SEDAR

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SEDAR 74 Gulf of Mexico Red Snapper Research Track
Terms of Reference
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Data Workshop Terms of Reference

1. Definition of assessment unit stock will be developed through the red snapper 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
   - Explore differences in growth parameters, spawning fractions, and fecundity data across area
   - Provide appropriate models to describe population and stock specific (if warranted) growth, maturation, and fecundity by age, sex, or length as applicable.
   - 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).
   - Provide appropriate measures of uncertainty for the abundance indices to be used in stock assessment models.
   - Document pros and cons of available indices regarding their ability to represent abundance.
   - Categorize the available indices into one of three tiers: Suitable and Recommended, Suitable and Not Recommended, or Not Suitable; *provide each categorization.*
   - For recommended indices, document any known or suspected temporal patterns in catchability not accounted for by standardization.

4. Provide commercial catch statistics for each stock being assessed, including both landings and discards in both pounds and number.

- 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 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.
   - Evaluate and discuss the adequacy of available data for accurately characterizing landings and discards by fishery sector or gear.
     - Specifically explore the transition from MRIP CHTS to FES
     - Specifically explore the Gulf state-specific data collection programs for red snapper for evaluating catch and effort data (i.e. LA Creel, Tails 'n Scales. Snapper Check, and State Reef Fish Survey)
     - Explore whether the recreational fleet structure can be realigned into individual fleets (private, charter, and headboat) or into a private fleet and a for-hire fleet (charter and headboat combined)
   - Provide length and age distributions for both landings and discards if feasible.
   - 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 red snapper 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.
     - Comment specifically on research detailing the efficacy of descending devices, including their adoption, prevalence of use, and effect on discard mortality
   - Provide estimates of uncertainty around recommended discard mortality rates
   - Document the rationale for recommended rates and uncertainties.

7. Explore the relationship among shrimp bycatch and juvenile red snapper mortality with emphasis on investigation of incorporating potential density-dependent juvenile mortality.

8. Consider the estimates and associated uncertainty derived from the "Great Red Snapper Count" and other independent studies. Provide recommendations for use in the assessment process.

9. Incorporate social and economic information into the stock assessment considerations as practicable.

10. Describe any known evidence regarding ecosystem, climate, species interactions (e.g. predation studies), habitat considerations, species range modifications (expansions or contractions) and/or episodic events (including red tide, upwelling events, and hypoxia*)* that would reasonably be expected to affect red snapper population dynamics.

11. Develop an updated Connectivity Modeling Simulation recruitment index for recruitment forecasting.
    - Explore potential hypotheses to link the ecosystem and climatic events identified to population and fishery parameters.

12. 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.

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

Assessment 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
   - Consider and incorporate as appropriate the information derived from the "Great Red Snapper Count" and other independent studies.
   - Evaluate selectivity and retention functions for all directed, discard, and bycatch fleets as appropriate.
   - Consider incorporating the Connectivity Modeling Simulation recruitment index to inform trends in recruitment for forecasting.
   - Investigate fitting length composition data directly within the SS3 model as opposed to developing age-length keys and converting length frequency to age composition external to the modeling process.
   - Explore whether available data supports the estimation of growth parameters within the model.
   - Explore whether alternate recreational fleet structures are supported in the assessment model. Specifically, determine whether selectivity functions are estimable and model stability is maintained.

3. 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.

4. 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.

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

6. 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 Data and Assessment processes 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 processes 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.