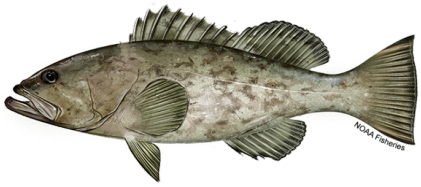
Gulf of Mexico Gag Grouper (*Mycteroperca microlepis*)

SouthEast Data, Assessment, and Review (SEDAR) 72 Summary

Gulf SSC Review Completed September 2022

NOAA FISHERIES



Data Inputs

Recreational and commercial landings and dead discards predicted by the assessment model are shown (Figure 1). Recreational removals were updated using Florida's State Reef Fish Survey. Indices of relative abundance were included from multiple sources (Figure 2).

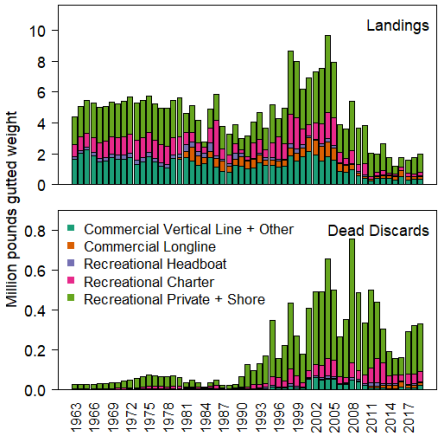


Figure 1: Final landings and dead discard estimates from the SEDAR 72 Operational Assessment model for commercial and recreational fisheries in millions of pounds, 1963-2019.

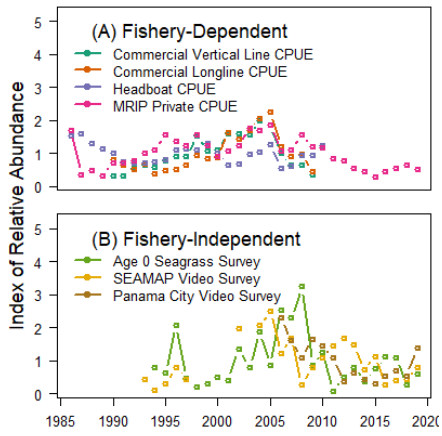


Figure 2: Fishery-dependent (A) and -independent (B) indices of abundance input into the SEDAR 72 Operational Assessment model.

Stock Status

The assessment found that Gag Grouper in the Gulf is overfished and undergoing overfishing as of 2019 using a Spawner Potential Ratio of 40% (Figure 3). Benchmarks including the Maximum Fishing Mortality Threshold (MFMT) and Minimum Stock Size Threshold (MSST) are defined in Table 1.

Table 1: Benchmarks from the SEDAR 72 Operational Assessment model. Spawning Stock Biomass (SSB) = metric tons, F = harvest rate (total biomass killed / total exploitable biomass).

Benchmarks	
Spawner Potential Ratio (SPR)	40%
Natural Mortality Rate (M)	0.16
MFMT = $F_{MSYproxy}$	0.1
$F_{2017-2019}$/ MFMT	3.63
Overfishing (F/MFMT> 1)?	Yes
$SSB_{MSYproxy}$	25,039
MSST = (0.5)*$SSB_{MSYproxy}$	12,520
$SSB_{2019}/SSB_{Unfished}$	0.03
SSB_{2019}/MSST	0.14
Overfished (SSB/MSST< 1)?	Yes

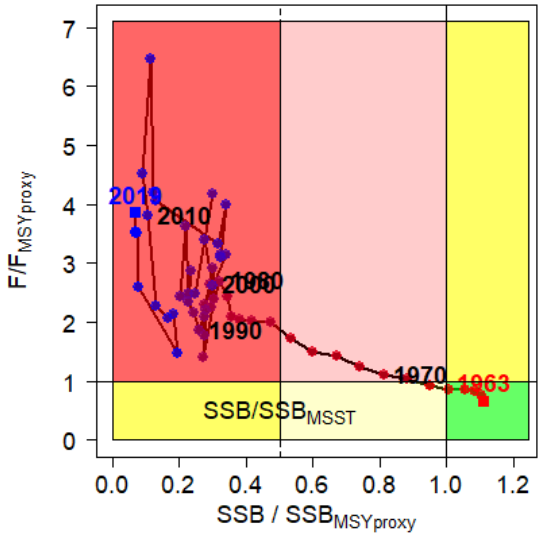


Figure 3: Kobe plot showing the progression of exploitation status of Gulf Gag Grouper from 1963 (red) to 2019 (blue), with MSST denoted.

Assessment Outcome

After requesting the explicit incorporation of the Florida State Reef Fish Survey recreational estimates into the base model, the Gulf of Mexico Fishery Management Council's Scientific and Statistical Committee (SSC) accepted the SEDAR 72 Operational Assessment State Reef Fish Survey Run model as the best scientific information available, and deemed it appropriate for providing management advice (Tables 1-2).

Projections

Final projections were run using an MSYProxy of 40% SPR, sector allocations (65% recreational, 35% commercial), and the "medium" red tide scenario for 2021. Forecast recruitment values were derived from the Beverton-Holt stock-recruitment relationship with fixed steepness, with recruitment values estimated in the assessment model from 1963-2019 (Figure 4).

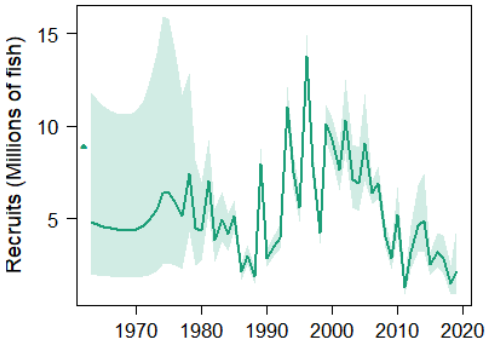


Figure 4: Annual and virgin (dot) recruitments estimated by the SEDAR 72 Operational Assessment model with uncertainty estimates (shading).

Table 2: SSC recommended catch levels for the Overfishing Limit (OFL; yield at FMSYproxy) and the Acceptable Biological Catch (ABC; yield at 75% FMSYproxy) for 2024-2028 (shown in Figure 5). Catch units are million pounds gutted weight (mp gw).

Yr	OFL	ABC
2024	0.591	0.444
2025	0.805	0.615
2026	0.991	0.769
2027	1.2	0.943
2028	1.454	1.156

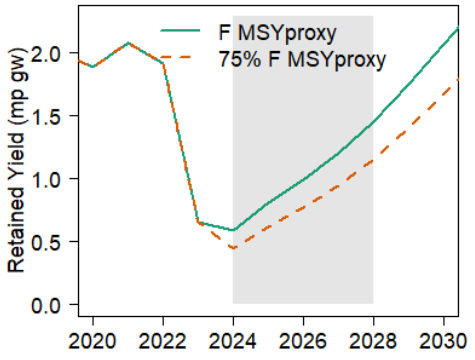


Figure 5: Retained yields from the OFL and ABC projections with the years highlighted (in gray) for catch advice.