

## SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON CENTRAL SUBPOPULATION OF NORTHERN ANCHOVY MANAGEMENT UPDATE

The Scientific and Statistical Committee (SSC) discussed the three tasks associated with this agenda item, which were assigned to the SSC and the National Marine Fisheries Service Southwest Fisheries Science Center (SWFSC) by the Council in April 2018. These tasks are all related to the overall goal of calculating overfishing limits (OFLs) and acceptable biological catches (ABCs) for the central subpopulation of northern anchovy (CSNA). This requires estimates of Biomass and  $E_{MSY}$  (the exploitation rate associated with maximum sustainable yield), and a method to estimate the uncertainty of the resultant OFL.

1. Determine a method to estimate the nearshore component of the stock not sampled by the Acoustic-Trawl (AT) Methodology

The biomass in the areas inshore of the acoustic survey grid can be estimated by surveying that area (the SSC preferred approach) or by extrapolating from the AT survey. Dr. Juan Zwolinski (University of California, Santa Cruz) presented information on small vessel and sail drone acoustic surveys that have been conducted inshore of the AT survey grid. Mr. Kirk Lynn (CDFW) was available to answer questions regarding the California Aerial Survey.

Three survey platforms have been used to survey areas inshore of the AT survey for various portions of the coast in recent years. These include an acoustic survey conducted using a small vessel, conducted concurrently with the AT survey in areas off portions of Oregon and Washington in 2017; a sail drone survey conducted concurrently with the AT survey in Central California in 2018; and an aerial survey off of California conducted over varying portions of the coast since 2012. The first two surveys, being concurrent with the AT survey, can be used to augment the information from the AT survey for those years and areas they cover. The SSC has not reviewed a methodology to expand the aerial survey to unsampled areas, and emphasizes the need for any survey to be synchronous with the AT survey. Ideally, the combined AT and inshore surveys would also be synoptic and synchronous, which would eliminate the need for extrapolations.

Extrapolations from the end of the AT survey transects to the 5 m isobath have been made by assuming the same density as observed in the equivalent length of the inshore end of the survey transect. This approach could be evaluated by comparing equivalent lengths at the end of the AT survey with sail drone or vessel data where it exists inshore of the AT survey.

2. Determine the timeline and process necessary to conduct the near-term establishment of an OFL for the CSNA stock using the methods described in the SSC report ([Agenda Item C.4.a, Supplemental SSC Report 1, April 2018](#))

The SSC discussed the document prepared by Dr. André Punt entitled An Approach for Computing  $E_{MSY}$ ,  $B_{MSY}$ , and  $MSY$  for the CSNA ([Agenda Item E.4, Attachment 1](#)). This document builds on the MSST report ([Agenda Item E.1.a, Supplemental NMFS Report, September 2016](#)), performing a Bayesian analysis to fit alternative formulations of the stock-recruit relationship (Ricker or Beverton-Holt, with or without autocorrelation) to the assessment estimates of recruitment and spawning biomass and assumed life history and selectivity parameters reported in the Jacobson et

al. (1995) assessment. The SSC recommends use of the posterior median as the point estimate for  $E_{MSY}$ . Accepted practice is to use the posterior median to determine OFLs from Bayesian assessments.

$E_{MSY}$  estimates arising from the above approach would be applied to CSNA biomass estimates to determine OFLs. The SSC endorses the approach used, with alternative assumptions potentially forming the basis for a decision table analysis. While the use of output from an assessment as data input to this analysis is not ideal, no better approach is immediately available.

3. Scope the process for recommending the frequency of revisions to OFLs and ABCs based on the potential impacts of changing reference points less frequently against potentially increased risk associated with not basing reference points on the most recent data.

The SSC discussed the document prepared by Dr. André Punt entitled Whitepaper on Frequency of Assessments and Updates to OFLs, ABCs, and annual catch limits (ACLs) for the CSNA ([Agenda Item E.4, Attachment 2](#)). This document provides a simple illustrative example of the tradeoffs involved in different frequencies of updating OFL specifications based on new biomass estimates, assuming that  $E_{MSY}$  and  $MSY$  are known. The analysis also evaluates the tradeoff between catch stability and larger buffers required to maintain a given risk of overfishing when updates are less frequent. It also describes how a management strategy evaluation (MSE) or MSE-lite (a simplified MSE that does not incorporate as full a range of uncertainty or management objectives as a full MSE) could be used to further assess the value of different frequencies of new assessments (allowing updates to reference points such as  $E_{MSY}$  and  $B_{MSY}$  in addition to updating biomass) and the required timeline for such analyses. The SSC endorsed the conceptual illustration, proposed approaches, and approximate timelines. This includes six months for an MSE-lite and one year for a full MSE (assuming full time staff were available). The SSC notes that the time required for an MSE increases with the amount of stakeholder involvement desired.

Prior to conducting an MSE, a scoping meeting should take place including the CPSSC, CPSAS, CPSMT and the SWFSC to determine candidate control rules and management objectives.

Review of new analyses for determining the OFL for CSNA, including  $E_{MSY}$ , biomass estimation, or results of an MSE, should take place at a CPS subcommittee meeting, with the CPSAS, CPSMT and the SWFSC.

PFMC  
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