

SEDAR

SouthEast Data, Assessment, and Review

South Atlantic Fishery Management Council
Gulf of Mexico Fishery Management Council
Caribbean Fishery Management Council
NOAA Fisheries
Atlantic States Marine Fisheries Commission
Gulf States Marine Fisheries Commission

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SEDAR Benchmark Terms of Reference

Data Workshop Terms of Reference

1. Review stock structure and unit stock definitions and consider whether changes are required.
2. Review, discuss, and tabulate available life history information if new information is available.
 - e.g., Age, growth, natural mortality, 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.
3. Recommend discard mortality rates.
 - Review available research and published literature
 - Consider research directed at these species as well as similar species from the SE and other areas.
 - 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.
 - Develop fishery and survey CPUE indices by appropriate strata (e.g., age, size, area, and fishery) and include measures of precision and accuracy.
 - Discuss the degree to which available indices adequately represent fishery and population conditions.
 - Recommend which data sources are considered adequate and reliable for use in assessment modeling.
 - Complete the SEDAR index evaluation worksheet for each index considered.

- Rank the available indices with regard to their reliability and suitability for use in assessment modeling.
5. Provide commercial catch statistics, including both landings and discards in both pounds and number.
 - Evaluate and discuss the adequacy of 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 both landings and discards in both pounds and number.
 - Evaluate and discuss the adequacy of 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.
 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. **Develop a spreadsheet of assessment model input data that reflects the decisions and recommendations of the Data Workshop.** <<< REVIEWING NEED AND USAGE >>>>
 9. Develop a list of tasks to be completed following the workshop.
 10. 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. Summarize data as 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.
 - << *Specify the particular models to be considered and evaluated* >>>
 - Document all input data, assumptions, and equations for each model.
 - Provide a continuity model consistent with the prior assessment configuration, updated to include the most recent observations
3. Provide estimates of stock population parameters, if feasible.
 - Include fishing mortality, abundance, biomass, selectivity, stock-recruitment relationship, etc
 - Include appropriate and representative measures of precision for parameter estimates.
4. Characterize uncertainty in the assessment and estimated values
 - Consider uncertainty in input data, modeling approach, and model configuration.
 - Consider other sources as appropriate for this assessment
 - 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 the 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
7. Provide declarations of stock status relative to management benchmarks, or alternative data poor approaches if necessary.
8. Perform a probabilistic analysis 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:
 - A) If stock is overfished:
 - $F=0$, $F=\text{current}$, $F=F_{\text{msy}}$, $F=F_{\text{target}}$ (e.g., F_{OY}),
 - $F=F_{\text{rebuild}}$ (max that rebuild in allowed time)
 - B) If stock is overfishing
 - $F=F_{\text{current}}$, $F=F_{\text{msy}}$, $F=F_{\text{target}}$ (e.g., F_{OY})
 - C) If stock is neither overfished nor overfishing

$F=F_{\text{current}}$, $F=F_{\text{msy}}$, $F=F_{\text{target}}$ (e.g., F_{0Y})

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

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. Prepare an accessible, documented, labeled, and formatted spreadsheet containing all model parameter estimates and all relevant population information resulting from model estimates and any projection and simulation exercises. Include all data included in assessment report tables and all data that support assessment workshop figures.
12. 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 adequacy, appropriateness, and application of data used in the assessment.
2. Evaluate the adequacy, appropriateness, and application of methods used to assess the stock, taking into account the available data.
3. Evaluate the assessment with respect to the following:
 - a) Is the stock overfished? What information helps you reach this conclusion?
 - b) Is the stock undergoing overfishing? What information helps you reach this conclusion?
 - c) Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?
 - 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 adequacy, appropriateness, and application of the methods used to project future population status with regard to accepted practices and data available for this assessment.
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.
 - 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.
 - Indicate and prioritize those that could reduce assessment uncertainty and improve the output content of future assessments.
7. Prepare a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference. Develop a list of tasks to be completed following the workshop. Complete and submit the Peer Review Summary Report in accordance with the project guidelines.

Standard Assessment TORs Framework

1. Update the approved SEDAR XX *STOCK* model with data through XXX (Specify if date is based on a fishing year).
 - Provide a continuity model consistent with the prior assessment configuration
 - Provide revised model configurations, as appropriate, incorporating changes made for this assessment (changes specified in (2) below)
2. Evaluate and document the following specific changes in input data or deviations from the benchmark model. List below each topic *or new dataset that will be considered in this assessment*.

Example items to list here:

 - *Evaluate discard mortality rates based on Smith et al 2010.*
 - *Evaluate FI abundance indices derived during SEDAR Procedural Workshop 5*
 - *Evaluate age composition information collected since 2005*
 - *Evaluate model weighting approaches suggested by the SEDAR XX Review Panel to improve model fit and performance*
3. Document any changes or corrections made to input datasets and tabulate complete updated input datasets. Provide commercial and recreational landings and discards in pounds, both gutted and whole weight, and numbers. State units of measurement in all tables.
4. Update estimates and tables of model parameter estimates and variances.
5. Update measures of uncertainty and provide representative measures of precision for stock parameter estimates.
6. Update estimates of stock status and management benchmarks; provide declarations of stock status relative to existing criteria.
8. Evaluate future stock status for (YEARS) according to the specifications in the Stock Management History (Note: Council will update the management history from the benchmark to provide full details).
9. Review the research and data recommendations from the previous assessment, note any which have been completed, note how new research or data is included in this assessment, and make any necessary additions or clarifications.
10. Develop a stock assessment workshop report to fully document the input data, methods, and results of the stock assessment update.

Update Assessment TORs Framework

1. Update the approved SEDAR XX *STOCK* model with data through XXX (Specify if date is based on a fishing year). If this update will include any changes in model software, configuration or assumptions, or will include any new input datasets (in accordance with SEDAR guidelines), provide both a continuity model consistent with the prior configuration and a revised model incorporating changes made for the update.
2. *Document here any allowed changes or deviations from the benchmark model (ie, reflecting the flexibility that is provided in the guidelines)*
3. Document any changes or corrections made to input datasets and tabulate complete updated input datasets. Provide commercial and recreational landings and discards in pounds, both gutted and whole weight, and numbers. State units of measurement in all tables.
4. Provide complete updated tables of model parameter estimates and variances, as well as citations for model equations.
5. Update measures of uncertainty and provide representative measures of precision for stock parameter estimates.
6. Update estimates of stock status and management benchmarks; provide declarations of stock status relative to existing criteria.
7. Update 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.
8. Evaluate future stock status for (LIST YEARS) according to the specifications in the Stock Management History (Note: Council will update the management history from the benchmark to provide full details, and request evaluation of any specific management actions necessary)
9. Review the research and data recommendations from the previous assessment, note any which have been completed, and make any necessary additions or clarifications.
10. Develop a stock assessment workshop report to fully document the input data, methods, and results of the stock assessment update.

NOTE: The intent of 'update' assessments is to expedite appraisals of stock status by using only the methods and data sets approved during the preceding SEDAR assessment of that stock. Accordingly, it is not the intent of this update to resolve any outstanding issues identified in the initial SEDAR XX assessment.