

The NOAA Southwest Fisheries Science Center & Pacific Fishery Management Council Workshop on CPS Assessments



Terms of Reference

- ▶ Evaluate model-based assessment approaches by using examples from other parts of the world where small coastal pelagic species are routinely assessed
- ▶ Compare available data, surveys, equipment, staffing resources, and other factors that affect stock assessments with reference to the situation for the central subpopulation of northern anchovy (CSNA) stock
- ▶ Priority to CSNA:
 - ▶ Other CPS stocks to consider: NSNA, jack mackerel, and others as appropriate
- ▶ Consider empirical approaches (biomass estimates) for harvest control rules
- ▶ Recommend methods and data collection/analyses for key CPS stocks

Panelists

- ▶ Jim Ianelli (co-chair, AFSC)
- ▶ André Punt (co-chair, SSC)
- ▶ Evelyn Brown (SSC)
- ▶ Will Satterthwaite (SSC)
- ▶ Owen Hamel (SSC)
- ▶ Martin Dorn (SSC)
- ▶ Aaron Berger (SSC)

- ▶ Diane Pleschner-Steele (CPSAS)
- ▶ Lorna Wargo (CPSMT)

- ▶ Doug Butterworth (UCT)
- ▶ Mike Prager (NMFS, retired)
- ▶ Alexandra Silva (IPMA, Portugal)
- ▶ Ian Stewart (IPHC)

- ▶ David Crabbe (PFMC)
- ▶ Corey Niles (PFMC)
- ▶ Steve Haeseker (PFMC, USFWS)

- ▶ Josh Lindsay (NMFS WCR, CPSMT)

36 other participants attended various sessions of the meeting

Review of CPS Fisheries, Assessments and Management Systems



Review of CPS Fisheries, Assessments and Management Systems

- ▶ Outside of California Current system:
 - ▶ Accounting for biases and uncertainty in acoustic survey data important
 - ▶ Age, growth and maturity data often highly variable
- ▶ Data workshops key
- ▶ Habitat information may help sampling and estimation
- ▶ Harvest control rules often simple to implement

Data for west coast CPS-I; Acoustic Trawl method (ATM)

- ▶ Effective tool to quantify west coast CPS
- ▶ 2011 review did not endorse ATM data for Pacific mackerel, jack mackerel, and northern anchovy
 - ▶ Concerns included incomplete spatial coverage
- ▶ Revisit use of ATM for CSNA?
 - ▶ Due to wider distribution of CSNA in 2015, ATM team believed an estimate for 2015 could be produced (unavailable during workshop)
 - ▶ Prior years not usable, future years might be
- ▶ Key concerns with the ATM estimates of abundance for the CSNA:
 1. the proportion of the biomass inshore of the survey area and
 2. the biomass missed in surface waters.

Panel conclusion:

ATM surveys have the potential to provide data on absolute abundance of anchovy. However, use of these data for management purposes should be restricted to providing an estimate of abundance only for the area and the portion of the water column surveyed, until a Methodology Review (and possibly additional research) can be undertaken to address concerns about the proportion of the population inshore of the survey area and the proportion in the surface waters.

Data for west coast CPS-II: Egg and larval indices

- ▶ CalCOFI core area (roughly from San Diego to Point Conception):
 - ▶ Sampled 2 times per year (fall and summer) since 1951
- ▶ 'DEPM light' proposed at workshop:
 - ▶ "Work backwards" from egg/larvae to spawning biomass required to produce them
 - ▶ An extension of the approach published by MacCall et al. (2016)
 - ▶ Similar to the TEP estimates used in the sardine assessment
 - ▶ Could provide a timeseries of abundance estimates, but likely with high variance
- ▶ Key concern: spatial overlap between the CalCOFI egg and larvae sampling and spawning
 - ▶ E.g., habitat models indicate good jack mackerel habitat outside CalCOFI area
 - ▶ Overlap with CSNA spawning habitat higher, but:
 - ▶ anchovy eggs have been found well down the coast into Mexico
 - ▶ there can be considerable spawning activity inshore that is not well captured by the current design

Data for west coast CPS-III

- ▶ Aerial surveys
 - ▶ Have potential to provide data on abundance for a wide area, rapidly
 - ▶ Could estimate the proportion of anchovy inshore of the ATM survey area
 - ▶ Aerial survey concerns:
 - ▶ Lack of established methods for analyzing their data
 - ▶ Potential methods need review
 - ▶ Impediments such as weather conditions (especially fog) limit scheduling
- ▶ Juvenile rockfish survey
 - ▶ Some potential in CPS assessments (e.g., use in informing recruitment assumptions for the 2016 Pacific sardine assessment)
 - ▶ For CSNA uncertainty on proportion of adult stock covered remains

Potential assessment methods (with a focus on CSNA)-I

- ▶ Indices of abundance directly:
 - ▶ 'DEPM light' indices based on egg and larval data
 - ▶ ATM estimates (at least for 2015)
- ▶ Biomass dynamic approaches:
 - ▶ The last assessment of the CSNA (Jacobson et al. 1994) was based on this type of approach
 - ▶ Extended method has not been implemented, tested or reviewed
- ▶ DLMTTool:
 - ▶ Additional research needed

Potential assessment methods (with a focus on CSNA)-I

- ▶ A full, integrated, age-structured assessment:
 - ▶ This is the best long-term approach for providing management advice for CSNA
 - ▶ Would require a STAR Panel review
 - ▶ Components might require methodology reviews as well
 - ▶ Could include information on age and from all of the available surveys
 - ▶ Workshop demonstrated a “proof-of-concept” using simulated data
 - ▶ (there is some circularity here)
 - ▶ Available staffing resources for conducting such an assessment was unclear

Potential options for a short-term approach to provide some preliminary information on the status of the CSNA at the November 2016 Council meeting

- ▶ Use DEPM/DEPM light to construct an index of abundance for the CSNA and provide estimates of absolute spawning biomass. The estimates will be negatively biased to an unknown extent due to the egg and larval surveys not covering the full range of the stock.
- ▶ The ATM survey results for 2015 could be analyzed to provide a (negatively biased) estimate of absolute abundance of the CSNA for the surveyed area if catchability is assumed to be 1.
- ▶ The estimates of absolute spawning biomass from the ichthyoplankton-based model should be compared to the estimate of biomass from the ATM survey, while realizing that both are expected to be underestimates.
- ▶ **NOTE:** Whether, the analyses should be reviewed by the SSC, its CPS subcommittee or a STAR Panel was beyond the scope of this workshop.

Other stocks

- ▶ Northern subpopulation of northern anchovy
 - ▶ A (likely negatively biased) estimate of biomass could be computed from the 2015 ATM survey results. In addition, the data from the NWFSC survey of the Columbia plume should be analyzed to assess whether these data could be used to provide a relative index of abundance.
- ▶ Jack mackerel
 - ▶ Jack mackerel bycatch in the hake fishery should be analyzed to assess whether these data could provide an index of relative abundance
- ▶ Pacific mackerel
 - ▶ The next assessment should consider evaluating an index of abundance for Pacific mackerel based on data from the hake fishery as noted above for jack mackerel

Final Notes

- ▶ The workshop was hampered by the lack of guidelines for what information is needed for the assessment of “monitored” CPS (in contrast with “actively managed” stocks).
- ▶ The two advisers (MT and AS) provided additional comments.
- ▶ Thanks to all the participants (national and international) for the very constructive discussions. Also, for the support for the Panel by Council Staff and the SWFSC.