Proposed Approaches For Calculating Acceptable Biological Catch (ABC), Applying 40-10 And 25-5 Rules, And Determining Stock Status From Multiple Sub-Area Assessments With Varying Assessment Categories Or Sigma (σ) Values.

Defining ABCs given sub-area assessments with different assessment categories or scientific uncertainty σ values, under the assumption that a single P* would be applied to the entire stock.

The stock level OFL is simply the sum of the sub-area assessment OFL values.

For ABC calculation, the proposed and simplest approach is to weight the assigned sub-area σ values by the proportional sub-area OFLs to get a single σ, which allows for the standard approach for increases in σ over time. This does result in slightly higher buffers than the traditional approach (Table 1), which appears appropriate given the greater uncertainty in managing multiple sub-areas with varying amounts of information. In particular, an evaluation of a representative set of combinations finds that for a P* of 0.45, the buffer is up to 1.03 times, and for a P* of 0.4, up to 1.05 times as large as the traditional approach below. The largest observed difference occurs when the OFL is divided between category 1 and category 3 assessments.

Table 1: Comparison of weighted buffers vs. buffers based on weighted scientific uncertainties (σ) for year 1 of the projection period.

P*	Prop. Cat 1. OFL	Prop. Cat 2. OFL	Prop. Cat 3. OFL	Weighted Buffer	Weighted σ Buffer	Difference	Multiplicative Difference
0.45	1	0	0	6.1%	6.1%	0	1.00
0.45	0.75	0.25	0	7.5%	7.6%	0.1%	1.01
0.45	0.5	0.5	0	8.9%	9.0%	0.1%	1.01
0.45	0.75	0	0.25	10.1%	10.4%	0.3%	1.03
0.45	0.5	0.25	0.25	11.6%	11.8%	0.2%	1.02
0.45	0.5	0	0.5	14.2%	14.5%	0.3%	1.02
0.45	0.25	0.25	0.5	15.6%	15.9%	0.3%	1.02
0.45	0	0.5	0.5	17.0%	17.2%	0.2%	1.01
0.4	1	0	0	11.9%	11.9%	0	1.00
0.4	0.75	0.25	0	14.5%	14.6%	0.1%	1.01
0.4	0.5	0.5	0	17.1%	17.3%	0.2%	1.01
0.4	0.75	0	0.25	18.9%	19.9%	1.0%	1.05
0.4	0.5	0.25	0.25	21.5%	22.4%	0.9%	1.04
0.4	0.5	0	0.5	25.8%	27.1%	1.3%	1.05
0.4	0.25	0.25	0.5	28.4%	29.4%	1.0%	1.04
0.4	0	0.5	0.5	31.1%	31.6%	0.5%	1.02

A more traditional approach for ABC calculation, in contrast, would be to calculate and sum sub-ABC values to get the stock-wide ABC. However, this does not account for the additional uncertainty in managing multiple sub-areas with different amounts of information under single stock management; would require applying different buffer values to each sub-area (when we are not necessarily applying management at the sub-area level), then summing the resulting sub-ABCs; and would require a back-calculation to get the associated σ value for the stock unit for each year. With the weighted σ approach described above, one could simply apply the standard increase in σ with time.

Application of the 40-10 and 25-5 rules.

The 40-10 and 25-5 rules should be applied to the stock level ABC to get a cap on the potential stock level ACL in each year.

Determining when it is possible to define stock status.

The question of whether or not we are able to define stock status given assessment results typically depends on the stock category. Category 1 or 2 assessments generally provide information on stock status that is considered adequately reliable to use. Category 3 assessments do not provide that information, or the information they provide is not adequately reliable. For a stock with multiple sub-area assessments, when one or more (but not all) sub-areas have category 3 assessments, we may or may not be able to define stock status.

The Scientific and Statistical Committee (SSC) should determine when it is possible to determine stock status, and report that stock status to the Council. The SSC is encouraged to develop approaches and general rules, though there may be edge and unusual cases that will require SSC consideration when they arise.

Outline of questions to be addressed on how to determine if a status determination can be made:

1. What proportion should be in category 1 or 2 versus category 3 in order to determine status?
    a. Does the status of those areas influence when we can determine status for the entire stock?
    b. Does it matter if there is perceived correlation in status between the category 1 and/or 2 areas and category 3 areas?
2. How to estimate proportion of unfished spawning biomass/spawning output in category 3 assessment areas?
    a. Relative habitat area?
    b. If the assessment types produce estimates of sub-area unfished abundance, even though they were ultimately designated as category 3?
    c. Other?
3. Can we estimate status for category 3 in some cases, either as a point estimate or range?
    a. Using Productivity and Susceptibility Assessment (PSA) to determine the vulnerability and an estimate of depletion in the sub-area(s) with category 3 assessments?
    b. If the assessment types produce estimates of sub-area depletion levels, even though they were ultimately designated as category 3?