

## DRAFT 2021 OFL CV Decision Criteria Table for Black Sea Bass

Note: All text from the previous (September 2019) version has been retained and additions are highlighted in red text. In the words of the Peer Review Committee: "The 2021 MTA [Management Track Assessment] for Black Sea Bass involved the addition of a single year of fishery-dependent and fishery-independent data. There were no structural changes to the assessment, and any parameter changes fell well within the scope of an MTA update of an approved assessment. "

Decision Criteria	Summary of Decision Criteria Considerations	Assigned OFL CV Bin (60/100/150)
<b>Data quality</b>	<p><b>Surveys</b></p> <ul style="list-style-type: none"> <li>• Fishery-independent data are derived from both NEFSC and state surveys.</li> <li>• NEFSC surveys provide coverage of all ages.</li> <li>• State surveys in the northern portion of the Mid-Atlantic provide estimates of all ages, but state surveys in the southern sub-area index age-1 fish only, requiring use of a Recreational Catch Per Angler (CPA) index.</li> <li>• <b>A new recreational CPUE time series for the northern region was examined, but not used in model fitting</b></li> </ul> <p><b>Landings and discards</b></p> <ul style="list-style-type: none"> <li>• Large recreational component (~60-80% of total in recent years) places reliance on MRIP.</li> <li>• Updated MRIP numbers show an understandable pattern of large increases in northern sub-area in recent years, but less so in the south.</li> <li>• MRIP data for 2016 are considered implausible owing to high variance in wave-specific data, but attempts to account for this observation did not materially affect model results.</li> </ul>	
<b>Model appropriateness and identification process</b>	<ul style="list-style-type: none"> <li>• BSB uses a two-area model for assessment, with no exchange between sub-areas (North/South).</li> <li>• A range of alternative model structures were presented at SAW 62, including a single area model, and a two-area model with exchange. Most of this wide range of different models give qualitatively similar conclusions about stock status and trends.</li> <li>• The two-area model responds to presence of a dominant 2011 year class in the northern sub-area but not in the southern. Adoption of the two sub-area model greatly improved model fit, especially of the 2011 year class data.</li> <li>• Growth rates are different between sub-areas as well. However, the division of the stock into two sub-areas was based on exchange and stock structure with limited support in the ecological literature: tagging data, oceanographic data, and a need to have a relatively equitable division of available data.</li> </ul>	
<b>Retrospective analysis</b>	<ul style="list-style-type: none"> <li>• Substantial retrospective bias in both northern and southern sub-areas is present in the 2019 operational assessment (Mohn's <math>r &gt; 0.4</math>) –</li> </ul>	

	<p>although the direction of bias is in opposite directions in the two sub-areas.</p> <ul style="list-style-type: none"> <li>• "The retrospective pattern was continued in the 2021 MTA but was larger in magnitude. The retrospective biases were 2-3x larger in the north than in the south."</li> <li>• Retrospectively adjusted SSB is approximately 40-50% higher than unadjusted, but adjustments do not change stock status. This pattern was also present in SAW 62.</li> </ul>	
<b>Comparison with empirical measures or simpler analyses</b>	<ul style="list-style-type: none"> <li>• The relationship between the recreational CPA index and a swept area index of exploitable biomass from the NESFC spring survey was presented at the 2019 operational assessment, as a part of a "Plan B" approach.</li> <li>• The swept-area estimate was coherent and broadly consistent with model output.</li> </ul>	
<b>Ecosystem factors accounted</b>	<ul style="list-style-type: none"> <li>• No ecosystem factors were considered in the assessment.</li> <li>• Clear northward shift in the stock's geographic distribution suggests an influence of temperature and changing ecosystem dynamics, especially at the northern edge of the range.</li> <li>• Analysis of temperature-linked surplus production suggests that Black Sea Bass productivity has thus far increased with warming.</li> </ul>	
<b>Trend in recruitment</b>	<ul style="list-style-type: none"> <li>• OFL is calculated based on most recent, higher, but more variable recruitment.</li> <li>• BSB stock abundance has been dominated by several recent strong year classes. Most notably, a 2011 year class was strong in the northern sub-area but very weak in the southern sub-area. This year class has supported a large fraction of the fishery.</li> <li>• Evidence exists for a second recent strong year class in 2015, which was more evenly distributed. This year class is now beginning to enter the fishery. <b>Continued evidence to support strong 2015 year class.</b></li> <li>• The 2017 year class may be one of the lowest in the time series.</li> </ul>	
<b>Prediction error</b>	<ul style="list-style-type: none"> <li>• On the past, the SSC could compare across successive stock assessment predictions of OFL, but inclusion of the revised MRIP data increased the population scale proportionately throughout the entire time series, rendering prediction comparisons less useful as a metric of model performance.</li> <li>• Combining model predictions from the two sub-areas into a single stock projection makes understanding prediction error more challenging.</li> </ul>	
<b>Assessment accuracy under different fishing pressures</b>	<ul style="list-style-type: none"> <li>• Long-term catch and survey index history shows substantial contrast, including periods of high (early 1990s) and low (recent decade) F and a 6-fold increase in SSB since Fs were reduced; i.e., a strong response to declining F. Recent Fs have been near Fmsy.</li> </ul>	
<b>Simulation analysis/MSE</b>	<ul style="list-style-type: none"> <li>• No formal MSE-type analyses have been conducted for this stock.</li> </ul>	

**Draft Narrative**

There is a strong retrospective bias present in the assessment results and this pattern differs between the two spatial sub-areas. The fishery has a large recreational component (~60-80% of total harvest in recent years), and thus a substantial reliance on MRIP. Updated MRIP numbers differ substantially from the old estimates, and the updated estimate for one year (2016) was considered implausible owing to high variance in wave-specific data. Spatially explicit models were implemented in the 2016 benchmark assessment, and there were detailed efforts to explore the consequences of the misspecification of the spatial resolution of these models on perceptions of stock status. There were broadly consistent patterns in the fishery independent indices.