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 Subpanel (CPSAS) jointly received a presentation from Dr. Kevin Hill concerning the Pacific sardine stock assessment conducted in 2014. The CPSMT recommends that the Pacific Fishery Management Council (Council) adopt the full assessment (model T) for management of the 2014-2015 sardine fishery (Agenda Item H.1.b, Stock Assessment Report). Based upon the 369,506 metric tons (mt) age 1+ biomass estimated from this assessment, the harvest control rule produces a harvest guideline (HG) of 28,646 mt (Table 1 below).

The upcoming season marks the implementation of a new fishery year schedule, from July 1- June 30. The CPSMT notes the biomass of age 1+ fish (369,506 mt as of July 1) estimated from the assessment, and used to set harvest guidelines, now coincides with the start date for the fishing year, unlike past years when the fishery year began on January 1. The CPSMT notes the stock assessment produced an estimate that is very similar to the catch-only projection of 378,120 mt for the interim (January –June) 2014 fishery.

The CPSMT commends the Stock Assessment Team (STAT) for incorporating numerous changes based on previous research recommendations. These improvements result in better model parameterization and stock structure. These changes include: defining the assessed stock using an environmental variable instead of port of landing, basing the spawner-recruit relationship on Beverton-Holt instead of using the Ricker curve, and the Acoustic-Trawl Method survey splitting from a single to a spring and summer time series.

As indicated above, the current stock assessment uses an environmentally-based method from satellite-based sea surface temperature (SST) data to differentiate sardine catch into northern and southern stocks, for the purpose of excluding the southern stock catch from the assessment model. The catch differentiation method is used to refine the estimate of fishery exploitation rate and biomass for the northern stock. Based on the overall distribution of both stocks and the low amount of southern stock harvested in U.S. waters, the CPSMT does not consider catch of southern stock as negatively impacting either stock. The CPSMT notes that there is some de facto management of the southern stock in U.S. waters, given that all U.S. catch of Pacific sardine is counted towards allocation limits and that all Pacific sardine harvest must comply with federal and/or tribal regulations. The CPSMT recognizes that this is a complex issue and may need additional evaluation in the future as the science develops.

Regarding the uncertainty surrounding the recruitment of the 2013 year class into the 2014-2015 fishery, the CPSMT notes this results from moving the start of the sardine fishery year from January to July. In past assessments, this year class would not have been incorporated in the estimate of stock biomass for management purposes. But with the timing change, recruitment of this year class was taken from the stock recruitment relationship and had no observed data from which to derive the estimate. There was insufficient time to address this uncertainty during this year's Stock Assessment Review (STAR) Panel review. For future assessments, the STAT has identified methods to reduce the level of uncertainty.

We encourage efforts to provide complementary and/or corroborative information to improve our understanding and assessment of the sardine stock. The CPSMT believes that a methodology review

of the aerial survey is necessary before new survey data are incorporated in the stock assessment. Likewise, the CPSMT encourages a methodology review of the acoustic trawl method (ATM) survey.

Harvest Specifications for 2014-2015

Table 1 (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 2011 for 2012, the Council chose a P* of 0.40 for the 2013 and interim 2014 fisheries. At its March 2014 meeting, and based on SSC guidance, the Council approved changing the temperature index from Scripps Pier (SIO) to CalCOFI (California Cooperative Oceanic Fisheries Investigations) for the purposes of estimating F_{MSY} (or E_{MSY}) in the OFL and ABC control rules for the 2014-2015 fishery and beyond. The estimated value of E_{MSY} derived from the CalCOFI index is 0.1219697. Also at the March 2014 meeting, the Council initiated action to change the temperature index for purposes of calculating HG FRACTION, with final action scheduled for November 2014. For the 2014-2015 fishery, the value for FRACTION (15 percent) used to calculate the HG is based on the Scripps Institution of Oceanography (SIO) temperature index.

Based on the values in Table 1, the CPSMT computed the HG according to the current fishery management plan formula (with SIO index) and also an alternative harvest level (expressed as annual catch limit [ACL]/ACT) using the CalCOFI index. Seasonal allocation schemes for HG and ACL are presented in Tables 2 and 3, respectively.

The Quinault Indian Nation requests 4,000 mt of Pacific sardine for their participation in the 2014-2015 fishery (Agenda Item H.1.a, Attachment 1). Acknowledging that a set-aside for the Quinault Indian Nation has yet to be determined, the CPSMT presents allocation schemes (Tables 2 and 3 below) incorporating the requested set-aside of 4,000 mt.

The Northwest Sardine Survey LLC notified the Council it is withdrawing its request for an exempted fishing permit for 2014-2015 (Agenda Item H.1.a, Attachment 2), so no set aside is necessary for an exempted fishing permit this year

The CPSMT incorporates the CPSAS recommendation that the incidental catch for CPS fisheries in each of the three allocation periods should be set to 500 mt (Tables 2 and 3) and that the incidental landing allowance for CPS fisheries be no more than 45 percent Pacific sardine by weight after the directed fishery closes.

Although the fishery year changed, the rollover provisions from the first fishing period to the second and from the second to the third remain the same as in previous years. The first fishing period is now July 1- September 14; the second period is September 15 – December 31 and the third fishing period is January 1- June 30. Any allocation remaining on June 30 is not rolled over to the next fishery year.

According to the CPS FMP framework, the ACL must be equal to or below the ABC, and typically the Council has set the ACL equal to the ABC. An ACT is equal to the HG or ACL, whichever value is less. Although the HG based on SIO is below the ABC, the Team recommends adopting the ACT based on the calculation in Table 1. Table 1 presents a calculation for an ACL, substituting the CalCOFI index for the SIO index in the HG formula. This resulting ACL is below the calculated HG and therefore, it would be the basis for the ACT for the 2014-2015 fishery.

The use of the ACL for setting the harvest level is atypical, but the team recognizes that the HG is likely to be based on the CalCOFI index for future fishery years and therefore, the CPSMT recommends the Council use the CalCOFI index, as the SSC has determined that it is best available science for the other sardine harvest control rules (OFL and ABC).

Table 1. Pacific sardine harvest formula parameters for 2014-2015.

Harvest Control Rule Formulas									
OFL = BIOMASS * E_{MSY} * DISTRIBUTION (CalCOFI temperature index)									
ABC = BIOMASS * $BUFFER_{P\text{-}star}$ * E_{MSY} * DISTRIBUTION (CalCOFI temperature index)									
HG = (BIOMASS – CUTOFF) * FRACTION * DISTRIBUTION (SIO temperature index)									
ACL/ACT = (BIOMASS – CUTOFF) * E_{MSY} * DISTRIBUTION (CalCOFI temperature index)									
Harvest Formula Parameters									
BIOMASS (ages 1+, mt)	369,506								
P-star	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10	0.05
ABC $Buffer_{Tier\ 1}$	0.9558	0.9128	0.8705	0.8280	0.7844	0.7386	0.6886	0.6304	0.5531
E_{MSY}	0.12197								
FRACTION	0.15								
CUTOFF (mt)	150,000								
DISTRIBUTION (U.S.)	0.87								
Harvest Control Rule Values (MT)									
OFL =	**39,210**								
$ABC_{Tier\ 1}$ =	37,475	35,792	34,131	32,464	30,757	28,961	26,999	24,719	21,688
HG =	28,646								
ACL/ACT =	**23,293**								

Table 2. Preliminary allocation scheme based on HG (with SIO index) for the 2014-2015 Pacific sardine fishery. Values in metric tons (mt)

HG = 28,646 mt; Tribal set-aside = 4,000 mt; Adjusted HG = 24,646 mt				
	Jul. 1 - Sep. 14	Sep. 15 - Dec. 31	Jan. 1 – Jun. 30	Total
Seasonal Allocation	9,858 (40%)	6,162 (25%)	8,626 (35%)	24,646
Incidental Set-Aside	500	500	500	1,500
Adjusted (Directed) Allocation	9,358	5,662	8,126	23,146

Table 3. Proposed preliminary allocation scheme based on ACL/ACT (with CalCOFI index) for the 2014-2015 Pacific sardine fishery. Values in metric tons (mt)

ACL/ACT = 23,293 mt; Tribal set-aside = 4,000 mt; Adjusted ACL/ACT = 19,293 mt				
	Jul. 1 – Sep. 14	Sep. 15 – Dec. 31	Jan. 1 – Jun. 30	Total
Seasonal Allocation	7,718 (40%)	4,823 (25%)	6,752 (35%)	19,293
Incidental Set-Aside	500	500	500	1,500
Adjusted (Directed) Allocation	7,218	4,323	6,252	17,793

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