



# SEDAR

## *SouthEast Data, Assessment, and Review*

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### **SEDAR 65 HMS Atlantic Blacktip Shark Assessment Terms of Reference**

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#### **Data Workshop Terms of Reference**

1. Define the unit stock for the SEDAR 65 stock assessment as from the northern extent of the stock to the east coast of Florida at the mainland at 25°20.4' N. lat., proceeding due east (the northern Miami-Dade County line).
  - a. The potential for population substructure within that stock unit may be examined, if feasible.
  - b. If feasible, document if the range of the stock has changed in recent years (e.g., moved further north) compared to historical norms.
2. Review, discuss, and tabulate available life history information.
  - a. Evaluate age, growth, natural mortality, and reproductive characteristics.
  - b. Provide appropriate models to describe population growth, maturation, and fecundity by age, sex, and/or length as applicable.
  - c. Evaluate the adequacy of available life history information for conducting stock assessments and recommend life history information for use in population modeling.
  - d. Evaluate and discuss the sources of uncertainty and error, and data limitations (such as temporal and spatial coverage) for each data source. Provide estimates or ranges of uncertainty for all life history information.
3. Recommend discard mortality rates.
  - a. Review available research and published literature.
  - b. Provide estimates of discard mortality rate by fishery, gear type, depth, and other strata as feasible or appropriate.
  - c. Include thorough rationale for recommended discard mortality rates.
  - d. Provide estimates of uncertainty around recommended discard mortality rates.
4. Provide measures of relative population abundance that are appropriate for stock assessment.
  - a. Consider and discuss all available and relevant fishery-dependent and -independent data sources.



- b. Document all programs evaluated; address program objectives, methods, coverage, sampling intensity, and other relevant characteristics.
  - c. Provide maps of fishery and survey coverage.
  - d. Develop fishery and survey CPUE indices by appropriate strata (e.g., age or size, and fishery) and include measures of precision and accuracy.
  - e. Develop fishery and survey CPUE length compositions by appropriate strata (e.g., age or size, and fishery) and include both the number of individuals measured as well as relevant alternative measures of effective sample size (i.e., alternative measures of sampling effort such as the number of trips, hauls, sets, baskets of gear, etc. that were sampled for length measurements).
  - f. Discuss the degree to which available indices and length compositions adequately represent fishery and population conditions.
  - g. Recommend which data sources adequately and reliably represent population abundance for use in assessment modeling.
  - h. Provide appropriate measures of uncertainty for the abundance indices to be used in stock assessment models.
  - i. Rank the available indices with regard to their reliability and suitability for use in assessment modeling.
5. Provide commercial catch statistics across all fisheries, including both landings and discards in both pounds and number.
    - a. Evaluate and discuss the adequacy of available data for accurately characterizing harvest and discard by fishery sector or gear.
    - b. Provide length distributions for both landings and discards if available and include both the number of individuals measured as well as relevant alternative measures of effective sample size (i.e., alternative measures of sampling effort such as the number of trips, hauls, sets, baskets of gear, etc. that were sampled for length measurements).
    - c. Discuss the degree to which available length distributions adequately represent commercial fishery conditions.
    - d. Provide estimates of uncertainty around each set of landings and discard estimates if available.
  6. Provide recreational catch statistics, including both landings and discards in both pounds and number.
    - a. Evaluate and discuss the adequacy of available data (including species id) for accurately characterizing harvest and discard by species and types of recreational fishing.
    - b. Provide length distributions for both landings and discards if available and include both the number of individuals measured as well as relevant alternative measures of effective sample size (i.e., alternative measures of sampling effort such as the number of trips, hauls, sets, baskets of gear, etc. that were sampled for length measurements).
    - c. Discuss the degree to which available length distributions adequately represent recreational fishery conditions.
    - d. Provide estimates of uncertainty around each set of landings and discard estimates.



7. Identify and describe ecosystem, climate, species interactions, habitat considerations, and/or episodic events that would be reasonably expected to affect population dynamics.
8. Provide recommendations for future research in areas such as sampling, fishery monitoring, and stock assessment. If possible, include specific guidance on sampling intensity (number of samples including age and length structures) and appropriate strata and coverage.
9. 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 Process Terms of Reference

1. Review any changes in data following the Data Workshop (DW) and any analyses suggested by the DW. Summarize data as used in each assessment model. Provide justification for any deviations from DW recommendations.
2. Develop population assessment models that are compatible with available data and document input data, model assumptions and configuration, and equations (if necessary) for each model considered.
3. Provide estimates of stock population parameters:
  - a. Include fishing mortality, abundance, biomass, selectivity, stock-recruitment relationship (if applicable), and other parameters as necessary to describe the population.
  - b. Include appropriate measures of precision for parameter estimates.
4. Characterize uncertainty in the assessment and estimated values.
  - a. Consider uncertainty in input data, modeling approach, and model configuration.
  - b. Consider and include other sources as appropriate for this assessment.
  - c. Provide appropriate measures of model performance, reliability, and ‘goodness of fit’.
  - d. Provide measures of uncertainty for estimated parameters
5. Provide estimates of yield and productivity.
  - a. Include yield-per-recruit, spawner-per-recruit, and stock-recruitment models.
6. Provide estimates of population benchmarks or management criteria to include associated uncertainty, with available data, applicable FMPs, proposed FMPs and Amendments, other ongoing or proposed management programs, and National Standards.
  - a. Evaluate existing or proposed management criteria as specified in the management summary.
  - b. Recommend and define proxy values when necessary, and provide appropriate justification.
7. Provide declarations of stock status relative to management benchmarks or alternative data-poor approaches if necessary.
8. Provide uncertainty distributions of proposed reference points and stock status metrics that provide the values indicated in the management specifications. Include probability density functions for biological reference point estimates and population metrics (e.g., biomass and exploitation) used to evaluate stock status.
9. Project future stock conditions and develop rebuilding schedules, if warranted. Provide the estimated generation time for the stock. Stock projections shall be developed in accordance with the following:
  - a. If the stock is overfished, then utilize projections to determine:
    - i. Year in which  $F=0$  results in a 70% probability of rebuilding (Year  $F=0_{p70}$ ).
    - ii. Target rebuilding year (Year<sub>rebuild</sub>).



1. Year  $F=0_{p70}$  if Year  $F=0_{p70} \leq 10$  years, or
  2. Year  $F=0_{p70} + 1$  generation time if Year  $F=0_{p70} > 10$  years.
  - iii.  $F$  resulting in 50% and 70% probability of rebuilding by Year<sub>rebuild</sub>.
  - iv. Fixed level of removals allowing rebuilding of stock with 50% and 70% probability.
  - b. If stock is undergoing overfishing, then utilize projections to determine:
    - i.  $F=F_{\text{reduce}}$  (different reductions in  $F$  that should end overfishing with a 50% and 70% probability).
  - c. If stock is neither overfished nor undergoing overfishing, then utilize projections to determine:
    - i. The  $F$  needed and corresponding removals associated with a 70% probability of overfishing not occurring (analogous to a  $P^* = 0.3$  approach).
  - d. If data-limitations preclude classic projections (i.e. a, b, and c above), explore alternate projection models to provide management advice.
10. Provide recommendations for future research and data collection.
- a. Be as specific as practicable in describing sampling design and sampling intensity.
  - b. Emphasize items that will improve future assessment capabilities and reliability.
  - c. Consider data, monitoring, and assessment needs.
11. Complete the Assessment Process (AP) 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, including discussion of the strengths and weaknesses of data sources and decisions, and consider the following:
  - a. Are data decisions made by the DW and AP 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 and discuss the strengths and weaknesses of the method(s) used to assess the stock, taking into account the available data, and considering the following:
  - a. Are methods scientifically sound and robust?
  - b. Are assessment models configured properly and consistent with standard practices?
  - c. Are the methods appropriate for the available data?
3. Evaluate the assessment findings and consider 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 helps you reach this conclusion?
  - c. Is the stock undergoing overfishing? What information helps you reach 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?
  - 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, including discussing strengths and weaknesses, and consider 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.
  - a. 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.
  - b. Ensure that the implications of uncertainty in technical conclusions are clearly stated.
6. Consider the research recommendations provided by the Data Workshop and Assessment Process and make any additional recommendations or prioritizations warranted.



- a. Clearly denote research and monitoring that could improve the reliability of, and information provided by, future assessments.
  - b. Provide recommendations on possible ways to improve the SEDAR process.
7. Consider whether the stock assessment constitutes the best scientific information available using the following criteria as appropriate: relevance, inclusiveness, objectivity, transparency, timeliness, verification, validation, and peer review of fishery management information.
8. Provide suggestions on key improvements in data or modeling approaches that should be considered when scheduling the next assessment.
9. Prepare a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference.

