SUPPLEMENTAL COASTAL PELAGIC SPECIES ADVISORY SUBPANEL REPORT ON PACIFIC MACKEREL ASSESSMENT AND MANAGEMENT MEASURES

The Coastal Pelagic Species Advisory Subpanel (CPSAS) heard a presentation by Dr. Paul Crone and Dr. Juan Zwolinski on the 2019 benchmark assessment of Pacific Mackerel. Dr. Owen Hamel also presented a summary of the Stock Assessment Review (STAR) Panel meeting.

CPSAS fishery representatives voice serious concerns regarding the sharp reduction in biomass estimated in the 2019 benchmark Pacific mackerel stock assessment. For the first time, this stock assessment was based primarily on the 2018 summer Acoustic Trawl (AT) survey. However, many of the problems identified at the 2011 and 2015 Pacific mackerel STAR panel meetings, as well as the 2018 AT methods review, have not yet been resolved. Fishermen continue to question AT survey methods and assumptions. For example, the 2018 AT survey apparently missed very large schools of mackerel in the Pacific Northwest because the fish were breezing near the surface, in the 10 meter acoustic 'dead zone', and the AT survey did not use side-scanning sonar data. The CPSAS representative on the 2019 Pacific Mackerel STAR Panel highlighted many of the industry's concerns in the CPSAS statement in the STAR Panel Report. The CPSAS would appreciate the Pacific Fishery Management Council's (Council) consideration of those comments, and to recommend that the Stock Assessment Team and Southwest Fisheries Science Center address the following concerns in the next update assessment.

- Data collection programs need to be substantially expanded to include other capture points, including age and distribution data. This includes bycatch in the Pacific whiting and other fisheries in the Northwest and perhaps Canada. Bycatch landings can be found on the present fish ticket systems. Subject to having sufficient resources, state agencies have expressed willingness to collect and take biological samples of a portion of this bycatch. To the extent possible, this information should be included in future update assessments. Moreover, although these data may not presently fit the model, the contrast between the non-survey and survey data may lead to important questions that launch new investigative queries that expand our understanding of Pacific mackerel biology and behavior.
- AT survey methodology should be improved as recommended in the 2018 AT methods review.
- Also, AT surveys should use side-scan sonar acoustics data to observe and document fish behavior, i.e. vessel avoidance.
- Likewise, efforts should continue to encourage collaborative tri-national research and data exchanges to increase the spatial boundaries of the survey grid into Mexico.
- Finally, increased collaboration with industry, both in expanding surveys and acknowledging fishermen's observations of CPS stock presence/abundance on the fishing grounds, and focusing surveys accordingly, would improve the accuracy of future stock assessments.

This 2019 benchmark attempted to assess age 1+ biomass with a new Model Alt_19 that is based mainly on the AT survey. However, although the Stock Assessment Team (STAT) strongly advocates for a survey-based assessment, the 2018 AT methods review recommended that AT

estimates of relative abundance should only be used directly for management of CPS **after** conducting a Management Strategy Evaluation.

There was not enough time at the STAR panel meeting to resolve the conflict in Model Alt between fishery age data, particularly age 0's collected in California fishery landings (but sometimes also in AT surveys), with the time-invariant age key used to assigned age to fish captured in AT surveys. Therefore, the STAT down-weighted the increase in recruitment of age 0 fish observed in 2018 by half to better fit Model Alt to the AT survey data. This resulted in a harvest guideline cut by more than half to only 11,109 metric ton (mt) in 2019-20 and a further reduction to 7,950 mt in 2020-21. We recommend providing sufficient time for future STAR panel meetings to address and resolve these types of issues.

Although mackerel fishery catches have been low in recent years in California, Pacific mackerel are known for sharp fluctuations in abundance. The sharply reduced harvest limits prescribed in this stock assessment may be in effect for another four years, when the next full assessment is scheduled. The fishery representatives note that this condition could preclude substantial harvest opportunity if Pacific mackerel spikes in the interim. Pacific mackerel are a key alternative CPS fishery in California, particularly in southern California.

To address this concern, we recommend **that the Council allow for sufficient flexibility to adjust the timing of update reviews and management measures as needed between scheduled benchmark assessments**. The Terms of Reference (TOR) for update assessments also need more flexibility built into the process to enable the STAT, Scientific and Statistical Committee, and Council to consider common-sense alternative approaches, such as 'mop up' reviews. Under the current TOR, any revisions to model structure and/or assumptions are now off limits except in benchmark assessments. An annual survey-based approach to setting mackerel specifications could potentially allow for a more responsive approach. However, the AT survey is not currently able to provide single biomass estimates that can be used in Pacific mackerel management.

The CPSAS recommends the following management measures:

Table 1: 2019-20 (from Stock Assessment Table ES-3a, see Appendix 1)

ABC Tier 2 (P* 0.45)	13,169 mt
HG	11,109 mt
ACT	10,109 mt
Incidental in CPS fisheries at 45% by weight in other CPS fisheries	1,000 mt
Incidental landed per landing in non-CPS fisheries	3 mt

Table 2: 2020-21 (from Stock Assessment Table ES-3b, Appendix 1)

ABC Tier 2 (P* 0.45)	13,050 mt
HG	7,950 mt
ACT	6,950 mt
Incidental in CPS fisheries at 45% by weight in other CPS fisheries	1,000 mt
Incidental landed per landing in non-CPS fisheries	3 mt

The CPSAS also recommends an in-season review of the 2019-2020 Pacific mackerel fishery at the March 2020 Council meeting, if needed, to consider releasing a portion of the incidental set-aside to the directed fishery.

PFMC
06/20/19

Appendix 1

Table ES-3. Pacific mackerel harvest control rules and associated management metrics base model ALT_19: a) 2019-20 fishing year; and b) 2020-21 fishing year.

a)

Harvest Control Rule Formulas						
OFL = BIOMASS * E_{MSY} * DISTRIBUTION						
ABC = BIOMASS * $BUFFER_{P\text{-}star}$ * E_{MSY} * DISTRIBUTION						
HG = (BIOMASS - CUTOFF) * E_{MSY} * DISTRIBUTION						
Harvest Formula Parameters						
BIOMASS (ages 1+, mt)	71,099					
P-star	0.45	0.40	0.35	0.30	0.25	
ABC Buffer(Tier 1 Sigma=0.5)	0.939	0.881	0.825	0.769	0.714	
ABC Buffer(Tier 2 Sigma=1.0)	0.882	0.776	0.680	0.592	0.509	
E_{MSY}	0.3					
CUTOFF (mt)	18,200					
DISTRIBUTION (U.S.)	0.7					
Harvest Control Rule Values (MT)						
OFL =	**14,931**					
ABCTier 1 =	14,020	13,154	12,318	11,482	10,661	
ABCTier 2 =	13,169	11,586	10,153	8,839	7,600	
HG =	**11,109**					

b)

Harvest Control Rule Formulas						
OFL = BIOMASS * E_{MSY} * DISTRIBUTION						
ABC = BIOMASS * $BUFFER_{P\text{-}star}$ * E_{MSY} * DISTRIBUTION						
HG = (BIOMASS - CUTOFF) * E_{MSY} * DISTRIBUTION						
Harvest Formula Parameters						
BIOMASS (ages 1+, mt)	56,058					
P-star	0.45	0.40	0.35	0.30	0.25	
ABC Buffer(Tier 1 Sigma=0.5)	0.935	0.873	0.813	0.754	0.696	
ABC Buffer(Tier 2 Sigma=1.0)	0.874	0.762	0.661	0.569	0.484	
E_{MSY}	0.3					
CUTOFF (mt)	18,200					
DISTRIBUTION (U.S.)	0.7					
Harvest Control Rule Values (MT)						
OFL =	**11,772**					
ABCTier 1 =	13,960	13,035	12,139	11,258	10,392	
ABCTier 2 =	13,050	11,377	9,869	8,496	7,227	
HG =	**7,950**					