SEDAR
SouthEast Data, Assessment, and Review

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SEDAR 48 Southeastern U.S. Black Grouper

Assessment* Terms of Reference

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Data Workshop Terms of Reference

1. Review stock structure and unit stock definitions and consider whether changes are required.
   - Review available research and published literature
   - Make recommendations on biological stock structure and define the unit stock
   - Provide recommendations to address Council management jurisdictions to support management of the stock(s), and specification of management benchmarks and fishing levels, by Council jurisdiction (SAFMC/GMFMC)
   - Document discussions and recommendations pertaining to this term of reference in a separate working paper
2. Review, discuss, and tabulate available life history information.
   - Evaluate age, growth, natural mortality, and reproductive characteristics
   - Provide appropriate models to describe growth, maturation, and fecundity by age, sex, or length as applicable
   - Evaluate the adequacy of available life-history information for conducting stock assessments and recommend life history information for use in population modeling
   - Provide estimates or ranges of uncertainty for all life history information
3. Recommend discard mortality rates.
   - Review available research and published literature
   - Consider research directed at black grouper, and other shallow water groupers, from the southeastern US Atlantic and Gulf of Mexico
   - Provide estimates of discard mortality rate by fishery, gear type, depth, and other feasible or appropriate strata
   - Include thorough rationale for recommended discard mortality rates
   - Provide justification for any recommendations that deviate from the range of discard mortality provided in the last benchmark or other prior assessment

4. Provide measures of population abundance that are appropriate for stock assessment.
    - Consider and discuss all available and relevant fishery-dependent and independent data sources
    - Document all programs evaluated; address program objectives, methods, coverage, sampling intensity, and other relevant characteristics
    - Provide maps of fishery and survey coverage for each data source
    - Develop fishery and survey CPUE indices by appropriate strata (e.g., age, size, area, and fishery) and include measures of precision and accuracy
    - Discuss issues related to historical mis-labeling of gag as black grouper and adjustments made to correct the historical data.
    - Recommend which data sources are considered adequate and reliable for use in assessment modeling
    - Discuss the degree to which available indices adequately represent fishery and population conditions.
    - Rank the available indices with regard to their reliability and suitability for use in assessment modeling
5. Provide commercial catch statistics including landings and discards in both pounds and number of fish.
    - Evaluate and discuss the available data for accurately characterizing harvest and discard by species and fishery sector or gear.
    - Provide length and age distributions for both landings and discards if feasible.
    - Provide maps of fishery effort and harvest.
6. Provide recreational catch statistics including landings and discards in both pounds and number of fish.
    - Evaluate and discuss the available data for accurately characterizing harvest and discard by fishery sector or gear.
    - Provide length and age distributions for both landings and discards if feasible.
    - Provide maps of fishery effort and harvest in state and federal waters
7. Provide recommendations for future research in areas such as sampling, fishery monitoring, and stock assessment. Include specific guidance on sampling intensity (number of samples including age and length structures) and appropriate strata and coverage.
8. Prepare the Data Workshop report providing complete documentation of workshop actions and decisions in accordance with project schedule deadlines (Section II. of the SEDAR assessment report).

Assessment Workshop Terms of Reference

1. Review any changes in data following the Data Workshop and any analyses suggested by the Data Workshop Panel. Summarize data used in each assessment model. Provide justification for any deviations from Data Workshop recommendations.
2. Develop population assessment models that are compatible with available data and document input data, model assumptions and configuration, and equations for each model considered.
3. Provide estimates of stock population parameters if feasible.
   - Include fishing mortality, abundance, biomass, selectivity, stock-recruitment relationship, and other parameters necessary to describe the population
   - Include appropriate and representative measures of precision for parameter estimates
4. Characterize uncertainty in the assessment and estimated parameter values.
   - Consider uncertainty in input data, modeling approach, and model configuration
   - Provide a continuity model consistent with the prior assessment configuration, if one exists, updated to include the most recent observations. Alternative approaches to a strict continuity run that distinguish between model, population, and input data influences on findings may be considered.
   - Consider other data sources as appropriate
   - Provide appropriate measures of model performance, reliability, and 'goodness of fit'
   - Provide measures of uncertainty for estimated parameters
5. Provide estimates of yield and productivity.
   - Include yield-per-recruit, spawner-per-recruit, and stock-recruitment models
6. Provide estimates of population benchmarks or management criteria consistent with available data, applicable FMPs, proposed FMPs and amendments, other ongoing or proposed management programs, and National Standards.
   - Evaluate existing or proposed management criteria as specified in the management summary
   - Recommend proxy values when necessary and provide justification for the use of any proxies
7. Provide declarations of stock status relative to management benchmarks, or alternative data poor approaches if necessary.
8. Perform probabilistic analyses of proposed reference points, stock status, and yield.
   - Provide the probability of overfishing at various harvest or exploitation levels
   - Provide a probability density function for biological reference point estimates
   - If the stock is overfished, provide the probability of rebuilding within mandated time periods as described in the management summary or applicable federal regulations
9. Project future stock conditions (biomass, abundance, and exploitation) and develop rebuilding schedules if warranted; include estimated generation time. Stock projections

shall be developed in accordance with the following ($F_{Current}$ = *geometric mean of the most recent three years of fishing mortality*):

A) If stock is overfished:
$F=0$, $F=F_{Current}$, $F=F_{MSY}$, F_{Target}
$F=F_{Rebuild}$ (max that rebuild in allowed time)

B) If stock is overfishing:
$F=F_{Current}$, $F=F_{MSY}$, F_{Target}

C) If stock is neither overfished nor overfishing:
$F=F_{Current}$, $F=F_{MSY}$, F_{Target}

D) If data-limitations preclude classic projections (i.e. A, B, or C above), explore alternate models to provide management advice

E) Provide equilibrium yields at F_{OY}

10. Provide recommendations for future research and data collection.
    - Be as specific as practicable in describing sampling design and sampling intensity
    - Emphasize items which will improve future assessment capabilities and reliability
    - Consider data, monitoring, and assessment needs
11. Complete the Assessment Workshop Report in accordance with project schedule deadlines (Section III of the SEDAR Stock Assessment Report).

Review Workshop Terms of Reference

1. Evaluate the data used in the assessment addressing the following:
   a) Are data decisions made by the DW and AW sound and robust?
   b) Are data uncertainties acknowledged, reported, and within normal or expected levels?
   c) Are data applied properly within the assessment model?
   d) Are input data series reliable and sufficient to support the assessment approach and findings?
2. Evaluate the methods used to assess the stock taking into account the available data.
   a) Are methods scientifically sound and robust?
   b) Are assessment models configured properly and used consistent with standard practices?
   c) Are the methods appropriate for the available data?
3. Evaluate the assessment findings with respect to the following:
   a) Are abundance, exploitation, and biomass estimates reliable, consistent with input data and population biological characteristics, and useful to support status inferences?
   b) Is the stock overfished? What information supports this conclusion?
   c) Is the stock undergoing overfishing at $F_{Current}$? What information supports this conclusion?
   d) Is there an informative stock-recruitment relationship? Is the stock-recruitment curve reliable and useful for evaluation of productivity and future stock conditions? If not, what additional data may help inform this relationship?
   e) Are the quantitative estimates of the status determination criteria for this stock reliable? If not, are there other indicators that may be used to inform managers about stock trends and conditions?
4. Evaluate the stock projections, addressing the following:
   a) Are the methods consistent with accepted practices and available data?
   b) Are the methods appropriate for the assessment model and outputs?
   c) Are the results informative and robust and useful to support inferences of probable future conditions?
   d) Are key uncertainties acknowledged, discussed, and reflected in the projection results?
5. Consider how uncertainties in the assessment and their potential consequences are addressed.
   - Comment on the degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty in the population, data sources, and assessment methods
   - Ensure that the implications of uncertainty in technical conclusions are clearly stated

6. Consider the research recommendations provided by the Data and Assessment Workshops and make any additional recommendations or prioritizations warranted.
    - Clearly denote research and monitoring that could improve the reliability of, and information provided by, future assessments
    - Provide recommendations on possible ways to improve the SEDAR process
7. Provide guidance on key improvements in data or modeling approaches that should be considered when scheduling the next assessment.
8. Prepare a Peer Review Summary that details the Panel's evaluation of the stock assessment and addresses each Term of Reference.

*This assessment will follow a Benchmark approach