

**COASTAL PELAGIC SPECIES MANAGEMENT TEAM REPORT ON PACIFIC SARDINE
ASSESSMENT UPDATE AND 2019-2020 HARVEST SPECIFICATIONS**

The Coastal Pelagic Species Management Team (CPSMT), Coastal Pelagic Species Advisory Subpanel (CPSAS) and the Scientific and Statistical Committee (SSC) jointly received a scientific review of the draft 2019 Pacific sardine stock assessment update from Drs. Kevin Hill (National Marine Fisheries Service, NMFS) and Juan Zwolinski (NMFS). The CPSMT commends the Stock Assessment Team on their efforts. The CPSMT recommends that the Pacific Fishery Management Council (Council) adopt the 2019 update of the 2017 full assessment for management of the 2019-2020 sardine fishery ([April 2019 Agenda Item E.3, Attachment 1](#)). The age 1+ biomass estimated from this assessment is projected to be 27,547 metric tons (mt) on July 1, 2019.

Similar to recent assessments, the 2019-2020 biomass estimate of 27,547 mt is below the CUTOFF value of 150,000 mt which precludes the primary directed Pacific sardine fishery. Hence, the primary directed fishery for sardine will remain closed for a fifth consecutive year. Additionally, the biomass estimate is below the 50,000 mt minimum stock size threshold (MSST) established for Pacific sardine (CPS FMP, Amendment 8). The CPSMT anticipates NMFS will issue a notice declaring the northern subpopulation of Pacific sardine overfished, which would trigger CPS FMP specific requirements. While not yet formally designated overfished, the CPSMT recommendations for the 2019-2020 sardine harvest and management specifications are consistent with the CPS FMP requirements for an overfished stock.

Biomass below MSST does not prohibit the allowance for exempted fishing permits, minor directed incidental catch in other CPS directed, live bait, recreational, and tribal fisheries. The CPS FMP does require incidental allowances 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).

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 recommends use of a P* value of 0.40, consistent with previous sardine management specifications. The SSC designated the 2019 update assessment as a Tier 2. The resulting sigma of 1.0 and a P* value of 0.40 applied to the 2019-2020 OFL of 5,816 mt produces an acceptable biological catch (ABC) of 4,514 mt.

For each year the sardine biomass has been below CUTOFF and the primary directed sardine fishery closed, the CPSMT has evaluated the potential incidental allowance needs for other CPS and non-CPS fisheries to set an ACL. Based on these evaluations and additional Council considerations, the ACLs were set below the ABCs, even though they could have been set equal to the ABC as in previous years. These ACL values, which ranged from 7,000-8,000 mt, were deemed sufficient to account for all of the differing fishery sector requirements without the need to set the ACL as high as the ABC during this time span. The CPSMT has conducted a similar evaluation and determined that, for the upcoming fishing year, CPS and non-CPS fisheries may be negatively affected by an ACL lower than the ABC, because of the reduction in the 2019-2020 ABC values.

Therefore, to afford opportunity to the CPS fisheries, including 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 recommends setting the ACL equal to the ABC, and an ACT of 4,000 mt for the 2019-2020 fishing year. In conjunction with setting an ACT, the CPSMT also recommends accountability measures as listed following Table 2 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. The live bait harvest numbers in this table are estimates based on voluntary logbooks, which result in a degree of management uncertainty. The California Department of Fish and Wildlife has instituted mandatory electronic fish tickets for live bait catch that will take effect at the beginning of the 2019-2020 fishing year.

Regarding the live bait fishery, the CPSMT notes that although Amendment 17 has not yet been approved, NMFS has indicated that the final decision on Amendment 17 will occur prior to the start of the next sardine fishing year which, if approved, would allow for directed live bait fishing when the stock is below the MSST. Therefore, consistent with NMFS guidance ([Agenda Item E.3.a, Supplemental NMFS Report 1](#)) and the status quo measures in place under the CPS FMP, the CPSMT includes the maximum incidental landing limit of 15 percent under the list of accountability measures.

Table 1: Sardine harvest formula for 2019-2020.

Harvest Control Rule Formulas										
OFL = BIOMASS * E_{MSY} * DISTRIBUTION; where E_{MSY} is bounded 0.00 to 0.25										
ABC _{P-star} = BIOMASS * BUFFER _{P-star} * 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)	27,547									
P-star	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10	0.05	
ABC Buffer _(Sigma 0.570)	0.93093	0.86564	0.80296	0.74181	0.68103	0.61920	0.55417	0.48196	0.39188	
ABC Buffer _{Tier 2}	0.88191	0.77620	0.68023	0.59191	0.50942	0.43101	0.35472	0.27761	0.19304	
CalCOFI SST (2016-2018)	16.1123									
EMSY	0.242675									
FRACTION	0.200000									
CUTOFF (mt)	150,000									
DISTRIBUTION (U.S.)	0.87									
Harvest Control Rule Values (MT)										
OFL =	5,816									
ABC _{Tier 1} =	5,414	5,034	4,670	4,314	3,961	3,601	3,223	2,803	2,279	
ABC _{Tier 2} =	5,129	4,514	3,956	3,443	2,963	2,507	2,063	1,615	1,123	
HG =	0									

Table 2. 2019-2020 OFL and ABC, and CPSMT recommended ACL and ACT

Biomass	27,547
OFL	5,816
P* Buffer	0.4
ABC/ACL	4,514
ACT	4,000

List of CPSMT Recommended Accountability Measures

1. If Amendment 17 is approved, directed live bait fishing for Pacific sardine will be permitted, and will also be subject to accountability measures specified under number 2 below. However, if Amendment 17 is not approved, live bait landings will be limited to the maximum allowed by the CPS FMP of 15 percent by weight, as currently required by the CPS FMP.
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 4,000 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 2 mt of Pacific sardine in non-CPS fisheries.

Table 3: Post-closure sardine landings (mt) by fishery for California, Oregon, and Washington.

Fishing Season	2015-2016	2016-2017	2017-2018	2018-2019⁵
CPS Incidental¹	164.1	514.5	275.3	177.3
Non-CPS Incidental	0.6	1.1	10.3	7.2
EFP²	N/A	N/A	N/A	357
Live Bait³	2,097	1,614	1,894	1,647
Tribal	66	85	0	0
Minor Directed⁴	N/A	N/A	7.3	49
Total	2,328	2,217	2,187	2,237
ACL	7,000	8,000	8,000	7,000

¹Incidental Pacific sardine limited to 40 percent landed weight in CPS fisheries

²Exempted Fishing Permit (EFP) take (PFMC April 2018)

³Based on voluntary logbook submission and information from other CDFW sources

⁴Minor directed fishery allowed under CPS-FMP Amendment 16 beginning March 2018

⁵2018-2019 data are preliminary and subject to change

PFMC
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