

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON
ACOUSTIC TRAWL SURVEY METHODOLOGY REVIEW – FINAL APPROVAL

An acoustic-trawl survey (ATM) methodology review took place January 29 – February 2, 2018 at the Southwest Fisheries Science Center (SWFSC) in La Jolla, California. The review Panel, made up of three Scientific and Statistical Committee (SSC) members and three reviewers from the Center for Independent Experts (CIE), provided a report ([Agenda Item C.3, Attachment 2](#)) with several recommendations for research to improve the survey as well as to guide the use of the survey biomass indices in stock assessments or management procedures. The SSC echoes the Panel's commendation of the ATM team for their thorough presentations and responsiveness to panel requests.

Dr. André Punt presented the report to the SSC. Overall, the Panel concluded that the design of the acoustic-trawl survey is satisfactory and could be used to provide indices of abundance for Pacific sardine, northern anchovy, jack mackerel, and Pacific mackerel, subject to caveats. There are many areas in which improvements in documentation, methods, or in the evaluation of current approaches could be made. The report focused on eight topics specified for review, which included elements of the survey design, factors affecting estimation, bias and precision of biomass indices, uncertainty, and documentation. The review panel identified twenty-two recommendations for future work related to those eight topics. One of the major issues identified by the panel, spanning multiple topics, is the potential for bias in the survey estimates of biomass.

The SSC endorses the panel report's conclusions regarding the appropriate use of biomass indices from the survey for the five coastal pelagic species (CPS) stocks (Table 3 in the report; simplified as Table 1 below). Given concerns about potential bias, the use of survey indices to develop estimates of absolute biomass was not endorsed for any stock.

The SSC endorses the panel report's research recommendations, recognizing there may be a medium-term tradeoff between conducting research at the expense of the coefficient of variation of the survey indices, if some of the limited survey time is devoted to research. The SSC recognizes the need for annual survey indices for CPS stocks and does not recommend foregoing the summer survey, although a management strategy evaluation could more formally inform this issue.

One major issue to be addressed is bias due to the survey missing a portion of a stock that is outside the survey area. Treating survey results as indices addresses this issue if the proportion missed is small or constant. This is not considered to be the case for northern anchovy. Notwithstanding the other high priority recommendations, the SSC finds the following to be necessary to provide information for anchovy management:

- Continue to explore and expand independent nearshore survey methods and efforts to estimate the proportion of the populations not currently surveyed by the ATM survey.
- Develop extrapolation methods from the existing data that would extend biomass indices to the coastline and account for the additional uncertainty.

The SSC considers direct estimates of nearshore biomass to be far superior to extrapolated biomass indices. Although the panel recommended that the sardine index could be used even in the absence of an inshore correction factor, the SSC considers evaluating an annual nearshore correction factor to be highly important for sardine as well.

The SWFSC ATM Team provided a response to the review (Appendix 8 in the review report), focusing on the importance of uncertainties identified by the panel. The panel provided rationale as to why these areas of uncertainty are important (Appendix 9 in the review report). The SSC concurs with the Panel response that these areas of uncertainty are important and should be addressed.

Table 1. Possible use of ATM results in assessments and management. See Table 3 of the review report.

Species/Stock	Inclusion in an integrated stock assessment		Use biomass indices to directly inform management ¹
	Relative abundance (Q estimated)	Absolute abundance (Q=1)	
Pacific Sardine	Yes	No	Yes
Pacific mackerel	Yes, summer surveys only	No	Yes, summer only
Jack mackerel	Yes, summer surveys only	No	Yes, summer only
Northern sub-population of northern anchovy	Yes, summer surveys only, if inshore area is addressed	No	Yes, summer surveys only, if inshore area is addressed
Central sub-population of northern anchovy	Yes if inshore areas is addressed ²	No	Yes if inshore areas is addressed ²

1. Only with MSE. Harvest control rules that use indices of biomass that are not considered absolute have been developed for other fisheries using MSE and generally involve examining changes in biomass indices. It was beyond the terms of reference to explore how one could use a relative index of abundance in a management procedure.

2. For the central subpopulation of northern anchovy, the spring survey may adequately cover the offshore central subpopulation in some years, but may not in other years.