

Science, Service, Stewardship



Gray Triggerfish Standard Assessment

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SEDAR 62 Gulf of Mexico Gray Triggerfish Assessment Terms of Reference

1. Update the approved SEDAR 43 Gulf of Mexico gray triggerfish base model, with data through 2017. Provide a model consistent with the previous assessment configuration to incorporate and evaluate any changes allowed for during this assessment.

- 2 Evaluate and document the following specific changes in input data or deviations from the benchmark model previous assessment model.
 - Consider continuity model stratification and data structure, suggest recommended revisions if needed.
 - Explore the use of a combined video index from the FWRI, Pascagoula, and Panama City video surveys.
 - Evaluate the start year and initial Fs used in the assessment model
 - Consider new fishery-independent visual surveys, if available
 - Explore shrimp bycatch age-structure, if data are available, as a means to better estimate recruitment



3. Document any revisions or corrections made to the model and input datasets, and provide updated input data tables. Provide commercial and recreational landings and discards in numbers and weight (pounds).
4. Update model parameter estimates and their variances, model uncertainties, and estimates of stock status and management benchmarks. In addition to the base model, conduct sensitivity analysis to address uncertainty in data inputs and model configuration and consider runs that represent plausible, alternate states of nature.



5. Project future stock conditions regardless of the status of the stock. Develop rebuilding schedule, if warranted. Stock projections shall be developed in accordance with the following Scenarios (preliminary, to be modified as appropriate):
 - FMSY or proxy
 - FOY= 75% FMSY (project when OY will be achieved)
 - Fcurrent/Constant Reference Catch (if necessary).
 - FREBUILD (if necessary)
 - F=0 (if necessary)

6. Develop a stock assessment report to address these TORs and fully document the input data, methods, and results.



2019 Assessment

- Mimic SEDAR43
- Landings
 - Rec 1981-2017, Number (thousands of fish)
 - Com 1981-2017, Weight (metric tons)
 - Virgin SS 1945,
 - linear ramp in Commercial
 - Recreational ramp mimics red snapper recreational landings
- Shrimp Bycatch as effort
- Discards as ratio to total catch



2019 Assessment

- East/West Gulf (but 1 area)
- Age comp from pooled (years) age-length key
- Indices:
 - MRFSS East,
 - HB East,
 - HB West,
 - Com HL East,
 - Com HL West,
 - SEAMAP Larval,
 - SEAMAP Fall Trawl,
 - Combined Video
- Circle hook effect



SS 62 Base Model AW Proposed Configuration Continuity Model

Base Model: 1945-2017:

Fisheries

- 4 Fleets in SS: Commercial Vertical line West (COM_W), Commercial Vertical line East (COM_E), Recreational West (REC-W), Recreational East (Recreational_E).
- 4 Surveys: Shrimp bycatch fleet, Larval Gulfwide, Video Survey, Seemap Trawl Survey
- Commercial input in mtons, recreational input in 1,000's of fish.
- Discards input as ratio to total catch and fitted to superperiods
Rec (W, E)-1981-2017, Com (W, E)- 2008-2017, Shrimp bycatch-1946-2017

Biology

- Weight-length relationship, fecundity-at-size fixed
- Lorenzen M at age
- Logistic Maturity full maturity age 2
- Fixed Growth rate parameter (K) and Linfinity



SS AW Model Configuration (continued)

- **Stock Recruitment function**
 - Sigma R estimated,
 - Steepness, R_0 , and $\log(R_1)$ offset parameter for initial equilibrium recruitment relative to virgin recruitment
 - Estimated Recruitment Deviations
- Assumes 1 area, single sex (50:50 (M:F))
- Length Selectivity estimated (constant over time)
 - Dome selex assumed for all fleets
- Retention functions estimated where possible
- 1 Time-varying retention block pattern with 3 blocks (1945 -1998,1999-2007,2008-2017)
- Retention blocks corresponded to size limits, quotas and implementation of circle hook regulation



S62 Gray Trigger Data and Assessment Workshop 2 Assessment Model

- **Goal 1:** Convert S43 Base model from 3.24 to Base SS 3.3
- **Preliminary Progress to date ‘Comparison Results’**
 - Key Derived Quantities (SB, Recruits, Biomass Ratios, Recruit Deviations) and Likelihood values are similar



Model Stability, Accuracy, and Uncertainty

Approach:

Model Convergence, Stability, and Performance

- Assessed through jitter exercise, 10 % jitter value normally used
- Inspection of correlated parameters in situations of non-convergence and/or instability

Model Accuracy and ability to estimate important model parameters

- Profiling of Key relevant parameters (steepness, σ_R , R_0)
- Inspection of correlated parameters in situations of non-convergence and/or instability

Model uncertainty - Assessed through sensitivity analyses, asymptotic standard errors, bootstrapping exercises,



Sensitivity Analyses

Path Planned:

Use Base Model Setup Configuration - Explore impact on estimates of key derived quantities (e.g, SB, Recruits, Biomass Ratios, Recruit Deviations, Exploitation ratios), Likelihood values

- Data inputs – removal of one or more years of data (Five (5) Retrospective analyses – 2013-2017)
- Parameter Uncertainty: Release (Discard) Mortality (0, 5%, 10%)
- Assumptions on Circle Hook Effectivity: Circle hook effect (1:1, 2.34:1)



Sensitiv Analyses (Continued)

Current Issues of Concern and Plan:

1. Discard Topic- SS not fitting discards well in current Continuity Model Configuration

Plan:

Consider Alternative Base Model Configuration

- Configure alternative model set-up with length composition and then use/do not use the age composition data as “Conditional” age at length data, separating the data by source (spines/otoliths/lab/sex) and explore: estimating growth and
 - Identify effects of each data source on growth, with considerations for 2-sex growth curves
 - entertain different growth models without re-running all of the data inputs.



Projections

Purpose: Projections run to " evaluate future stock status and provide OFL advice"

"Projections (2018-2128) will be run assuming:

- Terminal year of data 2017 therefore to initialize projections in 2018; 2018 landings to be characterized as data from most recent year (2017)
- Selectivity, Discarding, and Retention same as the three most recent years (2015-2017)
- SS estimates fishing mortality rate to achieve the 2017 catch value and estimates age 0 recruits from the S-R model and the 2015 estimate of SSB
- Forecast recruitments are derived from the model estimated Beverton-Holt stock-recruitment relationship, based on the recent time period (i.e., 2013-2017)
- Catch allocation among fleets used for the projections reflects the average distribution of fishing intensity among fleets.



Thank you !

Questions and Comments



Conclusions and Recommendations Regarding Gray Triggerfish

- Gray triggerfish age estimation based on translucent zones in dorsal spine sections does appear to be biased based on empirical data presented to the Panel.
- The Panel recommends gray triggerfish ageing error research be continued and expedited to the extent practicable such that its results can be vetted and incorporated into the gray triggerfish SEDAR 62 process as soon as possible.
- Incorporation of otolith-derived gray triggerfish age estimates into the SEDAR 62 assessment for that species may necessitate delaying the assessment. At the very least, existing data from the Atlantic that were reported by Shervette and Dean (2015) should be utilized to incorporate bias into the SEDAR 62 assessment similar to ageing error (bias) simulations reported above for red snapper.

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