SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON NORTHERN ANCHOVY STOCK ASSESSMENT AND MANAGEMENT MEASURES

Dr. André Punt summarized the October 2016 review by the Scientific and Statistical Committee (SSC) Coastal Pelagic Species (CPS) Subcommittee of the indices of abundance for the central subpopulation of northern anchovy (CSNA) based on egg and larval data for the California Cooperative Oceanic Fisheries Investigations (CalCOFI) survey area. Dr. Ed Weber then briefed the SSC on the seasonal indices of relative abundance developed in response to the guidance provided at the October review meeting (Agenda Item G.4.a, SWFSC Report). The Supplemental SWFSC Report (Agenda Item G.4.a, Supplemental SWFSC Report 2) was submitted far too late (November 11th) for adequate SSC review. However, the report was discussed because it included analyses specifically requested by the subcommittee.

The egg and larval production indices presented in the SWFSC report represent the best available science for trends in spawning biomass in the CalCOFI survey area. However, the report did not expand the trend information to estimate absolute spawning biomass in that area. The SSC agrees that this expansion is not appropriate, because it would require scaling the egg and larval indices using the Daily Egg Production Methods estimates for the 1980s. Neither the winter nor spring survey is conducted at the right time to fully capture spawning of CSNA, and the degree of mismatch may vary though time due to changing oceanographic conditions. A proper expansion from eggs and larvae to spawning biomass would require data on sex ratio, mean female weight, and fecundity. Variability in the timing of spawning may also complicate interpretation of the egg and larval time series as an index of relative abundance.

The spatial extent of the CalCOFI survey is limited (by depth and latitude) relative to the distribution of the broader CSNA population. The proportion of the population contained in the survey area at any given time is unknown and changes through time due, in large part, to oceanographic conditions. As trends in the CalCOFI survey area may not be representative of the broader population, it is difficult to infer population-level trends. However, the indices do indicate that the relative abundance of the CSNA in the CalCOFI survey area has remained low over the past decade, relative to the higher levels observed in the 1980s (during the peak of the fishery) and the mid-2000s (when a substantive fishery was absent).

The supplemental SWFSC report included results of the 2015 Acoustic Trawl Method (ATM) survey, which estimated the biomass of the CSNA to be approximately 31,427 metric tons (95% confidence interval 17,780-48,302t), with much of that biomass represented by age 0 (2015 year class) fish. The central California juvenile rockfish midwater trawl survey also provided evidence that the relative abundance of pre-recruit CSNA was high in 2015 and moderate in 2016. Although ATM data on the CSNA were collected during 2016, these data have not yet been analyzed to provide an estimate of biomass. Inshore areas where anchovy are known to occur, sometimes in large aggregations, remain outside the ATM survey area. Thus, the ATM estimate of anchovy biomass is likely to be negatively biased, with the degree of bias potentially changing from year to year. In common with the egg and larval production indices, the 2015

ATM results indicate that the current biomass for the CSNA appears to be well below historical levels.

The SSC recognizes that there is substantial uncertainty associated with how oceanographic conditions impact the spatial distribution of CSNA, including the proportion of anchovy biomass inshore of all available surveys (ATM, CalCOFI, and the Southern California Coastal Ocean Observing System – SCCOOS), and how those relationships change over time.

The biomass of the CSNA has undergone considerable variability over the last three decades, and as a consequence, there is a basis for reconsidering the current overfishing limit (OFL), which is based on a model using data from a historical period and collected under dramatically different environmental and abundance conditions. However, there are several important steps and data needs that must be considered to develop a revised OFL. These steps include the estimation of F_{MSY} or identification of a suitable proxy and developing methods for estimating total stock biomass, which would at a minimum require calibrating survey estimates to account for unsampled areas and preferably analyzing all the data in an integrated stock assessment. It is also important to consider time lags introduced by the collection, processing, and analysis of abundance data due to the highly dynamic nature of anchovy.

The SSC notes that in contrast to actively-managed CPS, there are currently no set procedures for setting and updating OFLs and acceptable biological catches for monitored species, including CSNA. Development of such procedures would be a useful addition to the fishery management plan, but should be based on an understanding of the population demographics of these species, preferably using some form of population dynamics model.

PFMC
11/17/16