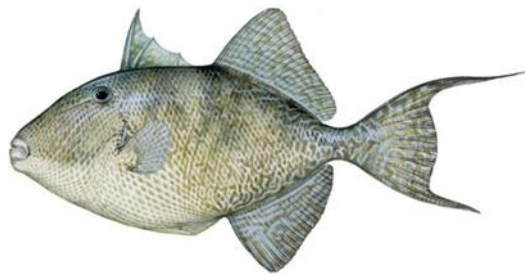


# **Modification of Gray Triggerfish Commercial Trip Limits**



## **Draft Framework Action under the Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico**

**Including Environmental Assessment, Regulatory Impact Review, and  
Regulatory Flexibility Act Analysis**

**January 2023**



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Atmospheric Administration Award No. NA20NMF4410007.*

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# ENVIRONMENTAL ASSESSMENT COVER SHEET

Framework Action under the Fishery Management Plan for Reef Fish Resources of the Gulf of Mexico: Modification of Gray Triggerfish Commercial Trip Limits, including Environmental Assessment, Regulatory Impact Review, and Regulatory Flexibility Act Analysis.

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## Responsible Agencies and Contact Persons

Gulf of Mexico Fishery Management Council (Council)  
4107 W. Spruce Street, Suite 200  
Tampa, Florida 33607  
Carly Somerset ([carly.somerset@gulfcouncil.org](mailto:carly.somerset@gulfcouncil.org))

813-348-1630  
813-348-1711 (fax)  
[gulfcouncil@gulfcouncil.org](mailto:gulfcouncil@gulfcouncil.org)  
[Gulf Council Website](#)

National Marine Fisheries Service (Lead Agency)  
Southeast Regional Office (SERO)  
263 13<sup>th</sup> Avenue South  
St. Petersburg, Florida 33701  
Peter Hood ([peter.hood@noaa.gov](mailto:peter.hood@noaa.gov))

727-824-5305  
727-824-5308 (fax)  
[SERO Website](#)

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( ) Administrative  
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This Environmental Assessment is being prepared using the 2020 CEQ NEPA Regulations as modified by the Phase I 2022 revisions. The effective date of the 2022 revisions was May 20, 2022 and reviews begun after this date are required to apply the 2020 regulations as modified by the Phase I revisions unless there is a clear and fundamental conflict with an applicable statute. This Environmental Assessment began on January 13, 2023, and accordingly proceeds under the 2020 regulations as modified by the Phase I revisions.

## ABBREVIATIONS USED IN THIS DOCUMENT

|               |   |
|---------------|---|
| ABC           | acceptable biological catch   |
| ACL           | annual catch limit  |
| ACT           | Annual Catch Target   |
| AM            | accountability measure  |
| B             | biomass   |
| GMFMC         | Gulf of Mexico Fishery Management Council                             |
| EA            | environmental assessment  |
| FL            | Fork Length   |
| FMP           | Fishery Management Plan   |
| FR            | Federal Register  |
| Gulf          | Gulf of Mexico  |
| lbs           | pounds  |
| LEAP          | Law Enforcement Advisory Panel  |
| LETC          | Law Enforcement Technical Committee                                   |
| M             | instantaneous rate of natural mortality                               |
| MSST          | minimum stock size threshold  |
| MSY           | Maximum sustainable yield   |
| NMFS          | National Marine Fisheries Service                                     |
| OY            | Optimum yield   |
| Reef Fish FMP | Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico |
| RFA           | Regulatory Flexibility Act  |
| RIR           | regulatory impact review  |
| SEDAR         | Southeast Data and Review   |
| SERO          | Southeast Regional Office   |
| SPR           | spawning potential ratio  |
| SSC           | Scientific and Statistical Committee                                  |
| TIP           | Trip Interview Program  |
| TL            | total length  |
| ww            | whole weight  |

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# CHAPTER 1. INTRODUCTION

## 1.1 Background

Gray triggerfish are managed under the Fishery Management Plan (FMP) for the Reef Fish Resources of the Gulf of Mexico (Reef Fish FMP). The gray triggerfish stock is managed by allocating the stock annual catch limit (ACL) between the recreational and commercial sectors. This framework action would modify the commercial trip limits for the gray triggerfish stock by increasing the number of retained fish allowed per trip.

### *Establishment of commercial gray triggerfish catch limits*

The ACLs and annual catch targets (ACTs) for gray triggerfish were established in Amendment 30A (GMFMC 2008). After the completion of the 2011 Southeast Data Assessment and Review (SEDAR) 9 Update Assessment (SEDAR 9 Update 2011), the National Marine Fisheries Service (NMFS) published an interim rule<sup>1</sup> (77 FR 28308; May 14, 2012) that reduced the recreational and commercial ACLs and ACTs to end overfishing while Amendment 37 (GMFMC 2012) was being developed. Amendment 37 established a plan to rebuild the stock in 5 years and replaced the ACLs specified by the 2012 interim rule reducing the ACLs and ACTs. The SEDAR 43 (2015) stock assessment indicated the gray triggerfish stock was not rebuilt. Amendment 46 (GMFMC 2017b) retained the acceptable biological catch (ABC) and sector ACLs and ACTs set with Amendment 37, but established a new rebuilding timeline of nine years (or through 2025), according to the results of the SEDAR 43 (2015) stock assessment and subsequent Council Scientific and Statistical Committee (SSC) review.

The gray triggerfish ABC, ACLs, and ACTs were recently increased in July 2021 based on results of an interim analysis (SEFSC 2020) and subsequent recommendations from the SSC. Amendment 46 to the Reef Fish FMP implemented a rebuilding plan based on the SSC's review of SEDAR 43,<sup>2</sup> and specified management measures in response to the results of that stock assessment. At that time the stock was considered overfished based on the results of SEDAR 43 (2015), and a minimum stock size threshold (MSST) defined as  $(1-M) \cdot B_{30\% \text{ SPR}}$ , where M is the natural mortality and B is the biomass. Amendment 44 (GMFMC 2017a) to the Reef Fish FMP changed the MSST for gray triggerfish to  $0.50 \cdot B_{\text{MSY (or proxy)}}$ , which resulted in a change in the stock status from overfished to not overfished but rebuilding.

### *Gray triggerfish commercial management and landings*

The fishing year for gray triggerfish is January 1 – December 31 with a fixed-closed season for the commercial sector from June 1 – July 31. The stock ACL is allocated 79% to the recreational sector and 21% to the commercial sector. The minimum size limit for gra

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<sup>1</sup> <https://www.govinfo.gov/content/pkg/FR-2012-05-14/pdf/2012-11663.pdf>

<sup>2</sup> <https://sedarweb.org/docs/supp/Gulf%20SSC%20Review%20Summary%20-%20SEDAR%2043%20-%20Gulf%20Gray%20Triggerfish.pdf>

triggerfish is a 14-inch FL for the commercial sector. The current commercial trip limit is 16 fish per vessel. The commercial sector has an ACT set at 8% below its ACL. This buffer was recently increased from 5% to 8% in the most recent framework action that increased the gray triggerfish catch levels (GMFMC 2021). When the commercial sector's landings reach or are projected to reach the ACT, it is closed to harvest for the remainder of the fishing year. If the commercial sector's landings exceed its ACL, then in the following fishing year, a post-season accountability measure (AM) overage adjustment (also called a payback) is applied that reduces the commercial ACL by the amount of the overage and adjusts the commercial ACT accordingly. The payback provision applies to any ACL overages regardless of stock condition. The commercial sector exceeded its ACL in 2012 and 2018, with the payback provision AM being applied in the year following the overages (2013 and 2019, respectively) (Table 1.1.1).

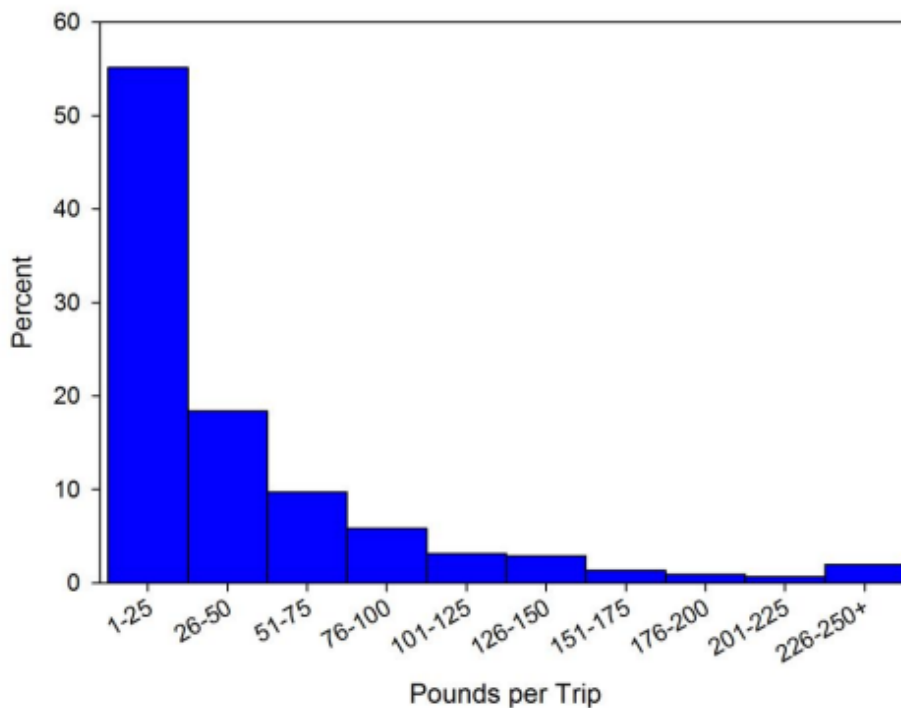
**Table 1.1.1.** Gray triggerfish commercial landings, commercial ACL, payback-adjusted ACL, percent ACL landed, and quota closure dates for 2008-2021. Landing units are in pounds whole weight (lbs ww).

| Year | Landings | ACT     | Adjusted ACT | Percent of ACT Landed | ACL     | Adjusted ACL | Percent of ACL Landed | Closure Date |
|------|----------|---------|--------------|-----------------------|---------|--------------|-----------------------|--------------|
| 2008 | 76,717   | 80,000  | None         | 95.9                  | 105,000 | None         | 73.1                  | None         |
| 2009 | 78,117   | 93,000  | None         | 84.0                  | 122,000 | None         | 64.0                  | None         |
| 2010 | 55,661   | 106,000 | None         | 52.5                  | 138,000 | None         | 40.3                  | None         |
| 2011 | 105,251  | 106,000 | None         | 99.3                  | 138,000 | None         | 76.3                  | None         |
| 2012 | 72,778   | 60,900  | None         | 119.5                 | 64,100  | None         | 113.5                 | 7/1/2012     |
| 2013 | 63,086   | 60,900  | 51,602       | 103.6                 | 64,100  | 54,802       | 98.4                  | None         |
| 2014 | 40,664   | 60,900  | None         | 66.8                  | 64,100  | None         | 63.4                  | None         |
| 2015 | 47,496   | 60,900  | None         | 78.0                  | 64,100  | None         | 74.1                  | None         |
| 2016 | 59,147   | 60,900  | None         | 97.1                  | 64,100  | None         | 92.3                  | None         |
| 2017 | 62,647   | 60,900  | None         | 102.9                 | 64,100  | None         | 97.7                  | 11/17/2017   |
| 2018 | 64,702   | 60,900  | None         | 106.2                 | 64,100  | None         | 100.9                 | 10/07/2018   |
| 2019 | 62,362   | 60,900  | 60,298       | 102.4                 | 64,100  | 63,498       | 97.3                  | 11/26/2019   |
| 2020 | 52,520   | 60,900  | None         | 86.2                  | 64,100  | None         | 81.9                  | None         |
| 2021 | 43,015   | 88,273  | None         | 48.7                  | 95,949  | None         | 44.8                  | None         |

Source: Southeast Fisheries Science Center (SEFSC) Commercial ACL data retrieved January 9, 2023 from SERO website. 2021 data is preliminary.

A large proportion of commercial gray triggerfish landings occur from harvest in the eastern Gulf, specifically off the Florida panhandle, followed by central Florida (GMFMC 2017b, 2021). Some commercial management measures for gray triggerfish were implemented based on Amendment 30A (GMFMC 2008) to assure a fishery-wide landings reduction needed to rebuild the stock. Analyses of trip limits, size limits, and season closures indicated that reducing the trip limit, increasing the size limit, and restricting the season would all be options to reduce

commercial landings by the recommended amount. Therefore, the Council chose to increase the commercial size limit to 14-inches FL and establish a commercial quota to achieve the percent reduction in harvest. Amendment 37 (GMFMC 2012) established trip limits, specifically a 12-fish trip limit as part of the modified rebuilding plan, effective June 2013. The Council used a commercial decision tool to estimate reductions in landings associated with various management measures. Reductions in landings for trip limits were determined using commercial logbooks and Trip Interview Program (TIP) data. The Council decided to establish the trip limit in numbers of fish instead of weight based on recommendations made by the Law Enforcement Advisory Panel (now the Law Enforcement Technical Committee). The panel believed it would be difficult to enforce a low poundage of fish per trip (i.e., if trip limits were set at less than 75 lbs ww); however, the advisory panel did support changing the trip limit to pounds for larger quantities of fish (i.e., 500 lbs ww or more). Trip limit options were based on the percent of commercial trips that landed at least 1 pound of gray triggerfish. The maximum pounds of gray triggerfish harvested per trip by each vessel was also explored. The conclusion was that the commercial sector typically landed a relatively small number of pounds per trip.



**Figure 1.1.1.** Percent of commercial trips landing gray triggerfish in 25-pound increments in the Gulf of Mexico from 2009 through 2011 (n = 4,692 trips that landed at least 1-pound of gray triggerfish). Pounds are in whole weight.  
Source: SERO Annual Catch Limits dataset.

Amendment 46 (GMFMC 2018) increased the commercial trip limit to 16 fish per trip. The amendment sought to establish a new rebuilding time period, catch levels, and management measures because the Gulf gray triggerfish stock was not making adequate progress towards

rebuilding. Commercial landings per trip were analyzed to determine the impact of changes to the trip limit. The Council carefully considered increasing the commercial trip limit, despite the rebuilding plan not making adequate progress. Because the commercial sector continuously harvested below its ACT since the implementation of the 12-fish commercial trip limit in 2013 (GMFMC 2018), the Council decided increasing the commercial trip limit would provide a better opportunity for the commercial sector to achieve the quota.

The analysis provided for the various alternatives indicated that the majority of Gulf commercial trips from 2014 through 2015 landed 12 gray triggerfish or less on any particular trip since the implementation of the 12-fish trip limit. There also appeared to be some harvest exceeding the trip limit with over 10% of the trips harvesting more than 12 gray triggerfish. Overall, the small number of commercial trips that landed 12 fish suggested that gray triggerfish was a non-targeted species by the commercial industry that was likely landed opportunistically when gray triggerfish were encountered with target species on a trip. Recently, at Reef Fish Advisory Panel meetings and Council public testimony, commercial industry stakeholders have indicated that the 16-fish trip limit is still limiting and gray triggerfish are only landed incidentally when targeting other species. Commercial fishermen have requested an increase in the trip limit to reduce discards when encountering gray triggerfish and allow for increased harvest of these fish to make it worthwhile to retain them when they are encountered.

## 1.2 Purpose and Need

The purpose of this action is to increase the gray triggerfish commercial trip limit to allow commercial fishermen the opportunity to land the commercial ACT.

The need for this action is to help reduce discards and achieve optimum yield of Gulf gray triggerfish consistent with the Magnuson-Stevens Fishery Conservation and Management Act.

## 1.3 History of Management

The **Fishery Management Plan (FMP) for Reef Fish Resources in the Gulf of Mexico (Reef Fish FMP)** was implemented in November 1984. The original list of species included in the management unit consisted of snappers, groupers, and sea basses. This summary focuses on actions pertinent to commercial management measures of gray triggerfish. A complete history of management for the **Reef Fish FMP** is available on the Council's website,<sup>3</sup> including other actions affecting gray triggerfish management.

**Amendment 1** [with its associated Environmental Assessment (EA), Regulatory Impact Review (RIR), and Regulatory Flexibility Act Analysis (RFA)], implemented in 1990, added gray triggerfish to the fishery management unit and provided a framework procedure for specifying the total allowable catch. The framework procedure specified that allocations between the

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<sup>3</sup> <https://gulfcouncil.org/fishery-management/implemented-plans/reef-fish/>

commercial and recreational sectors were based on historical landing percentages from average landings during 1979-1987.

**Amendment 12** (with its associated EA and RIR), implemented in January 1997, created an aggregate bag limit of 20-reef fish for all reef fish species not having a bag limit, including gray triggerfish.

**Amendment 16B** (with its associated EA and RIR), implemented in 1999, established a gray triggerfish 12-inch total length (TL) minimum size limit.

**Amendment 30A** (with its supplemental EIS, RIR and RFA), implemented in 2008, was developed in part to stop overfishing of gray triggerfish and rebuild the overfished stock. The amendment established the maximum sustainable yield (MSY), MSST, and OY status determination criteria, and set ACLs, ACTs and AMs, set sector allocations of 21% commercial and 79% recreational, and increased the gray triggerfish minimum size limit to 14-inches FL. The size limit was changed from TL to FL to assist fishermen in measuring gray triggerfish.

The **2012 interim rule** reduced the recreational and commercial ACLs and ACTs, respectively, after the results of the 2011 Update Assessment (SEDAR 9 Update 2011) until Amendment 37 could be finalized.

**Amendment 37** (with its associated EA, RIR, and RFA), implemented in May 2013, for ACLs and ACTs, and June 10, 2013, for management measures, modified the gray triggerfish rebuilding plan based on a 2011 gray triggerfish update assessment, which determined that the stock was not rebuilding on target. This amendment reduced the commercial and recreational ACL to 64,100 and 241,200 lbs ww respectively, and reduced the commercial and recreational ACTs to 60,900 and 217,100 lbs ww respectively. To meet the necessary reductions, a fixed closed season from June 1 through July 31 was established for the commercial and recreational sectors. In addition, this amendment established a commercial trip limit of 12 gray triggerfish, and a recreational bag limit of 2 gray triggerfish per angler within the 20-reef fish aggregate. The recreational accountability measures were modified by establishing an in-season closure authority based on the recreational ACT, and an overage adjustment to reduce the gray triggerfish ACL and ACT by the amount of the overage. This overage adjustment applies only while gray triggerfish is overfished.

**Amendment 44** (with its associated EA), implemented in 2017, re-defined MSST for seven reef fish species including gray triggerfish. MSST was re-defined to be 50% of the BMSY proxy.

**Amendment 46** (with its associated EA, RIR, and RFA), implemented in 2018, established a rebuilding time period of 9 years, or the end of 2025, modified the recreational fixed-closed season to be January 1 through the end of February, and June 1 through July 31, reduced the recreational bag limit to 1 gray triggerfish per angler per day within the 20-reef fish aggregate bag limit, increased the recreational minimum size limit for gray triggerfish to 15-inches FL and increased the commercial trip limit for gray triggerfish to 16 fish per trip.

**The Framework Action: Modifications to Gray Triggerfish Catch Levels** (with its associated EA, RIR, and RFA), implemented in July of 2021, increased the gray triggerfish annual catch limits and annual catch targets. It also used the ACL/ACT Control Rule to revise the buffers for the commercial and recreational sectors to 8 percent and 24 percent, respectively.

## CHAPTER 2. MANAGEMENT ALTERNATIVES

### 2.1 Action: Increase the gray triggerfish commercial trip limit

**Alternative 1:** No Action. Retain the current commercial trip limit of 16 gray triggerfish.

**Alternative 2:** Increase the commercial trip limit to 20 gray triggerfish per vessel.

**Preferred Alternative 3:** Increase the commercial trip limit to 25 gray triggerfish per vessel.

**Alternative 4:** Increase the commercial trip limit to 30 gray triggerfish per vessel.

#### **Discussion:**

This action evaluates different commercial trip limits as a measure to allow commercial fishermen the opportunity to land a greater number of gray triggerfish. Requests to increase the commercial trip limits have been made by industry stakeholders, especially since the increase in the commercial annual catch limit (ACL) and annual catch target (ACT) in 2021 (GMFMC 2021). Gray triggerfish commercial trip limits are in numbers of fish while the commercial quota is monitored in pounds whole weight. Trip limit alternatives have been in numbers of fish at the recommendation of the Law Enforcement Advisory Panel (LEAP). The LEAP felt it would be difficult to enforce a low poundage of gray triggerfish per trip (i.e., 25, 50, and 75 lbs ww) compared with counting a low number of fish; therefore, they recommended that the trip limit be set using numbers of fish. For larger quantities of fish, the LEAP supported trip limits set in pounds (i.e., 500 lbs ww or more). During the August 2016 Council meeting, a Council member requested the gray triggerfish commercial trip limit be changed to pounds of fish instead of number of fish due to potential high grading to larger fish by some commercial fishermen. The Law Enforcement Technical Committee (LETC), previously named the LEAP, met again in October 2016 and discussed trip limits in pounds versus number of fish and made the same recommendation as before. Given the small weight of fish in the alternatives, the LETC recommended the trip limit continued to be set in numbers of fish rather than weight. The LETC met again in October 2022 and agreed that counting fish was simpler than weighing fish, and that when on the water, the problem with weighing fish is the need for an accurately calibrated scale; patrol vessels do not have the ability to weigh fish.

Trip limits continue to be set in numbers of fish, especially when the trip limit is relatively low, to aid in enforcement purposes; however, commercial fishermen must still report their gray triggerfish landings in pounds for logbook reporting purposes. The commercial gray triggerfish quota is monitored in lbs ww. For the purposes of this document, to modify the commercial trip limit, an analysis was completed using landings in lbs ww, and numbers of fish. An evaluation of the trip limit alternatives in this document required analyses that utilized both landings in pounds, and numbers of fish. Because trip limits are in numbers of fish, a conversion between pounds and numbers of fish using an average weight is needed to get an estimate of the number

of fish that are equivalent to a certain amount brought back on a commercial trip. Commercial Trip Interview Program (TIP) data were also used. TIP samplers collect detailed commercial fisheries information at the individual trip level, such as weight and length. Because TIP weights are in both gutted weight and whole weight, a conversion factor of 1.04 was used in the trip limit analyses to convert gutted weight to whole weight. The trip limit analysis report can be found in its entirety in Appendix C. This report was used to evaluate the trip limit alternatives and inform management decisions based on the range of alternatives, should a certain increase in the trip limit result in a projected early season closure.

Since implementation of the 16-fish trip limit in 2018 (GMFMC 2017b), landings have been below the commercial ACL, with the exception of 2018 when 100.9% of the ACL was landed (Table 1.1.1). Although 2021 landings are still preliminary, landings estimates indicate that only 44.8% of the commercial ACL was landed. Previous analyses done when considering a reduction or increase in the commercial trip limit show that the commercial sector routinely harvests less than its trip limit and commercial ACL. Figure 1.1.1 illustrates analyses done in Amendment 37 (GMFMC 2012) and shows that a majority of commercial trips harvested less than 50 pounds per trip, which is equivalent to 12 fish or less per trip when using an average weight of 4.1 pounds. In Amendment 46 (GMFMC 2017b), similar analyses were done when examining whether to modify the commercial trip limit. Whole weight pounds for each trip were converted to numbers of gray triggerfish by dividing landings by an average weight. Since implementation of the 12-fish trip limit, the majority of Gulf commercial trips (2014 through 2015 data) landed 12 fish or less per trip. Amendment 46 increased the trip limit to 16 fish. More recent analyses indicate this trend of harvesting less than the trip limit continues (Appendix C).

Trip limit alternatives were analyzed to determine if an increase from the current trip limit of 16 fish would result in a change in landings that may result in an early season closure. Table 2.1.3 provides the percent predicted increase in landings per trip based on new total landings estimates calculated for each of the five alternatives, compared with landings under the current limit.

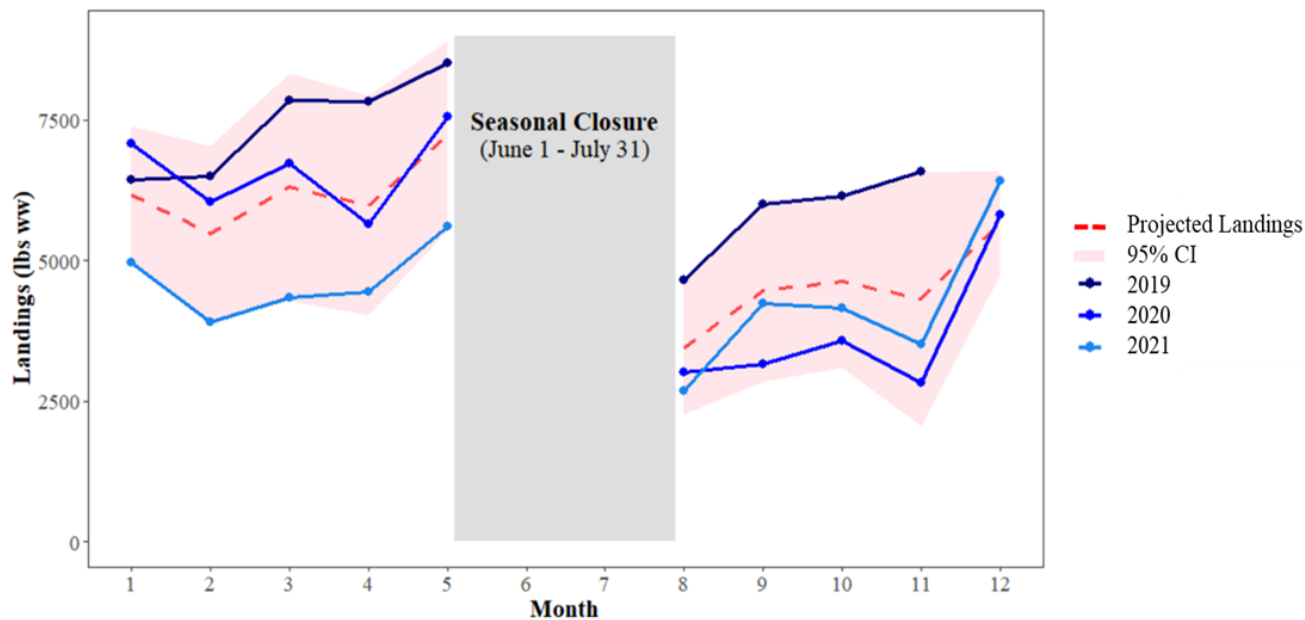
**Table 2.1.3:** Predicted percent increase in landings per trip from the current trip limit.

| <b>Alternatives (Proposed Trip Limit)</b>          | <b>Predicted Change in Landings</b> | <b>Predicted Closure Date</b> | <b>Predicted Season Length (Days)*</b> |
|--|-------------------------------------|-------------------------------|--|
| <b>Alternative 1 (No Action): 16 fish per trip</b> | 0%                                  | -                             | 304                                    |
| <b>Alternative 2: 20 fish per trip</b>             | 16%                                 | -                             | 304                                    |
| <b>Alternative 3: 25 fish per trip</b>             | 33%                                 | -                             | 304                                    |
| <b>Alternative 4: 30 fish per trip</b>             | 52%                                 | -                             | 304                                    |

\* The predicted season length will be 304 days or less because of the fixed June 1 through July 31 closure.

Additionally, a seasonal closure analysis was done using SEFSC monthly commercial landings from 2019 through 2021, and projected landings. The average monthly landings for the three-year period were calculated to create monthly projected landings. A daily catch rate was calculated by dividing projected monthly landings by the number of days per month. This was

used to determine the predicted change in landings as seen in Figure 2.1.4. Additional information can be found in the report (Appendix C).



**Figure 2.1.4:** Gray triggerfish monthly landings in lbs ww for 2019 through 2021 and projected monthly landings (average landings from 2019 through 2021).

Source: SEFSC commercial ACL dataset obtained August 31, 2022.

**Alternative 1 (No Action)** would maintain the current 16-fish trip limit. Based on recent data, although the commercial sector has exceeded its ACT three times in the last five years, the commercial sector is not routinely landing or exceeding its ACL (Table 1.1.1). Industry members have suggested that their sector is not able to harvest its quota because the commercial trip limit is too low. Commercial fishermen may harvest gray triggerfish incidentally or opportunistically when fishing for other reef fish species, but likely do not target them because of the low trip limit. Anecdotally, some commercial fishermen have stated that if they do encounter gray triggerfish, it is often a large number, more than the trip limit, so they may try to avoid them completely to reduce the number of discards.

**Alternative 2** would increase the trip limit to 20 fish, an estimated 90.2 lbs per trip, or a predicted 16% increase in landings. **Preferred Alternative 3** would increase the trip limit to 25 fish, an estimated 112.7 lbs per trip, or 33% predicted increase in landings. **Alternative 4** (30 fish) would increase the lbs per trip to 135, or 52% predicted increase in landings. None of the increased trip limits (**Alternatives 2 – 4**) are predicted to result in a shortened season.

It has been suggested in previous Council public testimony to increase the trip limit to anywhere from 32 to 40 fish to make it lucrative to commercial fishermen to harvest gray triggerfish. It is assumed that fishing behavior for those fishermen who currently harvest the 16-fish trip limit would continue to harvest the trip limit if it is increased. Commercial trips harvesting gray triggerfish in the logbook data are limited. It is possible that more commercial fishermen would begin to harvest gray triggerfish if the trip limit is increased. However, **Preferred Alternative**

**3 and Alternatives 2, and 4** are predicted to increase landings from 16-52% but they would likely not result in a shortened season. **Preferred Alternative 3** was chosen as the preferred alternative as it would conservatively increase the trip limit, thus allowing more opportunity to the commercial sector to harvest its ACL, while attempting to maintain the rebuilding timeline.

## CHAPTER 3. AFFECTED ENVIRONMENT

The actions considered in this framework action with associated environmental assessment (EA) would affect fishing in federal waters of the Gulf of Mexico (Gulf). Descriptions of the physical, biological, economic, social, and administrative environments (affected environments) completed in the environmental impact statements (EIS) in the Generic Essential Fish Habitat (EFH) Amendment (GMFMC 2004a), and the Generic Annual Catch Limits/Accountability Measures (ACL/AM) Amendment (GMFMC 2011a) apply to the Fishery Management Plan (FMP) for Reef Fish Resources in the Gulf of Mexico (Reef Fish FMP). Descriptions of the affected environments for reef fish are further described in Reef Fish Amendments 30B (GMFMC 2008), 32 (GMFMC 2011b), 40 (GMFMC 2014), 28 (GMFMC 2015), 50A (GMFMC 2019a), and 53 (GMFMC 2021). Below, information on each of these environments is summarized or updated, as appropriate.

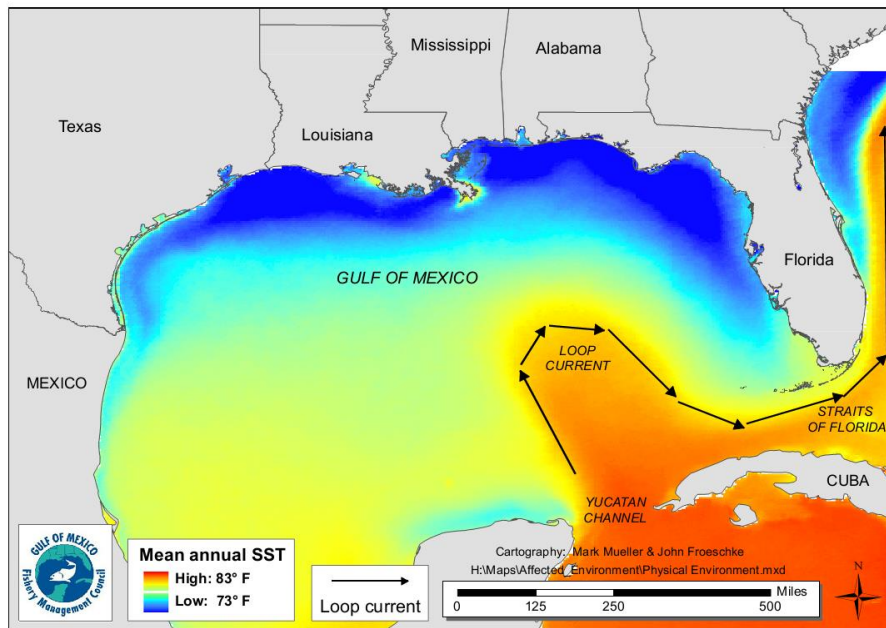
### 3.1 Description of the Physical Environment

The physical environment for Gulf of Mexico (Gulf) reef fish is detailed in the Generic Essential Fish Habitat (EFH) Amendment (GMFMC 2004a), Generic Amendment 3 (GMFMC 2005), and the Generic Annual Catch Limits (ACL)/Accountability Measures (AM) Amendment (GMFMC 2011a), which are hereby incorporated by reference.

The Gulf has a total area of approximately 600,000 square miles (1.5 million km<sup>2</sup>), including state waters (Gore 1992). It is a semi-enclosed, oceanic basin connected to the Atlantic Ocean by the Straits of Florida and to the Caribbean Sea by the Yucatan Channel (Figure 3.1.1). Oceanographic conditions are affected by the Loop Current, discharge of freshwater into the northern Gulf, and a semi-permanent, anti-cyclonic gyre in the western Gulf. The Gulf includes both temperate and tropical waters (McEachran and Fechtelm 2005). Gulf water temperatures range from 54° F to 84° F (12° C to 29° C) depending on time of year and depth of water. Mean annual sea surface temperatures ranged from 73 through 83° F (23-28° C) including bays and bayous (Figure 3.1.1) between 1982 and 2009, according to satellite-derived measurements.<sup>4</sup> In general, mean sea surface temperature increases from north to south with large seasonal variations in shallow waters.

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<sup>4</sup> <http://accession.nodc.noaa.gov/0072888>



**Figure 3.1.1.** Mean annual sea surface temperature derived from the Advanced Very High-Resolution Radiometer Pathfinder Version 5 sea surface temperature data set.<sup>5</sup>

### **Habitat Areas of Particular Concern (HAPC) and Environmental Sites of Special Interest Relevant to Reef Fish**

Detailed information pertaining to the Gulf area closures and marine reserves is provided in Amendment 32 to the Fishery Management Plan for the Reef Fish Resources in the Gulf of Mexico (Reef Fish FMP) (GMFMC 2011b) and Amendment 9 to the Fishery Management Plan for the Coral and Coral Reefs of the Gulf of Mexico, U.S. Waters (GMFMC 2018), which are hereby incorporated by reference. There are environmental sites of special interest that are discussed in the Generic EFH Amendment (GMFMC 2004a) that are relevant to gray triggerfish management and are hereby incorporated by reference. Some of these areas include the longline/buoy area closure, the Edges Marine Reserve, Tortugas North and South Marine Reserves, individual reef areas and bank HAPC of the northwestern Gulf, the Florida Middle Grounds HAPC, the Pulley Ridge HAPC, and Alabama Special Management Zone.

### **Northern Gulf of Mexico Hypoxic Zone**

Every summer in the northern Gulf, a large hypoxic zone forms. It is the result of allochthonous materials and runoff from agricultural lands resulting in increasing nutrient inputs to multiple rivers. These tributaries feed in to the Mississippi River, which disperses to the Gulf, and creates a temperature and salinity dependent, layering of waters. The nutrient rich fresh waters from the Mississippi create seasonal, large algal blooms at the surface that eventually die, sink to the bottom, and decompose. This creates the oxygen-poor, hypoxic, bottom water layer unless front

<sup>5</sup> <http://pathfinder.nodc.noaa.gov>

or storm events occur, which allows for mixing of the layers (Rabalais and Turner 2019). For 2020, the extent of the hypoxic area was estimated to be 2,117 square miles and is the third smallest area mapped since 1985. This in part can be attributed to multiple storm events that occurred in the Louisiana area in 2020, and why the 5-year hypoxic area average, which is 5,408 square miles, is important to consider. However, both the average and the low 2020 extent are still larger than the 1,930 square mile goal set by the federal-state Hypoxia Task Force to be reached by 2035.<sup>6</sup> The hypoxic conditions in the northern Gulf directly impact less mobile benthic macroinvertebrates (e.g., polychaetes) by influencing density, species richness, and community composition (Baustian and Rabalais 2009; Breitburg et al. 2018). However, more mobile macroinvertebrates and demersal fishes are able to detect lower dissolved oxygen levels and move away from hypoxic conditions. Therefore, these organisms are indirectly affected by limited prey availability and constrained available habitat (Baustian and Rabalais 2009; Craig 2012).

### **Greenhouse gases**

The Intergovernmental Panel on Climate Change (IPCC) has indicated greenhouse gas emissions are one of the most important drivers of recent changes in climate. Wilson et al. (2017) inventoried the sources of greenhouse gases in the Gulf from sources associated with oil platforms and those associated with other activities such as fishing. A summary of the results of the inventory are shown in Table 3.1.2 with respect to total emissions and from fishing. Commercial fishing and recreational vessels make up a small percentage of the total estimated greenhouse gas emissions from the Gulf (2.04% and 1.67%, respectively).

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<sup>6</sup> <http://gulfhypoxia.net>

**Table 3.1.2.** Total Gulf greenhouse gas 2014 emissions estimates (in tons per year) from oil platform and non-oil platform sources, commercial fishing, and percent greenhouse gas emissions from commercial fishing vessels of the total emissions\*.

| Emission source                     | CO <sub>2</sub>   | Greenhouse CH <sub>4</sub> | Gas N <sub>2</sub> O | Total CO <sub>2e</sub> ** |
|-------------------------------------|-------------------|----------------------------|----------------------|---------------------------|
| <b>Oil platform</b>                 | 5,940,330         | 225,667                    | 98                   | 11,611,272                |
| <b>Non-platform</b>                 | 14,017,962        | 1,999                      | 2,646                | 14,856,307                |
| <b>Total</b>                        | <b>19,958,292</b> | <b>227,665</b>             | <b>2,743</b>         | <b>26,467,578</b>         |
| <b>Commercial fishing</b>           | 531,190           | 3                          | 25                   | 538,842                   |
| <b>Recreational fishing</b>         | 435,327           | 3                          | 21                   | 441,559                   |
| <b>Percent commercial fishing</b>   | 2.66%             | >0.01%                     | 0.91%                | 2.04%                     |
| <b>Percent recreational fishing</b> | 2.18%             | >0.01%                     | 0.77%                | 1.67%                     |

\*Compiled from Tables 6-11, 6-12, and 6-13 in Wilson et al. (2017). \*\*The CO<sub>2</sub> equivalent (CO<sub>2e</sub>) emission estimates represent the number of tons of CO<sub>2</sub> emissions with the same global warming potential as one ton of another greenhouse gas (e.g., CH<sub>4</sub> and N<sub>2</sub>O). Conversion factors to CO<sub>2e</sub> are 21 for CH<sub>4</sub> and 310 for N<sub>2</sub>O.

## 3.2 Description of the Biological/Ecological Environment

A complete description of the biological/ecological environment can be found in Chapter 3 of Amendment 46 to the Reef Fish FMP (GMFMC 2017b). That description is summarized in the following sections and incorporated herein by reference.

### Gray Triggerfish Life History and Biology

Larval and juvenile gray triggerfish are found associated with *Sargassum* spp. mats in late summer and fall (Bortone et al. 1977; Dooley 1972; Fahay 1975; Wells and Rooker 2004). Adult gray triggerfish are closely associated with both natural and artificial reefs (Frazer and Lindberg 1994; Ingram 2001; Johnson and Saloman 1984; Kurz 1995; Lingo and Szedlmayer 2006; Simmons and Szedlmayer 2011; Vose and Nelson 1994) and are estimated to have high site fidelity (Ingram and Patterson 2001). Adult gray triggerfish are also found over soft bottom, where they lay their eggs in depressions in the sand substrate (Simmons and Szedlmayer 2012).

Studies conducted in the Gulf and South Atlantic Bight have found that peak spawning occurs during the months of June and July. However, spawning can occur as early as May and as late as August (Hood and Johnson 1997; Ingram 2001; Moore 2001; Simmons and Szedlmayer 2012; Wilson et al. 1995). Both sexes are reproductively mature by age-2, 10 inches fork length (FL) (250 mm FL) (Ingram 2001; Wilson et al. 1995) with some fish as young as age-0 being mature as well (Jefferson et al. 2019). Male gray triggerfish establish territories, build nests, and form

harems (one male and several females) (Simmons and Szedlmayer 2012). Eggs are laid in a gelatinous matrix in the bottom of the nest. After fertilization, female gray triggerfish provide parental care while the male defends his territory and courts other female gray triggerfish on the reef (Simmons and Szedlmayer 2012).

There have been relatively few age and growth studies on gray triggerfish; however, this species is estimated to live up to 11 years, with 16 being the maximum age recorded (Hood and Johnson 1997; Ingram 2001; Panama City National Marine Fisheries Service (NMFS) Database. (accessed March 2020; Wilson et al. 1995). Gray triggerfish is estimated to grow rapidly within the first year of life, then growth slows for both sexes combined (Hood and Johnson 1997; Ingram 2001; Wilson et al. 1995). Sexual dimorphism is evident with male gray triggerfish being significantly larger than females (Hood and Johnson 1997; Ingram 2001; Jefferson et al. 2019; Simmons and Szedlmayer 2012). Research for Southeast Data Assessment and Review (SEDAR) 62 (2019) was conducted using samples processed from 1999 through 2017 at the NMFS Panama City Laboratory from both fishery-dependent and fishery-independent samples in the Gulf. The samples showed a maximum recorded length of gray triggerfish being 26 inches FL (697 mm FL). The maximum weight recorded was 12.6 lbs gutted weight (gw) (5.7 kg). The maximum age (using spines) recorded was 14 years old. However, there were minimal samples at this size, weight, and/or age. Most fish sampled were 16-18 inches FL (400-450 mm FL) and 4 years old (Allman et al. 2019).

### **Stock Status History of Gray Triggerfish**

The first gray triggerfish assessments concluded that the stock was overfished and undergoing overfishing (Porch 2001; Valle et al. 2001). This assessment of the stock did not change in the next assessment, SEDAR 9 (2006). Based on SEDAR 9, a 6-year rebuilding plan was implemented in Amendment 30A (GMFMC 2008b). An update assessment (SEDAR 9 Update 2011) indicated the stock was still overfished and experiencing overfishing, and would not be rebuilt by 2013. Amendment 37 (GMFMC 2012) implemented a new plan to rebuild the stock in 5 years. The next stock assessment (SEDAR 43 2015) of Gulf gray triggerfish was reviewed by the Scientific and Statistical Committee (SSC) in October 2015. The assessment indicated that gray triggerfish was no longer experiencing overfishing, but remained overfished. In November 2015, NMFS notified the Gulf of Mexico Fishery Management Council (Council) that the gray triggerfish stock was not making adequate progress toward rebuilding. Based on SSC recommendations and Council discussion, the Council requested additional data and analyses from the Southeast Fisheries Science Center (SEFSC) for subsequent review by the SSC. The Council requested SEFSC complete six projection scenarios with specific rebuilding targets of 8, 9, and 10 years and assuming two recruitment scenarios (low, high) due to recruitment concerns raised during the SEDAR 43 stock assessment. The Council ultimately chose a 9-year rebuilding plan, which would rebuild the stock by 2025.

The implementation of Amendment 44 to the Reef Fish FMP (GMFMC 2017a) changed the gray triggerfish status determination criteria for minimum stock size threshold, resulting in the stock no longer determined to be overfished. The SEDAR 62 (2019) stock assessment was intended to update management advice using data through 2017; however, the assessment was withdrawn due to various impediments that will be addressed in a research track stock assessment,

scheduled to begin in 2024. Therefore, SEDAR 43 is the last full stock assessment to be accepted for gray triggerfish with a terminal data year of 2013. The gray triggerfish stock is still in a rebuilding plan; though, it is impossible to accurately gauge progress toward rebuilding as the interim analysis approach does not provide a biomass estimate. However, index of abundance trends in the 2020 interim analysis suggest that it is likely that gray triggerfish biomass has increased in recent years. This additional biomass should support additional removals, but it will take a full stock assessment to determine if the stock is rebuilding according to the plan specified in Amendment 46.

## **Bycatch**

Details of previous bycatch estimates in the gray triggerfish portion of the reef fish fishery can be found in Appendix G (Bycatch Practicability Analysis) of Amendment 46 to the Reef Fish FMP (GMFMC 2017b), and is hereby incorporated by reference.

While bycatch occurs in the hook-and-line and trawl fisheries, gray triggerfish make up a small portion of species landed on trips. Previous studies have documented low hook-and-line discard mortality of gray triggerfish, with only 5% estimated to die after release (GMFMC 2017b). However, updated research conducted for SEDAR 62 (2019) shows that mean estimated discard survival across all 35 depths for North Carolina was 35% and for Florida was 34% (Runde et al. 2019). These results have implications for gray triggerfish management because the estimate of discard survival is substantially lower than previously assumed. In the shrimp trawl fishery, mortality is assumed to be 100%, with all gray triggerfish assumed to be age-0 (GMFMC 2017b). Bycatch reduction device requirements and a reduction in shrimping effort is expected to have reduced gray triggerfish bycatch. However, there are no new bycatch rates from the observer program for gray triggerfish since those available for SEDAR 9 (2006) to inform the model and reduce the gray triggerfish bycatch estimates. Therefore, it is expected shrimp trawl bycatch is overestimated (Zhang 2020).

Given that gray triggerfish are normally caught as bycatch on trips targeting other reef fish species by hook-and-line, gray triggerfish discards may be reduced if more fish are allowed to be harvested during the fishing season. Shrimp trawl bycatch and discard mortality is expected to stay the same due the age of fish caught.

## **General Information on Reef Fish Species**

The National Ocean Service collaborated with NMFS and the Council to develop distributions of reef fish (and other species) in the Gulf (SEA 1998). Reef fish are widely distributed in the Gulf, occupying both pelagic and benthic habitats during their life cycle. In general, both egg and larval stages are planktonic. Gray triggerfish are exceptions to this generalization as they lay their eggs in nests on the sandy bottom (Simmons and Szedlmayer 2012). Larval fish feed on zooplankton and phytoplankton.

There currently are 31 species managed under the Reef Fish FMP. The NMFS Office of Sustainable Fisheries updates its Status of U.S. Fisheries Report to Congress on a quarterly basis utilizing the most current stock assessment information. Stock assessments and status

determinations have been conducted and designated for 14 stocks and can be found on the Council<sup>7</sup> and SEDAR<sup>8</sup> websites. Of the 14 stocks for which stock assessments have been conducted and accepted by the SSC, the four quarter 2022 Update Summary of Stock Status for non-FSSI stocks classifies two stocks as overfished (greater amberjack and gag) and five stocks undergoing overfishing (cobia, greater amberjack, gag, lane snapper, and the jacks complex). The status of both assessed and unassessed stocks, as of the writing of this amendment is provided on NMFS' Fishery Stock Status Updates webpage.<sup>9</sup>

## Protected Species

NMFS manages marine protected species in the Southeast region under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). A brief summary of these two laws and more information is available on NMFS Office of Protected Resources website.<sup>10</sup> ESA-listed species of marine mammals, sea turtles, fish, and corals occur in the exclusive economic zone (EEZ) of the Gulf. There are numerous stocks of marine mammals managed within the Southeast region. All marine mammals in U.S. waters are protected under the MMPA.

The five whale species that may be present in the Gulf (blue, sperm, sei, fin, and Rice's<sup>11</sup>) are listed as endangered under the ESA. Rice's whales are the only resident baleen whales in the Gulf recently being listed as endangered. Manatees, listed as threatened under the ESA, also occur in the Gulf and are the only marine mammal species in this area managed by the U.S. Fish and Wildlife Service.

Sea turtles, fish, and corals that are listed as threatened or endangered under the ESA occur in the Gulf. These include the following: six species of sea turtles (Kemp's ridley, loggerhead (Northwest Atlantic Ocean distinct population Segment (DPS)), green (North Atlantic and South Atlantic DPSs), leatherback, and hawksbill); five species of fish (Gulf sturgeon, smalltooth sawfish, Nassau grouper, oceanic whitetip shark and giant manta ray); and six species of coral (elkhorn, staghorn, lobed star, mountainous star, boulder star, and rough cactus). Critical habitat designated under the ESA for smalltooth sawfish, Gulf sturgeon, and the Northwest Atlantic Ocean DPS of loggerhead sea turtles occur in the Gulf, though only loggerhead critical habitat occurs in federal waters.

The most recent biological opinion (BiOp) for the FMP was completed on September 30, 2011 (NMFS 2011). The BiOp determined the operation of the Gulf reef fish fishery managed under the Reef Fish FMP is not likely to adversely affect ESA-listed marine mammals or coral, and was not likely to jeopardize the continued existence of sea turtles (loggerhead, Kemp's ridley,

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<sup>7</sup> [www.gulfcouncil.org](http://www.gulfcouncil.org)

<sup>8</sup> <http://sedarweb.org/>

<sup>9</sup> <https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates>

<sup>10</sup> <https://www.fisheries.noaa.gov/about/office-protected-resources>

<sup>11</sup> At the time of listing, Rice's whale was classified as The Gulf of Mexico Bryde's whale, but was later has recently been identified as morphologically and genetically distinct from other whales under the Bryde's whale complex, warranting classification as a new species of baleen whale living in the Gulf of Mexico to be named *Balaenoptera ricei* or Rice's whale.

green, hawksbill, and leatherback) or smalltooth sawfish. Since issuing the opinion, in memoranda dated September 16, 2014, and October 7, 2014, NMFS concluded that the activities associated with the Reef Fish FMP are not likely to adversely affect critical habitat for the Northwest Atlantic Ocean loggerhead sea turtle DPS and four species of corals (lobed star, mountainous star, boulder star, and rough cactus). On September 29, 2016, NMFS requested re-initiation of Section 7 consultation on the operation of reef fish fishing managed by the Reef Fish FMP because new species (i.e., Nassau grouper [81 FR 42268] and green sea turtle North Atlantic and South Atlantic DPSs [81 FR 20057]) were listed under the ESA that may be affected by the proposed action. NMFS documented a determination that the operation of the fishery to continue during the re-initiation period is not likely to adversely affect these species.

On January 22, 2018, NMFS published a final rule (83 FR 2916) listing the giant manta ray as threatened under the ESA. On January 30, 2018, NMFS published a final rule (83 FR 4153) listing the oceanic whitetip shark as threatened under the ESA. In a memorandum dated March 6, 2018, NMFS revised the request for re-initiation of consultation on the Reef Fish FMP to address the listings of the giant manta and oceanic whitetip. In that memorandum, NMFS also determined that fishing under the Reef Fish FMP during the extended re-initiation period will not jeopardize the continued existence of the giant manta ray, oceanic whitetip shark, Nassau grouper, or the North Atlantic and South Atlantic DPSs of green sea turtles.

NMFS published a final rule on April 15, 2019, listing the Gulf Bryde's (now Rice's whale) whale as endangered. In a memorandum dated June 20, 2019, NMFS revised the re-initiation request to include the Rice's and determined that fishing under the Reef Fish FMP during the re-initiation period will not jeopardize the continued existence of any of the newly listed species discussed above.<sup>12</sup>

There is no information to indicate marine mammals and birds rely on greater amberjack for food, and they are not generally caught by fishermen harvesting greater amberjack. The primary gear in the Gulf Reef Fish fishery used to harvest greater amberjack is hook-and-line. This gear is classified in the 2022 Marine Mammal Protection Act List of Fisheries as a Category III fishery (87 FR 23122), meaning the annual mortality and serious injury of a marine mammal resulting from the fishery is less than or equal to 1% of the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. Additionally, there is no evidence that the Gulf greater amberjack fishery as a whole is adversely affecting seabirds. Dolphins are the only species documented as interacting with the reef fish fishery. Bottlenose dolphins prey upon bait, catch, and/or released discards of fish from the reef fish fishery. They are also a common predator around reef fish vessels, feeding on the discards.

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<sup>12</sup> Any The official change to the name of the species listed under the ESA as the Gulf of Mexico Bryde's whale has no effect on NMFS's conclusion that the activities associated with the Reef Fish FMP will not jeopardize the continued existence of the species during the revised reinitiation period.

## ***Deepwater Horizon MC252 Oil Spill***

The presence of polycyclic aromatic hydrocarbons (PAH), which are highly toxic chemicals that tend to persist in the environment for long periods of time, in marine environments can have detrimental impacts on marine finfish, especially during the more vulnerable larval stage of development (Whitehead et al. 2012). The future reproductive success of fish species may be negatively affected by episodic events resulting in high-mortality years or low recruitment. These episodic events could leave gaps in the age structure of the population, thereby affecting future reproductive output (Mendelssohn et al. 2012). Other studies have described the vulnerabilities of various marine finfish species, with morphological and/or life history characteristics similar to species found in the Gulf, to oil spills and dispersants (Hose et al. 1996; Carls et al. 1999; Heintz et al. 1999; Short 2003).

In addition to the crude oil, over a million gallons of the dispersant, Corexit 9500A®, was applied to the ocean surface and an additional hundreds of thousands of gallons of dispersant was pumped to the mile-deep wellhead (National Commission 2010). No large-scale applications of dispersants in deep water had been conducted until the *Deepwater Horizon* MC252 oil spill. Thus, no data exist on the environmental fate of dispersants in deep water. Twenty-first century dispersant applications are thought to be less harmful than their predecessors. However, the combination of oil and dispersants has proven to be more toxic to marine fishes than either dispersants or crude oil alone. Marine fish which are more active (e.g. a pelagic species versus a demersal species) appear to be more susceptible to negative effects from interactions with weathered oil/dispersant emulsions. These effects can include mobility impairment and inhibited respiration (Swedmark et al. 1973). The effect of oil, dispersants, and the combination of oil and dispersants on fishes of the Gulf remains an area of concern. More information about the *Deepwater Horizon* MC252 oil spill is available on the NOAA Southeast Regional Office website.<sup>13</sup>

## **Climate change**

Climate change projections predict increases in sea-surface temperature and sea level; decreases in sea-ice cover; and changes in salinity, wave climate, and ocean circulation (IPCC).<sup>14</sup> These changes are likely to affect plankton biomass and fish larvae abundance that could adversely impact fish, marine mammals, seabirds, and ocean biodiversity. Kennedy et al. (2002) and Osgood (2008) have suggested global climate change could affect temperature changes in coastal and marine ecosystems that can influence organism metabolism and alter ecological processes such as productivity and species interactions; change precipitation patterns and cause a rise in sea level which could change the water balance of coastal ecosystems; altering patterns of wind and water circulation in the ocean environment; and influence the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs. The National Oceanic and Atmospheric Association (NOAA) Climate Change Web Portal<sup>15</sup> predicts the average sea surface temperature

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<sup>13</sup> <https://www.fisheries.noaa.gov/news/deepwater-horizon-10-years-later-10-questions>

<sup>14</sup> <http://www.ipcc.ch/>

<sup>15</sup> <https://www.esrl.noaa.gov/psd/ipcc/>

in the Gulf and South Atlantic will increase by 2–4°F (1–3°C) for 2010–2070 compared to the average over the years 1950–2010. For reef fishes and snapper-grouper species, Burton (2008) and Morley et al. (2018) speculated climate change could cause shifts in spawning seasons, changes in migration patterns, and changes to basic life history parameters such as growth rates.

The distribution of native and exotic species may change with increased water temperature, as may the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms (Sokolow 2009; Hollowed et al. 2013; Maynard et al. 2015; Wells et al. 2015; Gobler 2020). Some stocks have already shown increases in abundance in the northern Gulf (Fodrie et al. 2010) and Texas estuaries (Tolan and Fisher 2009). Integrating the potential effects of climate change into the fisheries assessment process is currently difficult due to the assessment rarely projecting through a time span that would include detectable climate change effects (Hollowed et al. 2013). However, there are ecosystem models available or being developed that incorporate future, potential, climate change effects (King and McFarlane 2006; Pinsky and Mantua 2014; Gruss et al. 2017; Chagaris et al. 2019). While complex, these factors do not change the reality of climate change impacts on managed species and the need to incorporate this information into stock assessments. Better planning and collaboration with managers are currently being pursued to include this type of data into the assessment process.

## Red Tide

Red tide is a common name for harmful algal blooms caused by species of dinoflagellates and other organisms that cause the water to appear to be red. Red tide blooms occur in the Gulf almost every year, generally in late summer or early fall. They are most common off the central and southwestern coasts of Florida between Clearwater and Sanibel Island, but may occur anywhere in the Gulf. More than 50 species capable of causing red tides occur in the Gulf, but one of the best-known species is *Karenia brevis* (Steindinger 2009). This organism produces toxins capable of killing fish, birds and other marine animals along with causing respiratory irritation in humans (Asai et al. 1982; Flewelling et al. 2005; Hemmert, 1975; Kirkpatrick et al. 2004; Landsberg et al. 2009). The effects of red tide on fish stocks have been well established. In 2005 and 2014, severe red tide events occurred in the Gulf along with an associated large decline in multiple abundance indices for red grouper, gag, and other species thought to be susceptible to mortality from red tide events (Chagaris and Sinnickson 2018; Flaherty and Landsberg 2011; Hu et al. 2015; Walter et al. 2013). Mortality occurs via absorption of toxins across gill membranes (Abbott et al. 1975; Baden 1988), ingestion of toxic biota (Flewelling et al. 2005; Landsberg 2002; Landsberg et al. 2009), from some indirect effect such as hypoxia (Walter et al. 2013) or from a combination of these effects. Gray triggerfish are found within fish communities of species negatively affected by high mortality due to red tide. However, although their abundance varied, studies have shown that gray triggerfish that remained in red tide areas were able to survive, suggesting that the stock is more tolerant and resilient to environmental stresses (Dupont and Coy 2008; DuPont et al. 2010).

### 3.3 Description of Economic Environment

Economic information pertaining to gray triggerfish can be found in Amendment 46 to the Reef Fish FMP (GMFMC 2017b) and GMFMC (2021) and is incorporated herein by reference. The following section contains select updated information on the economic environment of the Gulf gray triggerfish portion of the reef fish fishery, with a focus on the commercial sector. Inflation adjusted revenues and prices are reported in 2021 dollars using the annual, non-seasonally adjusted Gross Domestic Product (GDP) implicit price deflator provided by the U.S. Bureau of Economic Analysis (BEA).

#### 3.3.1 Commercial Sector

##### Permits

Any fishing vessel that harvests and sells any of the reef fish species managed under the Reef Fish FMP from the Gulf EEZ must have a valid Gulf reef fish commercial permit. Commercial Gulf reef fish permits are limited access permits. After a permit expires, it can be renewed or transferred up to one year after the date of expiration. As shown in Table 3.3.1.1, the number of permits that were valid at any point in a given year decreased steadily from 2016-2020. There were approximately 2% fewer valid permits in 2020 relative to 2016.

**Table 3.3.1.1.** Number of valid Gulf reef fish permits, 2016 - 2020.

| Year | Number of Permits |
|------|-------------------|
| 2016 | 852               |
| 2017 | 850               |
| 2018 | 845               |
| 2019 | 842               |
| 2020 | 837               |

Source: NMFS SERO Sustainable Fisheries (SF) Access permits database (accessed 11/17/22).

Reef fish harvested from a vessel with a valid Gulf reef fish commercial permit may only be sold to dealers with a federal a federal Gulf and South Atlantic Dealer (GSAD) permit. As of August 26, 2021, there were 379 entities with a GSAD permit.

##### Vessels, Landings, and Dockside Revenue

The number of federally permitted commercial vessels that landed Gulf gray triggerfish decreased modestly from 2017 through 2021 (Table 3.3.1.2). Landings of gray triggerfish increased from 2017 through 2019, then decreased through 2021. On average (2017 through 2021), vessels that landed gray triggerfish did so on approximately 33% of their Gulf trips and gray triggerfish accounted for less than half a percent of their annual all species revenue, including revenue from South Atlantic trips (Table 3.3.1.2 and Table 3.3.1.3). Average all species vessel-level revenue for these vessels dipped from 2017 through 2018 and then increased steadily to a five-year high in 2021 (Table 3.3.1.2). The average annual price per pound (lb)

guttled weight (gw) for gray triggerfish during this period was \$2.28 (2021 dollars). Although not shown in the table, the maximum annual revenue from all species reported by a single one of the vessels that harvested gray triggerfish from 2017 through 2021 was approximately \$2.8 million (2021 dollars) and occurred in 2021.

**Table 3.3.1.2.** Number of vessels, number of trips, and landings (lbs gw) by year for Gulf gray triggerfish.

| Year           | # of vessels that caught gray triggerfish (> 0 lbs gw) | # of trips that caught gray triggerfish | gray triggerfish landings (lbs gw) | Other species' landings jointly caught w/ gray triggerfish (lbs gw) | # of Gulf trips that only caught other species | Other species' landings on Gulf trips w/o gray triggerfish (lbs gw) | All species landings on South Atlantic trips (lbs gw) |
|----------------|--|---|------------------------------------|---|--|---|---|
| <b>2017</b>    | 283  | 1,479                                   | 51,156                             | 3,813,490   | 2,918  | 6,626,087   | 101,375   |
| <b>2018</b>    | 262  | 1,213                                   | 53,406                             | 2,838,244   | 2,680  | 5,697,726   | 49,136  |
| <b>2019</b>    | 263  | 1,353                                   | 60,012                             | 3,222,478   | 2,585  | 5,455,855   | 35,216  |
| <b>2020</b>    | 262  | 1,258                                   | 47,267                             | 3,419,412   | 2,459  | 5,563,042   | 19,125  |
| <b>2021</b>    | 233  | 1,151                                   | 42,428                             | 3,641,034   | 2,207  | 5,812,442   | 70,234  |
| <b>Average</b> | 261  | 1,291                                   | 50,854                             | 3,386,932   | 2,570  | 5,831,030   | 55,017  |

Source: SEFSC-SSRG Socioeconomic Panel (September 2022 version).

**Table 3.3.1.3.** Number of vessels and ex-vessel revenue by year (2021 dollars) for Gulf gray triggerfish.

| Year           | # of vessels that caught gray triggerfish (> 0 lbs gw) | Dockside revenue from gray triggerfish | Dockside revenue from 'other species' jointly caught w/ gray triggerfish | Dockside revenue from 'other species' caught on Gulf trips w/o gray triggerfish | Dockside revenue from 'all species' caught on South Atlantic trips | Total dockside revenue | Average total dockside revenue per vessel |
|----------------|--|--|--|---|--|------------------------|---|
| <b>2017</b>    | 283  | \$112,311                              | \$15,953,949   | \$28,635,484  | \$380,229.62   | \$45,081,973           | \$159,300                                 |
| <b>2018</b>    | 262  | \$116,206                              | \$12,389,435   | \$25,501,731  | \$198,775.10   | \$38,206,146           | \$145,825                                 |
| <b>2019</b>    | 263  | \$139,540                              | \$14,442,227   | \$24,911,687  | \$124,369.88   | \$39,617,824           | \$150,638                                 |
| <b>2020</b>    | 262  | \$106,360                              | \$15,191,459   | \$24,673,026  | \$72,504.82  | \$40,043,350           | \$152,837                                 |
| <b>2021</b>    | 233  | \$105,071                              | \$16,973,715   | \$26,947,784  | \$275,241.00   | \$44,301,811           | \$190,137                                 |
| <b>Average</b> | 261  | \$115,898                              | \$14,990,157   | \$26,133,942  | \$210,224  | \$41,450,221           | \$159,747                                 |

Source: SEFSC-SSRG Socioeconomic Panel (September 2022 version).

C. Liese (NMFS SEFSC, pers. comm. 2022) generated annual vessel-level estimates of costs (as a percentage of revenue) and net revenue from operations for vessels that harvested reef fish in the Gulf from 2014 through 2018 (Table 3.3.1.4). Estimates of producer surplus (PS) can be calculated from the cost information. PS is total annual revenue minus variable costs, which include fuel, other supplies, hired crew, and the opportunity cost of an owner's time as captain. Net revenue from operations, which most closely represents economic profits to the owner(s), is total annual revenue minus variable plus fixed costs, which include fuel, other supplies, hired crew, vessel repair and maintenance, insurance, overhead, and the opportunity cost of an owner's time as captain, as well as the vessel's depreciation. Loan Payments and IFQ purchases, although included in Table 3.3.1.4, are excluded from these calculations because they are treated as transfer payments. According to C. Liese (NMFS SEFSC, pers. comm. 2022), PS for commercial vessels that harvested Gulf reef fish was approximately 51.3% of their annual gross revenue, on average, from 2014 through 2018. Net revenue from operations was 32.1% of their annual gross revenue, on average, during this period. Applying these percentages to the results provided in Table 3.3.1.3 would result in an estimated per vessel average annual PS of \$81,950 (2021 dollars) and an average annual net revenue from operations of \$51,279 per year.

**Table 3.3.1.4.** Annual average economic characteristics of Gulf reef fish vessels from 2014-2018 (2021 dollars).

| <b>Cost Category</b>                          | <b>% of Revenue</b> |
|---|---------------------|
| <b>Fuel</b>                                   | 7.20%               |
| <b>Other Supplies</b>                         | 10.50%              |
| <b>Hired Crew</b>                             | 25.10%              |
| <b>Vessel Repair &amp; Maintenance</b>        | 9%                  |
| <b>Insurance</b>                              | 1%                  |
| <b>Overhead</b>                               | 5.50%               |
| <b>Loan Payment</b>                           | 1.30%               |
| <b>IFQ Purchase</b>                           | 15%                 |
| <b>Opportunity Cost of Owner-Captain Time</b> | 5.90%               |
| <b>Vessel Depreciation</b>                    | 3.70%               |

Source: C. Liese (NMFS SEFSC, pers. comm. 2022).

## Dealers

The information in Table 3.3.1.5 illustrates the purchasing activities of dealers that bought Gulf gray triggerfish landings from vessels during 2017 through 2021.<sup>16</sup> Like vessels, dealer participation in particular fisheries is fluid, and not all dealers purchased gray triggerfish in each year during this time. On average, from 2017 through 2021, gray triggerfish purchases comprised approximately 0.1% of all purchases made by these dealers. The average annual value of total purchases per gray triggerfish dealer experienced an increasing trend from 2017 through 2021 (Table 3.3.1.5). Although not shown in the table, the maximum annual value of all purchases made by a single gray triggerfish dealer from 2017 through 2021 was \$10.7 million (2021 dollars) in 2019.

**Table 3.3.1.5.** Purchase statistics for dealers that bought gray triggerfish landings (2021 dollars).

| Year    | Number of Dealers | Gray Triggerfish landed lbs gw | Gray Triggerfish Purchases | Other Gulf Purchases | South Atlantic Purchases | Average purchases value per dealer |
|---------|-------------------|--------------------------------|----------------------------|----------------------|--------------------------|------------------------------------|
| 2017    | 84                | 61,036                         | \$ 131,803                 | \$ 18,009,820        | \$ 84,615,620            | \$ 1,223,301                       |
| 2018    | 83                | 63,053                         | \$ 138,115                 | \$ 9,332,523         | \$ 78,156,262            | \$ 1,055,746                       |
| 2019    | 81                | 60,568                         | \$ 139,886                 | \$ 15,705,422        | \$ 81,763,896            | \$ 1,205,052                       |
| 2020    | 74                | 50,934                         | \$ 115,001                 | \$ 15,611,629        | \$ 74,721,515            | \$ 1,222,272                       |
| 2021    | 74                | 43,184                         | \$ 106,113                 | \$ 11,780,376        | \$ 87,216,474            | \$ 1,339,229                       |
| Average | 79                | 55,755                         | \$ 126,184                 | \$ 14,087,954        | \$ 81,294,753            | \$ 1,209,120                       |

Source: SEFSC Fishing Communities Web Query Tool (Version May 29, 2022 Years: 2014-2021).

## Imports

Imports of seafood products compete in the domestic seafood market and have, in fact, dominated many segments of the seafood market. Imports affect the price for domestic seafood products and tend to set the price in the market segments in which they dominate. Seafood imports have downstream effects on the local fish market. At the harvest level for reef fish in general, and gray triggerfish in particular, imports affect the returns to fishermen through the ex-vessel prices they receive for their landings. As substitutes to domestic production of reef fish, including gray triggerfish, imports tend to cushion the adverse economic effects on consumers resulting from a reduction in domestic landings. Imports data for gray triggerfish are not available; however, imported snapper may be considered a reasonable substitute for gray triggerfish. The following describes recent trends in snapper imports.

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<sup>16</sup> The estimates in this table are based on Accumulated Landings System data, which tends to produce slightly different estimates of landings and ex-vessel value for gray triggerfish than the SEFSC-SSRG socio-economic panel database.

Imports<sup>17</sup> of fresh snapper increased from 31.2 million lbs product weight (pw) in 2017 to 36 million lbs pw in 2021. Total revenue from fresh snapper imports increased substantially from \$98.9 million (2021 dollars<sup>18</sup>) in 2017 to a five-year high of \$148.6 million in 2021. The average annual price per lb pw increased from \$3.17 in 2017 to \$4.13 in 2021. Imports of fresh snappers primarily originated in Mexico, Central America, or South America, and entered the U.S. through the port of Miami, Florida. Imports of fresh snapper were highest on average (2017 through 2021) during the months of March through August.

Imports of frozen snapper were substantially less than imports of fresh snapper from 2017 through 2021. During this time, frozen snapper imports ranged from 11.4 million pounds pw to 18.2 million pounds pw and the value of these imports ranged from \$36.6 million (2021 dollars) to \$66.6 million. The average annual price per lb pw was mostly stable from 2017 through 2020 at approximately \$3.08 and then jumped to \$3.66 in 2021. Imports of frozen snapper primarily originated in South America (especially Brazil), Indonesia, and Mexico. The majority of frozen snapper imports entered the U.S. through the ports of Miami, Florida and New York, New York. Imports of frozen snappers tended to be highest during July through January, with a peak in December.

## **Business Activity**

The commercial harvest and subsequent sales and consumption of fish generate business activity as fishermen expend funds to harvest the fish and consumers spend money on goods and services, such as gray triggerfish purchased at a local fish market and served during restaurant visits. These expenditures spur additional business activity in the region(s) where the harvest and purchases are made, such as jobs in local fish markets, grocers, restaurants, and fishing supply establishments. In the absence of the availability of a given species for purchase, consumers would spend their money on substitute goods, such as other finfish or seafood products, and services, such as visits to different food service establishments. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic effects may be distributed through regional markets and should not be interpreted to represent the impacts if this species is not available for harvest or purchase.

Estimates of the U.S. average annual business activity associated with the commercial harvest of gray triggerfish in the Gulf were derived using the model developed for and applied in NMFS (2022) and are provided in Table 3.3.1.6.<sup>19</sup> This business activity is characterized as jobs (full- and part-time), output impacts (gross business sales), income impacts (wages, salaries, and self-employed income), and value-added impacts, which represent the contribution made to the U.S. GDP. These impacts should not be added together because this would result in double counting. The results provided should be interpreted with caution and demonstrate the limitations of these

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<sup>17</sup> NOAA Fisheries Service purchases fisheries trade data from the Foreign Trade Division of the U.S. Census Bureau. Data are available for download at <https://www.fisheries.noaa.gov/national/sustainable-fisheries/foreign-fishery-trade-data>

<sup>18</sup> Converted to 2021 dollars using the annual, non-seasonally adjusted GDP implicit price deflator provided by the U.S. BEA.

<sup>19</sup>A detailed description of the input/output model is provided in NMFS (2011).

types of assessments. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species. Separate models to address individual species are not available. For example, the results provided here apply to a general “all other finfish” category rather than just gray triggerfish, and a harvester job is “generated” for approximately every \$37,000 (2021 dollars) in ex-vessel revenue. These results contrast with the number of harvesters (vessels) with recorded landings of gray triggerfish presented in Table 3.3.1.2.

**Table 3.3.1.6.** Average annual business activity (2017 through 2021) associated with the commercial harvest of gray triggerfish in the Gulf. All monetary estimates are in 2021 dollars.

| Species          | Average Ex-vessel Value (\$ thousands) | Total Jobs | Harvester Jobs | Output (Sales) Impacts (\$ thousands) | Income Impacts (\$ thousands) | Value Added (\$ thousands) |
|------------------|--|------------|----------------|---------------------------------------|-------------------------------|----------------------------|
| Gray Triggerfish | \$116                                  | 14         | 3              | \$1,153                               | \$418                         | \$593                      |

Source: Calculated by NMFS Southeast Regional Office (SERO) using the model developed for and applied in NMFS (2022).

## 3.4 Description of the Social Environment

This framework action affects commercial management of gray triggerfish in the Gulf. The following description includes permits related to commercial reef fish fishing by state in order to provide a geographic distribution of fishing involvement. Top communities based on the number of permits are presented. Commercial landings by state are also included to provide information on the geographic distribution of fishing involvement. The top communities in the Gulf by commercial landings are identified and commercial engagement and reliance are described. Community level data are presented in order to meet the requirements of National Standard 8 of the Magnuson-Stevens Act, which requires the consideration of the importance of fishery resources to human communities when changes to fishing regulations are considered. Lastly, social vulnerability data are presented to assess the potential for environmental justice concerns.

Additional detailed information about communities in the following analysis can be found on the SERO Community Snapshots website.<sup>20</sup>

### 3.4.1 Commercial Sector

#### Permits

Gulf reef fish permits are issued to individuals in Florida (81.4% of Gulf reef fish vessels), Texas (7.8%), Alabama (4.5%), Louisiana (3.8%), and Mississippi (0.9%) (SERO permit office, July 8,

<sup>20</sup> <https://www.fisheries.noaa.gov/southeast/socioeconomics/snapshots-human-communities-and-fisheries-gulf-mexico-and-south-atlantic>

2021). Residents of other states (Arkansas, Georgia, Illinois, Maryland, Missouri, North Carolina, New York, Oklahoma, and South Carolina) also hold commercial reef fish permits, but these states represent a smaller percentage of the total number of issued permits.

Gulf reef fish permits are held by individuals with mailing addresses in 232 communities (SERO permit office, July 8, 2021). Communities with the most commercial reef fish permits are located in Florida and Texas (Table 3.4.1.1). The communities with the most reef fish permits are Panama City, Florida (9.1% of reef fish permits), Key West, Florida (4.8%), and St. Petersburg, Florida (3.3%).

**Table 3.4.1.1.** Top communities by number of Gulf reef fish permits.

| State | Community      | Reef Fish Permits (RR) |
|-------|----------------|------------------------|
| FL    | Panama City    | 82                     |
| FL    | Key West       | 43                     |
| FL    | St. Petersburg | 30                     |
| FL    | Largo          | 26                     |
| TX    | Galveston      | 22                     |
| FL    | Destin         | 22                     |
| FL    | Cortez         | 21                     |
| FL    | Pensacola      | 21                     |
| FL    | Seminole       | 20                     |
| FL    | Clearwater     | 16                     |
| FL    | Tampa          | 16                     |
| FL    | Lynn Haven     | 13                     |
| FL    | Naples         | 13                     |
| FL    | Steinhatchee   | 13                     |
| FL    | Apalachicola   | 11                     |
| FL    | Tarpon Springs | 11                     |

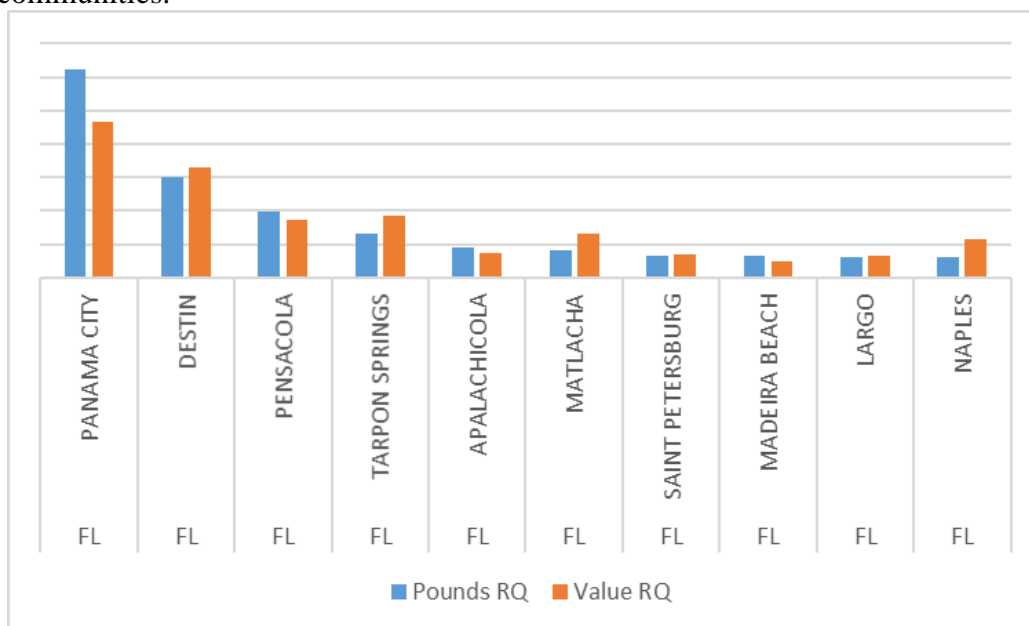
Source: SERO permit office, July 8, 2021.

## Landings

The majority of commercial gray triggerfish catch is landed along the west coast of Florida (average of 92.8% from 2017-2021), followed by Alabama and Mississippi (5.5%), and Louisiana and Texas (1.8%, SEFSC Commercial ACL Data). Alabama and Mississippi and Louisiana and Texas are combined to maintain confidentiality.

## Regional Quotient

Regional Quotient (RQ) is the proportion of gray triggerfish landed within a community out of the total amount of gray triggerfish landed within the Gulf. It is an indicator of the percent contribution in pounds or value of gray triggerfish landed within that community relative to the regional fishery. Figure 3.4.1.1 includes the top gray triggerfish communities by RQ landings and value in 2021. The top gray triggerfish communities are located in Florida. About 31% of gray triggerfish is landed in the top community of Panama City, representing approximately 23% of Gulf-wide ex-vessel value for the species. The top three communities (Panama City, Destin, and Pensacola) are located in the Florida Panhandle. In addition, another Florida Panhandle community, Apalachicola ranks fifth for gray triggerfish landings. Several Pinellas County communities (Tarpon Springs, Saint Petersburg, Madeira Beach, and Largo) are also included in the top communities.



**Figure 3.4.1.1.** Top Gulf communities ranked by pounds and value RQ of gray triggerfish.  
Source: SERO, Community ALS 2021.

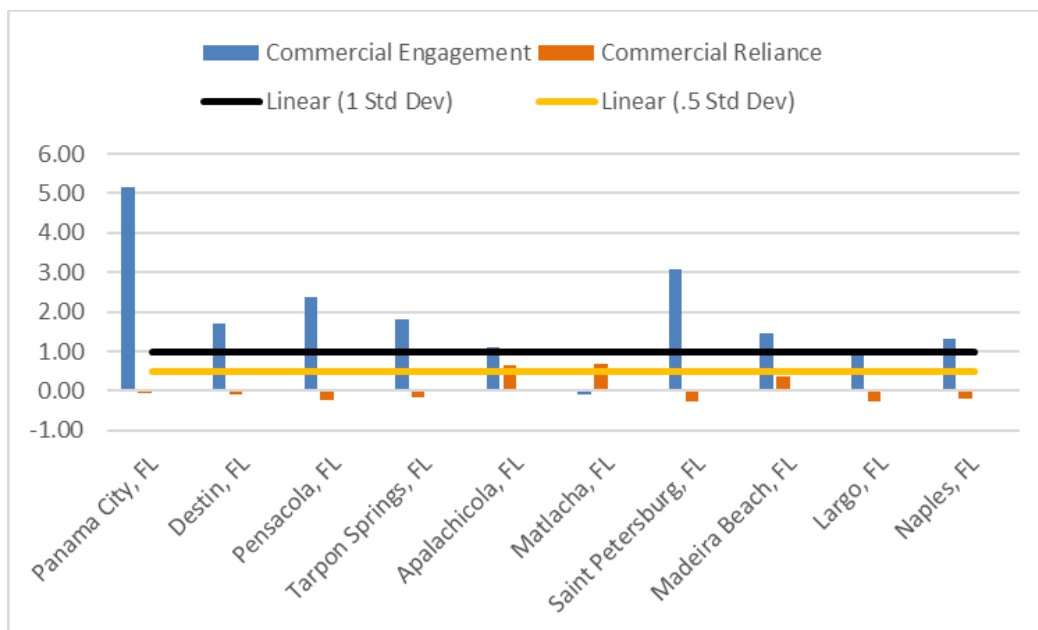
## Engagement and Reliance

In addition to examining the RQs to understand how Gulf communities are engaged and reliant on fishing, indices were created using secondary data from permit and landings information for the commercial sector (Jepson and Colburn 2013, Jacob et al. 2013). Fishing engagement is primarily the absolute numbers of permits, landings, and value. The analysis used the number of vessels designated commercial by homeport and owner address, value of landings, and total number of commercial permits for each community. Fishing reliance includes the same variables as fishing engagement divided by population to give an indication of the per capita influence of this activity.

Using a principal component and single solution factor analysis, each community receives a factor score for each index to compare to other communities. Taking the communities with the

highest RQs, factor scores of both engagement and reliance for commercial fishing were plotted. Two thresholds of one and one-half standard deviation above the mean are plotted onto the graphs to help determine a threshold for significance. The factor scores are standardized; therefore, a score above one is also above one standard deviation. A score above one-half standard deviation is considered engaged or reliant, with anything above one standard deviation to be very engaged or reliant.

Figure 3.4.1.2 is an overall measure of a community’s commercial fishing engagement and reliance and includes the communities with the strongest relationship to the commercial sector for gray triggerfish as depicted in Figure 3.4.1.1. Most communities in Figure 3.4.1.2 would be considered to be highly engaged in commercial fishing, as most are at or above one standard deviation of the mean factor score. Matlacha, Florida shows the least amount of engagement in commercial fishing overall. Apalachicola and Matlacha, Florida demonstrate a moderate level of commercial reliance.



**Figure 3.4.1.3.** Commercial fishing engagement and reliance for top gray triggerfish communities.

Source: SERO, Community Social Vulnerability Indicators Database 2019.

### 3.4.2 Environmental Justice, Equity and Underserved Communities

Federal agencies are required to consider the impacts and/or address the inequalities of their policies on minority populations, low-income populations, disadvantaged communities, and/or underserved communities. These requirements are outlined in the following Executive Orders (E.O.).

E.O. 12898 requires federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and

specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The main focus of E.O. 12898 is to consider “the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories...” This E.O. is generally referred to as environmental justice (EJ).

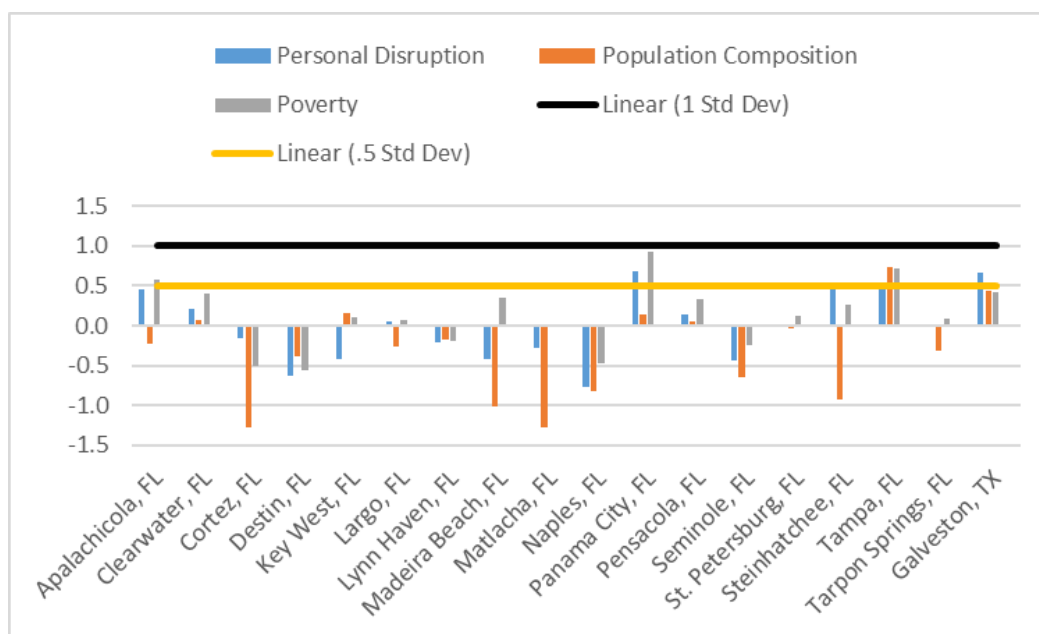
E.O. 13985 requires federal agencies to recognize and work to redress inequalities in their policies and programs that serve as barriers to equal opportunity, including pursuing a comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Federal agencies must assess how programs and policies perpetuate systemic barriers to opportunities and benefits to people of color and other underserved groups in order to equip agencies to develop policies and programs that deliver resources and benefits equitably to all.

E.O. 13985 provides definitions for equity and underserved communities, which expand the definition of a community from being geographically situated, or place-based, as defined through the Magnuson-Stevens Act, to also include communities that share a particular characteristic (e.g., crew of commercial gray triggerfish fishing vessels). Equity means the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. The term “underserved communities” refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life, as exemplified by the list in the preceding definition of “equity.”

E.O. 14008 calls on agencies to make achieving EJ part of their missions “by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts.” Census data are available to examine the status of communities with regard to minorities and low-income populations. These data describe geographically based communities (e.g., Panama City, Florida) and are descriptive of the total population, not limited to the fishing components of the community. Information is not available at this time to examine the status of underserved populations engaged in Gulf fisheries. To help assess whether EJ concerns may be present within regional place-based communities, a suite of indices were created using census data to examine the social vulnerability of coastal communities within the region. The three indices are poverty, population composition, and personal disruption. The variables included in each of these indices have been identified through the literature as being important components that contribute to a community’s vulnerability. Poverty includes poverty rates for different groups;

population composition includes more single female-headed households, households with children under the age of five, minority populations, and those that speak English less than well; and personal disruption includes disruptions such as higher separation rates, higher crime rates, and unemployment. Increased rates in the indicators are signs of populations experiencing vulnerabilities. Again, for those communities that exceed the threshold it would be expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

Figure 3.4.2.1 provides social vulnerability rankings for place-based communities identified in Section 3.4 as important to commercial fishing for gray triggerfish specifically or fishing for reef fish in general. Several communities exceed the threshold of one-half standard deviation above the mean for at least one of the indices (Apalachicola, Panama City, and Tampa, Florida and Galveston, Texas). These communities would be the most likely to exhibit vulnerabilities to social or economic disruption resulting from regulatory change.



**Figure 3.4.2.1.** Social vulnerability indices for top commercial reef fish and gray triggerfish communities.

Source: SERO, Community Social Vulnerability Indicators Database 2019.

People in these communities may be affected by fishing regulations in two ways: participation and employment. Although the place-based communities identified in Figure 3.4.2.1 may have the greatest potential for EJ concerns, complete data are not available on the race and income status for those involved in the local fishing industry (employment), or for their dependence on gray triggerfish specifically (participation). The potential effects of the actions on place-based communities and non-place-based communities; such as such as commercial fishermen are discussed in Section 4.1.4. There are no known populations that rely on the consumption of gray triggerfish for subsistence. Although no EJ issues have been identified, the absence of potential EJ concerns cannot be assumed.

## 3.5 Description of the Administrative Environment

### 3.5.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801 *et seq.*), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the EEZ. The EEZ is defined as an area extending 200 nautical miles from the seaward boundary of each of the coastal states. The Magnuson-Stevens Act also claims authority over U.S. anadromous species and continental shelf resources that occur beyond the EEZ.

Responsibility for federal fishery management decision-making is divided between the Secretary of Commerce (Secretary) and eight regional fishery management councils that represent the expertise and interests of constituent states. Regional councils are responsible for preparing, monitoring, and revising management plans for fisheries needing management within their jurisdiction. The Secretary is responsible for promulgating regulations to implement proposed plans and amendments after ensuring management measures are consistent with the Magnuson-Stevens Act and with other applicable laws summarized in Section 10. In most cases, the Secretary has delegated this authority to NMFS.

The Gulf Council is responsible for fishery resources in federal waters of the Gulf. These waters extend to 200 nautical miles offshore from the seaward boundaries of Alabama, Florida, Louisiana, Mississippi, and Texas, as those boundaries have been defined by law. The length of the Gulf coastline is approximately 1,631 miles. Florida has the longest coastline extending 770 miles along its Gulf coast, followed by Louisiana (397 miles), Texas (361 miles), Alabama (53 miles), and Mississippi (44 miles).

The Gulf Council consists of seventeen voting members: 11 public members appointed by the Secretary; one each from the fishery agencies of Texas, Louisiana, Mississippi, Alabama, and Florida; and one from NMFS. The public is also involved in the fishery management process.

### 3.5.2 State Fishery Management

The purpose of state representation at the Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters. The state governments of Texas, Louisiana, Mississippi, Alabama, and Florida have the authority to manage their respective state fisheries. Each of the five states exercises legislative and regulatory authority over their states' natural resources through discrete administrative units. Although each agency is the primary administrative body with respect to the states' natural resources, all states cooperate with numerous state and federal regulatory agencies when managing marine resources. A more detailed description of each state's primary regulatory agency for marine resources is provided on their respective web pages (Table 3.6.2.1).

**Table 3.5.2.1.** State marine resource agencies and web pages.

| <b>State Marine Resource Agency</b>               | <b>Web Page</b>   |
|---|---|
| Alabama Marine Resources Division                 | <a href="http://www.outdooralabama.com/">http://www.outdooralabama.com/</a> |
| Florida Fish and Wildlife Conservation Commission | <a href="http://myfwc.com/">http://myfwc.com/</a>                           |
| Louisiana Department of Wildlife and Fisheries    | <a href="http://www.wlf.louisiana.gov/">http://www.wlf.louisiana.gov/</a>   |
| Mississippi Department of Marine Resources        | <a href="http://www.dmr.ms.gov/">http://www.dmr.ms.gov/</a>                 |
| Texas Parks and Wildlife Department               | <a href="http://tpwd.texas.gov/">http://tpwd.texas.gov/</a>                 |

## CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

### 4.1 Action: Increase the gray triggerfish commercial trip limit

**Alternative 1:** No Action. Retain the current commercial trip limit of 16 gray triggerfish.

**Alternative 2:** Increase the commercial trip limit to 20 gray triggerfish per vessel.

**Preferred Alternative 3:** Increase the commercial trip limit to 25 gray triggerfish per vessel.

**Alternative 4:** Increase the commercial trip limit to 30 gray triggerfish per vessel.

#### 4.1.1 Effects on the Physical Environment

This action proposes an increase to an established commercial trip limit for Gulf of Mexico (Gulf) gray triggerfish. The effects on the physical environment from the implementation of a commercial gray triggerfish trip limit change have been previously considered (GMFMC 2017b). Although gray triggerfish are often harvested opportunistically, rather than targeted, due to the current trip limit, commercial fishing gear does have the potential to interact with substrate and could result in adverse impacts to the physical environment. Commercial fishing activities include bottom anchoring, using trawling gear, deploying bottom longlines and buoy gear. Commercial fishing for reef fish species is commonly conducted using vertical-line gear and less frequently with bottom longline and spear gear. All three of these gear types have the potential to snag and entangle bottom structures (Barnette 2001). Potential bottom substrate damage can also occur when deploying a vessel's anchor. Additionally, preferred fishing sites, like reefs, are targeted and revisited multiple times by fishing vessels which increases the potential for prolonged effects to the physical environment (Bohnsack 2000).

Maintaining the current 16-fish trip limit **Alternative 1** (No Action), would not be expected to result in any predicted change in landings. **Alternative 2** (20 fish) is expected to result in a 16% increase in predicted landings from **Alternative 1**, **Preferred Alternative 3** (25 fish), a 33% increase in predicted landings, and **Alternative 4** (30 fish), a 52% increase in predicted landings; however, none of the proposed alternatives are expected to result in an early closure. Because gray triggerfish are often caught incidentally, an increase in the trip limit is not expected to have an impact on fishing practices or impacts on the ocean bottom. Overall, it is expected that any effects on the physical environment would be minor, as gray triggerfish are incidentally caught in the commercial sector while other reef species are targeted. It is unlikely that any of the alternatives would result in modified trips or fishing practices by commercial fishermen to specifically target gray triggerfish.

#### 4.1.2 Effects on the Biological Environment

**Alternative 1** (No Action) would maintain the current 16-fish commercial trip limit.

**Alternative 2** would increase the trip limit to 20 fish. This trip limit is expected to result in a 16% predicted increase in landings compared to the current trip limit. **Preferred Alternative 3** would establish a trip limit of 25 fish and result in a 33% predicted increase in landings.

**Alternative 4** would increase the trip limit to 30 fish and result in a 52% predicted increase in landings. Gray triggerfish is not usually targeted on commercial fishing trips and as such, is often incidentally or opportunistically caught. Increasing the commercial trip limit would not be expected to result in commercial fishermen targeting gray triggerfish; however, not increasing the trip limit could result in less fish harvested, compared to **Alternatives 2-4**, which could be better for the stock and maintaining its current rebuilding timeline or even result in rebuilding sooner. An increase in the trip limit could lead to an increase in fishing effort that could potentially affect other reef fish species, as per-trip effort in the reef fish fishery is not usually constrained to a single species. However, increasing trip limits through this action is not expected to change how the reef fish fishery is prosecuted overall. Gray triggerfish is typically caught as a secondary species on most commercial fishing trips, and increasing the trip limit will increase the number of gray triggerfish commercial fishermen land while targeting other species, but the commercial sector still typically lands a relatively small number of pounds per trip.

**Preferred Alternative 3** is not a substantial increase in the number of fish from the current trip limit and none of the proposed alternatives are expected to result in commercial fishermen exceeding the quota or causing a shortened season. Compared to other species, the commercial sector lands a relatively small amount of fish per trip, often catching less than the current trip limit; however, modifying the current trip limit is not likely to cause fishermen to end their trips after the trip limit is met because most commercial trips are targeting more economically valuable species. Increasing the trip limit to **Preferred Alternative 3** (25 fish) may reduce regulatory discards and allow commercial fishermen the opportunity to harvest more fish and reach the ACT. Gray triggerfish post-release survival is high and most fish released in excess of the trip limit are expected to survive (SEDAR 43 2015). Any adverse effects to the gray triggerfish stock from discard mortality associated with trip limits should be minimal.

### 4.1.3 Effects on the Economic Environment

**Alternative 1** (No Action) would maintain the gray triggerfish commercial trip limit and, therefore, is not expected to affect commercial gray triggerfish landings and the economic environment.

**Alternative 2, Preferred Alternative 3 and Alternative 4** would increase the gray triggerfish commercial trip limit (20, 25, and 30 fish per trip, respectively). Based on Table 2.1.3., **Alternative 2, Preferred Alternative 3 and Alternative 4** are expected to increase commercial gray triggerfish landings by at least 16% (**Alternative 2**) and at most 52% (**Alternative 4**) relative to **Alternative 1**. **Preferred Alternative 3** is expected to increase commercial gray triggerfish landings by 33% relative to **Alternative 1**.

Economic effects expected to result from changes in commercial gray triggerfish trip limits are evaluated based on expected changes in commercial gray triggerfish landings and ex-vessel values. Because gray triggerfish are typically harvested as supplemental or incidental catch, the

number of commercial trips and associated costs would not be expected to vary as a result of trip limit modifications. Therefore, changes in producer surplus to commercial fishermen would be equivalent to changes in ex-vessel value. Table 4.1.3.1. provides expected commercial gray triggerfish landings by alternative, and expected changes in landings and in ex-vessel revenues relative to **Alternative 1** (No Action). Baseline commercial gray triggerfish landings (**Alternative 1**) were based on 2017-2021 average commercial landings provided in Table 3.3.1.2. An average ex-vessel price of \$2.28 per lb gw of gray triggerfish was obtained based on the average landings above and on the 2017-2021 average gray triggerfish revenues provided in Table 3.3.1.3.

**Table 4.1.3.1.** Expected gray triggerfish commercial landings and changes in landings and ex-vessel values (\$2021).

| Alternatives                       | Landings | Difference relative to<br>Alternative 1 |                             |
|------------------------------------|----------|---|-----------------------------|
|                                    |          | Pounds<br>gw                            | Ex vessel<br>value (\$2021) |
| Alternative 1                      | 50,854   | ---                                     | ---                         |
| Alternative 2                      | 58,991   | 8,137                                   | \$18,544                    |
| <b>Preferred<br/>Alternative 3</b> | 67,636   | 16,782                                  | \$38,246                    |
| Alternative 4                      | 77,298   | 26,444                                  | \$60,267                    |

Relative to **Alternative 1**, expected increases in commercial gray triggerfish landings are estimated to range from 8,137 lbs gw (**Alternative 2**) to 26,444 lbs gw (**Alternative 4**). In \$2021, associated increases in ex-vessel revenue are estimated to range from \$18,544 (**Alternative 2**) to \$60,267 (**Alternative 4**). Relative to **Alternative 1**, **Preferred Alternative 3** is expected to increase commercial gray triggerfish landings and ex-vessel value by 16,782 lbs gw and \$38,246 (\$2021), respectively.

Increases in commercial gray triggerfish landings are expected to increase the availability of gray triggerfish and may reduce gray triggerfish prices to consumers. However, potential increases in consumer surplus expected to result from the increased availability of gray triggerfish cannot be quantified due to lack of data. In addition, increases in commercial gray triggerfish landings would be expected to increase the availability of gray triggerfish to seafood dealers. Based on the information in Table 3.3.1.5, gray triggerfish accounted for less than 1% of dealers' purchases in the Gulf. Therefore, this action is expected to have minimal effects on dealers' revenues, if any.

#### 4.1.4 Effects on the Social Environment

Increasing the commercial trip limit for gray triggerfish would be expected to result in positive effects that would be realized through the additional opportunities to land the fish. The action is

intended to enable more of the ACL to be landed. With the exception of the year in which the current 16-fish trip limit was implemented (100.9% in 2018), commercial landings have remained below the ACL since the trip limit was implemented (Table 1.1.1). This is not unexpected because the in-season AM requires NMFS to prohibit harvest when the ACT is projected to be met. However, in 2021, landings totaled less than half of the commercial ACL, which is also well below the ACT.

**Alternative 1** (No Action) would maintain the commercial trip limit at 16 fish per trip. While additional social effects would not be expected, the commercial harvest would likely remain below the allowable catch levels for gray triggerfish, forgoing harvest opportunities with attending negative social effects. These effects are minimal; since 2019, approximately 60% of commercial trips that landed any gray triggerfish landed 10 or less fish per trip, although additional fish could have been retained if caught.

Compared with **Alternative 1**, increasing the trip limit to 20 (**Alternative 2**), 25 (**Preferred Alternative 3**), or 30 (**Alternative 4**) fish is expected to result in limited but positive effects relative to the extent these additional fishing opportunities are utilized. Those already landing gray triggerfish could land an additional 4, 9, or 14 fish, approximating an additional 18 lbs, 40.5 lbs, or 63 lbs, respectively (using average weight from Table 2.1.2). It is also possible that a larger trip limit is a factor contributing to some vessel crews' decision to land gray triggerfish. The largest trip limit (**Alternative 4**) has the potential for the greatest positive effects, followed by **Preferred Alternative 3**, and **Alternative 2**.

#### 4.1.5 Effects on the Administrative Environment

Modifying the gray triggerfish commercial trip limit is not expected to have substantial effects on the administrative environment. **Alternative 1** is not expected to impact the administrative environment because it would not change the current trip limit. **Alternative 2-4** would result in a short-term increased burden on the administrative environment due to the establishment of a new trip limit. Changing the trip limit from **Alternative 1** would increase the burden on NMFS, which would have to engage in rulemaking to implement this change in management. The administrative burden for law enforcement would go largely unchanged, as law enforcement officers would continue to monitor compliance with any established trip limit. After these changes to the trip limit are implemented, the type of enforcement and landings monitoring needed to manage the reef fish fishery would remain unchanged, regardless of the choice of the trip limit. Some administrative burden is anticipated with respect to outreach as it relates to notifying stakeholders of the changes to trip limits.

Within **Alternatives 2-4**, the greater the trip limit, the greater the likelihood that the commercial sector may harvest the commercial ACT or exceed the ACL, the greater the likelihood of triggering the AMs. If NMFS projected that the ACT would be met, NMFS would implement an in-season closure. If the ACL were exceeded, NMFS would have to reduce the subsequent year's ACT and ACL by the amount of the overage. These actions would create an administrative burden. Because **Alternative 4** would allow the highest trip limit (30 gray triggerfish), the likelihood of triggering AMs is highest. **Alternative 2** has the lowest proposed

change to the trip limit (20 gray triggerfish) and would have the lowest likelihood of triggering AMs. **Preferred Alternative 3** (25 gray triggerfish) is intermediate to **Alternatives 2 and 4** and so would have an intermediate likelihood of triggering AMs. However, any administrative impacts would not be significant because NMFS routinely implements AMs for various stocks through a relatively streamlined process.

## 4.2 Cumulative Effects Analysis

Federal agencies preparing an environmental assessment (EA) must also consider cumulative effects of a proposed action and other actions. Cumulative effects are those effects that result from incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions (RFFA), regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative effects can result from individually minor, but collectively significant actions that take place over a period of time (40 C.F.R. § 1508.1(g)(3)). Below is our five-step cumulative effects analysis that identifies criteria that must be considered in an EA.

1. *The area in which the effects of the proposed action will occur* - The affected area of this proposed action encompasses the state and federal waters of the Gulf of Mexico (Gulf) as well as Gulf communities that are dependent on reef fish fishing. Most relevant to this proposed action is gray triggerfish and those who fish for them. For more information about the area in which the effects of this proposed action will occur, please see Chapter 3, Affected Environment which describes these important resources as well as other relevant features of the human environment.

2. *The impacts that are expected in that area from the proposed action* - The proposed action would increase commercial gray triggerfish trip limits. The environmental consequences of the proposed action are analyzed in Section 4.1. Increasing the trip limits should have very little effect on the physical and biological environments, because the action is not expected to alter the manner in which the gray triggerfish portion of the reef fish fishery is prosecuted (Sections 4.1.1 and 4.1.2). Gray triggerfish are often part of a multi-species fishing strategy and fishermen would continue to discard gray triggerfish if they are opportunistically harvested and the season is closed, or continue to harvest them if it is open. Changing fishing practices on one stock does not generally change overall fishing effort or fishing practices. This action would likely have some positive effects on the social and economic environments (Sections 4.1.3 and 4.1.4). Increasing the trip limit is not expected to lead to increased costs in terms of vessel trips, as these trips would most likely be occurring for reef fish species in general. However, an increased trip limit will be more economically beneficial to the commercial sector. The action is not expected to significantly affect the administrative environment (Section 4.1.5).

3. *Other past, present and reasonably foreseeable future actions (RFFAs) that have or are expected to have impacts in the area* - There are numerous actions under development in the Gulf annually. Many of these activities are expected to have impacts associated with them and are listed below.

*Other fishery related actions* - The cumulative effects associated with modifying gray triggerfish catch limits were analyzed in the EAs for Amendments 30A (GMFMC 2008b), 37 (GMFMC

2012), and 46 (GMFMC 2017b) to the Reef Fish FMP. In addition, cumulative effects relative to reef fish management have been analyzed in the environmental impact statements (EIS) for Amendment 22 (GMFMC 2004b), Amendment 26 (GMFMC 2006), Amendment 27/14 (GMFMC 2007), Amendment 29 (GMFMC 2008a), Amendment 30A (GMFMC 2008b), Amendment 30B (GMFMC 2008c), Amendment 31 (GMFMC 2009), Amendment 40 (GMFMC 2014), Amendment 28 (GMFMC 2015), and Amendment 53 (GMFMC 2021). These cumulative effects analyses are incorporated here by reference. Other pertinent actions are summarized in the history of management (Section 1.3). Currently, there are multiple present actions and RFFAs that are being developed by the Council or considered for implementation by NMFS that could affect reef fish stocks. These include: Reef Fish Amendment 54, which proposes to modify greater amberjack catch limits and update the current rebuilding plan; Amendment 55, which proposes to revise yellowtail snapper catch limits; Amendment 56, which proposes to revise gag grouper allocations and catch limits; an interim rule to modify gag allocation and catch limits; a framework that proposes to modify the vermilion snapper bag limit and gray triggerfish fixed closed season and trip limit; a framework that would modify the red snapper catch limits; a generic framework, which would modify the Gulf of Mexico Fishery Management Council's Acceptable Biological Catch Control Rule; and a generic framework that addresses essential fish habitat

*Non-fishery related actions* - The cumulative effects from managing the reef fish fishery have been analyzed in multiple other actions.<sup>21</sup> They include detailed analysis of the reef fish fishery, cumulative effects on non-target species, protected species, and habitats in the Gulf. In general, the effects of these actions are positive as they ultimately act to restore/maintain the stocks at a level that will allow the maximum benefits in yield and recreational fishing opportunities to be achieved. However, for actions that reduce allowable harvest, some short-term negative impacts on the fisheries' social and economic environments may occur due to the need to limit directed harvest and reduce bycatch mortality. These negative impacts can be minimized by using combinations of management measures that provide the least disruption to the fishery while holding harvest to sustainable levels. None of the present and RFFAs under the Reef Fish FMP, identified above, are expected to affect how the reef fish fishery as a whole is prosecuted.

Impacts from the *Deepwater Horizon* MC252 oil spill are still being examined; however, as indicated in Section 3.3, the oil spill had some adverse effects on fish species. Further, the impacts on the food web from phytoplankton, to zooplankton, to mollusks, to top predators may be significant in the future. Impacts to greater amberjack from the oil spill may similarly affect other species that may be preyed upon by greater amberjack. However, since the majority of the spawning biomass for greater amberjack occurs outside the main areas affected by the *Deepwater Horizon* MC252 oil spill plume, it is less likely that a direct effect on this species will be detected. Greater amberjack are a mobile species and are able to avoid hypoxic conditions, so any effects from the Northern Gulf Hypoxic Zone on greater amberjack species are likely minimal.

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<sup>21</sup> <https://gulfcouncil.org/reef-fish/>

There is a large and growing body of literature on past, present, and future impacts of global climate change induced by human activities. Some of the likely effects commonly mentioned are sea level rise, increased frequency of severe weather events, and change in air and water temperatures. The Environmental Protection Agency's climate change web page provides basic background information on these and other measured or anticipated effects. In addition, the Intergovernmental Panel on Climate Change has numerous reports addressing their assessments of climate change. Global climate changes could affect the Gulf fisheries as discussed in Sections 3.2 and 3.3. In addition, the distribution of native and exotic species may change with increased water temperature, as may the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms. Climate change may significantly impact Gulf reef fish species in the future, but the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts would occur. The proposed action is not expected to significantly contribute to climate change through the increase or decrease in the carbon footprint from fishing, as this action should not change how the fishery is prosecuted. As described in Section 3.2, the contribution to greenhouse gas emissions from fishing is minor compared to other emission sources (e.g., oil platforms).

*4. The impacts or expected impacts from these other actions* - The cumulative effects from managing the reef fish fishery have been analyzed in other actions as listed in part three of this section. They include detailed analysis of the reef fish fishery, cumulative effects on non-target species, protected species, and habitats in the Gulf. The effects of this action are positive, as they ultimately act to restore/maintain the stocks at a level that will allow the maximum benefits in yield and increased fishing opportunities to be achieved. Some negative impacts on the social and economic environments may continue to occur despite the increase to the trip limit if in-season closures occur, which is more likely with a higher trip limit. However, these effects would be reduced as AMs would mitigate the risk of overfishing. Furthermore, it is assumed that reef fish trips would occur regardless of whether gray triggerfish is open for harvest, as fishing for gray triggerfish is generally part of a multi-species fishing strategy.

*5. The overall impact that can be expected if the individual impacts are allowed to accumulate:* This action, combined with other past actions, present actions, and RFFAs, is not expected to have significant beneficial or adverse effects on the physical and biological environments, because this action is not expected to affect current fishing practices (Sections 4.1.1 and 4.1.2). For the social and economic environments, some positive effects are expected to result for fishing communities from increasing the trip limit (Sections 4.1.3 and 4.1.4). These effects are likely minimal, as the proposed action, along with other past actions, present actions, and RFFAs, are not expected to alter the manner in which the fishery is prosecuted. Because it is unlikely there would be any changes in how the fishery is prosecuted, this action, combined with past actions, present actions, and RFFAs, is not expected to have significant adverse effects on public health or safety.

*6. Summary:* The proposed action is not expected to have individual significant effects to the physical, biological, economic, or social environments. Any effects of the proposed action, when combined with other past actions, present actions, and RFFAs are not expected to be significant. The effects of the proposed action are, and will continue to be, monitored through collection of landings data by NMFS, individual state programs, stock assessments and stock

assessment updates, life history studies, economic and social analyses, and other scientific observations. Landings data for the commercial sector in the Gulf are collected through trip ticket programs, port samplers, and logbook programs. Landings data for the recreational sector in the Gulf are collected through the Marine Recreational Information Program, Louisiana Creel Survey, Southeast Region Headboat Survey, and Texas Parks and Wildlife Department.

## CHAPTER 5. REGULATORY IMPACT REVIEW

### 5.1 Introduction

The National Marine Fisheries Service (NMFS) requires a Regulatory Impact Review (RIR) for all regulatory actions that are of public interest. The RIR does three things: 1) it provides a comprehensive review of the level and incidence of impacts associated with a proposed or final regulatory action; 2) it provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problem; and, 3) it ensures that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way. The RIR also serves as the basis for determining whether the regulations are a “significant regulatory action” under the criteria provided in Executive Order (E.O.) 12866. This RIR analyzes the impacts this action would be expected to have on the gray triggerfish component of the Gulf of Mexico (Gulf) reef fish fishery.

### 5.2 Problems and Objectives

The problems and objectives addressed by this action are discussed in Section 1.2.

### 5.3 Description of Fisheries

A description of the economic environment of the Gulf of Mexico reef fish fishery is provided in Section 3.3.

### 5.4 Impacts of Management Measures

#### 5.4.1 Action 1: Increase the gray triggerfish commercial trip limit

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.1.3. The following discussion summarizes the expected economic effects of the preferred alternatives.

Relative to **Alternative 1** (No Action), **Preferred Alternative 3** is expected to increase commercial gray triggerfish landings by 16,782 lbs gw. Associated increases in annual ex-vessel revenue and net economic benefits are estimated at \$38,246 (\$2021). Although expected increases in commercial gray triggerfish landings would be expected to increase the availability of gray triggerfish to seafood dealers, **Preferred Alternative 3** is expected have limited (if any) effects on dealers’ revenues because gray triggerfish represent a minute proportion of their revenues. Over a ten-year horizon, the change in net economic benefits from this action would equal \$336,034 (\$2021) using a 3% discount rate and \$287,428 using a 7% discount rate.

## 5.5 Public and Private Costs of Regulations

The preparation, implementation, and monitoring of this or any federal action involves the expenditure of public and private resources which can be expressed as costs associated with the regulations. Estimated costs associated with this action include:

|  |          |
|--|----------|
| Council costs of document preparation, meetings, public hearings, and information dissemination..... | \$23,225 |
| NMFS administrative costs of document preparation, meetings and review .....                         | \$19,215 |
| TOTAL .....  | \$42,440 |

## 5.6 Determination of Significant Regulatory Action

Pursuant to E.O. 12866, a regulation is considered a “significant regulatory action” if it is likely to result in: 1) an annual effect of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; 2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; 3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; or 4) raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in this executive order (E.O). Based on the information provided above, this action has been determined to not be economically significant for the purposes of E.O. 12866.

# CHAPTER 6. REGULATORY FLEXIBILITY ACT ANALYSIS

## 6.1 Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure such proposals are given serious consideration. The RFA does not contain any decision criteria; instead the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of various alternatives contained in the fishery management plan (FMP) or amendment (including framework management measures and other regulatory actions) and to ensure the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the FMP and applicable statutes.

With certain exceptions, the RFA requires agencies to conduct an initial regulatory flexibility analysis (IRFA) for each proposed rule. The IRFA is designed to assess the impacts various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those impacts. An IRFA is primarily conducted to determine whether the proposed action would have a significant economic impact on a substantial number of small entities. The IRFA provides: 1) a description of the reasons why action by the agency is being considered; 2) a succinct statement of the objectives of, and legal basis for, the proposed rule; 3) a description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply; 4) a description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirements of the report or record; 5) an identification, to the extent practicable, of all relevant federal rules, which may duplicate, overlap, or conflict with the proposed rule; 6) a description and estimate of the expected economic impacts on small entities; and 7) a description of the significant alternatives to the proposed rule and discussion of how the alternatives attempt to minimize economic impacts on small entities.

## 6.2 Statement of the need for, objective of, and legal basis for the proposed action

The need for and objective of this proposed action are provided in Chapter 1. In summary, there is a need to help reduce dead discards and achieve optimum yield (OY) of Gulf gray triggerfish consistent with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). The objective of this proposed action is to increase the gray triggerfish commercial trip limit to allow commercial fishermen the opportunity to land the commercial annual catch target (ACT). The Magnuson-Stevens Act provides the statutory basis for this proposed action.

### **6.3 Description and estimate of the number of small entities to which the proposed action would apply**

This proposed regulatory action, if implemented, would increase the gray triggerfish commercial trip limit and would apply to all federally-permitted commercial vessels that fish for or harvest gray triggerfish in federal waters of the Gulf of Mexico. It would not directly apply to federally-permitted dealers. Any change in the supply of gray triggerfish available for purchase by dealers as a result of this proposed regulatory action, and associated economic effects, would be an indirect effect of the proposed regulatory action and would therefore fall outside the scope of the RFA.

During 2020, there were a total of 837 valid or renewable<sup>22</sup> commercial Gulf reef fish permits. On average from 2017 through 2021, there were 261 federally-permitted commercial vessels with reported landings of gray triggerfish in the Gulf. Their average annual vessel-level gross revenue from all species for 2017 through 2021 was \$159,747 (2021 dollars) and gray triggerfish harvested in the Gulf accounted for less than half a percent of this revenue. For commercial vessels that harvest gray triggerfish in the Gulf, economic profits are estimated to be \$51,279 (approximately 32.1% of annual gross revenue), on average. The maximum annual revenue from all species reported by a single one of the vessels that harvested gray triggerfish from 2017 through 2021 was approximately \$2.8 million (2021 dollars).

For RFA purposes only, the National Marine Fisheries Service (NMFS) has established a small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing (see 50 CFR § 200.2). A business primarily engaged in commercial fishing (NAICS code 11411) is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual receipts not in excess of \$11 million for all its affiliated operations worldwide. All of the commercial fishing businesses directly regulated by this proposed action are believed to be small entities based on the NMFS size standard. No other small entities that would be directly affected by this action have been identified.

### **6.4 Description of the projected reporting, record-keeping and other compliance requirements of the proposed action, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for the preparation of the report or records**

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<sup>22</sup> A renewable permit is an expired limited access permit that cannot be actively fished, but can be renewed for up to one year after expiration.

This proposed action would not establish any new reporting, record-keeping, or other compliance requirements.

## **6.5 Identification of all relevant federal rules, which may duplicate, overlap or conflict with the proposed action**

No duplicative, overlapping, or conflicting federal rules have been identified.

## **6.6 Significance of economic impacts on a substantial number of small entities**

### **Substantial number criterion**

There are 837 federally permitted vessels eligible to commercially fish for or harvest gray triggerfish in the Gulf. However, it is expected that those vessels that historically landed gray triggerfish would be the most likely to be affected by this proposed action. From 2017 through 2021, there were 261 federally permitted commercial vessels, on average, that harvested and sold gray triggerfish each year. Because all of these vessels are believed to be small entities, it is assumed that this action would affect a substantial number of small entities.

### **Significant economic impacts**

The outcome of “significant economic impact” can be ascertained by examining two factors: disproportionality and profitability.

Disproportionality: Do the regulations place a substantial number of small entities at a significant competitive disadvantage to large entities?

All entities likely to be affected by this action are believed to be small entities and thus the issue of disproportionality does not arise.

Profitability: Do the regulations significantly reduce profits for a substantial number of small entities?

A detailed analysis of the economic effects associated with this proposed action can be found in Chapter 4. The following information summarizes that analysis, and additionally, analyzes the effects of this proposed action on the profitability of small entities.

This proposed action would raise the commercial trip limit for gray triggerfish from 16 fish to 25 fish per vessel. This change would be expected to increase commercial gray triggerfish landings by 16,782 lbs gw or 33% relative to the status quo. These additional landings would be worth an estimated \$38,246 (2021 dollars) in aggregate annual ex-vessel revenue. Divided by the average number of vessels with reported landings of gray triggerfish from 2017 through 2021, this translates to an annual increase of \$147 (approximately 0.1% of average annual per vessel gross

revenue). Because gray triggerfish makes up only a fraction of total revenue for vessels that land the species, it is assumed this proposed action would not materially affect fishing effort or trip costs. Therefore, this change in ex-vessel revenue would equate to an equal increase in economic profits (0.3% of average annual economic profits). Individual fishing businesses, however, may experience varying levels of economic effects, depending on their fishing practices, operating characteristics, and profit maximization strategies. In summary, this proposed action would not be expected to have a significant economic impact on a substantial number of small entities.

## **6.7 Description of the significant alternatives to the proposed action and discussion of how the alternatives attempt to minimize economic impacts on small entities**

This proposed action, if implemented, would not be expected to have a significant economic impact on a substantial number of small entities. As a result, the issue of significant alternatives is not relevant.

## CHAPTER 7. LIST OF PREPARERS

### PREPARERS

| Name                   | Expertise         | Responsibility  | Agency |
|------------------------|-------------------|---|--------|
| Carly Somerset         | Fishery Biologist | Co-Team Lead – Amendment development, biological analyses | GMFMC  |
| Peter Hood             | Branch Chief      | Co-Team Lead – Amendment development, biological analyses | SERO   |
| Assane Diagne          | Economist         | Economic analyses   | GMFMC  |
| David Records          | Economist         | Economic analyses   | SERO   |
| Ava Lasseter           | Anthropologist    | Social analyses   | GMFMC  |
| Christina Package-Ward | Anthropologist    | Social analyses   | SERO   |
| Alisha Gray            | Fishery Biologist | Data analyses   | SERO   |
| Dominique Lazarre      | Fishery Biologist | Data analyses   | SERO   |
| Mike Larkin            | Fishery Biologist | Data analyses   | SERO   |

### REVIEWERS

| Name           | Expertise                   | Responsibility    | Agency   |
|----------------|-----------------------------|-------------------|----------|
| Mara Levy      | Attorney                    | Legal review      | NOAA GC  |
| Adam Bailey    | Technical writer and editor | Regulatory writer | SERO     |
| Matthew Smith  | Research Statistician       | Review            | SERO     |
| Jashira Torres | Law Enforcement             | Review            | NOAA OLE |
| Jennifer Lee   | Protected Resources         | Review            | SERO     |
| Larry Perruso  | Fishery Biologist           | Review            | SEFSC    |
| Ryan Rindone   | Fishery Biologist           | Review            | GMFMC    |
| John Froeschke | Fishery Biologist           | Review            | GMFMC    |
| Carrie Simmons | Fishery Biologist           | Review            | GMFMC    |

GMFMC = Gulf of Mexico Fishery Management Council; NOAA GC = National Oceanic and Atmospheric Administration General Counsel; SEFSC = Southeast Fisheries Science Center; SERO = Southeast Regional Office of the National Marine Fisheries Service

## **CHAPTER 8. LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS CONSULTED**

National Marine Fisheries Service

- Southeast Fisheries Science Center
- Southeast Regional Office
  - Protected Resources
  - Habitat Conservation
  - Sustainable Fisheries

NOAA General Counsel

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## APPENDIX A. OTHER APPLICABLE LAW

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.) provides the authority for management of stocks included in fishery management plans (FMP) in federal waters of the exclusive economic zone. However, management decision-making is also affected by a number of other federal statutes designed to protect the biological and human components of U.S. fisheries, as well as the ecosystems that support those fisheries. Major laws affecting federal fishery management decision-making include the Endangered Species Act (Section 3.2.2), E.O. 12866 (Regulatory Planning and Review, Chapter 5) and E.O. 12898 (Environmental Justice, Section 3.4.3). Other applicable laws are summarized below.

### **Administrative Procedure Act**

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (5 U.S.C. Subchapter II), which establishes a “notice and comment” procedure to enable public participation in the rulemaking process. Under the Act, the National Marine Fisheries Service (NMFS) is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider, and respond to public comment on those rules before they are finalized. The Act also establishes a 30-day waiting period from the time a final rule is published until it takes effect. Proposed and final rules will be published before implementing the action in this framework.

### **Coastal Zone Management Act**

Section 307(c)(1) of the federal Coastal Zone Management Act of 1972 (CZMA), as amended, requires federal activities that affect any land or water use or natural resource of a state’s coastal zone be conducted in a manner consistent, to the maximum extent practicable, with approved state coastal management programs. The requirements for such a consistency determination are set forth in the National Oceanic and Atmospheric Administration (NOAA) regulations at 15 CFR part 930, subpart C. According to these regulations and CZMA Section 307(c)(1), when taking an action that affects any land or water use or natural resource of a state’s coastal zone, NMFS is required to provide a consistency determination to the relevant state agency at least 90 days before taking final action.

Upon submission to the Secretary of Commerce, NMFS will determine if this framework is consistent with the Coastal Zone Management programs of the states of Alabama, Florida, Louisiana, Mississippi, and Texas to the maximum extent possible. Their determination will then be submitted to the responsible state agencies under Section 307 of the CZMA administering approved Coastal Zone Management programs for these states.

### **Data Quality Act**

The Data Quality Act (Public Law 106-443) effective October 1, 2002, requires the government to set standards for the quality of scientific information and statistics used and disseminated by

federal agencies. Information includes any communication or representation of knowledge such as facts or data, in any medium or form, including textual, numerical, cartographic, narrative, or audiovisual forms (includes web dissemination, but not hyperlinks to information that others disseminate; does not include clearly stated opinions).

Specifically, the Act directs the Office of Management and Budget to issue government wide guidelines that “provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies.” Such guidelines have been issued, directing all federal agencies to create and disseminate agency-specific standards to: (1 ensure information quality and develop a pre-dissemination review process; (2 establish administrative mechanisms allowing affected persons to seek and obtain correction of information; and (3 report periodically to Office of Management and Budget on the number and nature of complaints received.

Scientific information and data are key components of FMPs and amendments and the use of best available information is the second national standard under the Magnuson-Stevens Act. To be consistent with the Magnuson-Stevens Act, FMPs and amendments must be based on the best information available. They should also properly reference all supporting materials and data, and be reviewed by technically competent individuals. With respect to original data generated for FMPs and amendments, it is important to ensure that the data are collected according to documented procedures or in a manner that reflects standard practices accepted by the relevant scientific and technical communities. Data will also undergo quality control prior to being used by the agency and a pre-dissemination review.

### **National Historic Preservation Act**

The National Historic Preservation Act (NHPA) of 1966, (Public Law 89-665; 16 U.S.C. 470 *et seq.*) is intended to preserve historical and archaeological sites in the United States of America. Section 106 of the NHPA requires federal agencies to evaluate the impact of all federally funded or permitted projects for sites listed on, or eligible for listing on, the National Register of Historic Places and aims to minimize damage to such places.

Historical research indicates that over 2,000 ships have sunk on the Federal Outer Continental Shelf between 1625 and 1951; thousands more have sunk closer to shore in state waters during the same period. Only a handful of these have been scientifically excavated by archaeologists for the benefit of generations to come.<sup>23</sup>

The proposed action does not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, nor is it expected to cause loss or destruction of significant scientific, cultural, or historical resources. In the Gulf of Mexico (Gulf), the *U.S.S. Hatteras*, located in federal waters off Texas, is listed in the National

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<sup>23</sup> <http://www.boem.gov/Environmental-Stewardship/Archaeology/Shipwrecks.aspx>

Register of Historic Places.<sup>24</sup> Fishing activity already occurs in the vicinity of this site, but the proposed action would have no additional adverse impacts on listed historic resources, nor would they alter any regulations intended to protect them.

### **Executive Orders (E.O.)**

#### **E.O. 12630: Takings**

The E.O. on Government Actions and Interference with Constitutionally Protected Property Rights that became effective March 18, 1988, requires each federal agency prepare a Takings Implication Assessment for any of its administrative, regulatory, and legislative policies and actions that affect, or may affect, the use of any real or personal property. Clearance of a regulatory action must include a takings statement and, if appropriate, a Takings Implication Assessment. The NOAA Office of General Counsel will determine whether a Taking Implication Assessment is necessary for this amendment.

#### **E.O. 12962: Recreational Fisheries**

This E.O. requires federal agencies, in cooperation with states and tribes, to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities through a variety of methods including, but not limited to, developing joint partnerships; promoting the restoration of recreational fishing areas that are limited by water quality and habitat degradation; fostering sound aquatic conservation and restoration endeavors; and evaluating the effects of federally-funded, permitted, or authorized actions on aquatic systems and recreational fisheries, and documenting those effects. Additionally, it establishes a seven-member National Recreational Fisheries Coordination Council (NRFCC) responsible for, among other things, ensuring that social and economic values of healthy aquatic systems that support recreational fisheries are considered by federal agencies in the course of their actions, sharing the latest resource information and management technologies, and reducing duplicative and cost-inefficient programs among federal agencies involved in conserving or managing recreational fisheries. The NRFCC also is responsible for developing, in cooperation with federal agencies, States and Tribes, a Recreational Fishery Resource Conservation Plan - to include a five-year agenda. Finally, the E.O. requires NMFS and the United States Fish and Wildlife Service to develop a joint agency policy for administering the ESA.

#### **E.O. 13089: Coral Reef Protection**

The E.O. on Coral Reef Protection requires federal agencies, whose actions may affect U.S. coral reef ecosystems, to identify those actions, utilize their programs and authorities to protect and enhance the conditions of such ecosystems, and, to the extent permitted by law, ensure actions that they authorize, fund, or carry out do not degrade the condition of that ecosystem. By

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<sup>24</sup> Further information can be found at <http://www.boem.gov/Environmental-Stewardship/Archaeology/Shipwrecks.aspx>.

definition, a U.S. coral reef ecosystem means those species, habitats, and other national resources associated with coral reefs in all maritime areas and zones subject to the jurisdiction or control of the United States (e.g., federal, state, territorial, or commonwealth waters).

Regulations are already in place to limit or reduce habitat impacts within the Flower Garden Banks National Marine Sanctuary. Additionally, NMFS approved and implemented Generic Amendment 3 for Essential Fish Habitat (GMFMC 2005), which established additional habitat areas of particular concern (HAPC) and gear restrictions to protect corals throughout the Gulf. There are no implications to coral reefs by the actions proposed in this amendment.

### **E.O. 13132: Federalism**

The E.O. on Federalism requires agencies in formulating and implementing policies, to be guided by the fundamental Federalism principles. The E.O. serves to guarantee the division of governmental responsibilities between the national government and the states that was intended by the framers of the Constitution. Federalism is rooted in the belief that issues not national in scope or significance are most appropriately addressed by the level of government closest to the people. This E.O. is relevant to FMPs and amendments given the overlapping authorities of NMFS, the states, and local authorities in managing coastal resources, including fisheries, and the need for a clear definition of responsibilities. It is important to recognize those components of the ecosystem over which fishery managers have no direct control and to develop strategies to address them in conjunction with appropriate state, tribes and local entities (international too).

No Federalism issues were identified relative to this action to modify the red snapper catch levels. Therefore, consultation with state officials under E.O. 12612 was not necessary.

### **E.O. 13158: Marine Protected Areas**

This E.O. requires federal agencies to consider whether their proposed action(s) will affect any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural or cultural resource within the protected area. There are several marine protected areas, HAPCs, and gear-restricted areas in the eastern and northwestern Gulf. The existing areas are entirely within federal waters of the Gulf. They do not affect any areas reserved by federal, state, territorial, tribal or local jurisdictions.

### **References**

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[https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/GENERIC/FINAL3\\_EFH\\_Amendment.pdf](https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/GENERIC/FINAL3_EFH_Amendment.pdf)

## APPENDIX B. ALTERNATIVES CONSIDERED BUT REJECTED

At its October 2022 meeting, the Gulf of Mexico Fishery Management Council (Council) voted to move Alternative 5 (40 fish) in Action 1 to considered but rejected. The Council recognized that a trip limit of 40-fish per trip would increase estimated landings to 180 lbs per trip, or a predicted 90% increase in landings and thus, was not considered a reasonable alternative.

**Action 1:** Increase the gray triggerfish commercial trip limit.

**Alternative 5:** Increase the commercial trip limit to 40 gray triggerfish per vessel.

## APPENDIX C. TRIP LIMIT ANALYSIS

### Commercial Trip Limit and Season Projection Analyses for Gulf of Mexico Gray Triggerfish

LAPP/DM Branch  
NOAA Fisheries Service  
Southeast Regional Office  
October 2022

The Gulf of Mexico Fisheries Management Council is considering changes to the commercial gray triggerfish trip limit. The current trip limit of 16 gray triggerfish per trip, was implemented in January of 2018 with Reef Fish Amendment 46. This limit was set in number of fish instead of pounds, at the recommendation of the Law Enforcement Advisory Panel. The following analysis combines a prior analysis conducted to determine the average weight of Gulf of Mexico (Gulf) gray triggerfish caught in the fishery, and use these data to explore how potential changes to the trip limit may impact landings. The average weight analysis used the Southeast Fisheries Science Center's (SEFSC) Trip Interview Program (TIP) to amass gray triggerfish length and weight data collected by TIP port samplers from the commercial sector. A summary of these findings will be provided as context. Additionally, a trip limit analysis was conducted to evaluate the impact of five trip limit alternatives: 16, 20, 25, 30 and 40 fish per trip limits.

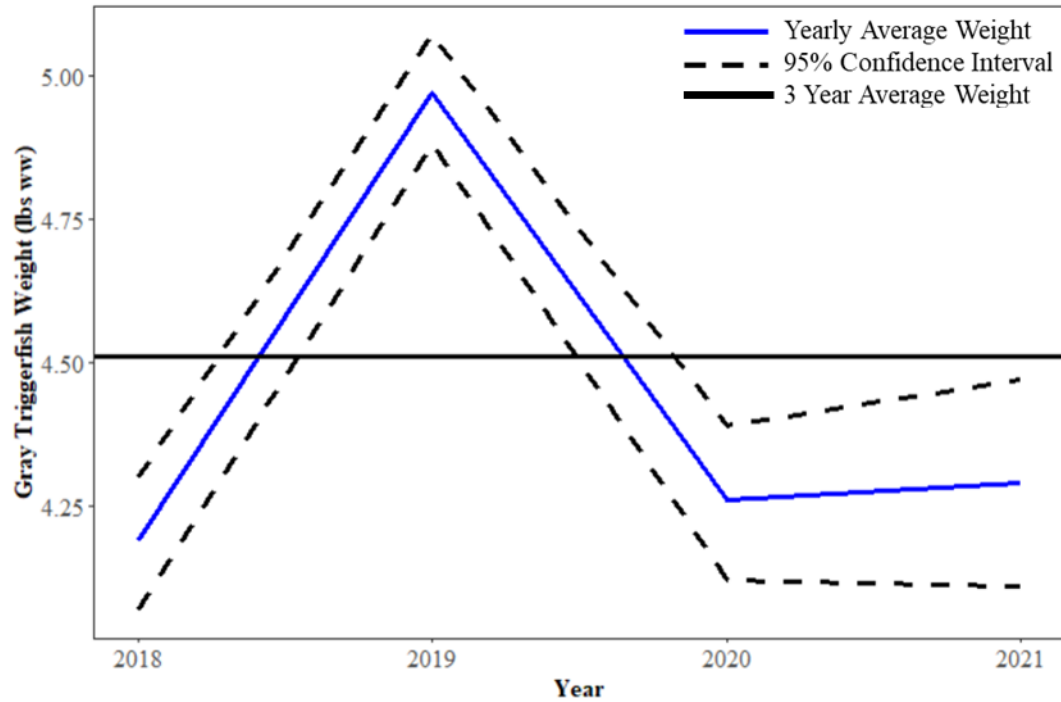
#### *Average weight analysis*

TIP data from 2018 to 2021 was provided from the SEFSC in June of 2022, including length and weight records from 3,595 gray triggerfish. A conversion factor of 1.04 was used to convert gutted weight measurements to whole weight measurements, and average weights for each year were calculated (**Table 1**).

**Table 1.** Average weight of gray triggerfish observed by port samplers conducting dockside surveys for the Trip Interview Program.

| Year | Number of Gray Triggerfish | Average Weight | Lower 95% Confidence Interval | Upper 95% Confidence Interval |
|------|----------------------------|----------------|-------------------------------|-------------------------------|
| 2018 | 920                        | 4.19           | 4.07                          | 4.3                           |
| 2019 | 1,479                      | 4.97           | 4.88                          | 5.07                          |
| 2020 | 754                        | 4.26           | 4.12                          | 4.39                          |
| 2021 | 442                        | 4.29           | 4.11                          | 4.47                          |

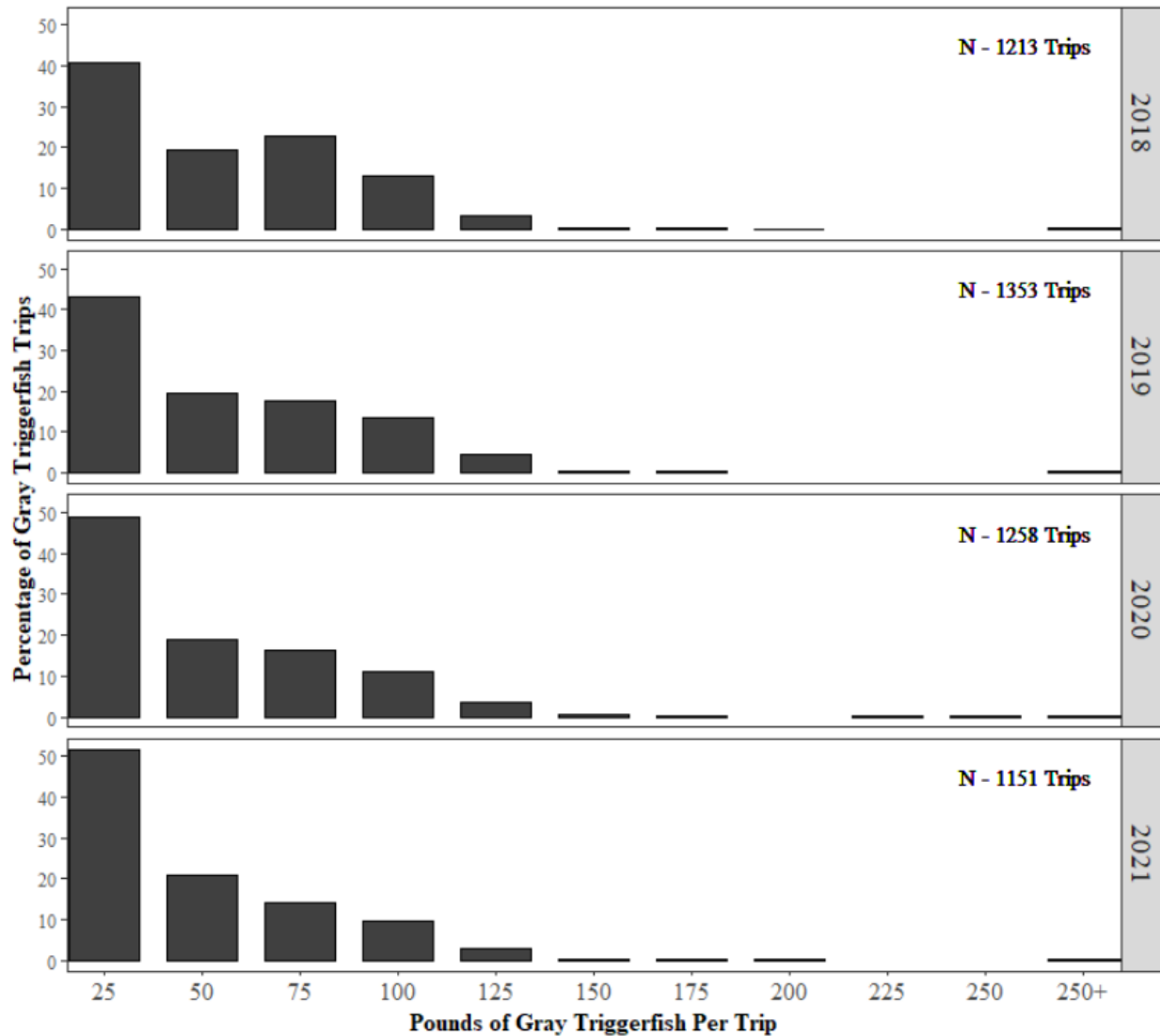
The average weight between 2019 and 2021, all years combined, was calculated to be 4.51 pounds whole weight (lb ww) per gray triggerfish (**Figure 1**). This average allows for the variability in the most recent years to be incorporated into the trip limit analysis.



**Figure 1.** Gulf of Mexico gray triggerfish annual average weight and 95% confidence intervals in the commercial sector from 2018-2021. A three-year average (all years combined) from 2019-2021 is represented by the solid black line (Source: SEFSC TIP Program).

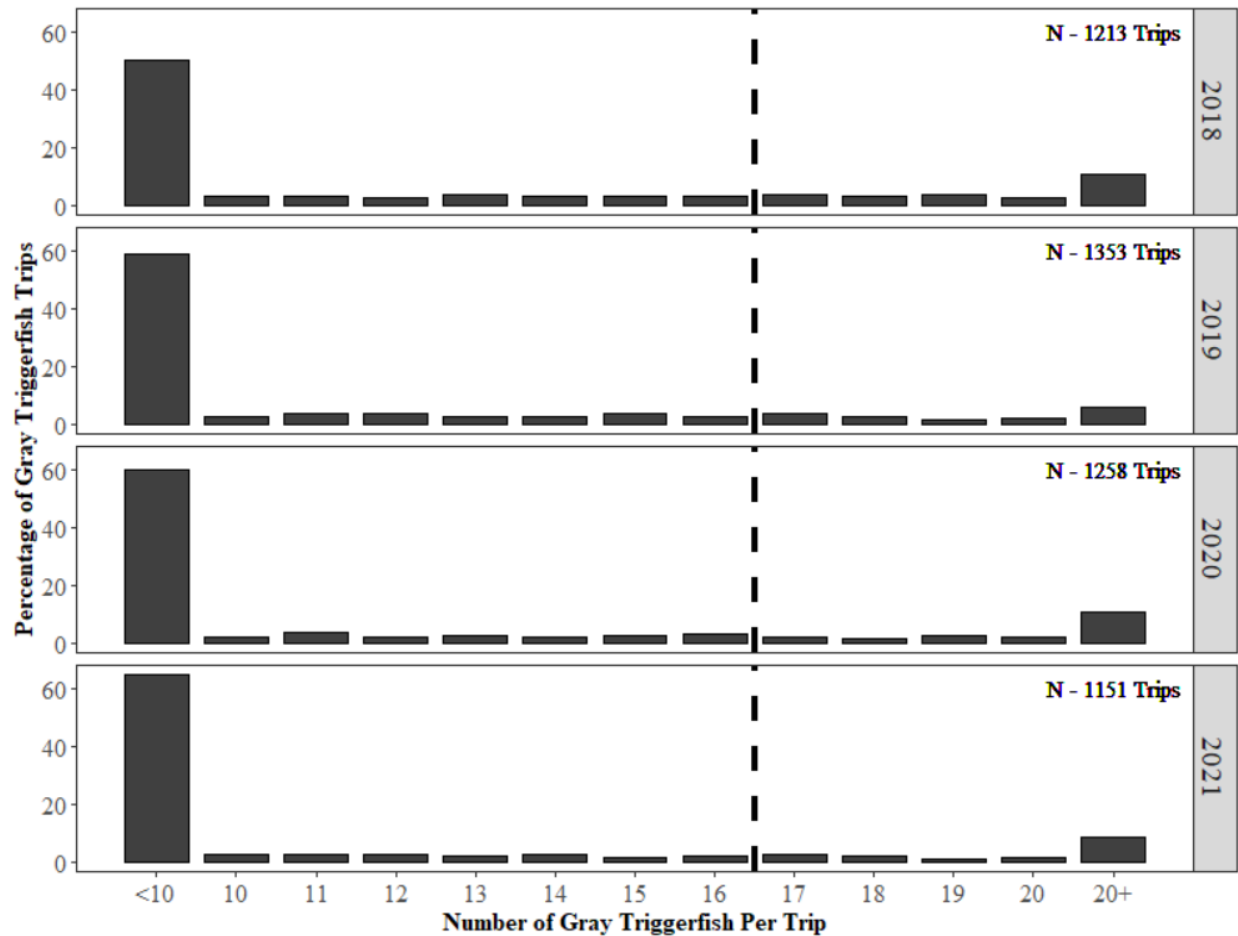
#### *Commercial trip limit analysis*

Recent Gulf commercial catch-effort data (years: 2018 to 2021) from the Southeast Fisheries Science Center (SEFSC) Commercial Logbook program (CLB) had 4,975 trips report that gray triggerfish were harvested. The distribution of gray triggerfish landed between 2018 and 2021, in pounds whole weight, is presented in **Figure 2**.



**Figure 2.** Distribution of Gulf of Mexico gray triggerfish harvested per trip from the SEFSC Commercial Logbook program between 2018 and 2021, in pounds whole weight.

While landings are reported in pounds, the trip limit for gray triggerfish is designated in numbers of fish. The average weight for the three most recent years was divided by the total weight landed on each trip to generate a count of gray triggerfish harvested per trip. **Figure 3** shows the distribution of the number of gray triggerfish harvested per trip. Using these estimates, it was determined that each year, at least 50% of the trips reported landing less than 10 gray triggerfish. Up to one quarter of trips landed more than the 16 fish trip limit in any of the four years of data analyzed. Approximately 6-11% of trips reported harvesting more than 20 fish.



**Figure 3.** Distribution of Gulf of Mexico gray triggerfish per trip from 2018-2021, from the SEFSC Commercial Logbook Program. The black dotted reference line represents the current 16 fish trip limit.

To determine the potential impact of the 5 alternative trip limits proposed, a scalar was calculated to represent the proportion of additional triggerfish that could be landed as a result of an increased trip limit. First, trips that landed less than 10 gray triggerfish were not modified. It was assumed that trips with less than 10 gray triggerfish were well below the current 16 fish trip limit, and would therefore not be affected by an increase to the commercial trip limit. For all trips that landed 10 or more gray triggerfish, the total number of pounds harvested was replaced with a new trip limit weight that corresponded with each trip limit scenario. The average weight for each trip limit was equal to the number of fish for each trip limit multiplied by the average weight for gray triggerfish (**Table 2**; see formula below).

$$Avg\ Weight_{Trip\ Limit} = Trip\ Limit * 3\ Yr\ Average\ Weight$$

**Table 2.** Trip limit weights used to replace reported landings for trips that harvested more than 10 gray triggerfish.

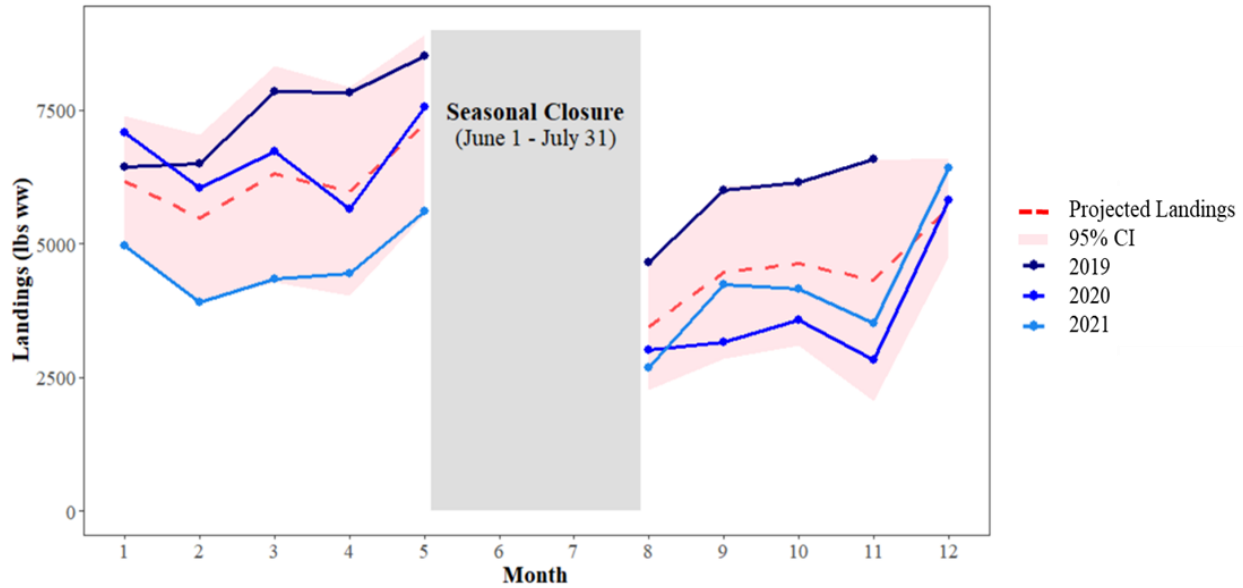
| <b>Trip Limit (in number of fish)</b> | <b>Average Weight (per fish)</b> | <b>Trip Limit Weight (in lb ww)</b> |
|---------------------------------------|----------------------------------|-------------------------------------|
| Alternative 2: 20 fish                | 4.51                             | 90.2                                |
| Alternative 3: 25 fish                | 4.51                             | 112.75                              |
| Alternative 4: 30 fish                | 4.51                             | 135.3                               |
| Alternative 5: 40 fish                | 4.51                             | 180.4                               |

As an example, a trip with a harvest of 54 pounds translates to a trip with 12 gray triggerfish ( $54 \text{ lb} / 4.51 \text{ lb per fish} = 12 \text{ fish}$ ). When considering a trip limit scenario of 20 fish, this trip would then be adjusted to have a harvest of 90.2 pounds ( $20 \text{ fish} * 4.51 \text{ lb per fish}$ ). All trips that caught more than 10 gray triggerfish would be adjusted similarly.

While the daily trip limit is currently set at 16 fish per trip, applying the potential trip limit to all the records with 10 or more fish provides an additional buffer for the estimated change in landings. Additionally, there are a percentage of trips that exceed the current trip limit. The landed weight for these trips were unchanged as it is assumed the same percentage of trips will exceed the trip limit. A new total landings estimate was calculated for each trip limit alternative and compared with landings under the current limit. Estimated increases in projected landings for all trip limits alternatives are shown in **Table 3**.

#### *Seasonal Closure Analysis*

The SEFSC provided commercial landings in their ACL dataset on August 31, 2022. These landings were summed by month and year for the three most recent years of data (2019-2021). The monthly landings from December 2016 were used in place of the December 2019 landings due to a fishery closure that year. The average monthly landings for the three year time period was calculated to create a monthly projected landings. Landings for each year in the analysis and the projected landings for each month are shown in **Figure 4**.



**Figure 4.** Gulf gray triggerfish monthly commercial landings (lb ww) for 2019-2021, and projected landings (average landings from 2019-2021). Commercial landings for Gulf gray triggerfish were obtained from the Southeast Fisheries Science Center’s commercial ACL dataset provided on August 31, 2022.

Projected monthly landings were divided by the number of days in each month to provide a daily catch rate. The projected increases for each alternative was multiplied by the average monthly landing and summed cumulatively to determine what day, if any, would result in a closure for gray triggerfish. The predicted closure date and season length for each alternative is presented in **Table 3**. The alternatives that increase the trip limit to 35 or 40 gray triggerfish are predicted to result in seasonal closures.

**Table 3.** The predicted percent increase in landings per trip from the current 16 fish per trip limit.\* The predicted season length will be 304 days or less because of the fixed June 1 through July 31 closure.

| Alternatives<br>(Proposed Trip Limit) | Predicted Change<br>in Landings | Predicted<br>Closure Date | Predicted Season<br>Length (Days)* |
|---------------------------------------|---------------------------------|---------------------------|------------------------------------|
| No Action: 16 fish per trip           | 0%                              | -                         | 304                                |
| Alternative 2: 20 fish per trip       | 16%                             | -                         | 304                                |
| Alternative 3: 25 fish per trip       | 33%                             | -                         | 304                                |
| Alternative 4: 30 fish per trip       | 52%                             | -                         | 304                                |
| Alternative 5: 40 fish per trip       | 90%                             | 11/19/22                  | 262                                |