

## COASTAL PELAGIC SPECIES MANAGEMENT TEAM REPORT ON MINIMUM STOCK SIZE THRESHOLDS REPORT

The Coastal Pelagic Species Management Team (CPSMT), Coastal Pelagic Species Advisory Panel (CPSAS) and the Scientific and Statistical Committee (SSC) jointly received a presentation from Dr. Kevin Hill on the review and re-evaluation of minimum stock size thresholds (MSSTs) for finfish in the CPS Fishery Management Plan (FMP). This MSST report was prepared by the National Marine Fisheries Service (NMFS) to meet terms of a settlement agreement specified in *Oceana, Inc. v. Penny Pritzker et al.* (Ninth Circuit No 13-16183; District Court No. C-11-6527 EMC (N.D.Cal)). The main objectives of the report were to 1) summarize existing MSST definitions for finfish CPS stocks; 2) describe status quo and alternative MSST approaches for these stocks; 3) review current sources of data for each stock; 4) apply different methods to evaluate MSST for each stock based on data availability; and 5) present discussion questions on potential future research to develop MSST for CPS stocks. The CPSMT commends NMFS and Dr. Kevin Hill for providing a thorough review of MSST approaches and for outlining potential options to consider in the future for defining and computing CPS MSSTs.

Finfish stocks considered in this report are Pacific sardine, Pacific mackerel, the central subpopulation of northern anchovy (CSNA), the northern subpopulation of northern anchovy (NSNA), and jack mackerel. NMFS guidelines for National Standard 1(NS1) of the Magnuson-Stevens Fishery Conservation and Management Act stated that MSST is the level of biomass below which the stock or stock complex is considered to be overfished. The CPS FMP (PFMC 1998, 2016) defined status of an overfished sardine stock as a population with an age 1+ biomass on July 1 of 50,000 mt or less. Similarly, in the CPS FMP the overfished status for Pacific mackerel was adopted to be a stock with an age 1+ biomass of 18,200 mt or less. Although a MSST is not currently specified in the CPS FMP for the CSNA, Amendment 6 adopted a de facto overfishing level that corresponds to a biomass below 50,000 mt. An MSST has not been specified for either jack mackerel or the NSNA.

### *MSST Specifications for Finfish CPS*

The MSSTs for finfish CPS were defined and computed using three different metrics (frame-worked MSSTs) (see Table 1 below). Two of the metrics were based on estimates of  $SSB_{MSY}$  and  $SSB_0$  assuming long-term equilibrium conditions, and the third one was based on current/dynamic  $SSB_0$  estimated from most recent stock assessment models. Table 1 presents the MSST values computed from equilibrium  $SSB_{MSY}$  and  $SSB_0$  and dynamic  $SSB_0$  estimated from assessment models for finfish stock in the CPS FMP. Status quo MSSTs for Pacific sardine, Pacific Mackerel and the CSNA were smaller than MSST computed from the proposed metrics. MSST for Jack mackerel was calculated based on  $SSB_0$ , but there was no status quo value to compare this estimate to. Additionally, MSSTs for Jack mackerel and the CSNA used data and assessment model parameters estimated from research conducted in 1995 and 1983, respectively. Due to the lack of data, no MSST was computed for the NSNA.

The CPSMT sees value in using frame-worked MSSTs (i.e. metrics) for all CPS finfish stocks as potential alternatives to utilizing fixed MSSTs (i.e., current MSST definitions). Given the highly

dynamic nature of CPS stocks, using frame-worked MSSTs may increase the ability to account for changes in population abundance that can occur over various temporal scales, annual, decadal and centennial. However, based on the SSC discussion of this report, it appears that much research work will need to be done before a frame-work MSST can be defined, reviewed, and adopted for finfish CPS stocks.

The CPSMT recognizes that current MSSTs defined in the CPS FMP could be revised based on the new proposed approaches, but until specific methods can be developed, reviewed by the SSC and adopted by the Council we recommend that status quo MSSTs continue to be used for finfish in the CPS FMP. It is important to note that the control rules for the two active stocks have Cutoff values, which provide sufficient buffer to prevent overfishing. Finally, the CPSMT encourages the Council to consider the overall workload on scientists at Science Center and State agencies, so that a flexible schedule can be outlined if the Council were to determine more research is needed on defining frame-worked MSSTs.

Table 1. Estimates of equilibrium  $SSB_{MSY}$ ,  $SSB_0$ , and dynamic  $SSB_0$ , with associated MSST calculations. Calculated MSSTs are provided in the lower half of the table.

	Pacific Sardine	Pacific Mackerel	No. Anchovy CSP	Jack Mackerel	No. Anchovy NSP
Metric \ Source	Hill et al. 2016	Crone & Hill 2015	Jacobson et al. 1995 & SRFIT	MacCall & Stauffer 1983	none available
Natural Mortality (M)	0.4	0.5	0.8	0.46	nd
Equilibrium $SSB_{MSY}$	101,790	55,297	139,561	nd	nd
Equilibrium $SSB_0$	421,572	156,849	345,246	1,360,800	nd
Dynamic $SSB_{0current (1 gen)}$	349,726	122,996	nd	nd	nd
Dynamic $SSB_{0current (2 gen)}$	608,484	130,763	nd	nd	nd
Current MSST Definition	50,000	18,200	50,000	nd	nd
$0.5 * SSB_{MSY}$ (for $M \geq 0.5$ )	na	27,649	69,781	nd	nd
$(1-M) * SSB_{MSY}$ (for $M \leq 0.5$ )	61,074	na	na	nd	nd
$0.2 * SSB_0$	84,314	31,370	69,049	272,160	nd
$0.2 * SSB_{0current (1 gen)}$	69,945	24,599	nd	nd	nd
$0.2 * SSB_{0current (2 gen)}$	121,697	26,153	nd	nd	nd

PFMC  
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