**Commercial Discards in Numbers and Pounds for Selected Stocks 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 are presented here. Estimates of Red Snapper commercial discards using similar methodology are ongoing and will be supplied when available. 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 each species. 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.

The principal assumptions and limitations are similar for the three species reported.

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.

**RESULTS**

*Red Grouper*

Red Grouper discard estimates in weight (whole pounds) and number for 2005 – 2017 are presented in **Table 1**. Sufficient data are present in both bottom longline and vertical line sectors to allow discard estimation in both sectors. As these commercial discard estimates are from current/ongoing assessments with 2017 as a terminal year, estimates for 2018 are not available.

*Gray Triggerfish*

Gray Triggerfish discards were calculated separately for Eastern (shrimp statistical zones 1 – 12) and Western (shrimp statistical zones 13 – 21) spatial strata (**Figure 1**) for the vertical line sector from 2005 – 2017 (**Table 2)**. Insufficient data exist for the bottom longline sector. Additionally, low sample size for the Western stratum necessitated an imputation procedure (Smith et al. 2019). As these commercial discard estimates are from current/ongoing assessments with 2017 as a terminal year, estimates for 2018 are not available.

Gray Triggerfish discards increased significantly in both spatial strata beginning in 2009. This increase can be largely attributed to effects of management changes. Minimum size increased in July 2008 from 12 inches total length (270 mm fork length) to 14 inches fork length (356 mm fork length). Beginning in 2010, a seasonal closure went into effect for all areas during the months of June and July. In 2012, an Annual Catch Limit (ACL) was enacted for GOM gray triggerfish, resulting in closures in 2012 (July 1, 2012 – Dec. 31, 2012) and 2017 (Nov. 17, 2017 – Dec. 31, 2017). Additionally, in 2013 a trip limit of 12 fish per boat per day went into effect.

*Vermilion Snapper*

Vermilion Snapper discards were calculated separately for Eastern (shrimp statistical zones 1 – 12) and Western (shrimp statistical zones 13 – 21) spatial strata (**Figure 1**) for the vertical line sector from 2007 – 2017 (**Table 3)**. Insufficient data exist for the bottom longline sector. As these commercial discard estimates are from current/ongoing assessments with 2017 as a terminal year, estimates for 2018 are not available. Additionally, discard estimation for Vermilion Snapper is in progress and results are not available for periods prior to the RFOP (2005 – 2006); data from 2007 – 2017 are still being reviewed and 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 Grouper discards in weight (whole pounds) and number of fish for the vertical line and bottom longline sectors.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Vertical Line | | Bottom Longline | |
| Year | Weight | Number | Weight | Number |
| 2005 | 398,782 | 133,793 | 1,105,462 | 440,858 |
| 2006 | 435,772 | 146,203 | 1,270,233 | 506,568 |
| 2007 | 494,752 | 150,881 | 1,093,883 | 405,702 |
| 2008 | 323,270 | 127,661 | 1,143,598 | 480,530 |
| 2009 | 460,616 | 219,006 | 404,760 | 153,431 |
| 2010 | 430,278 | 198,729 | 377,340 | 177,525 |
| 2011 | 717,532 | 290,423 | 835,475 | 346,979 |
| 2012 | 468,458 | 178,703 | 1,008,127 | 402,936 |
| 2013 | 229,580 | 96,399 | 537,033 | 209,867 |
| 2014 | 137,226 | 59,449 | 850,226 | 324,659 |
| 2015 | 199,812 | 86,568 | 460,603 | 195,727 |
| 2016 | 202,292 | 96,899 | 528,078 | 242,272 |
| 2017 | 132,138 | 71,658 | 436,208 | 216,046 |

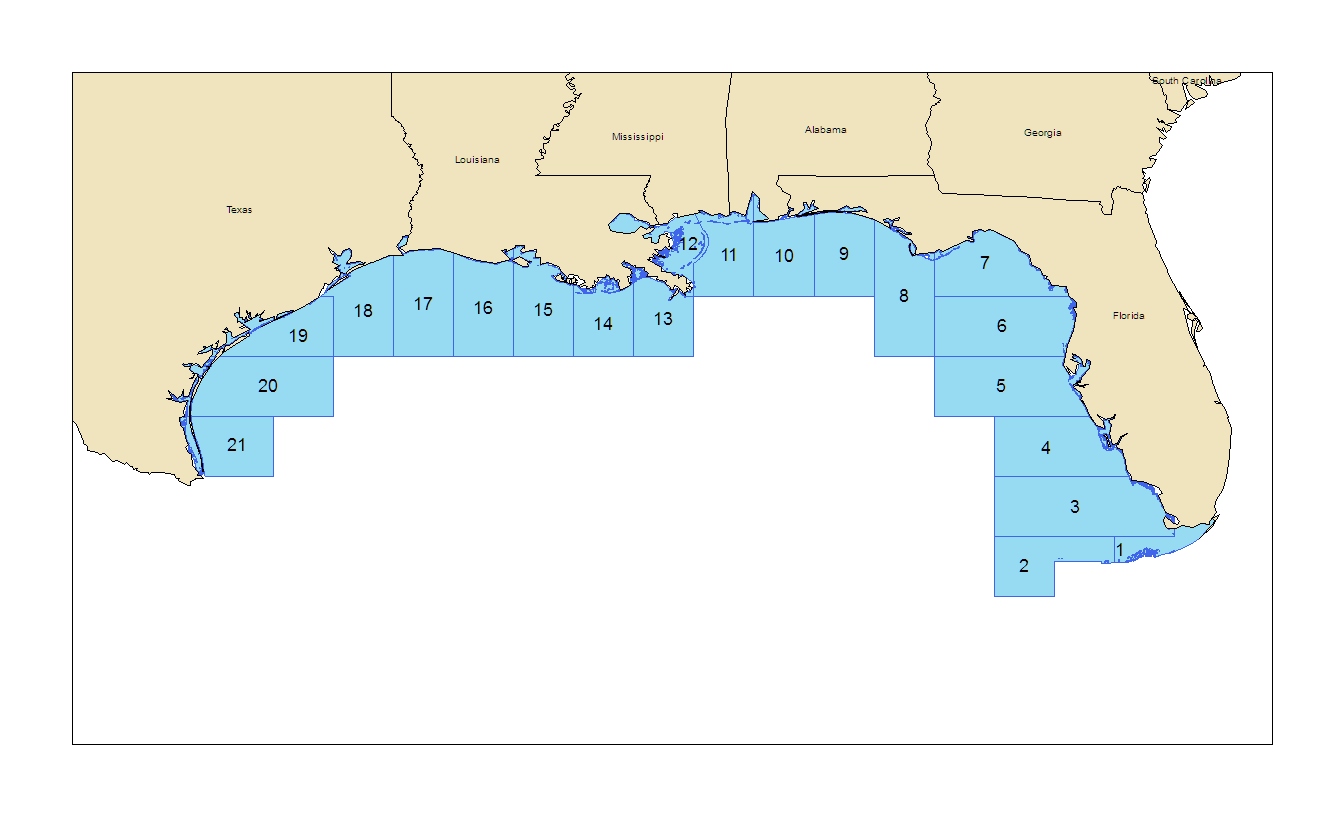
**Table 2**. Annual estimates of Gray Triggerfish discards for the vertical line sector in weight (whole pounds) and number of fish for the East and West spatial strata.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Weight | | Number | |
| Year | East | West | East | West |
| 2005 | 1,136 | 178 | 1,227 | 147 |
| 2006 | 604 | 151 | 652 | 125 |
| 2007 | 834 | 0 | 764 | 0 |
| 2008 | 272 | 224 | 339 | 185 |
| 2009 | 33,656 | 2,755 | 16,417 | 1,112 |
| 2010 | 13,707 | 1,506 | 7,990 | 608 |
| 2011 | 32,936 | 2,021 | 18,618 | 816 |
| 2012 | 51,784 | 16,666 | 21,536 | 4,542 |
| 2013 | 18,810 | 4,209 | 8,765 | 1,459 |
| 2014 | 15,854 | 3,303 | 6,932 | 1,462 |
| 2015 | 18,039 | 6,801 | 7,079 | 2,116 |
| 2016 | 41,457 | 4,032 | 15,781 | 1,110 |
| 2017 | 74,181 | 2,741 | 23,944 | 1,214 |

Table 3. Annual estimates of Vermilion Snapper discards for the vertical line sector in weight (whole pounds) and number for the East and West spatial strata.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Weight | | Number | |
| Year | East | West | East | West |
| 2007 | 170,494 | 6,529 | 439,192 | 19,637 |
| 2008 | 246,821 | 5,524 | 635,291 | 16,614 |
| 2009 | 384,493 | 5,094 | 989,331 | 15,321 |
| 2010 | 180,842 | 3,462 | 466,119 | 10,412 |
| 2011 | 316,023 | 3,393 | 813,504 | 10,206 |
| 2012 | 217,437 | 3,966 | 560,704 | 11,930 |
| 2013 | 129,571 | 3,275 | 335,044 | 9,850 |
| 2014 | 134,894 | 3,120 | 348,357 | 9,384 |
| 2015 | 104,372 | 3,676 | 270,610 | 11,055 |
| 2016 | 114,956 | 4,101 | 297,934 | 12,336 |
| 2017 | 124,995 | 3,618 | 323,736 | 10,883 |

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

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