

SEDAR 61 Assessment Workshop Webinar III
Gulf of Mexico Red Grouper
March 26, 2019 from 2:00 PM to 3:30 PM
Summary Report

Continuity Model Settings

The continuity model reflects the model last accepted for management advice in SEDAR 42. The time series used was 1993-2017, with the model structured as a single area with a single fishing season. Genders are combined, with maturity, protogyny and fecundity all modeled as a function of age. Spawning stock biomass is represented as female reproductive output in number of eggs. The von Bertalanffy growth function is fixed, as is the Lorenzen natural mortality estimate and steepness ($h=0.99$). Five fishing fleets are included with landings and discards (including red tide in 2005 and 2014), as are three fishery-independent indices of abundance. Age-based selectivity is estimated by fishing fleet, and length-based selectivity is estimated based on the fishery-independent surveys. Time-varying retention was used to account for changes in regulations.

In reviewing SEDAR 42, concern was expressed about the uncertainty surrounding the initial model conditions. This has been addressed within SEDAR 61. With a start date of 1993, the model starts in a non-equilibrium condition. Equilibrium catches were estimated for the continuity and SEDAR 61 model runs, with the continuity run slightly more optimistic than the SEDAR 61 run. Trends in recruitment are similar across runs, as are estimates of fishing mortality (including red tide events). Corrections in equilibrium fishing effort have resulted in a lower estimate of virgin recruitment, and a concurrently lower estimate of virgin spawning stock biomass.

Continuity Model Adjustments for the Base Case

Updated batch fecundity-at-age was sensitive to new samples. The analytical team has recommended converting batch fecundity-at-length to –at-age to result in a more biologically plausible scenario. The resultant estimate using the growth curve is lower compared to the strict –at-age estimate; however, the influence on spawning stock biomass and stock status is minimal. The relative ratio of the virgin spawning stock biomass to the estimate of fecundity is what is more important relative to stock status, and this ratio is smaller than previously estimated.

The combined video index and length composition data were updated to include data from the other video surveys. Because the fecundity estimates were lower, the combining of the length composition data also shows a lower estimate of fecundity; however, the effect on the outcome of total biomass over time does not result in large differences between outcomes (pre- and post-combining indices). The same can be said about estimates of recruitment. It is important to note that the overall spawner-recruit relationship is largely unchanged since steepness is fixed at 0.99.

Inclusion of the FWRI Repetitive Time Drop survey data showed little change in spawning stock biomass in both value and uncertainty. The same was apparent for recruitment and fishing

mortality, with little deviation between outcomes for virgin recruitment or virgin spawning stock biomass.

Modifications for the Base Case

The red tide events are modeled in 2005 and 2014, with nearly identical mortality modeled across years where the index is reflective of a red tide event. This reduces the number of parameters in the model. Essentially, this eliminates estimating “catch” when there is no red tide event in a given year. Also, steepness will be estimated, and selectivity parameterization will be improved by using a random walk for each age class for fleet selectivity at age by fleet (ages 1-20+ will be estimated for each fleet). Effective sample sizes will be reweighted per the SEDAR Best Practices, capping length composition sample sizes at n=100 and age composition sample sizes at n=200.

Base Case Settings

The combined video index data and accompanying length composition data will be updated, as will the recreational age composition data. Growth and natural mortality will be updated with the most recent data available, and fecundity will be converted from –at-length to –at-age. The FWRI Repetitive Time Drop survey data and accompanying length composition data will be added, and the fleet modifications to red tide mortality will be incorporated. Steepness will be estimated, and fleet selectivity will be parameterized using a double normal approach as opposed to a random walk. Composition data will be adjusted using the square root of the sample sizes, then iteratively reweighted based on effective sample size.

Proposed Sensitivity Runs

- Start model in earlier year
- Include the FWRI vertical line index
- Remove fishery-dependent indices
- Consider red tide in 2005; 2005 and 2014-2015; and 2005 and 2015

Next Steps

- Review Base Model results
- Diagnostics
- Sensitivity analyses

The next Assessment Webinar will be the week of April 29 th , 2019

Participants:

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