

## Commercial Discards in Numbers and Pounds for Red Snapper in the U.S. Gulf of Mexico

### INTRODUCTION

In May 2019, the Gulf of Mexico Fisheries Management Council (Council) requested a dataset including discards in numbers and weight for the private recreational, charter vessel, headboat, and commercial fleets by gear type, and year for the following species:

- Red Snapper
- Vermilion Snapper
- Red grouper
- Gag
- Greater amberjack
- Gray triggerfish
- King mackerel
- Spanish mackerel
- Cobia

Due to staffing limitations and conflicting commitments it was not possible to complete all of the work described above. However, in subsequent meetings with Council staff, the Science Center was able to negotiate a reduced task list. The Center agreed to give precedence to providing *recreational* discards in numbers and pounds for priority species (i.e. Red Snapper, Gag Grouper, Greater Amberjack), which are supplied as a separate document. Vermilion Snapper, Red Grouper, and Gray Triggerfish commercial discards estimated using a catch per unit effort (CPUE) expansion procedure were provided in a previous document. Estimates of Red Snapper commercial discards using similar methodology are presented here. The Council also requested a brief description of the methods, assumptions, and limitations associated with the use of these estimates.

### METHODS

The estimates provided here are calculated using methods consistent with decisions made for the most recent assessment of Gulf of Mexico Red Grouper and Gray Triggerfish. The general methodology for the reported species follows a CPUE expansion approach, where strata-specific CPUE data collected by the Reef Fish Observer Program (RFOP) are expanded by the total logbook effort within the stratum for each reported disposition (Smith et al. 2018, 2019). RFOP data collection began in 2006; data from 2007 – present are used. Comparison of estimated catch from the CPUE expansion procedure against logbook landings provides method validation.

For strata with low sample sizes (< 5 trips encountering Red Snapper) or strata in which the observer sampling was not representative of the fleet (as determined by comparison of estimated kept catch and logbook landings), an imputation procedure was applied following methods used for Gray Triggerfish (Smith et al. 2019), where the average annual ratio of observer CPUE in weight to logbook CPUE for the observer time series was calculated. This average ratio was then multiplied by the annual logbook CPUE to estimate observer CPUE. The standard CPUE expansion was then followed, where the estimated observer CPUE was multiplied against annual logbook effort to calculate observer catch.

The principal assumptions and limitations for the methodology are listed below.

Assumptions:

- The underlying premise of the CPUE expansion method is that the Reef Fish Observer Program is a representative sample of the total fleet as estimated by the logbook data, and that comparable effort variables exist in both data sets (Smith et al. 2018).
- Estimation of trip-level catch and effort from sub-trip level data in the RFOP are appropriate.
- This method assumes that RFOP observers are able to accurately enumerate all discards and kept fish from sampled sets.

#### Limitations:

- The CPUE expansion method is not appropriate for species where the RFOP sampling is not representative of the species fleet, either in space or in time.
- Regulatory changes for periods preceding the RFOP preclude current described methods.
- Additional procedures are required to address instances of low sample size within the RFOP data.

## RESULTS

### *Red Snapper*

Red Snapper discards were calculated separately for Eastern (sampling areas 1 – 12) and Western (sampling areas 13 – 21) spatial strata (**Figure 1**) for the vertical line (**Table 1**) and bottom longline (**Table 2**) sectors from 2007 – 2018. Results of applying this methodology to other species outside of an assessment framework should be considered preliminary

## REFERENCES:

Smith, Steven G., Allison C. Shideler, Kevin J. McCarthy. 2018. Proposed CPUE Expansion Estimation for Total Discards of Gulf of Mexico Red Grouper. SEDAR61-WP-15. SEDAR, North Charleston, SC. 11 pp.

Smith, Steven G., Allison C. Shideler, Kevin J. McCarthy. 2019. Proposed CPUE Expansion Estimation for Total Discards of Gulf of Mexico Gray Triggerfish. SEDAR62 WP-07. SEDAR, North Charleston, SC. 21pp.

**Table 1.** Annual estimates of Red Snapper discards for the vertical line sector in weight (whole pounds) and number of fish for the East and West spatial strata.

Year	Weight		Number	
	East	West	East	West
2007	171,170	72,580	151,768	48,004
2008	162,365	148,165	76,902	75,168
2009	410,818	51,689	118,990	60,911
2010	193,671	180,357	53,861	91,500
2011	442,669	249,103	100,144	96,270
2012	351,938	167,170	77,814	46,676
2013	174,949	183,527	60,604	79,306
2014	202,058	87,959	88,595	32,631
2015	170,797	239,156	50,795	69,839
2016	164,769	60,545	118,071	26,451
2017	320,123	55,608	138,396	22,594
2018	228,867	204,761	81,931	95,587

**Table 2.** Annual estimates of Red Snapper discards for the bottom longline sector in weight (whole pounds) and number for the East and West spatial strata.

Year	Weight		Number	
	East	West	East	West
2007	12,780	52,497	7,141	7,188
2008	17,589	17,492	2,648	2,395
2009	12,321	2,279	3,191	257
2010	35,631	2,554	5,598	415
2011	52,382	1,621	8,601	139
2012	61,418	3,959	9,322	542
2013	60,825	13,624	7,533	1,866
2014	55,301	16,231	5,222	2,223
2015	77,577	15,719	8,871	2,152
2016	90,543	17,126	10,082	1,920
2017	38,593	20,011	5,425	2,740
2018	106,600	20,079	18,375	2,749

**Figure 1.** Map of sampling areas in the Gulf of Mexico (map provided by B. Wrege).

