Comprehensive ABC Control Rule Amendment

OPTIONS PAPER
SAFMC Review March 2018

Background

The South Atlantic Fishery Management Council (Council) Scientific and Statistical Committee (SSC) developed an acceptable biological catch (ABC) control rule (CR) in 2008, based on the concept of using uncertainty and risk traits to determine the acceptable risk of overfishing. The acceptable risk of overfishing is specified as the P-Star (P*) value that is applied through assessment projections to develop the yield values that provide the ABC. During consideration by the Council and development of the Comprehensive Annual Catch Limit Amendment, the SSC added additional levels to the ABC CR to better address unassessed and data limited stocks.

The ABC CR was implemented by the Council through the Comprehensive Annual Catch Limit Amendment that became effective in April 2012. The Comprehensive ACL Amendment included fishery management plans (FMP) for snapper grouper, dolphin wahoo, golden crab, and Sargassum. A revision to the ABC CR for snapper grouper occurred in July 2015 when the Only Reliable Catch Stocks (ORCS) approach was add to the CR for snapper grouper stocks, through through Amendment 29 to the Snapper Grouper FMP.

In applying the ABC CRs as specified in the Comprehensive ACL Amendment and snapper grouper Amendment 29 to different stocks and assessments from 2012-1016, the SSC began to express concerns that the rules lacked adequate resolution to distinguish differences in uncertainty levels across assessments, did not address continued developments in data poor assessment methods, and mixed uncertainty evaluation (an SSC role under the Magnuson Stevens Fishery Conservation and Management Act (MSA)) and risk tolerance determination (a Council role under the MSA). Additionally, the existing CR does not provide a means to make use of 2016 revisions to National Standard 1 that increased the flexibility available to regional fishery management councils for managing catch limits by allowing carry-over of unharvested catch and phasing in of catch level changes. While the addition of the ORCS approach to the ABC CR for snapper grouper represented some progress in addressing data poor assessment developments, it did not address the other ABC CR concerns nor the National Standard revisions.

Actions in this amendment

- **Action 1.** Modify the acceptable biological catch control rule.
- **Action 2.** Specify an approach for determining the acceptable risk of overfishing.
- **Action 3.** Specify an approach for determining the probability of rebuilding success for overfished stocks.
- **Action 4.** Allow constant acceptable biological catch recommendations for multiple years.
- **Action 5.** Allow phase-in of acceptable biological catch changes.
- **Action 6.** Allow carry-over of unharvested catch.

Objectives for this meeting

- Review and approve the Purpose and Need statements
- Determine which FMPs to modify through this comprehensive amendment
- Review and provide guidance on actions and alternatives

Preliminary amendment timing

2014-2017	SSC discusses and reviews ABC control rule performance and developments in data limited methods.
September 2017	Council creates a Committee of the Whole to develop a comprehensive ABC control rule amendment
November 2017	ABC Committee of the Whole meets via webinar to discuss actions and alternatives
December 2017	Further discussion and Guidance. IPT formed
March 2018	Council approves Purpose and Need, FMPs to include.
April/May 2018	SSC and AP reviews
June 2018	Council approves wording of actions and alternatives
September 2018	Council reviews actions and alternatives
October 2018	SSC review
December 2018	Approval for public hearings
March 2019	Final approval

Purpose and need statement

Purpose for Actions

The purpose of this amendment is to revise the acceptable biological catch control rule; simplify incorporation of scientific uncertainty; modify the approach used to determine the acceptable risk of overfishing, and address flexibility in specifying catch levels.

Need for Actions

The need for this amendment is to ensure catch level recommendations are based on the best scientific information available, prevent overfishing while achieving optimum yield, and include flexibility in setting catch limits as allowed per recent changes to the Magnuson-Stevens Fishery Conservation and Management Act implementing regulations.

Committee Action:

Committee Action:

REVIEW AND MODIFY THE SUGGESTED PURPOSE AND NEED STATEMENT

Draft Motion:

DRAFT MOTION: APPROVE THE PURPOSE AND NEED STATEMENTS (AS MODIFIED).

Management Plans modified by this Comprehensive Amendment

IPT Recommendation:

Include the same FMPs as addressed in the original Comprehensive ACL amendment:

- Snapper Grouper (Amendment 25)
- Dolphin Wahoo (Amendment 2)
- Golden Crab (Amendment 5)
- Sargassum (Amendment 2)

Also include:

- Coral (currently does not have a control rule)

Recommendation on other FMPS:

- Spiny Lobster and CMP: recommend not including in this amendment

- Recommend not including in this amendment, due to these being joint plans with the GMFMC.
    - The Council has expressed interest in completing this amendment quickly, and including joint actions will make that more difficult.
    - The IPT suggests developing the SAFMC control rule in this amendment, then pursuing a separate amendment to include these provisions in the joint FMPs if desired.

- CMP ABC CR implemented through Amendment 18 (2011)
    - Atlantic King Mackerel: Same ABC CR as the SAFMC Comp ACL
    - Atlantic Spanish Mackerel: Same ABC CR as the SAFMC Comp ACL
    - Atlantic Cobia: Adopted the Gulf ABC CR as an "interim"
      Background:
        - SEDAR 28 results were not available at the time of Amendment 18 adoption, so the SAFMC ABC CR assessed stocks tier (P* specification) could not be fully applied.
        - The SAFMC SSC provided an ABC recommendation based on the Gulf ABC CR (ABC = 1,571,399 lb whole weight; equal to the mean plus 1.5 times the standard deviation of the most recent 10 years landings)
        - Amendment Discussion: "***Preferred Alternative 5*** *would adopt the Gulf Council's ABC control rule as an interim control rule until results are available from SEDAR 28 which begins in 2012, and would provide the greatest biological benefits over the long term if it sufficiently accounts for assessment uncertainty and prevents overfishing. The ABC provided in* ***Preferred Alternative 5*** *is also recommended by the South Atlantic Council's SSC.*"
    - Atlantic Cobia, CMP Amendment 20B ABC Specification
        - SAFMC SSC applied the SAFMC ABC CR (4/2013)
        - CMP Amendment 20 based ABC on the SAFMC SSC recommendation
- Spiny Lobster ABC CR implemented through Amendment 10 (2011)
    - Adopted the Gulf Council ABC CR

<u>OTHER FMPS TO CONSIDER- NO IPT RECOMMENDATION AT THIS TIME</u>

SHRIMP: No ABC control rule in place.

- IPT Recommendation: Shrimp has not been discussed by the IPT
- National Standard 1 guidance on "Annual Crops"
    - (1) *Exceptions from ACL and AM requirements—*
      (i) *Life cycle.* Section 303(a)(15) of the Magnuson-Stevens Act "shall not apply to a fishery for species that have a life cycle of approximately 1 year unless the Secretary has determined the fishery is subject to overfishing of that species" (Pub. L. 109-479 104(b)(2)). This exception applies to a stock for which the average age of spawners in the population is approximately 1 year or less. While exempt from the ACL and AM requirements, FMPs or FMP

amendments for these stocks must have SDC, MSY, OY, ABC, and an ABC control rule.

SSC Recommendation:

- The SSC recommended that ABC control rule changes should be implemented through a comprehensive amendment to ensure consistency across FMPs.

Committee Action:

Committee Action:

PROVIDE GUIDANCE ON THE FMPS TO AMEND THROUGH THIS AMENDMENT

Draft Motions:

DRAFT MOTION: AMEND THE SNAPPER GROUPER, DOLPHIN WAHOO, GOLDEN CRAB, SARGASSUM, AND CORAL FMPS THROUGH THE COMPREHENSIVE ABC CONTROL RULE AMENDMENT.

DRAFT MOTION: AMEND THE SNAPPER GROUPER, DOLPHIN WAHOO, GOLDEN CRAB, SARGASSUM, CORAL, SPINY LOBSTER, AND COASTAL MIGRATORY PELAGICS FMPS THROUGH THE COMPREHENSIVE ABC CONTROL RULE AMENDMENT.

DRAFT MOTION: AMEND THE SNAPPER GROUPER, DOLPHIN WAHOO, GOLDEN CRAB, SARGASSUM, CORAL, SHRIMP, SPINY LOBSTER, AND COASTAL MIGRATORY PELAGICS FMPS THROUGH THE COMPREHENSIVE ABC CONTROL RULE AMENDMENT.

Proposed Actions and Alternatives

PURPOSE OF THE MARCH 2018 SAFMC REVIEW:

The Council is asked to review and comment on the current language of the proposed Actions and Alternatives. Council guidance will be incorporated by the IPT.
The preliminary schedule calls for Action/Alternative language to be considered for approval by the Council in June 2018.
Topics to consider in this review

- Are there other Alternatives to consider?
- Does the wording of Alternatives capture the Council's intent?
- Is the wording clear and understandable?

Action 1 Modify the Acceptable Biological Catch Control Rules

Alternative 1 (No Action). Acceptable biological catch for included species will continue to be specified as per the control rule specified by the Comprehensive Annual Catch Limit Amendment (**Table 2.1**) for the Dolphin Wahoo, Golden Crab, and Sargassum Fishery Management Plans, and Amendment 29 to the Fishery Management Plan for Snapper Grouper (**Table 2.2**). There is no acceptable biological catch control rule for the Coral Fishery Management Plan.

Table 2.1. ABC control rule specified by the Comprehensive Annual Catch Limit Amendment for the Snapper Grouper, Dolphin Wahoo, and Sargassum FMPs. Parenthetical values in Level 1 indicate (1) the maximum adjustment value for a dimension; and (2) the adjustment values for each tier within a dimension.

Level 1 – Assessed Stocks	
Tier	**Tier Classification and Methodology to Compute ABC**
1. 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%)
2. 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 F_{MSY} and MSY are lacking. (7.5%) 5. None. Only single point estimates; no sensitivities or uncertainty evaluations. (10%)
3. 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%)
4. Productivity and Susceptibility 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 the 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). Done when only a limited number of years of catch data for a fishery are available. Requires a higher level of "informed expert judgment" than Level 2.	
Level 4 – Unassessed Stocks.	
OFL and ABC derived on a case-by-case basis. Stocks with very low landings that show very high variability in catch estimates (mostly caused by the high degree of uncertainty in recreational landings estimates), or stocks that have species identification issues that may cause unreliable landings estimates. Use "decision tree": 1. Will catch affect stock? NO: Ecosystem Species (Council did this already, ACL Amend) YES: Go to 2 2. Will increase (beyond current range of variability) in catch lead to decline or stock concerns? NO: ABC = 3rd highest point in the 1999-2008 time series YES: Go to 3 3. Is stock part of directed fishery or is it primarily bycatch for other species? Directed: ABC = Median 1999-2008	

Bycatch/Incidental: If yes, go to 4.

4. Bycatch. Must judge the circumstance:
   If bycatch in other fishery: what are trends in that fishery? What are the regulations? What is the effort outlook?

   If the directed fishery is increasing and bycatch of stock of concern is also increasing, the Council may need to find a means to reduce interactions or mortality. If that is not feasible, will need to impact the directed fishery. The SSC's intention is to evaluate the situation and provide guidance to the Council on possible catch levels, risk, and actions to consider for bycatch and directed components.

Table 2.2. Acceptable biological catch control rule specified for Snapper Grouper by Amendment 29 to the Snapper Grouper Fishery Management Plan. Parenthetical values in Level 1 indicate (1) the maximum adjustment value for a dimension; and (2) the adjustment values for each tier within a dimension.

Level 1 – Assessed Stocks	
Tier	**Tier Classification and Methodology to Compute ABC**
1. 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%)
2. 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 F_{MSY} and MSY are lacking. (7.5%) 5. None. Only single point estimates; no sensitivities or uncertainty evaluations. (10%)
3. 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%)
4. Productivity and Susceptibility 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 the 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). Done when only a limited number of years of catch data for a fishery are available. Requires a higher level of "informed expert judgment" than Level 2.	
Level 4 – Unassessed Stocks. Only Reliable Catch Stocks.	
OFL and ABC derived on a case-by-case basis. Apply ORCS approach using a catch statistic, a scalar derived from the risk of overexploitation, and the Council's risk tolerance level.	
Level 5 – Unassessed Stocks.	
OFL and ABC derived on a case-by-case basis. Stocks with very low landings that show very high variability in catch estimates (mostly caused by the high degree of uncertainty in recreational landings estimates), or stocks that have species identification issues that may cause unreliable landings estimates. Use "decision tree": 5. Will catch affect stock? NO: Ecosystem Species (Council did this already, ACL Amend) YES: Go to 2 6. Will increase (beyond current range of variability) in catch lead to decline or stock concerns? NO: ABC = 3rd highest point in the 1999-2008 time series YES: Go to 3 7. Is stock part of directed fishery or is it primarily bycatch for other species? Directed: ABC = Median 1999-2008 Bycatch/Incidental: If yes, go to 4. 8. Bycatch. Must judge the circumstance: If bycatch in other fishery: what are trends in that fishery? What are the regulations? What is the effort outlook? If the directed fishery is increasing and bycatch of stock of concern is also increasing, the Council may need to find a means to reduce interactions or mortality. If that is not feasible, will need to impact the directed fishery. The SSC's intention is to evaluate the	

situation and provide guidance to the Council on possible catch levels, risk, and actions to consider for bycatch and directed components.

Alternative 2. Specify an acceptable biological catch control rule that establishes categories based on the type of information and the scientific uncertainty evaluation available for a stock. The Council will specify the acceptable risk of overfishing for the stock, considering advice and recommendations from its advisory panels and Scientific and Statistical Committee. The Scientific and Statistical Committee will evaluate the information available and the level of scientific uncertainty for the stock and apply the Council's acceptable risk of overfishing to derive the acceptable biological catch recommendation. The Scientific and Statistical Committee may deviate from the acceptable biological catch control rule when necessary due to data or assessment circumstances that cannot be adequately addressed by the approved acceptable biological catch control rule.

Category Descriptions for **Alternative 2**:

- Category 1. The stock is assessed and scientific uncertainty is fully evaluated. Acceptable biological catch is derived by applying the acceptable risk of overfishing to the assessment overfishing limit distribution.
- Category 2. The stock is assessed, but scientific uncertainty is not fully evaluated or some assessment outputs may be lacking. The Scientific and Statistical Committee will adjust the assessment coefficient of variation or overfishing limit distribution as necessary to adequately address scientific uncertainty. Acceptable biological catch is derived by applying the acceptable risk of overfishing to the modified assessment overfishing limit distribution.
- Category 3. The stock is assessed; however, scientific uncertainty is not fully evaluated and no uncertainty distribution of the overfishing limit is available. The Scientific and Statistical Committee will develop a coefficient of variation or overfishing limit distribution as necessary to derive the acceptable biological catch that reflects scientific uncertainty, or apply a direct buffer to overfishing limit (or an overfishing limit proxy) to derive the acceptable biological catch recommendation.
- Category 4: No acceptable stock assessment is available. The overfishing limit and acceptable biological catch will be based on the expert judgement of the Scientific and Statistical Committee.

Additional Options to consider for **Alternative 2**:

- **Option 1**. Define acceptable biological catch based on the yield available at 75% of the fishing mortality rate that provides maximum sustainable yield for any assessment category if an acceptable overfishing limit distribution cannot be derived.
- **Option 2**. In the case of overfished stocks, the acceptable biological catch will be based on the rebuilding plan chosen by the Council.
- **Option 3**. Specify the acceptable biological catch as a constant annual value, for up to 5 years, when requested by the Council. (Possible replacement for fixed acceptable biological catch action – if this works here, Action 4 can be deleted)

Alternative 3. Specify the acceptable biological catch control rule to be consistent with the control rule specified in Amendment 29 to the Snapper Grouper Fishery Management Plan, modified such that the Scientific and Statistical Committee will determine the values for Tiers 1 and 2 of Level 1, and the Council will determine the values for Tiers 3 and 4 of Level 1. The acceptable biological catch will be based on the accepted probability of overfishing as modified by the total adjustment derived by the Scientific and Statistical Committee and the Council, derived from a stock projection analysis that achieves the appropriate probability of overfishing.

DISCUSSION:

The only difference in the no action tables is that table 2, addressing the snapper grouper ABC CR, includes the ORCS approach as Level 4, and unassessed stocks provisions renumbered as Level 5.

The Council and SSC have discussed changes in the ABC CR several times. The following bullets summarize the prior recommendations and discussion points made in support of the overall ABC CR modifications proposed in **Action 1**.

- The existing CR is overly prescriptive and formulaic with regard to assessed stocks, Tier 1, thus preventing the SSC from adequately addressing uncertainty differences across stocks or from responding to new methods and techniques.
- The CR is too prescriptive with regard to Tiers 2 and 3 (unassessed stocks), calling upon specific methods, which have in some cases been surpassed by recent developments.
- Some assessment information factors of Tier 1 (assessed stocks) are not appropriate for the stocks addressed under the current rule's Tier 1, and overlap with stocks assigned to other tiers (e.g., includes an adjustment for 'scarce or unreliable catch records' that is inappropriate now that the rule includes tiers addressing catch-only stocks)
- The current rule mixes uncertainty evaluation (an SSC responsibility) with risk tolerance (a Council responsibility); and relies upon the SSC to make recommendations with regard to both components.
- Language and definitions have become unclear over time, particularly with multiple use of the word "Tiers".
- The Council recommended that the SSC consider removing status from consideration in the CR. The Council cited two considerations in support of this request. The first is the fact that status determinations are made by the agency, not the SSC, as noted. The second is because status is an assessment output, not a characteristic of the assessment approach or the data, and therefore status is not a component to the underlying assessment uncertainty that is supposed to be addressed by the CR. The Council considers that stock status is more appropriately considered when it, the Council, considers its risk tolerance for a stock.
- Stock status is determined by NMFS, and is a factor that the SSC considers appropriate for the Council to consider when determining the acceptable risk of overfishing. As such, the SSC recommends removing stock status from the ABC CR.
- The Productivity and Susceptibility Assessment (PSA) information is also a factor that the SSC recommends the Council should consider when determining the acceptable risk of overfishing. The SSC recommends removing the PSA consideration from the ABC

CR. However, the SSC recommends that the current PSA information should be updated and reviewed by the SSC if the Council wishes to use it to establish risk levels.

Alternative 2

The SSC recommended categorizing assessed stocks based on the information provided to evaluate and characterize assessment uncertainty, which led to **Alternative 2**.

The IPT recommended including this sentence as part of **Alternative 2**: "*The Council will specify the acceptable risk of overfishing for the stock, considering advice and recommendations from its advisory panels and Scientific and Statistical Committee.*" This statement was proposed as a stand-alone action in earlier iterations of the CR discussions. Since the MSA allows the Council to specify risk tolerance, and both the SSC and Council supported this provision during earlier discussions, the IPT felt it was appropriate to include as part of the core ABC CR being considered through **Action 1**.

The IPT recommended that using **Options** within **Alternative 2** would simplify the subsequent evaluation of actions and alternatives. The Council could choose any or all of these options to address how the CR is applied.

Option 1 was considered as a separate alternative in earlier iterations.

Option 2 was proposed as a separate action in earlier iterations. The IPT recommends including it here to allow the Council to select this provision, while reducing the overall number of actions to evaluate.

Option 3 is proposed for **Alternative 2** to allow specifying a constant ABC value for multiple years. Including this provision here in **Action 1** will reduce the total number of actions and remove the need for the separate **Action 4**.

Alternative 3

Alternative 3 is a slight modification of the existing CR. It adds the ORCS approach, and divides the adjustment factors of the current CR into uncertainty considerations, addressed by the SSC, and risk tolerance considerations, addressed by the Council.

Other Alternatives Discussed by the Council and SSC

Establish an Ecosystem Component Category

This alternative would create an additional category to address Ecosystem Component stocks identified by the Council under the MSA guidelines. This approach was opposed by the SSC because these stocks are not subject to the full suite of fishing level specifications, such as OFL and ABC, and therefore would not be subject to the same control rule provisions as other stocks in the FMU. Including them in the ABC CR will add confusion and unnecessary complexity.

Establish and identify categories based on data levels

- Data labels, particularly "Data poor" can be negative, misleading.
- Many stocks defy clear categorization by data – relative quality can vary greatly across the available data types.
- There are no accepted standards for the typical data descriptors: (rich, limited, moderate, poor, complete, etc)
- Characterizing assessments and stocks by data levels may infer inappropriate or undesired quality or reliability conclusions.
- Data availability is not the salient point to determining how ABC is derived: Assessment information and uncertainty evaluations are.

Establish and identify categories based on assessment levels or types

- Assessment science is always changing, so model types and descriptions can become outdated or limiting (as shown in the purpose and need regarding data limited approaches)
- Assessment outputs and their reliability is more important to deriving the ABC than the particular type or class of model.
- There can be considerable overlap in the outputs of various assessment models, as well as variations in which outputs are reliable and useful for any particular assessment.
- Characterizing assessments and stocks by assessment type may infer inappropriate or undesired quality or reliability conclusions, and lead to efforts to simply move stocks "up" the hierarchy.
- The assessment type or label is not the salient point to determining how ABC is derived: Assessment information and uncertainty evaluations are.

SSC Recommendations:

- The SSC supported modifying the ABC CR as described in Alternative 2.
- The SSC recommended against including ecosystem component stocks in the ABC CR provisions.
- The SSC did not support designing the ABC CR solely around data or assessment categories or levels, and recommended that the treatment of uncertainty was a more robust and useful categorization approach.

Committee Action:

REVIEW AND PROVIDE GUIDANCE ON THE SUGGESTED ACTION AND ALTERNATIVES

Action 2 Specify an approach for determining the acceptable risk of overfishing.

Alternative 1 (No Action). The acceptable risk of overfishing is determined by the acceptable biological catch control rule criteria that are evaluated by the Scientific and Statistical Committee.

Alternative 2. The Council will specify the acceptable risk of overfishing using the existing acceptable biological catch control rule provisions addressing stock status and the productivity and susceptibility analysis (Tier 1, Dimensions 3 and 4), considering advice from the Scientific and Statistical Committee and the Council's advisory panels.

Alternative 3. The Council will specify the acceptable risk of overfishing based on three stock biomass levels and three stock risk ratings. Stocks will be assigned a risk rating of high, moderate, or low by the Council, considering the recommendations of the Scientific and Statistical Committee and the Council's advisory panels. Stock biomass will be based on stock assessment results or the expert judgement of the Scientific and Statistical Committee, and categorized as high, moderate, or low. For all stock risk ratings, the highest risk tolerance will be allowed when biomass exceeds the maximum sustained yield biomass level. The risk tolerance will be reduced to the moderate level when biomass is below the maximum sustained yield biomass level, and further reduced to low risk tolerance when biomass is below the midpoint between the maximum sustained yield biomass level and the minimum stock size threshold. Risk tolerance values for each biomass and stock category will be set by the Council, considering recommendations from the Scientific and Statistical Committee and other Council Advisory Panels. The Scientific and Statistical Committee will evaluate a stock's risk category each time the stock is assessed.

Option 1. Allow the highest risk level when stock biomass exceeds 110% of the biomass at maximum sustained yield, and use 110% of the maximum sustained yield biomass level to evaluate the biomass midpoint for defining the boundary between the moderate and low risk levels.

Option 2. Allow the Council to deviate from the default risk levels by 0.1 for an individual stock, based on its expert judgment, new information, or recommendations by the Scientific and Statistical Committee or other expert advisors. Risk tolerance may not exceed 0.5.

Option 3. Assign unassessed stocks to the moderate biomass level, unless there is a recommendation from the Scientific and Statistical Committee that justifies a different level.

Alternative 4. Specify risk tolerance for each stock directly, considering recommendations of the Scientific and Statistical Committee and the Council's advisory panels. Risk tolerance may not exceed 0.5.

DISCUSSION:

Summary table of risk tolerance levels based on stock-specific risk ratings and biomass levels.

Risk rating (Stock Specific)	Council's Default Risk Tolerance: accepted risk of overfishing (P* values)		
	High Biomass Biomass exceeds B_{MSY} (or 110% B_{MSY} per Option 1)	**Moderate Biomass** Biomass is ABOVE the midpoint between B_{MSY} and MSST	**Low Biomass** Biomass is below the midpoint between B_{MSY} and MSST
low	0.5	0.45	0.4
medium	0.5	0.4	0.3
high	0.4	0.3	0.2

Alternative 2 represents a slight modification in the existing practices. It would not address the concerns raised by the SSC regarding the information used to determine productivity and susceptibility, and would not address the concern that using a stocks overfishing status to determine the accepted risk of overfishing for that stock creates an unnecessary penalty.

Alternative 3 would base risk tolerance on stock specific traits, through the assigned risk rating, and on the stocks biomass. It allows the Council to determine the risk level, and provides flexibility for the SSC and FMP APs to provide recommendations for the Council to consider. By including biomass considerations, it addresses National Standard 1 guidance to consider reducing fishing mortality as stock biomass declines.

The IPT recommended using options rather than sub-alternatives to provide address flexibility in risk tolerance assignments. **Options 1** and **2** of **Alternative 3** were previously proposed as sub-alternatives.

Option 1 provides a higher degree of precaution, by raising the biomass level at which the highest risk rating is allowed. **Option 2** provides the Council flexibility to deviate from the specified risk levels. **Option 3** provides guidance for assigning risk levels when stock biomass is unknown. It includes a default value as well as flexibility for an alternative SSC recommendation.

Alternative 4 is the simplest approach, but also potentially the most difficult to implement as it provides little guidance to the Council on the appropriate risk level. It could be difficult to establish risk levels that adequately reflect stock productivity differences, and risk it not related to stock biomass.

SSC Recommendation:

- The SSC supports varying risk tolerance by biomass levels and considering the PSA risk categories for assigning stock risk ratings.

Committee Action:

REVIEW AND PROVIDE GUIDANCE ON THE SUGGESTED ACTION AND ALTERNATIVES; CONSIDER ADDITIONAL ALTERNATIVES

NEW Action 3 Specify an approach for determining the probability of rebuilding success for overfished stocks

Alternative 1 (No Action). Do not specify an approach for determining the probability of rebuilding success for overfished stocks.

Alternative 2. When developing a stock rebuilding plan, the Council will specify a probability of rebuilding success, considering the recommendations of the appropriate fishery management plan advisory panel and the Scientific and Statistical Committee.

Alternative 3. When developing a stock rebuilding plan, the Council will specify a probability of rebuilding success based on the stock risk rating. The rebuilding probability will be set at 80% for high risk stocks, 70% for moderate risk stocks, and 60% for low risk stocks. The Council may deviate from these levels by 10% to address unforeseen or unique circumstances. Stocks will be assigned a risk rating of high, moderate, or low by the Council, considering the recommendations of the Scientific and Statistical Committee and the Council's advisory panels.

DISCUSSION:

The IPT recommended adding this action to address the difference between the probability of overfishing and the probability of rebuilding.

If the Council took no action (**Alternative 1**) the rebuilding probability would need to be at least 50%, per MSA requirements.

Alternative 2 provides the most flexibility, as it allows the Council to set the rebuilding probability directly. **Alternative 3** ties the rebuilding probability to stock risk levels.

SSC Recommendation:

This is a new Action, and has not been reviewed by the SSC as written. However, the Action is consistent with how rebuilding probabilities are addressed in the existing rule.

Committee Action:

REVIEW AND PROVIDE GUIDANCE ON THE SUGGESTED ACTION AND ALTERNATIVES; CONSIDER ADDITIONAL ALTERNATIVES

Action 4 Allow constant acceptable biological catch recommendations for multiple years.

Alternative 1 (No Action). Acceptable biological catch recommendations will be provided as annual values.

Alternative 2. The Scientific and Statistical Committee will provide acceptable biological catch recommendations as a constant value for up to 5 years.

Option 1: Only when requested by the Council.
Option 2: Constant acceptable biological catch values will be provided for 3 years.

Alternative 3. The Scientific and Statistical Committee will provide acceptable biological catch recommendations as both annual values and constant values for up to 5 years.

Option 1: Only when requested by the Council.
Option 2: Constant acceptable biological catch value will be provided for 3 years.

DISCUSSION:

This action addresses flexibility allowed under the revised NS 1 guidelines.

The alternatives differ in whether the ABC is provided as only a constant value over multiple years (**Alternative 2**), or as both constant and annual values (**Alternative 3**). **Alternatives 2** and **3** both include options to further refine the process and the time period.

This entire Action could be omitted if provisions for multi-year constant ABC specifications are included as an option for **Action 1**. Note that this is shown as **Option 3** in **Action 1-Alternative 2**.

SSC Recommendation:

- The SSC supports allowing constant ABC recommendations for 3-5 years.

Committee Action:

REVIEW AND PROVIDE GUIDANCE ON THE SUGGESTED ACTION AND ALTERNATIVES; CONSIDER ADDITIONAL ALTERNATIVES

Action 5 Allow phase-in of acceptable biological catch changes

Sub-Action 5.1: Establish criteria specifying when phase-in is allowed.

Alternative 1 (No Action). No phase-in of ABC changes is allowed.

Alternative 2. Allow phase-in when a new acceptable biological catch is less than X% of the existing acceptable biological catch.

Option 1: X=70%

Option 2: X=80%

Option 3: X=90%

Alternative 3. Allow phase-in when stock biomass exceeds a specific level

Option 1: if stock biomass exceeds the minimum stock size threshold

Option 2: if the stock biomass is greater than the midpoint between the biomass that provides maximum sustainable yield and the minimum stock size threshold.

Sub-Action 5.2. Specify the approach for phase-in of acceptable biological catch changes.

Alternative 1 (No Action). No phase-in of ABC changes is allowed.

Alternative 2. Phase-in acceptable biological catch changes over 3 years.

- Year 1: modified acceptable biological catch may not exceed the overfishing limit.
- Year 2: modified acceptable biological catch equals one-half the difference between the overfishing limit and the new acceptable biological catch recommendation.
- Year 3: modified acceptable biological catch equals the original recommended year 3 acceptable biological catch (based on the projections and analyses that triggered the phase-in).
- Year 4 and beyond: acceptable biological catch is based on revised projections that account for the phase-in during years 1-3.

Alternative 3. Phase-in acceptable biological catch changes over 1 year.

- Year 1: modified acceptable biological catch may not exceed the overfishing limit.
- Year 2: acceptable biological catch is based on revised projections that account for the phase-in during year 1.

DISCUSSION:

This action addresses flexibility allowed under the revised NS 1 guidelines.

The IPT recommended using sub-actions to address criteria and process alternatives separately, so the alternatives under each sub-action can be evaluated relative to each other. The IPT believes this will simplify the analysis and evaluation of alternatives under this action.

Relevant National Standard 1 Guidance:

> *Phase-in ABC control rules.* Large changes in catch limits due to new scientific information about the status of the stock can have negative short-term effects on a fishing industry. To help stabilize catch levels as stock assessments are updated, a Council may choose to develop a control rule that phases in changes to ABC over a period of time, not to exceed 3 years, as long as overfishing is prevented each year (*i.e.,* the phased-in catch

level cannot exceed the OFL in any year). In addition, the Councils should evaluate the appropriateness of phase-in provisions for stocks that are overfished and/or rebuilding, as the overriding goal for such stocks is to rebuild them in as short a time as possible.

Sub-Action 5.1 provides guidance for when phase-in will be allowed, addressing the National Standard guidance directing the Council to consider when phase-in is appropriate. **Alternative 2** provides a boundary on the amount of change required in ABC to justify phase-in. This addresses the National Standard language referencing "large changes in catch limits". **Alternative 3** address stock biomass considerations. **Option 1** will allow phase-in when a stock is not overfished (biomass exceeds MSST). **Option 2** is more conservative, only allowing phase-in if the biomass is between MSST and the MSY level.

Sub-Action 5.1 provides alternatives for the time period of the phase-in, and provides guidance on how the higher catch allowed during phase-in is addressed during later years to ensure overfishing does not occur in the later years.

The IPT recommended adding **Sub-Action 5.2** – **Alternative 3** as a shorter phase-in alternative.

SSC Recommendation:

- The SSC supports phase-in for stocks above MSST.

Committee Action:

REVIEW AND PROVIDE GUIDANCE ON THE SUGGESTED ACTION AND ALTERNATIVES; CONSIDER ADDITIONAL ALTERNATIVES

Action 6 Allow carry-over of unharvested catch

Sub-Action 6.1. Establish criteria specifying circumstances when unharvested catch can be carried over from one year to increase the available harvest in the next year.

Alternative 1 (**No Action).** No carry over will be allowed.

Alternative 2. Carry-over of unharvested catch will be allowed if the stock is neither overfished nor experiencing overfishing.

Alternative 3. Carry-over of unharvested catch will only be allowed for a fishery sector that has experienced a regulatory closure due to catch exceeding the annual catch limit at least once in the previous 3 years.

Alternative 4. Carry-over of unharvested catch will only be allowed for a fishery sector for which total landings over the previous 3 years are less than the total annual catch limit over those same years.

Alternative 5. Unharvested catch will only be carried over for harvest in the following year.

Sub-Action 6.2. Specify limits on the amount of unharvested catch that may be carried over for the following year.

Alternative 1 (No Action). There will be no carry-over of unharvested catch.

Alternative 2. Allow carry-over of unharvested catch for an individual fishery sector using the buffer between the annual catch limit and the acceptable biological catch. Thus, the amount of catch that may be carried over is limited by the acceptable biological catch.

Alternative 3. Allow carry-over of unharvested catch for an individual fishery sector that results in an adjusted annual catch limit that exceeds the original acceptable biological catch for the year for which the unharvested catch is carried-over. The original acceptable biological catch for the carry-over year will be revised upwards to accommodate the temporary increase in annual catch limit. The revised acceptable biological catch will remain in place for one year and may not exceed the overfishing limit, and evaluations of carry-over for future years will be based on the original acceptable biological catch, not the temporary revised acceptable biological catch.

Option 1. If the overfishing limit is unknown, the revised acceptable biological catch may not exceed 105% of the original acceptable biological catch.

Option 2. If the overfishing limit is unknown, the revised acceptable biological catch may not exceed 110% of the original acceptable biological catch.

Option 3. If the overfishing limit is unknown, the revised acceptable biological catch may not exceed 120% of the original acceptable biological catch.

Alternative 4. Allow carry-over of unharvested catch for an individual fishery sector of up to 25% of the sector annual catch limit. If the carry over results in an annual catch limit that exceeds the original acceptable biological catch for the year for which the unharvested catch is carried-over, the acceptable biological catch for that year will be revised upwards to accommodate the temporary increase in annual catch limit. The revised acceptable biological catch will remain in place for one year and may not exceed the overfishing limit, and evaluations of carry-over for future years will be based on the original acceptable biological catch, not the temporary revised acceptable biological catch.

Sub-Action 6.3. Specify an approach for implementing acceptable biological catch and annual catch limit modifications to support carrying over unharvested catch.

Alternative 1 (No Action). No carry over is allowed.

Alternative 2. Use the framework approaches as provided in each fishery management plan.

Alternative 3. Implement an expedited approach to address carry-over of unharvested catch. The Council will consider the need for and benefits of carry over during a scheduled Council meeting, If the Council decides carry over will be beneficial to the fishery and will not result in overfishing, it will notify the Regional Administrator of the recommendation for carry-over in a letter indicating that the criteria and guidance of this amendment are met, and including the Council's analysis of the relevant biological, economic, and social information necessary to meet the criteria and guidance and support the Council's request. If the Regional Administrator concurs that the Council's recommendations are consistent with the objectives of the fishery management plan, the Magnuson-Stevens Fishery Conservation and Management Act, and all other applicable law, the Regional Administrator is authorized to implement the Council's request through publication of appropriate notification in the *Federal Register*, providing appropriate time for additional public comment as necessary.

Option 1. The Scientific and Statistical Committee will review carry-over requests that require a change in the acceptable biological catch.

DISCUSSION:

This action addresses flexibility allowed under the revised NS 1 guidelines.

Carry-over that does not exceed the ABC can be accommodated under existing rules, using the buffer between the ACL and OFL. However, for many Council stocks, ACL=ABC.

Under existing rules, the Council could ask the SSC to consider recommending a temporary, higher ABC to accommodate carry-over. This approach is not particularly efficient, given the timing of Council and SSC meetings. The overall purpose of this action is to develop criteria to guide when carry-over can be allowed while preventing overfishing, and develop an efficient process that will accommodate minor, temporary increases in an ABC to support carry over. Overfishing is prevented as long as the revised ABC stays below OFL, so no increased ABC due to carry over can exceed the annual OFL.

The Final Rule addressing carry-over allowances states that Councils must state in its FMP when carry over can and cannot be used. This is addressed through the criteria in **Sub-Action 6.1**. The FMP must also state how overfishing is prevented.

Relevant National Standard 1 Guidance:

> *Carry-over ABC control rules.* An ABC control rule may include provisions for the carry-over of some of the unused portion of an ACL (*i.e.*, an ACL underage) from one year to increase the ABC for the next year, based on the increased stock abundance resulting from the fishery harvesting less than the full ACL. The resulting ABC recommended by the SSC must prevent overfishing and must consider scientific uncertainty consistent with the Council's risk policy. Carry-over provisions could also

allow an ACL to be adjusted upwards as long as the revised ACL does not exceed the specified ABC. When considering whether to use a carry-over provision, Councils should consider the likely reason for the ACL underage. ACL underages that result from management uncertainty (*e.g.*, premature fishery closure) may be appropriate circumstances for considering a carry-over provision. ACL underages that occur as a result of poor or unknown stock status may not be appropriate to consider in a carry-over provision. In addition, the Councils should evaluate the appropriateness of carry-over provisions for stocks that are overfished and/or rebuilding, as the overriding goal for such stocks is to rebuild them in as short a time as possible.

SSC Recommendation:

- The SSC supported this action if applied to stocks that are neither overfished nor overfishing, and have catch close to the ACL

Committee Action:

REVIEW AND PROVIDE GUIDANCE ON THE SUGGESTED ACTION AND ALTERNATIVES; CONSIDER ADDITIONAL ALTERNATIVES

Appendices

Definitions

ABC Control Rule (ABC CR)	a policy for establishing a limit or target catch level that is based on the best scientific information available and is established by the Council in consultation with its SSC.
Accountability Measure (AM)	Management controls to prevent ACLs, including sector-ACLs, from being exceeded, and to correct or mitigate overages of the ACL if they occur.
Allowable Biological Catch (ABC)	A level of a stock or stock complex's annual catch, which is based on an ABC control rule that accounts for the scientific uncertainty in the estimate of OFL, any other scientific uncertainty, and the Council's risk policy.
Annual Catch Limit (ACL)	A limit on the total annual catch of a stock or stock complex, which cannot exceed the ABC, that serves as the basis for invoking AMs. An ACL may be divided into sector-ACLs (*see* paragraph (f)(4) of this section).
Annual Catch Target (ACT)	An amount of annual catch of a stock or stock complex that is the management target of the fishery, and accounts for management uncertainty in controlling the catch at or below the ACL.
Approaching an Overfished Condition	A stock or stock complex is approaching an overfished condition when it is projected that there is more than a 50 percent chance that the biomass of the stock or stock complex will decline below the MSST within two years.
Buffer	Informal term often used by the SSC when referring to the difference between OFL and ABC. Related to the level of assessment uncertainty. May be expressed in absolute values or as a percentage of OFL.
Catch	The total quantity of fish, measured in weight or numbers of fish, taken in commercial, recreational, subsistence, tribal, and other fisheries. Catch includes fish that are retained for any purpose, as well as mortality of fish that are discarded.
Coefficient of Variation (CV)	Standardized statistical measure of uncertainty, reflecting the dispersion (i.e. spread) of a probability distribution.

Optimum Yield	The amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities and taking into account the protection of marine ecosystems; that is prescribed on the basis of the MSY from the fishery, as reduced by any relevant economic, social, or ecological factor; and, in the case of an overfished fishery, that provides for rebuilding to a level consistent with producing the MSY in such fishery.
Overfished	A stock or stock complex is considered "overfished" when its biomass has declined below MSST.
Overfishing	Occurs whenever a stock or stock complex is subjected to a level of fishing mortality or total catch that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis.
Overfishing Limit (OFL)	Annual amount of catch that corresponds to the estimate of MFMT applied to a stock or stock complex's abundance and is expressed in terms of numbers or weight of fish.
Management Uncertainty	Uncertainty in the ability of managers to constrain catch so that the ACL is not exceeded, and the uncertainty in quantifying the true catch amounts (i.e., estimation errors). The sources of management uncertainty could include: Late catch reporting; misreporting; underreporting of catches; lack of sufficient inseason management, including inseason closure authority; or other factors.
Maximum Fishing Mortality Threshold (MFMT)	The level of fishing mortality (i.e. F), on an annual basis, above which overfishing is occurring. The MFMT or reasonable proxy may be expressed either as a single number (a fishing mortality rate or F value), or as a function of spawning biomass or other measure of reproductive potential.
Maximum Sustainable Yield (MSY)	The largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological, environmental conditions and fishery technological characteristics (*e.g.*, gear selectivity), and the distribution of catch among fleets.; actual year to year yields will vary with changes in stock size and catch characteristics.
MSY Fishing Mortality Rate	Fmsy; The fishing mortality rate that, if applied over the long term, would result in MSY.
MSY Stock Size	Bmsy; The long-term average size of the stock or stock complex, measured in terms of spawning biomass or other appropriate measure of the stock's reproductive potential that would be achieved by fishing at Fmsy.
Minimum Stock Size Threshold (MSST)	The level of biomass below which the capacity of the stock or stock complex to produce MSY on a continuing basis has been jeopardized; used to determine if a stock is overfished.

Probability Density Function (PDF)	A function that can be used to determine the likelihood of a particular value. In ABC CR use, it can provide the yield associated with a given P*.
Scientific Uncertainty	uncertainty in the information about a stock and its reference points. Sources of scientific uncertainty could include: Uncertainty in stock assessment results; uncertainty in the estimates of MFMT, MSST, the biomass of the stock, and OFL; time lags in updating assessments; the degree of retrospective revision of assessment results; uncertainty in projections; uncertainties due to the choice of assessment model; longer-term uncertainties due to potential ecosystem and environmental effects; or other factors.

ABC CONCEPTUAL DIAGRAMS & DESCRIPTION

The following figures illustrate the relationships between reference points and how OFL and ABC are derived from the yield distribution and the chosen risk tolerance (P*).

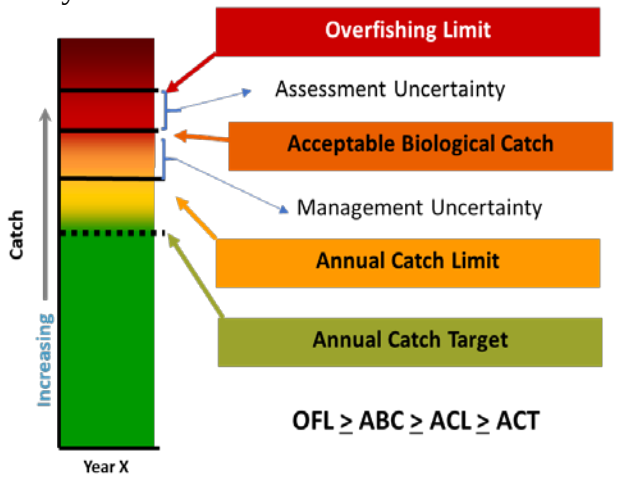

Figure 1. Illustrated general relationship between OFL, ABC, ACL, and ACT. The difference between OFL and ABC addresses assessment uncertainty, while the difference between ABC and ACL addresses management uncertainty.

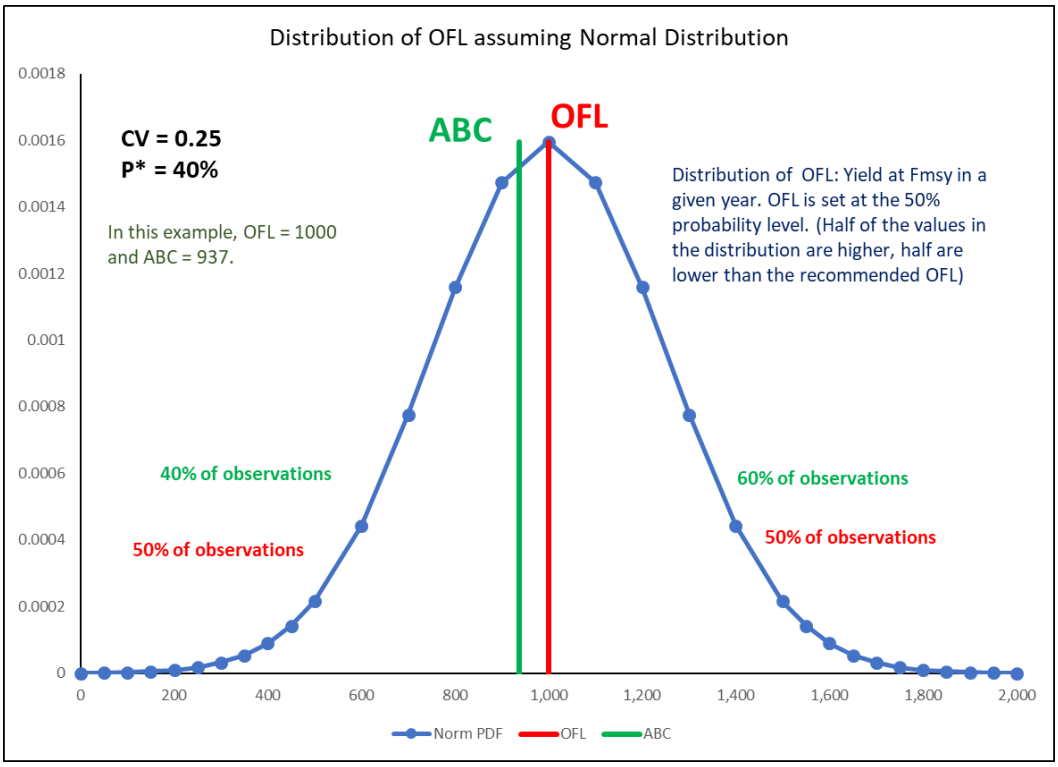

Figure 2. Example distribution illustrating OFL and ABC for a hypothetical stock with OFL=1000 pounds, a chosen risk tolerance or P* pf 40% (40% chance that overfishing occurs), and an assessment CV of 0.25.

How is ABC derived for assessed stocks under this rule?

Three basic items are required to derive an ABC from a stock assessment:

1. Estimates of productivity (i.e. MSY and OFL) and stock assessment uncertainty.

These are products of an assessment and inputs to the ABC Control Rule. Various proxies can be used for unassessed stocks, such as SPR (spawning potential ratio) levels, or Fmax.

a. Estimated yield (OFL) and, ideally, a distribution of its uncertainty or a PDF.

b. Assessment CV that can be applied to the OFL distribution

2. A risk tolerance for overfishing (e.g., P*).

This is set by the Council, as guided by the ABC Control Rule. Typically, the Council will provide risk tolerance guidance for the SSC to use when applying the ABC CR.

a. The Council will specify a risk rating for each stock (Action 2).

The SSC and relevant AP will provide guidance and recommendations for consideration by the Council.

b. The SSC will evaluate the biomass level of the stock, either through the use of assessment results or, in the case of unassessed stocks, application of its best judgement as informed by other information as may be available.

c. The risk tolerance is determined based on the combination of the stock risk rating and the stock biomass (Action 2).

3. A method for applying the risk tolerance to the assessment results.

This is addressed by the SSC, guided by the ABC Control Rule, and forms the basis of the ABC recommendation.

a. Direct approach: distribution of OFL used to derive ABC

The P* is applied to the distribution (PDF) of the estimated overfishing level (OFL). MSY or the OFL is based on the midpoint (50^{th} percentile) of the estimated stock yield at FMSY. ABC is based on a different percentile, determined by the P* value. For example, if the risk of overfishing is 30%, P*=0.3 and ABC is determined by the 30^{th} percentile of the OFL yield. The difference between ABC and OFL will vary across assessments, and will depend on the observed OFL distribution.

This is the approach used most often for assessed SAFMC stocks.

(To come: some example OFL distributions)

b. Indirect approach: CV and assumed distribution of OFL used to derive ABC

If the distribution of OFL is not available, or not considered adequate for determining ABC, the ABC can be derived from a measure of assessment uncertainty (CV) and an assumed distribution of OFL. The type of distribution assumed (e.g., normal or log-normal) determines its shape. The CV determines how widely the distribution spreads. Thus, high CV distributions are broad and

flat, encompassing many values; while low CV distributions are narrow and steep, encompassing fewer values with many more values centered closely around a mode or median.

Once a CV and type of distribution is decided, the buffer between ABC and OFL can be determined for any risk level. In fact, the buffer can be determined in advance for any combination of CV, distribution, and risk tolerance (P*). To derive ABC, the buffer calculated by the CV, distribution, and P* is applied to the OFL. For example, if a CV of 0.5 and a log-normal distribution of OFL are assumed, the ABC buffer will be 53%. If the OFL were 100,000 pounds, the OFL would be 47,000 pounds.