

Review Workshop Advisory Report Gulf of Mexico Gray Triggerfish SEDAR 9 Review Workshop

Stock Distribution:

- The gray triggerfish are found throughout the Gulf of Mexico, which is considered a single stock based on its prolonged, indeterminate larval stage.
- This assessment addresses gray triggerfish in the U.S. Gulf of Mexico. The stock is divided into eastern and western gulf components at the Mississippi River to allow application of area-specific life history characteristics, catch statistics, and survey indices.

Assessment Methods & Data:

- Gray triggerfish in the Gulf of Mexico were assessed with two models, including ASPIC and SSASPM. Within each type of model various configurations and sensitivity runs were explored. Details of all models are available in the Stock Assessment Report and the Review Panel Consensus Summary.
- The Assessment Workshop chose the SSASPM model to provide the base assessment results based on its flexibility and better mathematical rigor to incorporate more information on life history and on the age structure of the harvest. The RW accepted this model with modifications that are detailed in the Assessment Report Addendum (prepared by Dr. Josh Sladek Nowlis and attached with this report in the Appendix) and summarized here in a subsequent section.
- Data sources include landings by relevant sectors from recreational east, recreational west, commercial east, commercial west and shrimp bycatch (Table 1 and Fig 1 in the Addendum); five fishery-dependent indices and three fishery-independent indices (Table 2 and Fig 2 in the Addendum); gray triggerfish life history parameters based on the biological studies (Table 3 in the Addendum), as well as relative age composition data inferred from size at age data using area-specific growth patterns (Table 4 in the Addendum).

Sources of Information:

- Results are summarized in the following bullets. Complete details are available in the SEDAR 9 Data and Assessment Reports, Assessment Report Addendum and the SEDAR 9 Review Panel Consensus Summary, and the many SEDAR 9 workshop working papers.
- Complete results of the SSASPM model configuration preferred by the Review Panel are contained in the Stock Assessment Report Addendum.

Catch Trends:

- Catch in numbers of fish is dominated by shrimp bycatch which mainly consists of age-0 and age-1 fish (Table 1 and Fig 1 in the Addendum). The shrimp bycatch fishery annually removes roughly 1 million age-1 equivalent and peaked at 5 million fish at year 2002 (Table 1 and Fig 1 in the Addendum). The recreational and commercial fisheries combined take roughly 1 million pounds in recent years but had past peaks reaching 3 million pounds annually.
- Catch information was derived from several fleets (SEDAR9-DW-Report). Based on age-structure of the catches, these were pooled into four directed fleet categories: recreational east, recreational west, commercial east, and commercial west, with the east-west split occurring at the Mississippi River.

Fishing mortality trends

- Fishing mortality is variable and irregular ranged about between 0.4 to 0.6 with MSY at 0.45 (Fig 6 in the Addendum). Generally, it shows a decreasing trend from the mid 80s to the early 90s and an increasing trend to its peak during the mid 90s ($F = 0.65$), then decreasing from the mid 90s to 2000, slowly building to F_{MSY} in recent years.

Stock abundance and biomass trends

- Model assumed virgin condition in 1963 with virgin SSB of 7.5 trillion eggs, model predicts a drop to ¼ virgin at trough in the mid 1980s, 50% increase through early 1990s, cut in half by late 1990s to MSST, 25% rise by 2002 and drop by 10% in 2004 (Fig 6 in the Addendum).

Status determination criteria and Stock Status

- The parameters relevant to management are estimated from the preferred base model by the Review Workshop as follows:

<i>Parameter</i>	<i>Base Value (Low-High Steepness)</i>
Population parameters and management benchmarks	
$F_{20\%SPR}$	0.419
$F_{30\%SPR} = MFMT$	0.269
$F_{40\%SPR}$	0.186
F_{msy}	0.45 (0.294-0.525)
SSB_{msy} (measured as egg production)	1.21t (1.78t-1.049t)
$SSB_{30\%SPR} = MSST$	2.094t (1.967t-2.109t)
F_{OY}	Not defined
MSY (lbs, incl. shrimp bycatch)	1.638m (1.441m-1.707m)
Stocks parameters in 2004	
F_{2004}	0.435 (0.431-0.435)
$F_{2004}/MFMT$	1.62 (1.6-1.62)

<i>Parameter</i>	<i>Base Value (Low-High Steepness)</i>
SSB ₂₀₀₄ (eggs)	1.345t (1.323t-1.351t)
SSB ₂₀₀₄ /MSST	1.02 (1.22-1)
F ₂₀₀₄ /OY	Not defined

- Declarations of Stock Status:
 - The stock experienced overfishing. According to the existing $F_{30\%SPR}$ maximum fishing mortality threshold (MFMT), current fishing mortality rates are 60% too high (Table 6 and Fig 8 in the Addendum). Current fishing mortality rates are in the range of MSY-based fishing mortality rates (F_{MSY}) as estimated by the base model ($F_{2004}/F_{MSY} = 0.97$). However, this status measure is sensitive to the stock-recruitment relationship, which is poorly estimated with the data available on this stock. Over a range of potentially realistic parameter values, current fishing mortality rates range from 83 to 147 percent of F_{MSY} (Table 6 and Fig 8 in the Addendum).
 - The Review Workshop cannot come to a conclusion whether the stock is overfished or not, although it appears to be approaching an overfished condition. The stock is estimated to be just above the minimum stock size threshold, currently defined as a stock condition below 20%SPR. This status measure has some sensitivity to the stock-recruitment relationship, but in most cases the stock is identified as being just above the threshold. However, current fishing rates are predicted to drive the stock below the threshold in the near future.

Projections

- Quantitative projections are available for the preferred base model from Review Workshop (Table 7 and Fig 9 in the Addendum). These indicate:
 - If conditions in 2004 continue, forecasts are uncertain but indicate the stock is slightly more likely to decrease than to increase;
 - The extent of reduction in fishing mortality brought about by additional management measures in 2005 cannot be evaluated at present since no new management measures were put in place for gray triggerfish in 2005.