SEDAR 25 Black Sea Bass Assessment: Standard, Update, or Benchmark?

Prepared for the SAFMC SEDAR Committee

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SEDAR 25 is conducting assessments of South Atlantic black sea bass and tilefish. Both stocks have prior approved benchmarks; black sea bass also includes an update conducted in 2005. This project was planned during a time when the SEDAR Steering Committee was evaluating changes in the SEDAR process, and it began prior to the Steering Committee finalizing such changes so that the assessment results could be provided to the Council by December 2011. Therefore, the approach in effect for this assessment actually falls between a standard and a benchmark as defined by the SEDAR Steering Committee in May 2011. Importantly, the approach and the Terms of Reference were approved by the Council at the December, 2010 meeting.

Key criteria for **benchmark assessments** are a full 3-workshop approach, incorporation of an independent peer review panel, evaluation of multiple models, evaluation of prior recommendations and decisions and consideration of new data sources. Conversely, **standard assessments** will be developed through a single workshop focused primarily on model fit and interpretation, limited allowance for new data, and review provided by the SSC. Given these criteria and considering the SEDAR 25 process, both as defined by the Council and as occurring in practice, this project most resembles a benchmark. The specifics noted below for the data workshop phase illustrate that all of the key characteristics of a benchmark were met, in practice, by this assessment. In many cases the data workshop work groups went above and beyond the Terms of Reference for this assessment in evaluating and admitting new data sources.

During the assessment workshop, both a production model and an age-based model will be produced. Consideration of multiple models is an additional benchmark characteristic which will not occur for future standard assessments. Furthermore, many of the earlier decisions regarding model structure and configuration are expected to be revisited in the assessment workshop in order to incorporate the significant new research and additional data sources put forth through the data workshop.

SEDAR 25 BLACK SEA BASS ASSESSMENT APPROACH

Expanded "Standard Assessment"

- Includes separate data and assessment workshops

- Includes independent peer review panel with CIE appointed reviewers

- Incorporating new data without prior assessment or procedural workshop review

- Preparing multiple models during the assessment workshop

<u>DATA WORKSHOP</u>

1) Summary Statistics

- Data Workshop working papers prepared: 25

- Reference Documents reviewed as of the Data Workshop: 46

- +65,000 age structures incorporated, plus associated biological info

- Incorporated recent research on discard mortality rates

- included 2 new indices of abundance and evaluated 4 additional new indices

- extended commercial and recreational time series

- included discards from commercial logbook and HB observer information

2) Commercial Group

Revisions:

- recommend treating trawls as separate gear category

- recommend providing data back to 1950 (New Data)

- updated discard estimates, using discard logbook data (New Data)

Additional Evaluations:

- Stock boundaries

- GSA Foundation observer data, 2007-2009

- Misidentification and unclassified landings evaluated

- Reviewed landings by state, considered units and aggregations for confidentiality

- sampling intensity

- weight conversions

3) Life History Group

Revisions:

- Updated natural mortality rate, and application of age-based estimates (New Data)

- provided age samples (New Data)

- updated growth models, based on reanalysis of historic data to address calendar ages

- updated growth models, incorporating size restriction modification

- updated female maturity rates; also evaluated by depth and latitude
- used logistic regression to model age of transition
- updated weight conversion
- revised discard mortality rate (reduced from 15% to 1-7%)

Additional Evaluations:
- reviewed 8 references addressing discard mortality rates
- stock ID: genetics, otolith microchemistry and demographics
- spawning seasonality
- growth rates by latitude and depth
- evaluated 7 references addressing movements and migrations
- batch fecundity estimates provided.

4) Recreational Statistics Group

Revisions:
- revised approach (from SEDAR 22) for estimating weight for MRFSS
- omitted Monroe County landings
- post-stratified NC landings for North and South of Hatteras
- provided headboat data prior to 1978
- recommended including SCDNR finfish survey length compositions (New Data)
- recommended using headboat discard survey estimates (New Data)
- added "kept and discarded" length compositions, from HB observers (New Data)

Additional Evaluations:
- reviewed several sources of historical data, including FWS surveys
- evaluated SC charter boat index (New Data)

5) Indices Group

Revisions:
- SEDAR Indices worksheets applied to all 9 indices
- SEDAR Indices report cards submitted for 8 indices
- All indices standardized, some for the first time
- Provided rankings of indices for reliability/application to assessment

- Developed and recommended MARMAP blackfish/antillian trap gears combined index

- Developed and recommended Headboat discard index (New Data)

- Developed and recommended commercial logbook vertical line index (New Data)

- Revised several decisions regarding the headboat index

Additional Evaluations:

- Evaluated SC DNR charter boat index (New Data)

- Evaluated commercial logbook trap index (New Data)

- Evaluated SC shallow trawl index (New Data)

- Evaluated FL pot index (New Data)

- Explored regional difference, between and within various surveys

PROGRESS TOWARD RESEARCH RECOMMENDATIONS OF PRIOR ASSESSMENTS

SEDAR 2 (Black Sea Bass) Benchmark Recommendations:

1. Representative age sampling is needed (proportional); also commercial age sampling.

    ADDRESSED: This assessments incorporates age proportions obtained from significantly increased age sampling conducted since the benchmark.

2. Increases in fishery independent sampling.

    ADDRESSED: The MARMAP program increased sampling at the northern and southern extremes of its range; estimates are included in this assessment.

3. Development of logbook indices is recommended.

    ADDRESSED: Three logbook indices were considered in this assessment; one is recommended for inclusion.

4. Information about fecundity is needed (batch fecundity and frequency at age and/or size).

    ADDRESSED: Fecundity information was evaluated and provided for this assessment. Findings are based on combining MARMAP data with additional data from an ongoing study being conducted through UNC-Wilmington.

5. Further consideration of implications of change in sex for fishery management.

    ADDRESSED: Despite research directed at this phenomena, concerns still remain regarding the ability of management to address hermaphroditic stocks and questions still remain for most stocks regarding the importance of one sex over another for productivity and recruitment.

    The data workshop discussed the issue of sperm limitation, which is one of the concerns related to this life history strategy that does not typically arise with other species. Overall

the life history group did not consider males a limiting factor in black sea bass productivity. Therefore, the assessment will estimate spawning potential based on female fecundity, rather than mature biomass of both sexes as provided in prior assessments.

Realistically, this issue is much larger than any single assessment. Insights are expected as fishing mortality is reduced and stocks are observed at higher spawning stock abundances and expanded age structure. Managers have been advised to take such characteristics into account when setting catch limits.

6. Further development of analytical models to incorporate historical catch information.

   ADDRESSED: The 2005 update concluded historical data (1950–1972) can and should be used in the next benchmark assessment. Significant effort has been devoted since the original benchmark to evaluate historic input sources and develop methods that accommodate such data.

   The DW for this assessment provided data back to 1950, including several additional years of headboat estimates from the early 1970's which were not included in the earlier benchmark. It should be noted, however, that since the data workshop the early period of headboat data has come under significant criticism by industry representatives. They claim that headboat data prior to the 1980's are wholly unreliable because participants did not fill out their logbooks promptly, crew members often filled out the reports weeks after a trip, and may have filled out reports for trips they did not participate in. Supporting evidence of this claim is provided by written comment from several Captains operating at the time.

7. *(Unnumbered in original document.)* Future research should be conducted to further develop age-structured models that could account for historic landings. Specifically, methods that allow scaling of uncertainty in landings records over time are needed. We need to include more historical records which are more uncertain than current records, this may be done by changing CVs over time as opposed to constant CV for a data series.

   ADDRESSED: The update and this assessment can incorporate CVs that vary over time in accordance with knowledge of data precision. Continued progress has been made, as noted in the previous item, toward understanding the uncertainties in historic data sources.

2005 Update Recommendations:

1. Development and implementation of more extensive methods to estimate bycatch and discards are required, preferably by age and size class. This should improve future assessments and help managers better understand the effects of possible management measures.

   ADDRESSED: NMFS/SEFSC initiated a discard logbook for commercial fisheries in 2002, and a discard category was added to the SEFSC headboat survey in 2004. States have also increased discard sampling, such as that provided by the for-hire observer study conducted by FL FWC.

2. As representative age-composition data become available, they should be incorporated into the assessment.

ADDRESSED: This assessment incorporates the considerable age composition information collected in recent years.

3. Tagging and genetic studies should be used to gain information on population structure.

    ADDRESSED: Both tagging and genetic studies have been conducted, and were available for and considered during the data workshop.

4. A study is recommended to examine whether a recruitment index could be derived from such sources as the bridge net sampling program at Beaufort, the SEAMAP program, or other monitoring programs (e. g., state or inter-jurisdictional projects).

    ADDRESSED: Other monitoring programs were evaluated in this assessment, including SEAMAP.

5. A study is recommended to determine whether the MARMAP gear-standardization study currently being conducted can be used to effectively combine trap indices in future assessments (NOTE: Referred to combining chevron trap with earlier trap gears). This standardization would provide an additional relatively long index of abundance. The possibility was considered by the (DW) and deferred because only one year of the three-year study had been completed.

    ADDRESSED: MARMAP conducted gear comparisons and data collection is complete. The analysis and report is not complete, however initial indications are that it may not be feasible to compare gears to the extent desired due to variability in catch data. The DW recommended combining snapper and blackfish trap gears from earlier MARMAP sampling.

6. A study of ghost pots (unrecovered traps) is recommended. Of interest are estimating occurrence, configuration, and possible effects of such gear, both on the fish stock through unreported mortality and on the habitat through mechanical damage. The potential for removing traps is also of interest.

    NOT ADDRESSED: Ghost pots have not been explicitly studied for this fishery. Research has been conducted on discard mortality, results of which led to revised discard mortality estimates as noted above. Ghost pot issues are more management than assessment related, thus this recommendation would be more appropriate for inclusion in an FMP or within the Council's review of research and monitoring needs.

7. The AW recommends that the next benchmark assessment of black sea bass be conducted in five years.

    PARTIALLY ADDRESSED: The Council originally planned an update of sea bass for 2010, which would have met the timing of this recommendation. The project was delayed initially so that resources could be devoted to red snapper. Further delay occurred when it was recognized that changes necessary to incorporate new age data, and various other data sources as described above, went beyond the realm of an update.

    Upon consideration of the necessary changes and data additions identified during initial data scoping activities, and of changes in assessment types under consideration by the SEDAR Steering Committee, the Council recommended that this project be pursued as a standard assessment. The Terms of Reference and overall approach for this project were

developed by the Council to meet the needs of this assessment in particular, with recognition that it could be quite dissimilar from future SEDAR standard assessments.

8. The AW recommends that the headboat program commence collecting depth and more detailed location information (e.g., GPS or VMS coordinates) with catch records.

PARTIALLYADDRESSED: Some additional data is collected by observers on the headboat vessels, and resolution of area has improved. The Council has long supported moving to electronic monitoring approaches that would enable much greater spatial detail.

9. To date, SEDAR assessments have computed MSY-related benchmarks based on existing selectivity patterns. However, MSY varies with selectivity. The AW recommends that in future assessments, possible changes in selectivity be modeled, to estimate whether better yield per recruit, and thus increased sustainable yield, could be attained.

MAY BE ADDRESSED: Future selectivity will depend upon Council actions, thus this issue is not fully addressable through an assessment. However, methods exist to enable such calculations, and the SEDAR process recognizes and allows for such post-assessment evaluations.