SEDAR 68
Gulf of Mexico and Atlantic Scamp
Research Track Assessment
Terms of Reference

December 2018

Data Workshop Terms of Reference

1. Definition of assessment unit stock will be developed through the Scamp Stock ID process and will be added to TORs once process is complete.

2. Review, discuss, and tabulate available life history information for each stock being assessed.
   - Evaluate age, growth, natural mortality, and reproductive characteristics
     - Explore the validity of age data and methodology across ageing facilities
   - Provide appropriate models to describe population and fleet specific (if warranted) growth, maturation, hermaphroditism including age and size at transition, 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.
   - 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. Provide measures of population abundance that are appropriate for stock assessment.
   - Consider 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 independent 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.
   - Document pros and cons of available indices regarding their ability to represent abundance.
     - Consider potential species identification issues between scamp and yellowmouth grouper and, if present, whether the issue was adequately addressed during index development.
   - Categorize the available indices into one of three tiers: Suitable and Recommended, Suitable and Not Recommended, or Not Suitable; *provide justifications for the categorization*.
   - For recommended indices, document any known or suspected temporal patterns in catchability not accounted for by standardization.
   - Provide appropriate measures of uncertainty for the abundance indices to be used in stock assessment models.

4. Provide commercial catch statistics for each stock being assessed, including both landings and discards in both pounds and number. Consider species identification issues between scamp and yellowmouth grouper and correct for these instances as appropriate.
    - Evaluate and discuss the adequacy of available data for accurately characterizing landings and discards by fishery sector or gear.
    - Provide length and age distributions for both landings and discards if feasible.
    - Provide maps of fishery effort and harvest by fishery sector or gear.
    - Provide estimates of uncertainty around each set of landings and discard estimates.

5. Provide recreational catch statistics for each stock being assessed, including both landings and discards in both pounds and number. Consider species identification issues between scamp and yellowmouth grouper and correct for these instances as appropriate.
    - Evaluate and discuss the adequacy of available data for accurately characterizing landings and discards by fishery sector or gear.
    - Provide length and age distributions for both landings and discards if feasible.
    - Provide maps of fishery effort and harvest by fishery sector or gear.
    - Provide estimates of uncertainty around each set of landings and discard estimates.

6. Recommend discard mortality rates.
    - Review available research and published literature.
        - Consider research directed at scamp as well as similar species from the southeastern United States and other areas.
    - Provide estimates of discard mortality rate by fishery, gear type, depth, and other feasible or appropriate strata.
    - Provide estimates of uncertainty around recommended discard mortality rates
    - Document the rationale for recommended rates and uncertainties.

7. Describe any known evidence regarding ecosystem, climate, species interactions, habitat considerations, and/or episodic events *(including red tide and upwelling events)* that would reasonably be expected to affect scamp population dynamics, *and the effectiveness of* biological reference points that might ensue.
    - Review available predation studies and summarize diet composition with respect to ontogeny, seasonality, and habitat, where available.
    - Provide species envelopes, i.e. minimum and maximum values of environmental boundaries (e.g. depth, temperature, substrate, relief) based on observations of occurrence.
    - Use available survey datasets to determine species that frequently co-occur or are associated with scamp.
    - Develop hypotheses to link the ecosystem and climatic events identified in addressing this TOR to population and fishery parameters that can be evaluated and modeled.

8. 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.

9. Prepare a Data Workshop report providing complete documentation of workshop actions and decisions in accordance with project schedule deadlines.

Assessment Process Terms of Reference

1. Review any changes in data or analyses following the Data Workshop. Summarize data as used in each assessment model. Provide justification for any deviations from Data Workshop recommendations.

2. Develop population assessment model(s) that are appropriate for the available data

3. Recommend biological reference points for use in management
    a. Consider how reference points could be affected by management, ecosystem, climate, species interactions, habitat considerations, and/or episodic events.

4. Provide estimates of stock population parameters, including:
    - Fishing mortality, abundance, biomass, selectivity, stock-recruitment relationship, sex ratio, and other parameters as necessary to describe the population.

5. Characterize uncertainty in the assessment and estimated values.
    - Consider uncertainty in input data, modeling approach, and model configuration.
    - Provide appropriate measures of model performance, reliability, and 'goodness of fit'.
    - Provide measures of uncertainty for estimated parameters and derived quantities such as biological reference points and stock status.

6. Provide recommendations for future research and data collection. Emphasize items that will improve future assessment capabilities and reliability. Consider data, monitoring, and assessment needs.

7. Complete an Assessment Workshop Report in accordance with project schedule deadlines.

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. Consider the following:
   - Are data decisions made by the DW and AW justified?
   - Are data uncertainties acknowledged, reported, and within normal or expected levels?
   - Is the appropriate model applied properly to the available data?
   - Are input data series sufficient to support the assessment approach?

2. Evaluate and discuss the strengths and weaknesses of the methods used to assess the stock, taking into account the available data. Consider the following:
   - Are methods scientifically sound and robust?
   - Are priority modeling issues clearly stated and addressed?
   - Are the methods appropriate for the available data?
   - Are assessment models configured properly and used in a manner consistent with standard practices?

3. 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.
   - Comment on the likely relationship of this variability with possible ecosystem or climate factors and possible mechanisms for encompassing this into management reference points.

4. Provide, or comment on, recommendations to improve the assessment
   - Consider the research recommendations provided by the Data and Assessment workshops in the context of overall improvement to the assessment, and make any additional research recommendations warranted.
   - If applicable, provide recommendations for improvement or for addressing any inadequacies identified in the data or assessment modeling. These recommendations should be described in sufficient detail for application, and should be practical for short-term implementation (e.g., achievable within ~6 months). Longer-term recommendations should instead be listed as research recommendations above.

5. Provide recommendations on possible ways to improve the Research Track Assessment process.

6. Prepare a Review Workshop Summary Report describing the Panel's evaluation of the Research Track stock assessment and addressing each Term of Reference.