

COASTAL PELAGIC SPECIES MANAGEMENT TEAM REPORT ON PACIFIC SARDINE  
ASSESSMENT, HARVEST SPECIFICATIONS, AND MANAGEMENT MEASURES –  
FINAL ACTION

The Coastal Pelagic Species Management Team (CPSMT), Coastal Pelagic Species Advisory Subpanel (CPSAS), and the Scientific and Statistical Committee (SSC) jointly received a presentation from Dr. Peter Kuriyama of the Southwest Fisheries Science Center (SWFSC) on the 2022 Pacific sardine update assessment ([Agenda Item E.3, Attachment 1](#)). The CPSMT appreciates the efforts made by the stock assessment team (STAT) to provide an update assessment.

The STAT provided the update assessment biomass estimate of 27,369 metric tons (mt) which was subsequently endorsed by the SSC. The stock remains below the CUTOFF value of 150,000 mt, which per the CPS Fishery Management Plan (FMP) precludes the primary directed Pacific sardine fishery. Hence, the primary directed fishery for sardine will remain closed for an eighth consecutive year. Additionally, the biomass estimate remains below the 50,000 mt minimum stock size threshold (MSST) established for Pacific sardine (CPS FMP, Amendment 8) and is consequently in an overfished condition. Biomass below MSST does not prohibit allowing exempted fishing permits (EFP), incidental catch, minor directed catch, or catch from live bait, recreational, and tribal fisheries.

Table 1 below presents the Overfishing Limit (OFL) and the range of Acceptable Biological Catch (ABC) values based on various P\* values. The CPSMT offers Table 2 below, which utilizes a P\* value of 0.40 for use in setting harvest specifications. The resulting sigma from Category 2 status and a P\* value of 0.40 applied to the 2022-2023 OFL of 5,506 mt produces an ABC of 4,274 mt.

The CPSMT recommends setting the Annual Catch Limit (ACL) equal to ABC, and an Annual Catch Target (ACT) of 3,800 mt for the 2022-2023 fishing year (Table 2). This will afford opportunity to CPS fisheries and the requested EFPs, while avoiding restricting non-CPS fisheries that may incidentally harvest sardine, since achieving the ACL could result in the prohibition of take in all fisheries. The CPSMT also recommends accountability measures as listed below, to prevent exceeding the ACT and ACL. The CPSMT notes that all sources of catch including any EFP research set-asides, the live bait fishery, and other minimal sources of harvest, such as incidental catch in CPS and non-CPS fisheries, and minor directed fishing, will be accounted for against the ACL. These recommended harvest specifications align with the recently adopted rebuilding plan for Pacific sardine.

Table 3 summarizes the levels of sardine catch in CPS and non-CPS fisheries since the primary directed sardine fishery was closed. The CPSMT notes that recent catches of northern subpopulation of Pacific sardine continue to be well below the OFL ([Table 5, 2022 Pacific Sardine Update Assessment, Agenda Item E.3, Attachment 1](#)).

## **Future Research and Assessment Recommendations**

The CPSMT maintains its previous concerns regarding management of the Pacific sardine stock ([April 2021 Agenda Item E.4, CPSMT Report 1](#)). The CPSMT supports the SSC recommendation to postpone the scheduled 2023 Pacific Sardine benchmark assessment to 2024 in order to work towards resolving uncertainties associated with the stock assessment. The CPSMT recommends that an update assessment would therefore be appropriate in 2023.

Table 1. Sardine harvest formulas for 2022-2023 based on biomass from the 2022 update stock assessment.

<b>Harvest Control Rule Formulas</b>										
OFL = BIOMASS * $E_{MSY}$ * DISTRIBUTION; where $E_{MSY}$ is bounded 0.00 to 0.25										
ABC <sub>P-star</sub> = BIOMASS * BUFFER <sub>P-star</sub> * $E_{MSY}$ * DISTRIBUTION; where $E_{MSY}$ is bounded 0.00 to 0.25										
HG = (BIOMASS - CUTOFF) * FRACTION * DISTRIBUTION; where FRACTION is $E_{MSY}$ bounded 0.05 to 0.20										
<b>Harvest Formula Parameters</b>										
BIOMASS (ages 1+, mt)	<b>27,369</b>									
P-star	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10	0.05	
ABC Buffer <sub>(Tier 1; Sigma 0.5)</sub>	0.93910	0.88102	0.82476	0.76936	0.71373	0.65651	0.59558	0.52688	0.43936	
ABC Buffer <sub>(Tier 2; Sigma 1.0)</sub>	0.88191	0.77620	0.68023	0.59191	0.50942	0.43101	0.35472	0.27761	0.19304	
ABC Buffer <sub>(Tier 3; Sigma 2.0)</sub>	0.77777	0.60248	0.46272	0.35036	0.25950	0.18577	0.12582	0.07707	0.03726	
CaICOFI SST <sub>(2019-2021)</sub>	16.0393									
$E_{MSY}$	0.231257									
FRACTION	0.200000									
CUTOFF (mt)	150,000									
DISTRIBUTION (U.S.)	0.87									
<b>Harvest Control Rule Values (MT)</b>										
OFL =	<b>5,506</b>									
ABC(Sigma 0.5) =	5,171	4,851	4,542	4,236	3,930	3,615	3,280	2,901	2,419	
ABCTier 2 =	4,856	4,274	3,746	3,259	2,805	2,373	1,953	1,529	1,063	
ABCTier 3 =	4,283	3,318	2,548	1,929	1,429	1,023	693	424	205	
HG =	<b>0</b>									

Table 2. 2022-2023 Age 1+ Biomass, SSC-recommended OFL, CPSMT-recommended P\* Buffer, ABC, ACL, and ACT.

Biomass	27,369 mt
OFL	5,506 mt
P* Buffer	0.40
ABC <sub>Tier 2</sub>	4,274 mt
ACL	4,274 mt
ACT	3,800 mt

List of CPSMT Recommended Accountability Measures

1. Incidental landing limit in CPS fisheries of 20 percent.
2. If landings in the live bait fishery attain 2,500 mt, a per landing limit of one mt of Pacific sardine per trip will apply to the live bait fishery.
3. If the ACT of 3,800 mt is attained, a per trip limit of one mt of Pacific sardine applies to all CPS fisheries.
4. An incidental per landing allowance of two mt of Pacific sardine in non-CPS fisheries until the ACL is reached.

Table 3. Pacific sardine landings (mt) by fishery and harvest specifications for previous sardine fishing seasons (July 1-June 30).

<b>Fishing Season</b>	<b>2015-2016</b>	<b>2016-2017</b>	<b>2017-2018</b>	<b>2018-2019</b>	<b>2019-2020</b>	<b>2020-2021</b>	<b>2021-Mar 2022<sup>6</sup></b>
<b>CPS Incidental<sup>1</sup></b>	165	517	275	272	249	131	159
<b>Non-CPS Incidental<sup>2</sup></b>	1	1	14	14	5	1	30
<b>EFP<sup>3</sup></b>	-	-	-	470	728	976	139
<b>Live Bait<sup>4</sup></b>	2,097	1,614	1,894	1,694	1,008	1,308	878
<b>Tribal</b>	66	85	0	0	0	0	0
<b>Minor Directed<sup>5</sup></b>	N/A	N/A	10	57	70	82	12.45
<b>Total</b>	2,329	2,217	2,192	2,507	2,060	2,498	1,219
<b>ACT</b>	n/a	n/a	n/a	n/a	4,000	4,000	3,000
<b>ACL</b>	7,000	8,000	8,000	7,000	4,514	4,288	3,329

<sup>1</sup>Incidental Pacific sardine limited to 40% landed weight in CPS fisheries and was reduced to 20% incidental starting in the 2019-2020 season

<sup>2</sup>Non-CPS incidental includes at-sea whiting total mortality from PacFIN

<sup>3</sup>Exempted Fishing Permit (EFP) take ([PFMC April 2018](#), [PFMC April 2019](#), [PFMC November 2020](#), [PFMC November 2021](#))

<sup>4</sup>Based on voluntary logbook submission through 2018 and based on electronic fish tickets since 2019.

<sup>5</sup>Minor directed fishery allowed under CPS-FMP Amendment 16 beginning March 2018

<sup>6</sup>2021-2022 data as of March 31, 2022 and subject to change