

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 presentations from Dr. Peter Kuriyama on the 2020 Pacific sardine benchmark stock assessment and from Dr. Andre Punt on the Stock Assessment Review (STAR) Panel report. The CPSMT commends the Stock Assessment Team (STAT) on their efforts. The CPSMT recommends that the Pacific Fishery Management Council (Council) adopt the 2020 assessment as the best scientific information available for management of the 2020-2021 sardine fishery ([Agenda Item D.3, Attachment 1](#)). The age 1+ biomass estimated from this assessment is projected to be 28,276 metric tons (mt) on July 1, 2020.

Similar to recent assessments, the 2020-2021 biomass estimate is 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 a sixth consecutive year. Additionally, the biomass estimate is projected to remain below the 50,000 mt minimum stock size threshold (MSST) established for Pacific sardine (CPS FMP, Amendment 8). Therefore, as required by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), NMFS notified the Council in July 2019 that the northern subpopulation of Pacific sardine had been declared overfished, which necessitates a rebuilding plan be put into place by July 2021. Additionally, the CPS FMP requires incidental allowances to be set for overfished stocks, in priority order: 1) to minimize fishing mortality on overfished stocks, and 2) to minimize discards of overfished stocks (Section 5.1.6.1). Biomass below MSST does not prohibit allowing exempted fishing permits (EFPs), 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\* (probability of overfishing) values. The CPSMT offers Table 2 below, which utilizes a P\* value of 0.40, consistent with previous sardine management specifications, for use in setting harvest specifications. The SSC designated the 2020 assessment as Tier 2. The resulting sigma of 1.0 and a P\* value of 0.40 applied to the 2020-2021 OFL of 5,525 mt produces an acceptable biological catch (ABC) of 4,288 mt.

The CPSMT recommends setting the annual catch limit (ACL) equal to ABC, and an annual catch target (ACT) equal to 4,000 mt for the 2020-2021 fishing year (Table 2). This will afford opportunity to CPS fisheries and EFPs, while avoiding restricting non-CPS fisheries that may incidentally harvest sardine, as achieving the ACL could result in the prohibition of incidental take in these fisheries. The CPSMT also recommends accountability measures as listed below, to prevent exceeding the ACL. Included in these accountability measures is a recommendation that the incidental landing limit of Pacific sardine in other CPS directed fisheries be set at the maximum allowed by the CPS FMP of 20 percent by weight. 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.

Table 3 summarizes the levels of sardine catch in CPS and non-CPS fisheries since the primary directed sardine fishery was closed. Live bait harvest numbers prior to the 2019 calendar year are estimates based on voluntary logbooks. The California Department of Fish and Wildlife (CDFW) instituted mandatory electronic fish tickets for live bait catch beginning with the 2019 calendar year, which has decreased management uncertainty for California live bait catches.

Due to circumstances out of the Council's control related to the COVID-19 pandemic, CPS EFPs as a formal agenda item has been removed from the April meeting agenda. However, the CPSMT included consideration of EFP requests in recommending the harvest specifications detailed below. The Council received two renewal CPS EFP requests for preliminary review and public comment in November 2019: one from the California Wetfish Producers Association for 400 mt of Pacific sardine, and one from the West Coast Pelagic Conservation Group for 5 mt of Pacific sardine. These two groups are conducting aerial and/or acoustic CPS surveys to extend coverage to the nearshore. In addition, the California Wetfish Producers Association is requesting a second EFP to conduct new work during the 2019-2020 and 2020-2021 fishing years (April 2020 Agenda Item D.3.b) to collect biological data to better inform the stock assessment model, the aerial survey age compositions, and recruitment.

These EFPs all address crucial needs and provide information for stock assessments and management. Therefore, the CPSMT supports the tonnages requested for the 2020-2021 fishing year by the three proposals (1,145 mt total). With these EFP requests and accounting for expected fishery catches, the proposed ACT of 4,000 mt is still unlikely to be reached or exceeded. The CPSMT also supports the new request for 640 mt by the California Wetfish Producers Association to be used during this current fishing season i.e., through June 30, 2020. Given this requested amount and sardine landings to date for the 2019-2020 fishing season (Table 3), the current ACT of 4,000 mt is also not likely to be reached or exceeded.

Table 1: Sardine harvest formula for 2020-2021.

Harvest Control Rule Formulas										
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										
Harvest Formula Parameters										
BIOMASS (ages 1+, mt)	<b>28,276</b>									
P-star	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10	0.05	
ABC Buffer <sub>(Sigma 0.607)</sub>	0.92657	0.85748	0.79148	0.72742	0.66408	0.60003	0.53312	0.45943	0.36852	
ABC Buffer <sub>Tier 2</sub>	0.88191	0.77620	0.68023	0.59191	0.50942	0.43101	0.35472	0.27761	0.19304	
CalCOFI SST (2016-2018)	15.9965									
$E_{MSY}$	0.224584									
FRACTION	0.200000									
CUTOFF (mt)	150,000									
DISTRIBUTION (U.S.)	0.87									
Harvest Control Rule Values (MT)										
OFL =	<b>5,525</b>									
ABC <sub>(Sigma 0.607)</sub> =	5,119	4,737	4,373	4,019	3,669	3,315	2,945	2,538	2,036	
ABC <sub>Tier 2</sub> =	4,872	4,288	3,758	3,270	2,814	2,381	1,960	1,534	1,067	
HG =	<b>0</b>									

Table 2. 2020-2021 OFL and ABC, and CPSMT-recommended ACL and ACT.

Biomass	28,276 mt
OFL	5,525 mt
P* Buffer	0.40
ABC <sub>Tier 2</sub>	4,288 mt
ACL	4,288 mt
ACT	4,000 mt

List of CPSMT Recommended Accountability Measures

1. 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.
2. If the ACT of 4,000 mt is attained, a per trip limit of one mt of Pacific sardine applies to all CPS fisheries.
3. An incidental per landing allowance of 2 mt of Pacific sardine in non-CPS fisheries.

Table 3: Pacific sardine landings (mt) by fishery for California, Oregon, and Washington and harvest specifications for each sardine fishing season (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-March 2020<sup>5</sup></b>
<b>CPS Incidental<sup>1</sup></b>	165	517	275	272	241
<b>Non-CPS Incidental</b>	1	1	11	12	5
<b>EFP<sup>2</sup></b>	-	-	-	470	110
<b>Live Bait<sup>3</sup></b>	2,097	1,614	1,894	1,694	796
<b>Tribal</b>	66	85	0	0	0
<b>Minor Directed<sup>4</sup></b>	N/A	N/A	10	57	50
<b>Total</b>	2,329	2,217	2,190	2,505	1,202
<b>ACL</b>	7,000	8,000	8,000	7,000	4,514

<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>Exempted Fishing Permit (EFP) take (PFMC April 2018 and PFMC April 2019)

<sup>3</sup>Based on voluntary logbook submission through 2018 and based on electronic fish tickets since 2019.

<sup>4</sup>Minor directed fishery allowed under CPS-FMP Amendment 16 beginning March 2018

<sup>5</sup>2019-2020 data as of March 31, 2020 and subject to change

#### Future Research Considerations

The CPSMT recognizes the research recommendations put forward by both the STAT and the STAR Panel and recommends that these be addressed in the ongoing efforts to improve surveys and assessments. The northern subpopulation of Pacific sardine has undergone large population fluctuations for centuries even in the absence of industrial fishing. There is general scientific consensus that environmental conditions are the main factors driving these fluctuations. The CPSMT also encourages ongoing research into developing a mechanistic understanding of the interplay among the environmental drivers that influence stock productivity and how they can best be incorporated into management.

PFMC  
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