ABC Control Rule Work Group
Webinar #3 Summary
March 22, 2012

Steven Atran opened the meeting at 12:00 p.m., and reviewed the summary of Webinar #2.

Comparison of Tier 3 Methods for Setting OFL

Harry Blanchet described a table he had put together base on one provided by Steven Atran that compared OFL based on mean landings plus 2 standard deviations vs. 150% of the mean for several stocks. The table showed standard deviations for the landings of each stock. Stocks that were more constrained by using 150% of the mean tended to be low harvest stocks, while those that were more constrained by 2 sd tended to be those stocks with higher landings. The underlying purpose of the presentation was to come up with some method whereby a percent of the mean of landings could be derived that would have a basis for use as a reasonable ceiling for 2 standard deviations, rather than using the admittedly ad hoc value of 150%. Given the subset of stocks presented in the table, the arithmetic average of the (mean+2SD) of the stocks would be 180% of the mean, and the median would be 175% of the mean. Therefore, half of the stocks would be limited by the 2 SD rule, and the other half by the cap on the SD.

Doug Gregory suggested looking at only those stocks for which Tier 3 applied since the higher tier stocks might behave differently. He also suggested looking at a non-parametric approach used by the South Atlantic Council SSC, where OFL = the 80^{th} percentile of recent 10 years of landings. In most cases this resulted in an OFL similar to using the mean plus 2 sd. He felt that a non-parametric approach made more sense when dealing with data poor stocks, and it would address concerns brought up in Webinar #2 that, for rare species the standard deviation approach could produce an OFL that could be as much as triple the mean of landings. Luiz Barbieri added that it would be simpler if the Gulf Council and South Atlantic Council used similar methods.

Harry Blanchet noted that the table he assembled did not include all stocks, but it was a good start. Also, he noted that for stocks managed as an aggregate, the species that contributes to most of the landings can change from year to year, which could make some of the methodologies inappropriate. Mr. Gregory supported a suggestion made in Webinar #2 by Clay porch that the less prescriptive the SSC was, the more flexibility it would provide, reducing the need for future revisions. Dr. Barbieri suggested that examples of using the 80^{th} percentile be compiled for comparison to the other two methods. The SSC could then select which method to use on a case by case basis, providing the flexibility suggested by Dr. Porch and Mr. Gregory.

A suggestion was made to review a white paper provided by Joe Powers linking the determination of Tier 3 OFL to prior year events and to data collection actions. However, because the white paper had been provided at the last minute, and Dr. Powers was not present to discuss it, the work group decided to defer discussion of Dr. Powers' paper until either the next SSC meeting or the next work group webinar if one is scheduled.

The work group next reviewed an analysis of the Pacific Council's method for setting ABC (Ralston et al. 2011) to Gulf stocks. Clay Porch was unable to attend the webinar but Brian Linton explained the analysis.

In the method currently used in the Gulf, a PDF is established from MCMC runs with model averaging and is assumed to be normally distributed. The Ralston et al. (2011) method assumes a lognormal distribution to develop OFL yields. The mean of the OFL is the log of the model runs minus $\Phi^2/2$. The Gulf method for establishing the variance (Φ) has been to obtain it from the MCMC runs or use the asymptotic standard errors from inverting the Hessian matrix in the assessment runs. In the Ralston et al. (2011) method, the Φ is from a meta analysis of all assessed stocks. Within model variance and between model variances were calculated for each species and the larger of the two used for the species variance. An aggregate Φ for all species was then developed. The aggregate Φ was then adjusted based on data level. For data rich species, the Φ itself was used, for data moderate species, $2*\Phi$ was used, and for data poor species $4*\Phi$ was used. These adjusted Φ are then used to develop the PDF function. For the P* value, Ralston et al. (2011) used 0.45 for data rich species and 0.40 for data moderate and data poor species. The P* is then applied to the PDF to obtain the ABC. When the Ralston Method was applied to gag (using the Φ value developed by Ralston et al. 2011), the resulting ABC values were slightly lower than those obtained from the GMFMC ABC control rule.

The Science Center analysis applied the Ralston et al. (2011) method to several stocks assessed for the Gulf. For red snapper the ABC values came out higher. However, red snapper ABCs are not currently based on the control rule, but rather on setting ABC = the yield at 75% of F_{MSY}. The ABCs from the Ralston et al. (2011) method were also higher for gray triggerfish and red grouper, but were smaller for vermilion snapper, yellowedge grouper, and king mackerel. In general, the Ralston et al. (2011) method produced lower ABCs than the GMFMC when the ABC control rule was used. Part of this is because the Ralston et al. (2011) method produces a wider distribution of the PDF ($\Phi = 0.36$ and $P^* = 0.45$ for all of the analyses). Steven Atran asked, under Tier 1, if the spreadsheet currently used to determine P* would instead be used to determine a multiplier for Φ. Dr. Linton responded that it could be used that way, or a set multiplier for each tier could be used as in Ralston et al. 2011. Compared to the MCMC approach with model averaging, the Ralston et al 2011 method is simpler, avoids some technical issues with model averaging, and would reduce the workload for the Science Center.

Doug Gregory noted that the Ralston et al. 2011 approach also produced narrow buffers between OFL and ABC. Dr. Linton referenced the 2010 National SSC Workshop report (Carmichael and Fenske 2011), on page 21, which reported that, for the Pacific Council SSC's Category 1 (data rich) species, with $\Phi = 0.36$ and $P^* = 0.45$, this method produced a buffer of 4.4%. For Category 2 (data moderate species), with $2*\Phi = 0.72$ and $P^* = 0.40$ the buffer increased to 16.7%, and for Category 3 (data poor species), with $4*\Phi = 1.44$ and $P^* = 0.40$, the buffer was 30.6%. Dr. Barbieri suggested that, with the Ralston et al. 2011 approach the size of the buffer was better aligned with the P*.

The next step is to develop a Φ for Gulf stocks, or potentially a separate Φ for aggregates of similar stocks. Dr. Linton was unable to say when this analysis would be available.

Dr. Barbieri suggested that Jim Berkson be invited to give a presentation on the ORCS approach (Berkson et al. 2011) at the June SSC meeting. If Dr. Berkson was not able to do the presentation, either he or Shannon Cass-Calay could give a brief presentation. This is an approach that the South Atlantic Council is considering for their data poor stocks. Presenting it to the Gulf Council SSC could help keep the two programs coordinated.

Doug Gregory asked how model averaging is done so that it captures the different states of nature. Dr. Linton responded that the math was easy, but the question was how to weight the different models. Weights could be developed from AIC values, provided the models are comparable. Another approach is to subjectively weight the models, which is the method that was used for red snapper. Will Patterson cautioned that if a model averaging approach is used, care should be take to include just the model runs that represent different states of nature, and not the runs that were done simply as sensitivity runs.

The work group discussed Tier 2 and how it fit into the control rule. Tier 2 was originally set up for situations where stock assessments had been done but a PDF could not be generated. However, PDFs can be generated for a variety of assessments, but PDFs generated from a single model produce very narrow buffers. Tier 2 was also intended for use with alternative assessment methods such as stock reduction analysis, but to date no assessments have used such methods. Harry Blanchet noted that with the greater amberjack assessment, the assessment gave a fairly good description of stock status and provided more information than needed for Tier 3, but did not generate a PDF that was suitable for Tier 1. Steven Atran suggested that Tier 2 should be for cases where a stock assessment has been done but for some reason Tier 1 cannot be used, such as with the greater amberjack assessment. Doug Gregory stated that the buffer generated by Tier 2 should be greater than for Tier 1. However, that can't be guaranteed since the tiers use different methods to generate ABC. A suggestion was made that the risk level (P*) should be set by the Council, and the Φ should be calculated by the SSC. Under this method, the Tier 1 approach would be used to modify Φ, and the risk level (P*) would be set by the Council. At a given P*, the uncertainties in the assessment would be captured by the Φ, possibly modified by a multiplier as with Ralston et al. 2011.

Chad Hanson noted that the ORCS report (Berkson et al. 2011) described a number of approaches to calculating ABC, listed in hierarchal order depending on amount of available data. He suggested that an approach of that type might be appropriate to bridge the gap between Tier 1 and Tier 3. He suggested that the idea was that the buffers would be narrower at the higher tiers. Dr. Patterson clarified that the issue was not whether the buffers were too narrow, but whether scientific uncertainty was being adequately captured.

Dr. Linton suggested that Tier 1 might be divided into Tier 1a, for cases where there is a stock assessment and the SSC feels that the PDF adequately captures the scientific uncertainty, and Tier 2b, where there is a stock assessment and the SSC feels that the PDF does not adequately capture the scientific uncertainty. Tier 2 would then be for cases where alternative assessment methods are used.

Doug Gregory suggested that the issue was not whether the P* method was capturing all the uncertainties, but whether the assessment outputs were providing the methods for characterizing uncertainty. Therefore, the assessment outputs were what needed to be adjusted. Dr. Patterson questioned whether the P* method would ever be an adequate method given the diversity of assessment methods. While P* itself is straightforward, the calculation of a PDF is unique for each assessment model, and the application of P* will always be ad hoc.

Steven Atran suggested that while the work group had developed some ideas for Tiers 1 and 3, there was still a lot of work that needed to be done with Tier 2. Doug Gregory felt that the Council was looking for approaches that were simple and transparent. Tier 1 in particular was

not simple. The work group briefly reviewed the spreadsheet used with Tier 1 to generate P*. Dr. Patterson noted that the spreadsheet does not capture scientific uncertainty. Rather, it discounts the value of P* based on available information. Uncertainty is captured in the shape of the PDF.

Work group members suggested having an additional meeting prior to the next SSC meeting to wrap up loose ends. Steven Atran stated that he would send out a Doodle poll for a meeting sometime in May once he knew how long it would take the Science Center to conduct its additional analysis.

REFERENCES

Berkson, J., L. Barbieri, S. Cadrin, S. Cass-Calay, P. Crone, M. Dorn, C. Friess, D. Kobayashi, T.J. Miller, W.S. Patrick, S. Pautzke, S. Ralston, and M. Trianni. 2011. Calculating acceptable biological catch for stocks that have reliable catch data only (only reliable catch stocks – ORCS). NOAA Technical Memorandum NMFS-SEFSC-616. 56 p.

Carmichael, J. and K. Fenske (editors). 2011. Third national meeting of the regional fisheries management councils' scientific and statistical committees. Report of a national SSC workshop on ABC control rule implementation and peer review procedures. South Atlantic Fishery Management Council, Charleston, SC, October 19-21, 2010. 95 p.

Ralston, S., A.E. Punt, O.S. Hamel, J.D. DeVore, and R.J. Conser. 2011. A meta-analytic approach to quantifying scientific uncertainty in stock assessments. Fishery Bulletin 109:217-231.

ABC Control Rule Work Group present

Luiz Barbieri
Harry Blanchet
Bob Gill
Doug Gregory
Will Patterson

Staff

Steven Atran, GMFMC
Rich Malinowski, NMFS/SERO
Brian Linton, NMFS/SEFSC

Others

Roy Crabtree, NMFS/SERO
Claudia Friess, Ocean Conservancy
Chad Hanson, Pew Environment Group
Russell Nelson, Coastal Conservation Assoc.