

## COASTAL PELAGIC SPECIES MANAGEMENT TEAM REPORT ON SARDINE REBUILDING PLAN

The Coastal Pelagic Species Management Team (CPSMT) continued discussion of a range of alternatives (ROA) for the Pacific sardine rebuilding plan, the rebuilding analysis, and socio-economic considerations. Dr. Kevin Hill and the other CPSMT members also met with the Scientific and Statistical Committee (SSC) and heard discussion regarding use of the ‘Rebuilder’ tool. The SSC endorsed the use of the Rebuilder tool to inform the rebuilding analysis and provided additional comments on the parameters which will require additional work by Dr. Hill before the Rebuilder tool can be used. The SSC also provided their input on the socio-economic analysis for the rebuilding plan.

Part of the rebuilding analysis process will be the identification of a target biomass for when the stock will be considered rebuilt (i.e.,  $B_{MSY}$  or proxy). Although Pacific sardine management includes the Cutoff parameter of 150,000 mt, this is not explicitly described in the CPS fishery management plan (FMP) as a rebuilding target and is not a  $B_{MSY}$  proxy. Therefore, although it represents a similar concept as  $B_{MSY}$  as described in Appendix A (Agenda Item G.1.a, CPSMT Report 1), the CPSMT plans to use the rebuilder tool to look at two different productivity scenarios to help determine an appropriate rebuilding target. One can expect that  $B_{MSY}$  will be a higher biomass level and stocks will undergo shorter rebuilding times under relatively higher productivity scenarios, and  $B_{MSY}$  will be lower and stocks will take longer to rebuild in poorer productivity scenarios.

The sardine population experiences boom and bust cycles even in the absence of commercial fishing. Environmental conditions and resulting productivity are critical factors affecting the population size of this stock and how quickly it can recover from low levels. Therefore, model outputs should not be viewed as true rebuilding times for Pacific sardine. Evaluation of modeling results and proposed alternatives may find that sardine fishery management will have minimal effects on stock rebuilding. The CPSMT emphasizes that the Council needs to keep these caveats and limitations in mind as it considers the range of alternatives at this meeting and when the rebuilding analyses are completed.

The CPSMT report 1 outlines the CPSMT’s proposed approach at modeling status quo management (i.e., maintaining existing harvest control rules) using a set of constant, fixed-catch time series (Alternative 1). The CPSMT had identified this as the most appropriate and cleanest approach at the time, considering some of the intricacies of the modeling platform and CPS management. The CPSMT notes the value in keeping the modeling as simple as possible to avoid overparameterization given the assumptions and inputs regarding productivity. However, during discussion at this meeting, the CPSMT identified another potential approach that may more fully model status quo management by simulating the acceptable biological catch (ABC) control rule to the extent practicable with the addition of a constant value as a proxy for additional catch outside of U.S. control. This approach will require some modifications to the rebuilder tool, and as of now it is not certain whether these changes can be accomplished. The CPSMT intends to further pursue this with hopes of bringing this approach to the proposed mid-July meeting with the CPS subcommittee of the SSC.

In developing the range of alternatives (ROA) document (Agenda Item G.1.a, CPSMT Report 1), as well as at this meeting, the CPSMT has spent considerable time discussing the value of examining an intermediate management alternative between status quo and zero U.S. harvest. In part, the struggles the CPSMT has had on whether to recommend a third alternative at this time are explained by the measures the Council has already taken, and those in the CPS FMP, intended to conserve Pacific sardine and assist in its rebuilding. As mentioned in G.1.a, CPSMT Report 1, many of the traditional measures that might be taken under a rebuilding plan have already been implemented. For example, primarily as a result of the Cutoff parameter in the harvest guideline (HG) control rule during years leading up to the closure of the directed fishery in 2015, the Council took drastic measures and reduced the HG by approximately 60 percent in one year and 66 percent in another.

The lack of modeling results for the two proposed alternatives posed difficulties in creating and weighing the merits of a third alternative. The need for additional alternative(s) may become more evident after viewing these results, as well as the value of T<sub>min</sub>. If the rebuilding times are very similar for the status quo alternative and the zero harvest alternative, there may not be much value in looking at intermediate options. However, if there are large differences then it is likely the CPSMT and the Council would want to see the results of an intermediate option. Therefore, the CPSMT includes a third alternative that reduces ABC to see if the results will be substantially different from the other two alternatives.

Additional work by Dr. Hill and the CPS subcommittee of the SSC needs to be done to fine-tune the Rebuilder tool. The CPSMT strongly recommends a webinar be scheduled in mid-July to complete and review the rebuilding analyses and to ensure complete documentation. This would facilitate subsequent review and CPSMT discussion and may allow adequate time for the CPSMT to prepare a report for the September 2020 Council meeting, recognizing the substantial amount of work to create the rebuilding plan.

### **Revised Range of Alternatives**

Alternatives 1 and 2 below are substantially the same as described in G.1.a CPSMT Report 1. Alternative 3 below is new.

#### **Alternative 1: Status Quo**

The Alternative 1 or status quo option continues current harvest control rules (HCRs) that are in place for the northern subpopulation of Pacific sardine. Annual harvest specifications would be determined based on annual stock assessments, the existing overfishing limit, ABC and HG control rules, as well as the other management measures in place for sardine when it is below minimum stock size threshold and below Cutoff.

The Status Quo alternative represents the upper end of the range of allowable harvest. The primary directed commercial fishery has been closed since 2015 because the biomass estimate fell below the Cutoff value of 150,000 mt. Limited harvest remains allowed under the CPS FMP, primarily for live bait and, to a lesser extent, incidental and minor directed harvest. The direct regulatory pressures on the socio-economics of the CPS fishery would remain constant; however, additional effects are possible due to the long term effect of the closure. There would not be a substantial change in the nature of ecosystem or fishery effects.

### Alternative 2: Zero Harvest

Alternative 2 would adopt a zero-harvest approach, meaning that no live bait, no incidental harvest, and no minor directed harvest would be allowed. This alternative is not a true zero harvest approach because fishing for the northern subpopulation of Pacific sardine occurs in Mexican waters, outside of U.S. management jurisdiction.

This alternative may include direct socio-economic impacts to commercial fishing vessels that land Pacific sardine (including incidentally) and could have indirect effects to the recreational fishing sector and commercial fishing sector in general.

### Alternative 3: Reduced Status Quo

Alternative 3 would continue existing harvest control rules as in Alternative 1, except ABC would be reduced by some percentage. Once we know the results of the rebuilding times for  $T_{min}$  and  $T_{max}$ , as well as the status quo alternative, the MT will determine appropriate alternatives to analyze. This alternative may ultimately include multiple sub-alternatives.

This alternative may include direct socio-economic impacts to commercial fishing vessels that land Pacific sardine (including incidentally) and indirect effects to the recreational fishing sector and commercial fishing sector in general.

### Economic Analysis

The Summary of Socio-Economic Considerations (Agenda Item G.1.a, CPSMT Report 1 Appendix B) included in the June 2020 Briefing Book provided an overview of CPS-related fisheries and the potential socio-economic impacts of regulations associated with rebuilding. It does not provide an analysis of the socio-economic impacts of potential ROA policies that are under development. The September 2020 CPSMT report will include such an analysis and will take into consideration the recommendations from the SSC.

PFMC  
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