

Comparison of harvest advice from stock assessments and the tier 3 ABC control rule

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Background

The Gulf of Mexico Fishery Management Council (Council) is required to establish harvest levels that are sustainable while allowing harvest and supporting recreational opportunities. While some species can be managed based on advice from stock assessments, many species have insufficient data to support a stock assessment and harvest advice is based on a less data intensive approach. These species are typically considered data poor and harvest advice in the Gulf of Mexico (Gulf) is based on SSC advice and application of tier 3a of the ABC control rule. Tier 3a relies on landings information from a reference period to establish ABC values (e.g., mean + 1 standard deviation of annual landings for a given stock). This method is advantageous in that landings information is available for all managed species that require Annual Catch Limits but its relative performance relative to the advice from stock assessments has not been investigated.

The purpose of the analysis was to compare the harvest advice for nine reef fish species in the Gulf of that have accepted stock assessments with the result of applying tier 3a of the ABC control for these same species. The original application of this method used 2000-2009 as reference years and this is repeated in the current analysis. The stock assessment advice is based on the ABC recommendation for 2009 (six species) or similar years (three species) that were assessed before or shortly after 2009. Results are presented to summarize performance of the methods for each of the species in Table 1.

Table 1. Summary of values computed using the tier 3a ABC control rule and the ABC recommendation from the SSC based on review of a stock assessment for nine reef species on or near 2009. Mean represents the average annual catch over the reference period, MSD = mean + 1 standard deviation of annual landings, MSD15 = mean + 1.5 standard deviations of annual landings, MSD20= mean + 2.0 standard deviations of annual landings, ABC is the acceptable biological catch recommendation from the SSC based on an accepted stock assessment.

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	Name	Mean	MSD	MSD15	MSD20	ABC
1	black grouper	0.4	0.52	0.58	0.64	0.65
2	gag	5.99	7.59	8.38	9.18	3.38
3	gray triggerfish	0.65	0.86	0.96	1.07	0.58
4	greater amberjack	2.3	2.99	3.34	3.69	1.9
5	mutton snapper	0.27	0.38	0.43	0.49	1.13
6	red grouper	7.74	9.14	9.85	10.55	7.57
7	red snapper	8.62	9.83	10.44	11.05	5
8	vermillion snapper	2.64	3.11	3.34	3.58	6.48
9	yellowtail snapper	0.69	0.85	0.92	1	1.01

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Comparison of Methods

For each method (i.e., stock assessment or tier 3a), species was used an independent replicate and median and variability of the estimates for each method was compared . In comparison to stock assessment ABC values, harvest advice was generally higher and more variable using the tier 3a approach (Figure 2). For all species, the ABC recommendation was used a reference, however other metrics such as equilibrium yield may alter this pattern as the ABC recommendation for at least some species were under rebuilding plans.

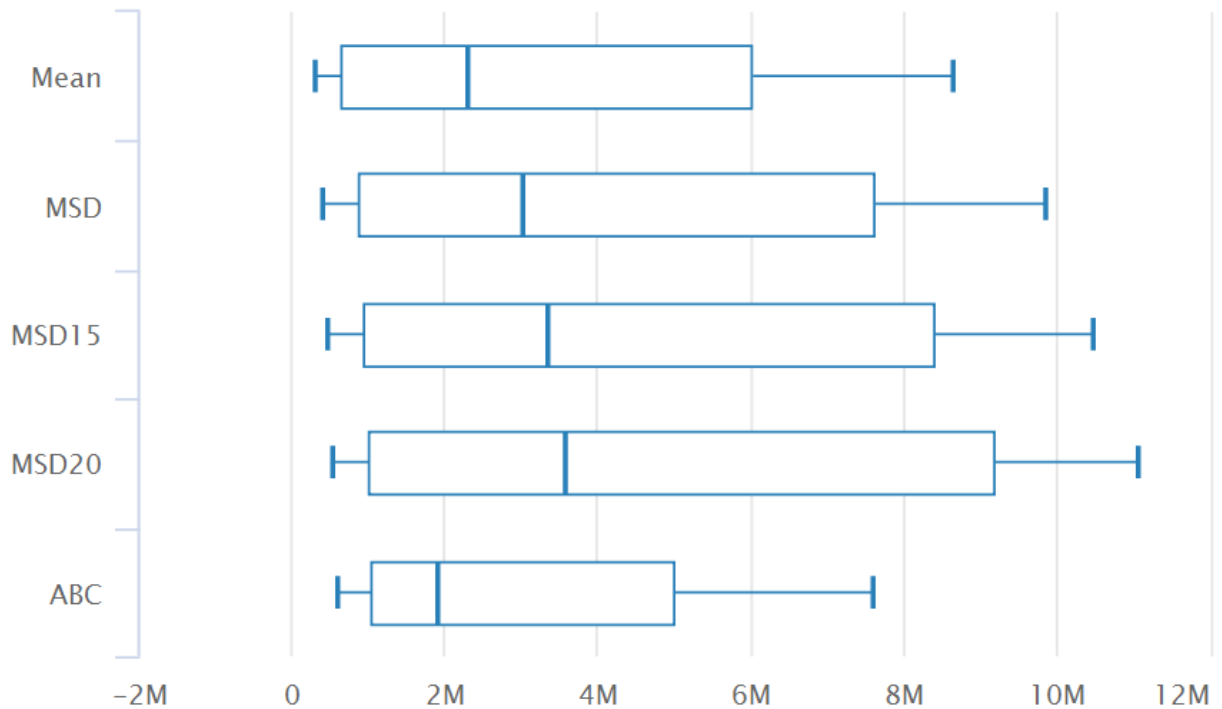


Figure 1. Summary of ABC values from stock assessments and the application of the tier 3a ABC control rule. Landings data were calculated using harvest data from 2000-2008 and the ABC recommendation was for the year 2009 is available or the earliest year after 2009 if a 2009 ABC recommendation from a stock assessment was unavailable.

Tier 3a vs Stock Assessment Recommendations

If harvest advice based on an accepted stock assessment is considered the most accurate source of harvest advice, a comparison can be made to examine potential bias in the tier 3a ABC control rule. For example, if comparable, both methods would yield similar harvest advice for a given species but systematic differences between the methods would indicate a potential source of bias.

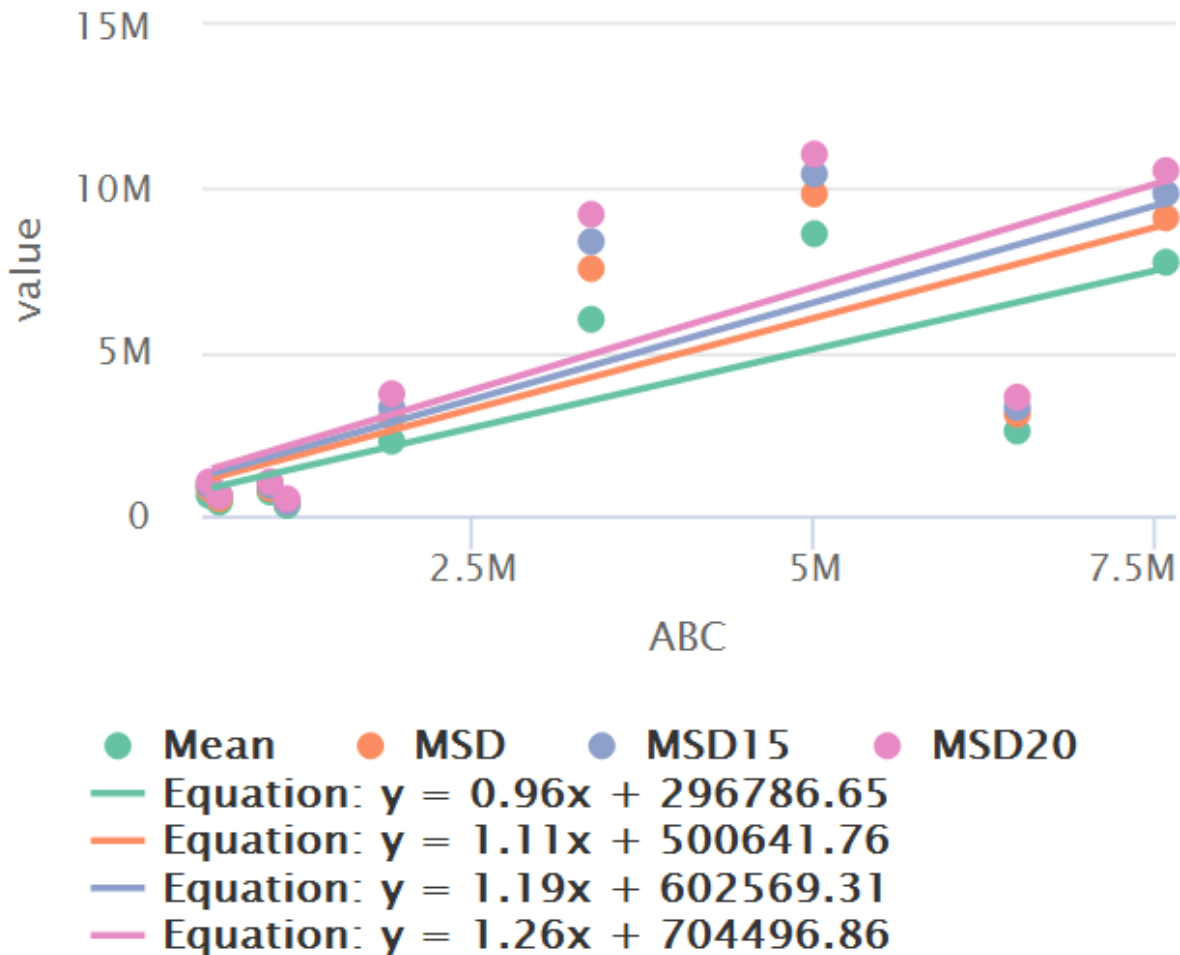


Figure 2. Comparison of ABC and tier 3a harvest recommendations. The ABC values are based on the recommendations of the species in Table 1. The corresponding value from the options in the tier 3a ABC control rule result from applying the method to 2000-2008 landings data for each species. The regression line is fit separately for each method and a slope of ~ 1 would indicate similar advice from a stock assessment and the tier 3a control rule. Slope values greater than 1 suggest the option in the control rule would recommend a value higher than the assessment. Mean plus one standard deviation (orange line) is the default method of tier 3a of the ABC control rule.