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MEMORANDUM FOR: The Record

FROM: Christofer H. Boggs

ABOUT: Advice regarding what Deep-7 bottomfish assessment to use in 2015

Our assessment scientists did a good job on the 2014 assessment, which initiated an improvement in the approach for standardizing CPUE data. The Science Center now has additional insights to why the fisheries data used in the 2014 assessments produced results that CIE peer review advised were not ready for management application. These insights result from the intense scrutiny the assessment has received and our consideration of the peer review's conclusions. Although the 2014 assessment used a superior new approach to standardizing CPUE compared to the 2011 assessment, there are some good reasons why the fisheries data could be better used in such an approach. The 2011 assessment relied on the only data continuously available throughout the time series: catch per day fished. The new 2014 CPUE standardization approach split the time series into old (1949-1993) and new stanzas (1994-2013). It did so to account for differences among fishermen that could only be linked through time in the recent stanza. The fisheries data could be better used for this new split-stanza context in two important ways:

1) Although catch per day fished is the best available CPUE that is available continuously over the whole time series, it may not be the best available over the most recent time series. If the time series is to be split with CPUE issues addressed differently before and after the split, one could also analyze and include detailed effort data that has been collected only for the last dozen years. This data could strongly influence recent trends. This was not seen by the Center as the work for a simple update in 2014, as it is a complex undertaking.

The use of CPUE defined as catch per day fished is subject to great criticism, and one way to address this is use of details on hours and numbers of lines and hooks used by fishermen over the last dozen years. Only inexplicit, undescribed differences among fishermen linked through time were applied to the recent stanza in the 2014 CPUE standardization. Using the recent effort detail would still allow differences between individual fishermen to be

standardized, and also allow changes in effort details through time, to be addressed. Both were factors of great concern to the reviewers. (Differences among areas and seasons and other such factors that can be applied throughout the whole time series have remained part of the CPUE standardization in both 2011 and 2014).

2) Further efforts could be made to apply the CPUE standardization for differences between fishermen to more data using various exploratory methods and other data sets. The 2014 assessment overlooked a compilation of confidential non-electronic records held by the State of Hawaii that may help to link fisher's identities back through an earlier stanza of time.

Since the CIE peer review advised that the 2014 assessment was not ready for application to management, and we cannot improve the assessment in the ways described above in short order, the Science Center believes that a much more simple update of the 2011 assessment using data from the 3 most recent years available provides the best scientific information available for management. Although catch per day fished may not be the best available CPUE data that can be used in the superior split-stanza CPUE standardization, it is the best available CPUE data that is available over the entire time series, and thus appropriate for use in the 2011 assessment approach, which does not utilize a split-stanza CPUE standardization approach.

Attachment:

Update of 2011 benchmark stock assessment of Deep 7 bottomfish in the Main Hawaiian Islands using data through 2013

Update of 2011 benchmark stock assessment of Deep 7 bottomfish in the Main Hawaiian Islands using data through 2013

This document summarizes the results of a strict update of the 2011 benchmark assessment of Deep 7 bottomfish in the Main Hawaiian Islands (Brodziak et al. 2011) using three additional years of data from 2011-2013. Both catch data and standardized CPUE from 2011-2013 are included; CPUE is standardized using the same methods as previously applied in the 2011 assessment. All other assumptions and methods are the same as those used in the 2011 stock assessment.

Table 1. Estimated parameters, reference points, and stock status values. Values indicating biomass (e.g. B, B_{MSY}, MSY) are in units of million pounds.

Parameter/Reference point/ Stock status	Mean	SD
r	0.106	0.025
K	27.36	9.378
M	1.76	1.28
P_1	0.58	0.1
Q	13	4.3
τ^2	0.05	0.01
σ^2	0.022	0.008
H_{MSY}	6.00%	2.10%
B_{MSY}	14.51	4.267
MSY for Total Catch	0.839	0.324
MSY for Reported Catch	0.404	0.156
P_{MSY}	0.54	0.08
H_{2013}	3.80%	1.40%
H_{2013}/H_{MSY}	0.627	N/A
Prob ($H_{2013} > H_{MSY}$)	14.7%	N/A
B_{2013}	13.34	5.397
B_{2013}/B_{MSY}	0.930	0.258
Prob ($B_{2013} < 0.70*B_{MSY}$)	25.1%	N/A

Table 2. Estimated acceptable biological catches (ABCs) (pounds) for commercial fishing in fishing years 2015 and 2016, corresponding 2015 probabilities of overfishing from 0% to 50% in 5% increments, as well as mean projected harvest rates, exploitable biomasses, and probable stock status conditions. Overfished is defined as $B<0.70*B_{MSY}$, and overfishing is defined as $H>H_{MSY}$. These projections assume that annual commercial catch in 2014 was 276,000 pounds, or 80% of the 2014 annual catch limit of 346,000 pounds.

Probability of Overfishing Deep7 Bottomfish in the Main Hawaiian Islands in Fishing Year 2015	Acceptable Biological Commercial Catch (pounds) in Fishing Years 2015 and 2016	Probability of Overfishing in 2016	Expected Harvest Rate in 2015	Expected Harvest Rate in 2016	Mean Exploitable Biomass (1000,000 pounds) in 2016	Probability of being overfished in 2016
0.00	14,000	0.00	0.2%	0.2%	14.80	0.15
0.05	130,000	0.05	2.3%	2.2%	14.56	0.17
0.10	174,000	0.10	3.1%	3.0%	14.47	0.18
0.15	202,000	0.14	3.6%	3.5%	14.41	0.18
0.20	228,000	0.19	4.0%	4.0%	14.35	0.18
0.25	250,000	0.24	4.4%	4.4%	14.31	0.19
0.30	270,000	0.29	4.8%	4.7%	14.27	0.19
0.35	290,000	0.34	5.1%	5.1%	14.23	0.19
0.40	310,000	0.39	5.5%	5.5%	14.18	0.20
0.41	314,000	0.40	5.6%	5.6%	14.18	0.20
0.45	330,000	0.44	5.8%	5.9%	14.14	0.20
0.50	352,000	0.50	6.2%	6.3%	14.10	0.21

References:
Brodziak, J., D. Courtney, L. Wagatsuma, J. O'Malley, H. Lee, W. Walsh, A. Andrews, R. Humphreys, and G. DiNardo. 2011. Stock assessment of the Main Hawaiian Islands Deep7 bottomfish complex through 2010. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TMNMFS-PIFSC-29, 176 p. + Appendix.