

SEDAR 52 Assessment Webinar II
Gulf of Mexico Red Snapper
March 6, 2018 from 1:00 PM to 2:30 PM
Summary Report

Analysts asked for assistance with writing up certain sections of the assessment report. Panelists were asked to submit research recommendations, rationale for model changes proposed, and new methodologies used by data providers. Analysts will work with the appropriate parties to obtain needed portions.

Continuity Model

Review

The continuity model is an age-structured east/west model, and includes data generally from 1872 – 2016. Time-varying parameters are recruitment, selectivity, retention, and discard mortality. Shrimp discards are treated as a super-year to fix bycatch at the median value across all years. Recreational discard mortality was increased to 11.8%. SEDAR best practices were used to integrate headboat discards, and landings-corrected discards were used for the commercial sector. The MRIP and headboat-East indices were truncated at 2013 to account for changes in management. Index standard errors were scaled to a common mean of 0.2, and effective sample sizes were reweighted to better fit age composition data.

Initial continuity model results indicate that as of the end of 2016, red snapper stocks in the Gulf continue to grow from their all-time lows in the 1980s and 1990s. The western Gulf appears to continue to hold the majority of the red snapper in the Gulf. Recruitment remains highly variable year-to-year, with what appears to be a generally increasing trend in recruitment in recent years. Fishing mortality has decreased substantially since 2008, with something of an increase in the last two years of data (2015-2016). Fits to age composition data are good, except for the eastern NMFS bottom longline data. Fits to fishery-dependent indices generally follow observed trends in the data, even if predicted fits do not exactly match observed data. Fits to fishery-independent indices and discard data also generally follow observed trends. One caveat with the discard fits is the headboat discards, which the model appears to be overestimating.

Base Model Run

The base model is also age structured, and differs in several ways from the continuity model. Selectivity parameters were estimated as double normal, except the SEAMAP trawl, shrimp, and NMFS bottom longline surveys. Recreational discard mortality was increased to 11.8%. SEDAR best practices will be used to integrate headboat discards, and landings-corrected discards will be used for the commercial sector. The MRIP and headboat-East indices are truncated at 2013 to account for changes in management. New site selection was used for larval indices, and the NMFS bottom longline index included DISL data. All stock-recruitment parameters were estimated, along with bias adjustments and recruitment deviations for years with corresponding age composition data. Index standard errors were scaled to a common mean of 0.2, and effective sample sizes were reweighted to better fit age composition data.

Base model initial results show a slower pace of rebuilding in the eastern Gulf, while the western Gulf growth looks similar to the continuity model. By and large, terminal year selectivities for the commercial and recreational fleets were similar, with some differences in the breadth of sizes selected by region. Fits to age composition were good with the exception of the NMFS bottom longline east survey, which may be due to low sample sizes early in the time series. Fits to fishery-dependent and fishery-independent indices largely follow trends in observed data. Fits to SEAMAP fall survey data were weaker than other fishery-independent surveys. Fits to discard data also followed trends in observed data quite well. Shrimp discards were fit at a super-year median across the time series, as opposed to year-to-year variability, and the model fit to shrimp discards was acceptable.

Jitter analyses were performed to test the model's stability, and also to see whether model adjustments of 10% or less for estimated parameters result in the model converging on a markedly different solution than the original base model. Jitters for fishery-independent surveys, age composition data, catch data, and discard estimates showed variation, indicating the model was most sensitive to these inputs. Bootstrapping for the base model was performed 700 times, and yielded roughly evenly distributed results across measured outputs (like spawning stock biomass, recruitment, etc).

Retrospective analyses were performed, whereby each run eliminates a successive year of data from the model to see the degree to which the model result changes. The only component which remained unchanged between runs was the median used for shrimp trawl bycatch. Retrospective analyses tracked well year to year, showing only slight variations, and gave similar estimates between runs.

Index jack-knife runs eliminate individual indices, or index groupings, to see how sensitive the model is to particular indices. Nine runs to remove either an individual index or an index grouping were performed. No strong deviations were observed; however, the fishery-independent indices of abundance appeared to be bringing the estimates of area-specific total biomass down somewhat.

A likelihood profile of virgin recruitment was performed to determine the best estimate for the R_0 parameter (virgin biomass). Seven partitions of the likelihood were plotted; the general takeaway was that the discard data seemed to be driving changes in the model's likelihood estimate for R_0 . This wasn't surprising to the analysts due to the difficulty in fitting some of the discard data. Regardless of the R_0 parameter estimate used, the population appears to be just under the target SPR of 26%. Similar results were obtained by profiling recruitment over time. The steepness likelihood profile pushed the model above a steepness value of 0.9; as such, steepness was fixed at 0.99 as in the previous assessment. The model estimate of SPR is naturally very sensitive to steepness, which itself appears sensitive to the discard data. The present Gulf-wide SPR level is thought to be near 24%.

Comparison of Model Runs

Model runs compared were the 2014 red snapper update assessment, the SEDAR 52 continuity model, the continuity model with double-normal selectivity functions, and the SEDAR 52 base

model run. With respect to area-specific biomass estimates, the base model estimates a lower biomass in the eastern Gulf than the continuity model or 2014 update, with a similar biomass estimate reached in the western Gulf. Models matched up well with respect to recruitment, and only slightly less so for estimates of virgin biomass.

Base Model Sensitivity Runs

Two sensitivity runs were performed: removal of all fishery-dependent indices of abundance, and substituting 15.8% for the recreational discard mortality rate. Pulling out fishery-dependent indices appeared to have little effect on area-specific biomass. Likewise, increasing the recreational discard mortality rate did not have a substantial effect on area-specific biomass. The same could be said about both sensitivity runs with respect to Gulf-wide biomass.

Preliminary Projections

Constant recruitment was assumed for the recent time period, and selectivity, retention and discard mortality were fixed from estimates from the most recent time block used in the base model. Sector allocations were set at 51% for the commercial fleets and 49% for the recreational fleets. Discards and bycatch estimates were taken from the terminal year in the base model and held constant throughout the projections.

Preliminary data from 2017 may be available for incorporation into projections; however, presently, the terminal year of data remains as 2016. The OFL and ABC are expected to decrease to lower asymptotes as the stock continues to rebuild to an SPR of 26%. Recruitment remains highly variable; however, with a steepness value of 0.99, there is no perceived relationship between stock size and recruitment. The SPR estimates by area vary strongly. The eastern Gulf is not projected to fare well under current exploitation rates, with SPR dropping from a present value of ~13% to under 4% after 2030. Conversely, the stock in the western Gulf is expected to continue to rebuild under current exploitation rates, meaning that the Gulf-wide rebuilding effort is being carried entirely by the western Gulf portion of the red snapper stock.

Data from 2017 will not be finalized until late August of 2018. Preliminary landings data may be available, in part, as soon as the latter half of March 2018; however, these data may differ somewhat from the finalized data due to be available in late August. The Panel agreed it best that *both* commercial and recreational provisional estimates be included in projections when the provisional 2017 data are made available. The analytical team thought they could commit to providing the base model to the Gulf SSC to review in May; however, it would not be wise to promise that the preliminary data from 2017 would be available to incorporate into projections in time for that May SSC meeting.

Assessment Report draft due to panel by March 23, 2018 Edits on Assessment Report due back to analysts by April 9, 2018 Assessment Report due to SEDAR by April 23, 2018 Assessment delivered to the Gulf Council on April 27, 2018
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Participants:

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