

COASTAL PELAGIC SPECIES MANAGEMENT TEAM REPORT ON SARDINE  
ASSESSMENT, SPECIFICATIONS, AND MANAGEMENT MEASURES

The Coastal Pelagic Species Management Team (CPSMT) and the Coastal Pelagic Species Advisory Panel (CPSAS) jointly received a presentation from Dr. Kevin Hill concerning the Pacific sardine stock update assessment conducted in 2015. The CPSMT recommends that the Pacific Fishery Management Council (Council) adopt the update assessment for management of the 2015-2016 sardine fishery (Agenda Item Supplemental Assessment Report) using the recent three year average to estimate recruitment. The age 1+ biomass estimated from this assessment, using the three year average to estimate recruitment, is 96,688 metric tons (mt).

A set of control rules describe harvest policy for the management of Pacific sardine, including the overfishing limit (OFL), the acceptable biological catch (ABC), and the harvest guideline (HG). The Pacific sardine HG control rule, the primary mechanism for setting the annual directed quota for Pacific sardine, includes a CUTOFF value of 150,000 mt. This amount is subtracted from the annual biomass estimate before calculating the applicable HG for the fishing season. The 2015-2016 biomass estimate of 96,688 mt is notable for being below CUTOFF. Accordingly, the CPSMT recommends closure of the primary directed fishery for Pacific sardine for the upcoming fishing year (July 1, 2015 - June 15, 2016). This closure however does not preclude the allowance for incidental catch in other CPS and non-CPS fisheries as well as directed live bait and tribal harvest.

Chapter 5 of the CPS FMP describes the established allowances for incidental and live bait harvest for CPS. Sections 5.1.2 and 5.1.5 of that chapter respectively provide guidance on the established allowances for incidental catch and live bait harvest for when stocks are not overfished. The overfished threshold for Pacific sardine is a biomass level of 50,000 mt. Because Pacific sardine is not overfished, the CPSMT used these as guidance for our recommendations on allowable harvest for the 2015-2016 fishing season.

5.1.2 Incidental Catch Allowances When Stocks are Not Overfished

When a stock is not overfished according to the definition of overfishing in the FMP, incidental catch allowances for commercial fishing shall be set at zero percent to 45% of landed weight, as recommended by the Council.

5.1.5 Incidental Catch Allowances for Live Bait When Stocks are Not Overfished

When a stock is not overfished according to the definition of overfishing in the FMP and an ACL is not anticipated to be exceeded, no restrictions are placed on live bait harvest.

*Incidental Landings History*

The CPSMT looked at the incidental catch history of Pacific sardine in all other fisheries from 2008 through 2014. Years of lower Pacific sardine biomass paired with higher incidental rates,

are presented in Table 1. The CPSMT used this recent data to determine the most likely scenarios for the coming year. The Team recognizes that the dynamics of the other CPS (Pacific mackerel, jack mackerel, anchovy and squid) fisheries may change as a shift in effort occurs with the absence of a directed sardine fishery. Most incidental sardine landings occur in other CPS fisheries while minimal incidental landings have occurred in other fisheries using ten other gear types (<1 metric ton of landings since 2008).

Table 1. Incidental landings totals for Washington, Oregon, and California from 2012-2014/15 for all gear types (metric tons).

	2012	2013	2014 Interim	2014/15	Highest Year
WA	0.00	<b>0.62</b>	0.00	0.00	0.62
OR	47.83	17.14	0.00	<b>366.90</b>	366.90
CA	412.95	<b>1,327.39</b>	832.70	808.30	1,327.39
Total	460.78	1,345.15	832.70	1,175.20	1,694.91

The CPSMT reviewed California CPS landing receipts. A count of incidental landings of sardine in targeted CPS fisheries shows that the Pacific mackerel fishery has the highest rate of encounters with sardine (Figure 1). Of the 1,181 directed Pacific mackerel landing receipts, 263 or 22% of those landings contain incidental sardine, defined as loads with less than 50% sardine. Of the 263 Pacific mackerel loads with incidental sardine, proportions of sardine within these by percentage bin are indicated above each bar in Figure 1. If the Council sets an incidental allowance of 40%, it would have affected a total of 12% (7% + 5%) of the Pacific mackerel landings that contained incidental sardine between 2012 and 2014. An incidental allowance at 30% would affect another 13% (6% + 7%).

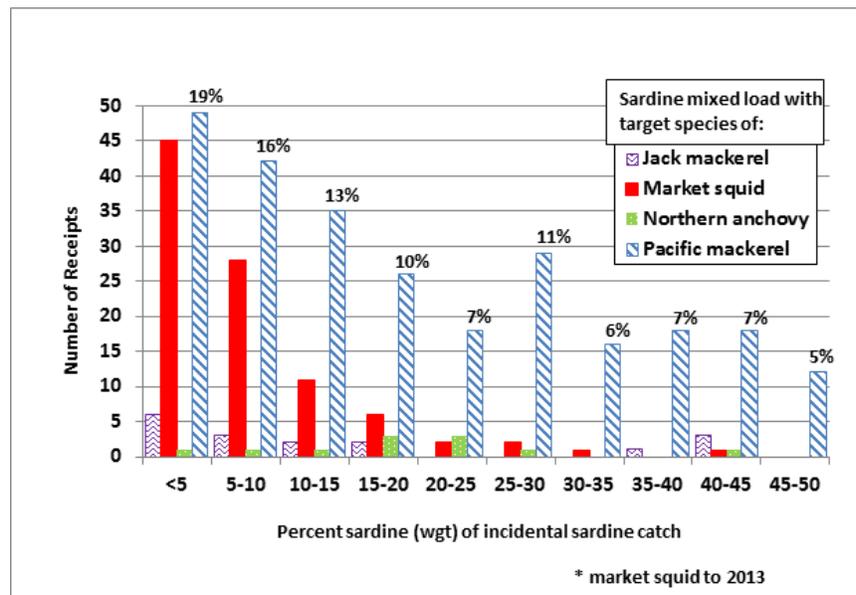


Figure 1. All mixed CPS load receipts where sardine was < 50% of load. Target species are predominant species in the load. Percentages of Pacific mackerel loads with incidental sardine by percentage bin are indicated above each bar. Market squid receipts for 2014 are undergoing a review, therefore the data for market squid are from years 2012-2013.

*Harvest Specifications for 2015-2016*

Table 2 (below) contains the overfishing limit (OFL) and a range of acceptable biological catch (ABC) values based on various P\* (probability of overfishing) values. Considering the results of the full stock assessment conducted in 2014, the Council chose a P\* of 0.40 for the 2014-2015 fishery. This P\* value applied to the OFL of 13, 227 mt produces an allowable biological catch (ABC) of 12,074 mt. To help conserve sardine while allowing fisheries to proceed, the CPSMT recommends an ACL of 8,000 mt (Table 3). The CPSMT also recommends the following accountability measures (AMs) as management controls: an ACT of 4,000 mt for CPS fishery incidental catch, an incidental per landing allowance of 40% Pacific sardine in non-treaty CPS fisheries until a total of 1,500 mt of Pacific sardine are landed; At this point, the recommended incidental per landing allowance would be reduced to 30%; when the ACT (4000 mt) is reached the incidental per landing allowance would be reduced to 5% for the remainder of the 2015-2016 fishing year. Additionally, the CPSMT recommends a 2 mt incidental per landing allowance in non-CPS fisheries. The CPSMT proposes these incidental allowances (as listed below) to allow the fisheries to proceed while also minimizing discard of fish at sea and in recognition that higher mixing of sardine and mackerel occurs at low biomass levels.

The proposed AMs are not intended to apply to the Quinault Indian Nation fishery and the live-bait fishery. However, the CPSMT acknowledges that this catch and other minimal sources of mortality, such as recreational take, are to be accounted for against the ACL and is consistent with the previous management and the CPS FMP.

The CPSMT further recommends the Council adopt an in-season review provision, tentatively scheduled for the September Council meeting, to consider revisions for incidental trip allowances.

**Table 2. Pacific sardine harvest formula parameters for 2015-2016.**

<b>Harvest Control Rule Formulas</b>									
OFL = BIOMASS * $E_{MSY}$ * DISTRIBUTION									
ABC <sub>P-star</sub> = BIOMASS * BUFFER <sub>P-star</sub> * $E_{MSY}$ * DISTRIBUTION									
HG = (BIOMASS - CUTOFF) * FRACTION * DISTRIBUTION									
<b>Harvest Formula Parameters</b>									
BIOMASS (age 1+, mt)	96,688								
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</sub>	0.9558	0.9128	0.8705	0.8280	0.7844	0.7386	0.6886	0.6304	0.5531
$E_{MSY}$	0.15724								
FRACTION	0.15								
CUTOFF (mt)	150,000								
DISTRIBUTION (U.S.)	0.87								
<b>Harvest Control Rule Values (mt)</b>									
OFL =	<b>13,227</b>								
ABC <sub>Tier 1</sub> =	12,642	<b>12,074</b>	11,514	10,951	10,375	9,769	9,108	8,338	7,316
ACL =	<b>8,000</b>								
HG =	<b>0</b>								

**Table 3. 2015-16 Calculated OFL and ABC and CPSMT Recommended ACL and ACT Values.**

Biomass	96,688
OFL	13,227
P* buffer	0.4
ABC <sub>0.4</sub>	12,074
ACL	8,000
ACT	4,000

**List of CPS Recommend Accountability Measures**

- An incidental per landing allowance of 40% Pacific sardine in non-treaty CPS fisheries until a total of 1,500 mt of Pacific sardine are landed.
- When the 1,500 mt is achieved the recommended incidental per landing allowance would be reduced to 30%.
- When the ACT (4000 mt) is reached the incidental per landing allowance would be reduced to 5% for the remainder of the 2015-2016 fishing year.
- A 2 mt incidental per landing allowance in non-CPS fisheries.

*Methodology Review*

Finally, the CPSMT reiterates its support of a methodology review for the Southwest Fisheries Science Center (SWFSC) Acoustic-Trawl (A-T) survey. This survey has provided an index of abundance in the sardine stock assessment model since 2011, and has not been reviewed since February 2011. The Team also supports the Scientific and Statistical Committee’s (SSC) request to the survey principals for a formal, point-by-point response to the list of potential items that were requested of the lead scientists in the April 2011 Methodology Review Panel report . The MT notes that the A-T survey is the only point estimate for the 2014 surveys in the 2015 update assessment indicating to its importance in informing sardine management. Moreover, the A-T survey could be used to assess abundance of other CPS.