

1.4.2 SSC Designation of OFL and ABC

Acceptable Biological Catch (ABC) and ABC Control Rule

The Magnuson-Stevens Reauthorization Act (MSRA) in 2006 required specification of additional management criteria in federal fisheries management plans. These criteria include an Overfishing Limit (OFL), an Annual Catch Limit (ACL), an Annual Catch Target (ACT), and appropriate Accountability Measures (AM). The Act also stated that Council Scientific and Statistical Committees (SSCs) should specify an Acceptable Biological Catch (ABC) that is reduced from the OFL to address assessment uncertainty. Guidance in National Standard 1 (NS1) of the MSRA suggest that the Council should establish a process for developing ABC control rules and to establish ABC control rules based on scientific advice from the SSC. ABC control rules should specify a level of separation between OFL and ABC that is based on scientific uncertainty in the estimate of OFL and the level of scientific knowledge about the stock. The SSC is charged with recommending an ABC to the Council based on the control rule while also having a role in advising the Council on establishing the initial control rule.

The following NS1 excerpts describe the process:

Specification of ABC. ABC may not exceed OFL. Councils should develop a process for receiving scientific information and advice used to establish ABC. This process should: Identify the body that will apply the ABC control rule (i.e., calculates the ABC), and identify the review process that will evaluate the resulting ABC. The SSC must recommend the ABC to the Council. An SSC may recommend an ABC that differs from the result of the ABC control rule calculation, based on factors such as data uncertainty, recruitment variability, declining trends in population variables, and other factors, but must explain why. While the ABC is allowed to equal OFL, NMFS expects that in most cases ABC will be reduced from OFL to reduce the probability that overfishing might occur in a year.

Expression of ABC. ABC should be expressed in terms of catch, but may be expressed in terms of landings as long as estimates of bycatch and any other fishing mortality not accounted for in the landings are incorporated into the determination of ABC.

ABC for overfished stocks. For overfished stocks and stock complexes, a rebuilding ABC must be set to reflect the annual catch that is consistent with the schedule of fishing mortality rates in the rebuilding plan.

ABC control rule. For stocks and stock complexes required to have an ABC, each Council must establish an ABC control rule based on scientific advice from its SSC. The determination of ABC should be based, when possible, on the probability that an actual catch equal to the stock's ABC would result in overfishing. This probability that overfishing will occur cannot exceed 50 percent and should be a lower value. The ABC control rule should consider reducing fishing mortality as stock size declines and may establish a stock abundance level below which fishing would not be allowed. The process of establishing an ABC control rule could also involve science advisors or the peer review process established under Magnuson Stevens Act section 302(g)(1)(E). The ABC control rule must articulate how ABC will be set compared to the OFL

based on the scientific knowledge about the stock or stock complex and the scientific uncertainty in the estimate of OFL and any other scientific uncertainty. The ABC control rule should consider uncertainty in factors such as stock assessment results, time lags in updating assessments, the degree of retrospective revision of assessment results, and projections. The control rule may be used in a tiered approach to address different levels of scientific uncertainty.

The SAMFC SSC first discussed ABC control rules in June 2008. An issue paper outlining various alternative approaches to establishing ABC was provided to the Council in September 2008. The intent was to obtain initial feedback on control rules and the level of overfishing risk that the Council considered appropriate for various likely stock information levels. Control rule options were therefore presented in general terms rather than as specific alternatives and sub-alternatives. The Council supported further developing a control rule approach which specified ABC as a function of yield at maximum sustainable yield (MSY) and assessment uncertainty. The Council further specified that ABC should be set at a level providing a 25% chance of overfishing, with a range of values corresponding to 10 to 40% chance of overfishing.

While the approach suggested in September 2008 provided general guidance for assessed stocks for which the probability of overfishing can be provided in terms of yield, it did not address those stocks that lack assessments and it did not explicitly account for varying levels of uncertainty in assessments. Therefore, the SSC requested a special meeting for March 2009 devoted solely to developing an ABC control rule that could be applied to all managed stocks and which would provide an objective means to evaluate levels of uncertainty. During that meeting the SSC decided on general characteristics and components of the rule and developed a framework of dimensions and tiers. The SSC agreed that the ABC control rule should provide an objective means of determining the buffer between the overfishing level (typically MSY) and the ABC. The resulting approach, however, was only applicable when the OFL could be stated in fish weight and some measure of statistical uncertainty about the OFL could be estimated. Adjustments to the level of buffer are based on the probability of overfishing, which can be reflected in yield through frequency distributions or a “P*” analysis.

Discussion of the general concept and approach led to creation of a system of dimensions composed of multiple tiers that are scored to provide a value that can be used to select the appropriate probability of overfishing for each stock. Each stock evaluated receives a single “adjustment factor”, which is the sum of tier scores across dimensions and which ultimately determines the amount of buffer or separation between OFL and ABC. Adjustment factors are subtracted from the “base probability of overfishing” to provide the “critical probability”. The base probability of overfishing is the value used to determine OFL. The critical probability is a probability of overfishing that is used to determine ABC in the same manner that the base probability is used to determine MSY and OFL. Through this process, tier scores equate to an adjustment in the probability of overfishing occurring, and do not represent, or necessarily correspond to, a specific poundage or percentage of the OFL. Recommended ABC values are derived from probability density functions that provide the probability of overfishing occurring for any particular yield.

The SSC met again in April 2010 to further develop the ABC control rule for stocks which are unassessed and for which no P* analyses are available. An alternative control rule was

developed and presented to the Council in June 2010. However, some aspects of the proposed rule and its criteria were considered inappropriate considering guidance that the rule should account for scientific uncertainty. The Council ultimately rejected the unassessed stocks control rule as put forth by the SSC, and provided specific recommendations and guidance for further consideration. The SSC met again in August 2010 to reconsider the control rule for unassessed stocks. During this meeting they developed a rule incorporating several tiers reflecting varying levels of data availability for the unassessed stocks. This approach was presented to the Council in September 2010. The final proposed ABC Control rule is included as **Alternative X in Action 4** of this amendment and included below:

Level 1: Assessed Stocks

- Apply the assessed stocks control rule to determine ABC.

The SSC recommended assessed stocks control rule. The rule provides a hierarchy of dimensions and tiers within dimensions used to characterize uncertainty associated with stock assessments in the South Atlantic. Parenthetical values indicate (1) the maximum adjustment value for a dimension; and (2) the adjustment values for each tier within a dimension.

I. Assessment Information (10%)

1. Quantitative assessment provides estimates of exploitation and biomass; includes MSY-derived benchmarks. (0%)
2. Reliable measures of exploitation or biomass; no MSY benchmarks, proxy reference points. (2.5%)
3. Relative measures of exploitation or biomass, absolute measures of status unavailable. Proxy reference points. (5%)
4. Reliable catch history. (7.5%)
5. Scarce or unreliable catch records. (10%)

II. Uncertainty Characterization (10%)

1. **Complete.** Key Determinant – uncertainty in both assessment inputs and environmental conditions are included. (0%)
2. **High.** Key Determinant – reflects more than just uncertainty in future recruitment. (2.5%)
3. **Medium.** Uncertainties are addressed via statistical techniques and sensitivities, but full uncertainty is not carried forward in projections. (5%)
4. **Low.** Distributions of Fmsy and MSY are lacking. (7.5%)
5. **None.** Only single point estimates; no sensitivities or uncertainty evaluations. (10%)

III. Stock Status (10%)

1. Neither overfished nor overfishing. Stock is at high biomass and low exploitation relative to benchmark values. (0%)
2. Neither overfished nor overfishing. Stock may be in close proximity to benchmark values. (2.5%)
3. Stock is either overfished or overfishing. (5%)
4. Stock is both overfished and overfishing. (7.5%)
5. Either status criterion is unknown. (10%)

IV. Productivity and Susceptibility – Risk Analysis (10%)

1. **Low risk.** High productivity, low vulnerability, low susceptibility. (0%)
2. **Medium risk.** Moderate productivity, moderate vulnerability, moderate susceptibility. (5%)
3. **High risk.** Low productivity, high vulnerability, high susceptibility. (10%)

Level 2: Unassessed Stocks. Reliable landings and life history information available.

- OFL derived from "Depletion-Based Stock Reduction Analysis" (DBSRA).
- ABC derived from applying the assessed stocks rule to determine adjustment factor if possible, or from expert judgment if not possible.

Level 3: Unassessed Stocks. Inadequate data to support DBSRA.

- ABC derived directly, from "Depletion-Corrected Average Catch" (DCAC).

Level 4: Unassessed Stocks. Inadequate data to support DCAC or DBSRA.

- OFL and ABC derived on a case by case basis.

The SSC is still in the process of evaluating alternative approaches for stocks in the fourth level. For the time being, the SSC recommends using the Methot framework for stocks whose catch fits into Methot’s categories of “nil” or “small” (Table X).

Table X. Dr. Rick Methot’s approach for incorporating information on historical catch in ABC decisions for species where only catch data exist.

Historical Catch	Expert Judgment	Possible Action
Nil, not targeted	Inconceivable that catch could be affecting stock	Not in fishery; Ecosystem Component; SDC not required
Small	Catch is enough to warrant including stock in the fishery and tracking, but not enough to be of concern	Set ABC and ACL above historical catch; Set ACT at historical catch level. Allow increase in ACT if accompanied by cooperative research and close monitoring.
Moderate	Possible that any increase in catch could be overfishing	ABC/ACL = f(catch, vulnerability) So caps current fishery

<p>Moderately high</p>	<p>Overfishing or overfished may already be occurring, but no assessment to quantify</p>	<p>Set provisional OFL = $f(\text{catch, vulnerability})$; Set ABC/ACL below OFL to begin stock rebuilding</p>
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