	60,945	25,000
2023	3,135	243,779	60,945	25,000

Table 8- 7. Northern subpopulation of northern anchovy (NSNA) landings in the U.S. (metric tons) by calendar year since 2011. *Data has been withheld from this row for confidentiality purposes.

Calendar year	U.S. Landings
2013	105
2014	*
2015	414
2016	5538
2017	118
2018	89
2019	53
2020	53
2021	35
2022	41
2023	30

Table 8- 8. Jack mackerel landings (PacFin) in California, Oregon, and Washington (metric tons) by calendar year since 2011. *Data has been withheld from this row for confidentiality purposes, and for the U.S. total, the presence of the confidential flag indicates that data from at least one state has been withheld.

Calendar year	CA	OR	WA	Total
2013	892	123	80	1,015
2014	787	800	243	1,830
2015	1,284	117	136	1,537
2016	207	116	51	374
2017	129	303	*	432
2018	64	96	*	160
2019	9	457	*	466
2020	33	365	*	398
2021	24	871	*	895
2022	32	857	*	889
2023	121	620	*	741