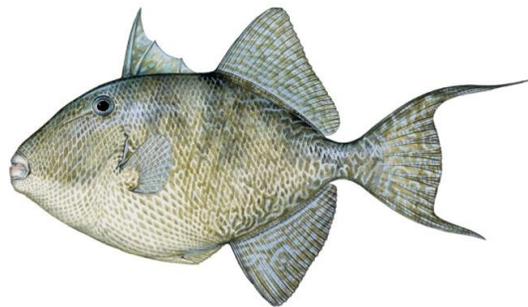


# Modifications to the Gray Triggerfish Rebuilding Plan



## Draft Options Paper for Amendment 46 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico

June 2016



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# COVER SHEET

## Name of Action

Options Paper for Amendment 46: Modifications to the Gray Triggerfish Rebuilding Plan

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## ABBREVIATIONS USED IN THIS DOCUMENT

ABC	acceptable biological catch
ACL	annual catch limit
ACT	annual catch target
AMs	accountability measures
B	biomass
B <sub>MSY</sub>	stock biomass level capable of producing an equilibrium yield of MSY
Council	Gulf of Mexico Fishery Management Council
F	Instantaneous rate of fishing mortality
FL	fork length
F <sub>MSY</sub>	fishing mortality rate corresponding to an equilibrium yield of MSY
F <sub>OY</sub>	fishing mortality rate corresponding to an equilibrium yield of OY
F <sub>30% SPR</sub>	fishing mortality corresponding to 30% spawning potential ratio
FMP	Fishery Management Plan
GMFMC	Gulf of Mexico Fishery Management Council
M	Instantaneous rate of natural mortality
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MFMT	Maximum fishing mortality threshold
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OFL	overfishing level
OY	optimum yield
SEDAR	Southeast Data, Assessment and Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
SSASPM	State-Space Age-Structured Production Model
SSB	spawning stock biomass
SSC	Scientific and Statistical Committee
SPR	Spawning potential ratio
ww	whole weight

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# CHAPTER 1. INTRODUCTION

## 1.1 Background and Status of the Gray Triggerfish Stock

Gray triggerfish (*Balistes capriscus*) is one of 31 reef fish species in the management unit for the Fishery Management Plan (FMP) for the Reef Fish Resources of the Gulf of Mexico (Gulf). The FMP provides management for reef fish species in the federal waters of the Gulf.

Gray triggerfish is caught throughout the Gulf, but landings are greater east of the Mississippi River than in the western Gulf (SEDAR 43 2015). Total landings in the last fifteen years, from 2001 through 2015, have increased and peaked in 2004 at almost 1,200,000 lbs whole weight (ww) (Figure 1.1.1). Landings declined after 2004 to just under 500,000 lbs ww in 2008 and 2009 and decreased to around 350,000 lbs ww in 2010. In 2013, landings increased to 564,000 lbs ww.

In 2012, the Gulf of Mexico Fishery Management Council (Council) modified the gray triggerfish rebuilding plan through Reef Fish Amendment 37 (GMFMC 2012). This rebuilding plan implemented management changes to the recreational and commercial sectors. Amendment 37 reduced the recreational annual catch limit (ACL) to 241,200 lbs ww and the recreational annual catch target (ACT) to 217,100 lbs ww. The commercial ACL was reduced to 64,100 lbs ww and the commercial ACT (quota) was reduced to 60,900 lbs ww. This rebuilding plan also established a fixed closed season for both the recreational and commercial sectors during peak spawning from June 1 – July 31. A recreational bag limit of 2 gray triggerfish within the 20-reef fish aggregate bag limit and a commercial trip limit of 12 gray triggerfish were also established. The recreational accountability measures (AMs) were modified to allow an in-season closure authority for gray triggerfish based on project landings reaching the recreational ACT. As long as gray triggerfish remains overfished, if the recreational ACL is exceeded, a post-season overage adjustment is applied that reduces the ACL and ACT by the amount of the overage the following fishing year.

### *Annual Catch Limit (ACL)*

The amount of fish that can be harvested from the stock each year.

### *Annual Catch Target (ACT)*

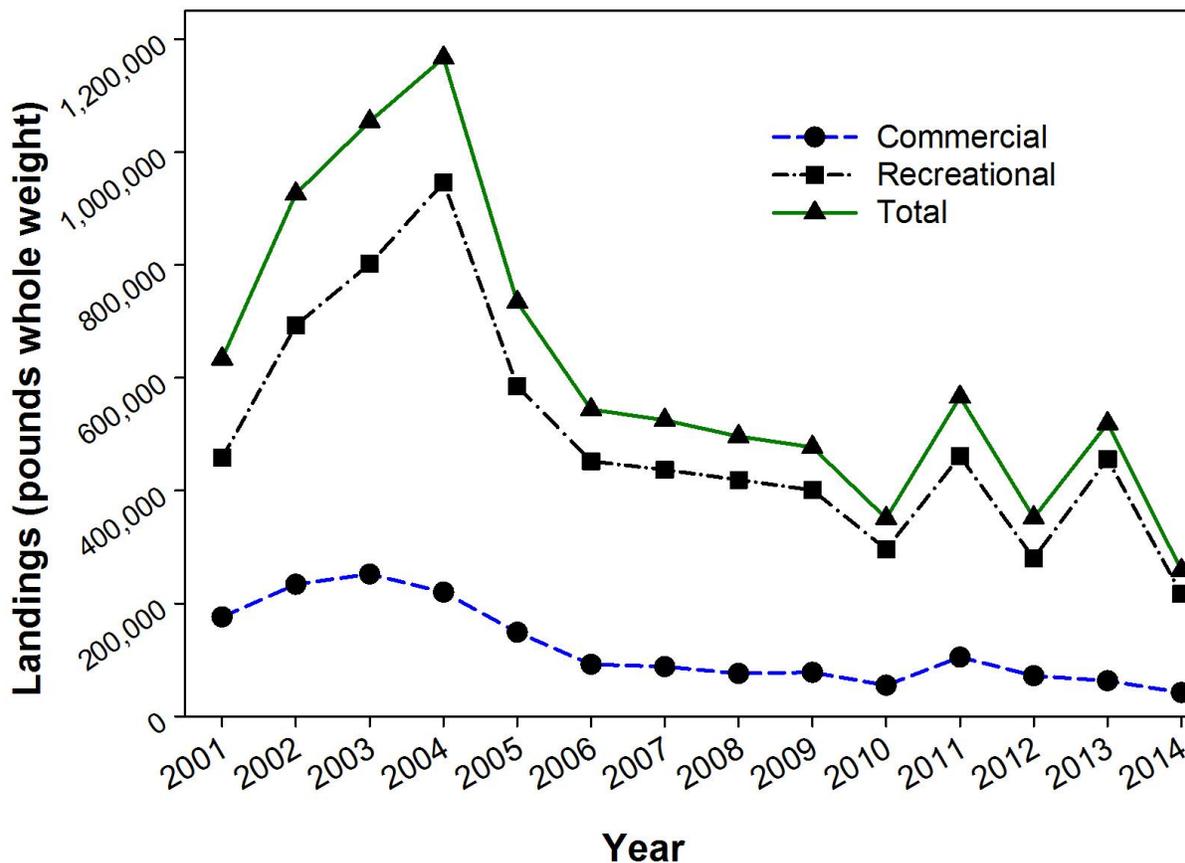
A harvest level set lower than the annual catch limit to create a buffer so that overharvest does not occur.

### *Accountability Measures (AMs)*

Measures taken to prevent harvest from exceeding the annual catch limit and, if exceeded, to mitigate or correct the overage.

The recent SEDAR 43 (2015) standard assessment of gray triggerfish was completed and reviewed by the Scientific and Statistical Committee (SSC) in October 2015. The assessment indicated that the Gulf gray triggerfish was no longer undergoing overfishing, but remains overfished (Table 1.1.1). On November 2, 2015, National Marine Fisheries Service (NMFS) notified the Council that the gray triggerfish stock was not making adequate progress toward rebuilding. Within two years of this notification, the Council must prepare and implement a plan amendment or proposed regulations to rebuild the stock. 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 the SEFSC complete 6 projection scenarios with specific rebuilding targets of 8, 9, and 10 years and assuming 2 recruitment scenarios due to recruitment concerns brought up during the assessment for the SSC to review at their January 2016 meeting.



**Figure 1.1.1.** Gulf of Mexico gray triggerfish recreational, commercial, and total landings in pounds whole weight from 2001 through 2014. Source: Commercial landings from SERO (February 16, 2016). Recreational landings from the ACL dataset (October 8, 2014).

In January 2016, the SSC accepted the low recruitment for 2014-2018 scenarios as the basis for the projections because the results of the analyses demonstrated there was a 5-year auto-correlation in the recruitment indices. However, the SSC felt there was no information in the assessment to support holding recruitment at lower levels more than 5 years into the future. The Council requested the projections start in 2017; however, the last year of data in the assessment was 2013 therefore, the following methodology was used for 2014, 2015, and 2016 landings. For 2014, the SEFSC used the finalized commercial and recreational landings; however at the time 2015 landings were only provisional for the commercial sector and partially available for the recreational sector, with the remainder of the 2015 recreational landings estimated based on

prior years' landings. For 2016, the total landings were set at the combined commercial and recreational ACLs of 305,300 lbs ww. Selectivity, discard, and retention functions were held constant for all years of the projections. The assessment indicated that the Gulf gray triggerfish stock was no longer undergoing overfishing, but remains overfished (Table 1.1.1).

**Table 1.1.1.** Status determination criteria and stock status of gray triggerfish based on SEDAR 43 (2015) accepted by the SSC. The highlighted rows indicate gray triggerfish stock status as overfished ( $SSB_{CURRENT}/MSST$ ) but no longer experiencing overfishing ( $F_{CURRENT}/MFMT$ ).

Criteria	Definition	Value
<i>Mortality Rate Criteria</i>		
$F_{MSY}$	$F_{30\% SPR}$	0.166
MFMT	$F_{MSY proxy}$	0.166
F <sub>oy proxy</sub>	75% of $F_{30\% SPR}$	0.125
$F_{CURRENT}$	2013	0.120
<b><math>F_{CURRENT}/MFMT</math></b>	<b>30% SPR proxy</b>	<b>0.72</b>
Base M	M	0.28
<i>Biomass Criteria</i>		
$SSB_{MSY proxy}$ (egg production)	Equilibrium egg production @ $F_{30\% SPR}$	9.16E+09
MSST (egg production)	$(1-M)*SSB_{30\% SPR}$ : M= 0.28	6.60E+09
$SSB_{CURRENT}$	2013	1.13E+10
<b><math>SSB_{CURRENT}/MSST</math></b>	<b><math>SSB_{MSY proxy}</math></b>	<b>0.89</b>
Equilibrium MSY (lbs ww)	Equilibrium Yield @ $F_{30\% SPR}$	2,236,983
Equilibrium OY proxy (lbs ww)	Equilibrium Yield @ 75% * $F_{30\% SPR}$	2,103,591

The SSC recommended yield streams for all three of the possible rebuilding time scenarios so that the Council could determine which target date (8, 9, or 10 years) to adopt. Given the uncertainties in the assessment and projections, the SSC recommended acceptable biological catch (ABC) for 3 years (2017-2019) using a 40% probability of exceeding the overfishing limit (OFL) applied to the yield at  $F_{rebuild}$  (the yield that rebuilds the stock within 10 years or less). If there is not a new assessment by 2019, the SSC intends to reevaluate the ABC yield stream based on updated landings and any other new information available.

## 1.2 Assessment and Management History

A benchmark stock assessment was conducted in 2006 for the Gulf gray triggerfish stock (SEDAR 9 2006a). The assessment used the two scenarios of a Stock Production Model Incorporating Covariates and the State-Space Age-Structured Production Model (SSASPM). The assessment results indicated the stock was both overfished and experiencing overfishing (SEDAR 9 2006a). In October 2006, NMFS notified the Council that the gray triggerfish stock was overfished and experiencing overfishing. This required that the Council take action to end overfishing and develop a rebuilding plan.

Reef Fish Amendment 30A (GMFMC 2008) put in place a stock rebuilding plan beginning in 2008 as required by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Commercial and recreational ACTs<sup>1</sup>, ACLs, and AMs were also established in Amendment 30A. The sector-specific ACTs, ACLs, and landings are shown in Table 1.2.1. For the commercial sector, the in-season AM would close the fishing season the year after the ACT (quota) is estimated to be met. If the commercial ACL is exceeded, the post-season AM is to reduce the ACL for the following year by the amount of the overage in the prior year. For the recreational sector, a post-season AM was established. If the ACL for a single year, or the 3-year running average of recreational landings resulted in the ACL being exceeded, then the length of the fishing season would be shortened the next year based on the ACT.

An update stock assessment was conducted for Gulf gray triggerfish in 2011 (SEDAR 9 Update 2011b). The same assessment model (SSASPM model) from the 2006 gray triggerfish benchmark assessment (SEDAR 9 2006a) was applied and three scenarios were explored: 1) re-run the same model but with updated landings, catch-per-unit-effort series including 2010, and updated indices of abundance; 2) additional updated age-length information; and 3) updated shrimp trawl bycatch and effort data.

The Council's SSC reviewed the 2011 Update Assessment and accepted the second and third model scenarios listed above that used the updated age and length data and the shrimp trawl bycatch and effort data. At that time the status determination criteria and the estimated rebuilding timeframes were based on future recruitment adhering to maximum sustainable yield (MSY) proxy. The MSY proxy is defined as the fishing mortality rate at 30% spawning potential ratio ( $F_{30\% SPR}$ ). Future yields are normally based on recruitment projections that depend in part on the spawner-recruit curve developed in the assessment. At the time the update assessment was completed, gray triggerfish recruitment had been at low levels relative to the spawner-recruit curve (SEDAR 9 Update 2011b). The reason for low recruitment was unknown. Further, it was unknown whether recruitment in the near future will remain at these low levels or revert back to the levels projected by the spawner-recruit curve. At that time the SSC set the ABC based on a low recruitment time period (i.e., 2005 through 2009) for 2012 and 2013 of 305,300 lbs ww ([http://gulfcouncil.org/resources/SSC\\_Reports.php](http://gulfcouncil.org/resources/SSC_Reports.php)). The corresponding overfishing limit defined by the SSC was the yield at  $F_{SPR30\%}$ , equal to 401,600 lbs ww for these years. Results from the update stock assessment showed that the gray triggerfish stock is continuing to experience overfishing and the stock was considered overfished. In March 2012, NMFS informed the Council of the status of the gray triggerfish stock (NMFS 2012).

#### *Spawning Potential Ratio (SPR)*

The spawning potential ratio assumes that a certain amount of fish must survive and spawn in order to replenish the stock.

The spawning potential ratio is calculated as the average number of eggs per fish over its lifetime when the stock is fished compared to the average number of eggs per fish over its lifetime when the stock is not fished.

<sup>1</sup> Because this amendment was developed before the new National Standard 1 guidelines (74 FR 3178) were published, the Council used the term target total allowable catch to describe what are now referred to as ACTs.

In response to this letter, the Council requested an interim rule for gray triggerfish be prepared for their April 2012 Council meeting that would reduce the recreational ACL to 241,200 lbs ww and recreational ACT to 217,100 lbs ww. The commercial ACL was reduced to 64,100 lbs ww and the commercial ACT (quota) was reduced to 60,900 lbs ww. The interim rule also established in-season closure authority for the recreational sector based on the ACT. Therefore, if the recreational gray triggerfish ACT is reached or projected to be reached within a fishing year, the Assistant Administrator for Fisheries can close the recreational sector from harvesting gray triggerfish the rest of the year ([http://sero.nmfs.noaa.gov/bulletins/fishery\\_bulletins.htm](http://sero.nmfs.noaa.gov/bulletins/fishery_bulletins.htm)). Amendment 30A (GMFMC 2008) had already established in-season closure authority for the commercial sector based on the ACT (quota). Following the implementation of the interim rule in May 2012, the recreational sector was closed on June 11 and the commercial sector was closed on July 1. The interim rule reduced fishing levels until long-term management measures were implemented through Amendment 37.

On June 10, 2013, NMFS implemented Amendment 37 (GMFMC 2012), that adjusted the commercial and recreational ACLs and ACTs, established a 12-fish commercial trip limit and a 2-fish recreational daily bag limit, established an annual fishing season closure from June 1 through July 31 for the commercial and recreational sectors, and revised the in-season AM for the recreational sector by eliminated the 3-year running average ACL. In addition, an overage adjustment for the recreational sector was added.

Since the implementation of Amendment 30A in 2008 and the reduction in sector ACTs in Amendment 37 (GMFMC 2012), the commercial sector has only exceeded its ACT (quota) in 2012 (Table 1.2.1). However, this has not been the case for the recreational sector. The recreational sector has exceeded its gray triggerfish ACL in 2008, 2011, 2012, 2013, 2014, and 2015. The ACLs for 2009 and beyond are based on an average of the  $F_{OY}$  yield streams as established in Amendment 30A (GMFMC 2008).

**Table 1.2.1.** Gulf of Mexico landings, ACTs, and ACLs for gray triggerfish during the eight years of the rebuilding plan.

Year	Recreational			Rec. Landings Moving Average	Commercial		
	Landings	ACT	ACL		Landings	ACT (Quota)	ACL
2008	419,276	306,000	394,000	419,000	76,569	80,000	105,000
2009	401,026	356,000	426,000	410,000	78,117	93,000	122,000
2010	296,358	405,000	457,000	372,000	55,661	106,000	138,000
2011	461,548	405,000	457,000	386,000	105,251	106,000	138,000
2012	279,874	217,100	241,200		71,948	60,900	64,100
2013	456,642	217,100	241,200		63,086	60,900	64,100
2014	217,885	211,093	186,993		42,532	60,900	64,100
2015*	114,059	30,107	54,207		47,480	60,900	64,100

Source: Landings provided by SERO. The asterisk indicates landings are preliminary. Data is from the most current commercial and recreational ACL datasets. Commercial landings are from December 24, 2015 commercial ACL dataset and recreational landings came from the March 17, 2016 recreational ACL dataset.

### 1.3 Purpose and Need

#### *Purpose for Action*

The purpose is to modify management measures and the timeline to rebuild the gray triggerfish stock in the Gulf of Mexico.

#### *Need for Action*

The need is to make adequate progress to rebuild an overfished stock, and to achieve, on a continuing basis, the optimum yield from the federally managed stock.

## CHAPTER 2. MANAGEMENT ALTERNATIVES

### 2.1 Action 1 - Modify the Gulf of Mexico Gray Triggerfish Rebuilding Plan

**Alternative 1:** No Action. Maintain the gray triggerfish rebuilding plan at a constant fishing mortality rate defined as fishing mortality rate at optimum yield ( $F_{OY}$ ) from the 2011 Update Assessment and Amendment 37.

**Alternative 2:** Modify the rebuilding plan to be the minimum number of years ( $T_{min}$ ) to rebuild the stock based on a constant fishing mortality rate equal to zero starting in 2017. Using the Scientific and Statistical Committee (SSC) selected recruitment scenario the gray triggerfish stock is projected to recover to a biomass at 30% spawning potential ratio (i.e., spawning biomass is 30% of virgin biomass) in 6 years, by the end of 2022.

**Alternative 3:** Modify the rebuilding plan for gray triggerfish to rebuild the stock within 8 years or by the end of 2024.

**Alternative 4:** Modify the rebuilding plan for gray triggerfish to rebuild the stock within 9 years or by the end of 2025.

**Alternative 5:** Modify the rebuilding plan for gray triggerfish to rebuild the stock within 10 years or by the end of 2026.

Note: The modifications to the rebuilding plan are assumed to begin in 2017 based on the results of the SEDAR 43 (2015) standard assessment. The yield streams for this rebuilding period correspond to the 40<sup>th</sup> percentile of the  $F_{rebuild}$  probability distribution functions.

#### **Discussion:**

This action evaluates various rebuilding time periods for gray triggerfish from status quo to the range of approved years supported by the Scientific and Statistical Committee (SSC). The stock needs to be rebuilt to a size that can support harvesting the maximum sustainable yield (MSY). For gray triggerfish, the yield at the fishing mortality rate ( $F$ ) that can support a 30% spawning potential ratio (SPR), or the yield at  $F_{30\% SPR}$  is used as a proxy for MSY. To account for uncertainty in stock dynamics, current stock status, and recruitment variability, Restrepo et al. (1998) suggest that rebuilding plans should be designed to possess a 50% or higher chance of achieving the biomass target with the proposed rebuilding time period.

**Alternative 1** (No Action) would maintain the current rebuilding schedule established in Amendment 37 (GMFMC 2012). Based on the most recent Standard Assessment (SEDAR 43 2015) on gray triggerfish, which indicated the stock was not rebuilding on schedule, this alternative would not rebuild the stock in 10 years or less. Since implementation of Amendment 37 rebuilding plan the Council has ended overfishing; however, the assessment indicated that inadequate progress has been made to rebuild the stock. The National Marine Fisheries Service

(NMFS) informed the Gulf of Mexico Fishery Management Council (Council) of this determination in a November 2, 2015, letter.

**Alternative 2** would be the most conservative rebuilding plan by establishing a fishing mortality value of zero. Based on the stock assessment and SSC recruitment scenario the gray triggerfish stock is projected to rebuild in 6 years or by the end of 2022 with zero fishing mortality. This is the minimum time the stock is expected to rebuild if all sources of fishing mortality (including discard mortality) were eliminated. It is projected this would require a complete closure to the harvest of gray triggerfish. Unlike other reef fish species, gray triggerfish is considered hardy and less susceptible to discard mortality (SEDAR 9 2006a; SEDAR 43 2015). Therefore, this alternative could be feasible for rebuilding the stock. For other reef fish species, discard mortality is greater and so alternative measures to reduce bycatch within different sectors would need to be considered for a rebuilding plan where fishing mortality is set at zero to work.

**Alternatives 3-5** would use the SSC’s recommended rebuilding time period for the gray triggerfish stock of 8, 9, or 10 years respectively. All of these alternatives are projected to begin in 2017 and are based on the results of SEDAR 43 (2015). The rebuilding time periods and the respective yield streams were approved by the SSC. **Alternatives 3-5** consider a constant fishing mortality rate and the resulting catch levels, if constrained, have a 60% probability of rebuilding the stock within the 8, 9, or 10-year periods.

**Table 2.1.1.** Rebuilding times starting in 2017 for the gray triggerfish with fishing mortality maintained at constant fishing mortality rate (F).

<b>Alternative</b>	<b>Rebuilding time (years)</b>	<b>Rebuilding date</b>
<b>Alternative 2</b>	6	2022
<b>Alternative 3</b>	8	2024
<b>Alternative 4</b>	9	2025
<b>Alternative 5</b>	10	2026

## 2.2 Action 2 - Establish Annual Catch Limits and Annual Catch Targets for Gray Triggerfish

\*Notes: The decisions in Action 1 for rebuilding time period dictates the options that can be used in Alternative 3.

The sector allocations for gray triggerfish are 21% commercial and 79% recreational as established in Amendment 30A. All acceptable biological catch (ABC), sector annual catch limits (ACLs), and annual catch targets (ACTs) are in pounds whole weight.

**Alternative 1:** No Action. Retain the gray triggerfish sector ACLs and ACTs as developed in Amendment 37 and has been in effect since 2012.

ABC	Commercial ACL	Recreational ACL
305,300	64,100	241,200
	Commercial ACT (quota)	Recreational ACT
	60,900	217,100

**Alternative 2:** Set sector ACLs and ACTs for gray triggerfish at zero pounds until a new stock assessment has been completed.

**Alternative 3:** Use the SSC's recommended rebuilding period of 8, 9, or 10 years from SEDAR 43 (2015).

**Option a.** Corresponds with the annual ABC's recommended for 2017 through 2019 by the SSC that are estimated to rebuild the gray triggerfish stock in 8 years or by the end of 2024. Use the ACL/ACT control rule buffer for each sector based on landings from 2012 through 2015. This results in an 8% buffer between the ACL and ACT for the commercial sector and a 20% buffer between the ACL and ACT for the recreational sector.

Year	ABC	Commercial ACL	Commercial ACT (quota)	Recreational ACL	Recreational ACT
2017	216,000	45,360	41,731	170,640	136,512
2018	227,000	47,670	43,856	179,330	143,464
2019	233,000	48,930	45,016	184,070	147,256

**Option b.** Corresponds with the annual ABC's recommended for 2017 through 2019 by the SSC that are estimated to rebuild the gray triggerfish stock in 9 years or by the end of 2025. Use the ACL/ACT control rule buffer for each sector based on landings from 2012 through 2015. This results in an 8% buffer between the ACL and ACT for the commercial sector and a 20% buffer between the ACL and ACT for the recreational sector.

Year	ABC	Commercial ACL	Commercial ACT (quota)	Recreational ACL	Recreational ACT
2017	399,000	83,790	77,087	315,210	252,168
2018	412,000	86,520	79,598	325,480	260,384
2019	417,000	87,570	80,564	329,430	263,544

**Option c.** Corresponds with the annual ABC's recommended for 2017 through 2019 by the SSC that are estimated to rebuild the gray triggerfish stock in 10 years or by the end of 2026. Use the ACL/ACT control rule buffer for each sector based on landings from 2012 through 2015. This results in an 8% buffer between the ACL and ACT for the commercial sector and a 20% buffer between the ACL and ACT for the recreational sector.

Year	ABC	Commercial ACL	Commercial ACT (quota)	Recreational ACL	Recreational ACT
2017	546,000	114,660	105,487	431,340	345,072
2018	554,000	116,340	107,033	437,660	350,128
2019	555,000	116,550	107,226	438,450	350,760

**Alternative 4:** Use the SSC recommendation of mean ABC yield streams for 2017 through 2019 for each of rebuilding periods (8, 9, and 10 years). Use the ACL/ACT control rule buffer for each sector based on landings from 2012 through 2015. This results in an 8% buffer between the ACL and ACT for the commercial sector and a 20% buffer between the ACL and ACT for the recreational sector.

**Option a.** Corresponds with the mean ABC projections to rebuild the stock in 8 years or by the end of 2024.

**Option b.** Corresponds with the mean ABC projections to rebuild the stock in 9 years or by the end of 2025.

**Option c.** Corresponds with the mean ABC projections to rebuild the stock in 10 years or by the end of 2026.

Options	Year	ABC Mean (2017-2019)	Commercial ACL	Commercial ACT (quota)	Recreational ACL	Recreational ACT
<b>Option a</b>	8-year	225,333	47,320	43,534	178,013	142,410
<b>Option b</b>	9-year	409,333	85,960	79,083	323,373	258,698
<b>Option c</b>	10-year	551,667	115,850	106,582	435,817	348,654

## **Discussion:**

Action 2 includes alternatives to modify the acceptable biological catch (ABC), annual catch limits (ACLs), and annual catch targets (ACTs) for gray triggerfish based on the SEDAR 43 (2015) stock assessment and subsequent Scientific and Statistical Committee (SSC) review.

**Alternative 1** (No Action) would retain an ABC of 305,000 lbs as established in Amendment 37 (GMFMC 2012). **Alternative 2** would set the sector ACLs and ACTs at zero until a new stock assessment is completed, currently scheduled for initiation in 2019. The current ABC recommendation from the SSC to rebuild the stock within 8 years for 2017 through 2019 are as follows: **Alternative 3a**: 216,000 lbs, 227,000 lbs, and 233,000 lbs. The SSC also made recommendations for ABC's to rebuild the gray triggerfish stock within a 9-year period (**Alternative 3b**), and 10-year period (**Alternative 3c**). However, the 9 and 10-year rebuilding recommendations in **Alternative 3b** and **3c** exceed the current ABC level. **Alternative 4** uses the SSC recommendation of the mean of the ABC yield streams from 2017-2019 for each of the rebuilding periods (8, 9, and 10 years). For **Alternative 4** the mean ABC in **Option a** (8 years) is 225,333 lbs, **Option b** (9 years) is 409,333 lbs, and **Option c** (10 Years) is 551,667 lbs. **Alternatives 3, 4** and **5** would all use the ACL/ACT control rule to set the commercial ACT buffer at 8% less than the commercial ACL (Appendix A), and the recreational ACT buffer at 20% less than the recreational ACL (Appendix B).

Gray triggerfish are currently managed toward harvesting the ACT (i.e., quota). This strategy provides a management buffer between the ACT and ACL, ultimately reducing the likelihood of exceeding the ACL and triggering accountability measures (AMs). The Council established the ACL/ACT control rule in the Generic ACL/AM Amendment (GMFMC 2011). The Council developed the ACL/ACT control rule so it could objectively and efficiently assign catch limits and targets that take into account management uncertainty. The rule uses different levels of information about catch levels, sector overages, stock management practices, and data quality to assign levels of reduction for either sector ACLs or ACTs.

## 2.3 Action 3 - Modify the Recreational Fixed Closed Season for Gray Triggerfish

**Alternative 1:** No Action. Do not modify the gray triggerfish current closed season for the recreational sector of June 1 through July 31.

**Alternative 2:** Modify the gray triggerfish closed season for the recreational sector to be from June 1 through August 31.

**Alternative 3:** Modify the gray triggerfish closed season for the recreational sector to be from January 1 through July 31.

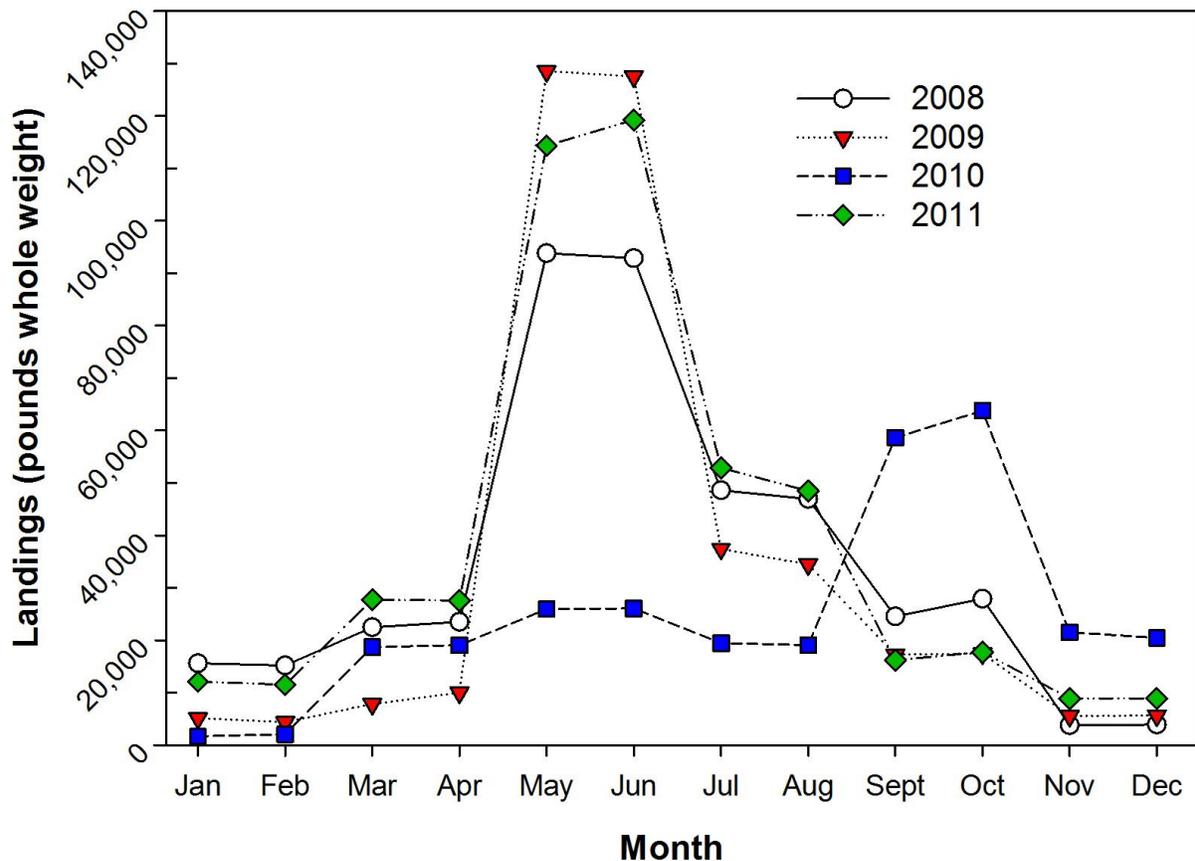
**Alternative 4:** Modify the gray triggerfish closed season for the recreational sector to be from January 1 through February 28 and maintain the June 1 through July 31 closed season.

**Alternative 5:** Modify the gray triggerfish closed season for the recreational sector to be from January 1 through January 31 and maintain the June 1 through July 31 closed season.

### **Discussion:**

Action 3 would modify the recreational fixed closed season for gray triggerfish for 2017 and beyond. In 2008, 2009, and 2011, peak recreational gray triggerfish landings occurred during the months of May and June. Recreational gray triggerfish landings then decreased in July and August, but remained greater than other monthly landings throughout the year (Figure 2.3.1). In 2010, the pattern of landings may have shifted because of fishing closures due to the Deepwater Horizon MC252 oil spill ([http://sero.nmfs.noaa.gov/fishery\\_bulletins/bulletin\\_archives/2010/index.html](http://sero.nmfs.noaa.gov/fishery_bulletins/bulletin_archives/2010/index.html)).

Recreational landings will need to be reduced based on the ACT selected by the Council in Action 2. **Alternative 1** would maintain the fixed June 1 through July 31 recreational closed season. The Council elected to establish this fixed closed season, because it overlapped with the time period of peak spawning, document in the northern Gulf (Ingram 2001; Simmons and Szedlmayer 2012). Gray triggerfish are fecund as early as May and as late as August, but peak spawning was recorded in June and July in the northern Gulf and South Atlantic Bight (Wilson et al. 1995; Hood and Johnson 1997; Ingram 2001; Moore 2001; Simmons and Szedlmayer 2012). The month of June was also one of the two peak months for recreational landings of gray triggerfish (Figure 2.3.1).



**Figure 2.3.1.** Recreational landings of gray triggerfish in the Gulf of Mexico by month from 2008 through 2011. Source: SERO-ACL dataset. Will be updated after June Council meeting.

**Alternative 1** is projected to provide 163 fishing days, closing in mid-August, based on the recreational decision tool, SERO-LAPP Gulf 2016. However, as the stock rebuilds this projected closure could fluctuate annually. Gray triggerfish and red snapper commonly co-occur on reefs in the northern Gulf of Mexico. Currently, the recreational red snapper season is open during June so anglers may not currently land gray triggerfish while fishing for red snapper. Discarded gray triggerfish are estimated to have a minimal mortality (SEDAR 9 2006a; SEDAR 9 Update 2011b). Therefore, closing gray triggerfish fishing during part of the red snapper season would not be expected to substantially increase dead discards.

**Alternative 2** would establish a fixed closed season for gray triggerfish from June through August. **Alternative 3** would establish a fixed recreational closed season for gray triggerfish from January 1 through July 31. **Alternatives 4** and **5** would maintain the June 1 – July 31 closed season, and establish an additional fixed recreational closed season. **Alternative 4** would establish the additional fixed recreational closed season for gray triggerfish during the months of January and February, and **Alternative 5** would establish the additional fixed recreational closed season during the month of January.

**Table 2.3.1.** The total recreational projected landings expected by closing single months or a combination of months and maintaining the minimum size limit of 14 inches fork length (FL) and the 2 fish bag limit.

<b>Action 3</b>	<b>Closed Month(s)</b>	<b>Total Projected Landings (ww)</b>
<b>Alternative 1</b>	None (status quo)	337,803 lbs
<b>Alternative 2</b>	June - August	272,727 lbs
<b>Alternative 3</b>	Jan-July	148,177 lbs
<b>Alternative 4</b>	Jan-Feb & Jun - July	299,984 lbs
<b>Alternative 5</b>	Jan & Jun-July	317,932 lbs

Source: SERO-LAPP Gulf 2016.

## 2.4 Action 4 - Modify the Recreational Bag Limit for Gray Triggerfish

**Alternative 1:** No Action. Do not modify the recreational daily bag limit of 2 gray triggerfish per angler per day within the 20-reef fish aggregate bag limit.

**Alternative 2:** Reduce the recreational daily bag limit to be 1 gray triggerfish per angler per day within the 20-reef fish aggregate bag limit.

### **Discussion:**

Action 4 would modify the recreational bag limit for gray triggerfish. Gray triggerfish is currently part of the 20-reef fish aggregate bag limit that includes: vermilion snapper, lane snapper, almaco jack, tilefish (golden), goldface tilefish, and blueline tilefish. Gray triggerfish currently has a 2 fish per angler per day bag limit (**Alternative 1**). **Alternative 2** would reduce the recreational bag limit to 1 gray triggerfish per angler within the 20-reef fish aggregate bag limit. If the Council reduced the bag limit to 1 gray triggerfish per angler and maintained the June 1 through July 31 closed season and 14-inch FL minimum size, recreational landings are estimated to be 286,008 lbs whole weight (ww). Therefore, depending on the rebuilding time period and catch limits established in Actions 1 and 2, other management measures would likely be necessary in addition to a bag limit reduction.

## 2.5 Action 5 - Modify the Recreational Minimum Size Limit for Gray Triggerfish

**Alternative 1:** No Action. Do not modify the gray triggerfish recreational minimum size limit of 14 inches fork length (FL).

**Alternative 2:** Increase the recreational minimum size limit for gray triggerfish to 15 inches FL.

**Alternative 3:** Increase the recreational minimum size limit for gray triggerfish to 16 inches FL.

### Discussion:

Action 5 would increase the recreational minimum size limit. **Alternative 1** (No Action) would maintain the current 14 inch FL recreational minimum size. **Alternative 2** and **3** would increase the minimum size limit to 15 and 16 inches FL, respectively. Amendment 37 (GMFMC 2013) originally included management alternatives to modify the current minimum size limit of 14 inches FL, to 16 or 18 inches FL. The SERO-LAPP 2016 recreational decision tool allows for an increase in minimum size limits up to 20 inches FL.

Amendment 16B (GMFMC 1998) established a 12-inch total length (TL) minimum size limit, which became effective in 1999. To assist fishermen in measuring gray triggerfish, the size limit was changed from total length to fork length in Amendment 30A (implemented in August 2008). Amendment 30A also increased the minimum size limit to 14-inches FL as part of the rebuilding plan to end overfishing and allow the stock to recover.

The SERO-LAPP 2016 recreational decision tool does not account for effort shifting that may take place during season closures, nor does it consider any changes in the average size of gray triggerfish during rebuilding. Future angler behavior is unknown and the model is based on past behavior and economic environments. However, effort shifting and changes in average size may affect the total number of pounds harvested. Further, the model does not account for increases in the number of trips taken to compensate for implemented effort controls such as aggregate bag limits and closed seasons because it is largely unknown how management measures considered in the model will affect angler behavior. Finally, changes in recreational effort levels or catch-per-effort are not considered in the model. As such, management reductions projected by the model may be overestimated, and caution should be taken in their interpretation and use.

The 14-inch FL minimum size limit is greater than the size at first maturity. Studies estimated first maturity for both male and female gray triggerfish at 10-inches FL (Hood and Johnson 1997; Ingram 2001). Unlike nearly all other reef fish species managed by the Council, gray triggerfish has a very low release mortality rate. Only small percentages (i.e., 1.5%) of gray triggerfish are estimated to die after release (GMFMC 2008). Increasing the minimum size limit is not anticipated to significantly increase discard mortality due to the very low release mortality rate. An increase in the minimum size limit could also potentially benefit the stock by increasing spawning potential (larger fish are more fecund).

Size limits are typically established to reduce fishing mortality, increase yield-per-recruit, and prevent growth overfishing. Increasing the minimum size limit is estimated to increase the proportion of dead discards to landings. Nevertheless, the overall magnitude of dead discards is estimated to be less for higher size limits relative to the status quo because of the concurrent reductions in harvest.

The issue of undersized gray triggerfish being landed from 2009 through 2011 was brought to the attention of NMFS, the Council, and the Gulf state directors. The Council determined that there should be increased education regarding the current size limits before implementing new size limits and that the current minimum size limit (14 inches FL) was a large gray triggerfish. Staffs of NMFS and the Council conducted education and outreach efforts on species identification and measuring guidelines for gray triggerfish which were developed cooperatively with public relations staff from all agencies. These efforts in 2013 were successful, and the next draft of the document will summarize the improvements made in reducing the frequency of undersized gray triggerfish landings.

## 2.6 Action 6 - Modify the Commercial Fixed Closed Season for Gray Triggerfish

**Alternative 1:** No Action. Do not modify the gray triggerfish current closed season for the commercial sector of June 1 through July 31.

**Alternative 2:** Modify the gray triggerfish closed season for the commercial sector to be from March 1 through July 31.

**Alternative 3:** Modify the gray triggerfish closed season for the commercial to be from June 1 through August 31.

### **Discussion:**

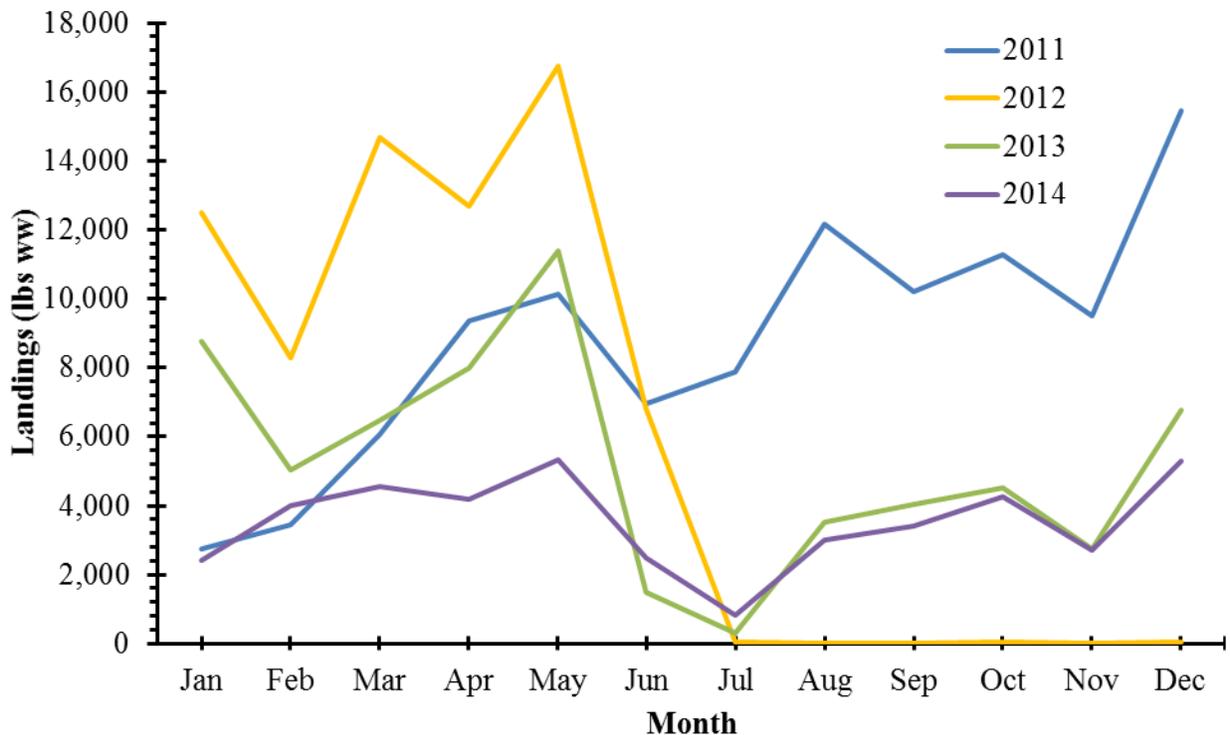
The commercial decision tool for gray triggerfish (SERO-LAPP 2016) is currently being developed to allow the Council to examine a range of options after selecting a rebuilding time period (Action 1) and establishing ACLs and ACTs (Action 2). The model has been updated to include landings data from 2013-2015 and will be available for the next Council meeting. The model also provides estimates of total projected landings for gray triggerfish under the various management scenarios and total removals. An estimate of total removals incorporates discard mortality. The stock assessments for gray triggerfish determined discard mortality was minimal and therefore discard mortality was modeled at 0% (SEDAR 9 2006a; SEDAR 9 Update 2011b) and modeled at 5% with a sensitivity analysis at 10% in SEDAR 43 (2015). Results indicated that spawning stock biomass (SSB) was not sensitive to discard mortality. Following this assumption, discard mortality was modeled at 5% in the updated commercial decision tool (SERO-LAPP 2016).

The gray triggerfish commercial decision model estimates reductions in landings associated with various management measures (i.e., trip limits and closed seasons) necessary to achieve the ACTs summarized in Action 2. Reductions in landings for trip limits and minimum size limits were determined using logbook and trip interview program data from 2013 through 2015. These reductions were applied to 2017 monthly projected commercial landings to determine how much harvest would be reduced by implementing new management regulations. The impacts of seasonal closures were modeled by converting the number of days closed into a percentage of days closed for a given month, and then applied the percentage to 2017 monthly projected commercial landings. Projected 2017 landings were generated from a seasonal auto-regressive integrated moving average model (Box and Jenkins 1976), which uses a combination of historical landings data and past, present, and future exploitable abundances to predict future landings.

The commercial decision tool does not account for effort shifting that may take place during season closures, nor does it consider any changes in the average size of gray triggerfish during rebuilding. Future fishing behavior is unknown and the model is based on past behavior and economic environments. Thus, changes in effort and average size of fish landed could affect the total pounds of gray triggerfish harvested. Further, the model does not account for increases in

the number of trips taken to compensate for implemented effort controls such as trip limits and closed seasons for the same reasons. Therefore, it is unknown how the management measures considered in the model will impact commercial effort levels or catch-per-effort thereafter. As such, management reductions projected by the model may be overestimated, and caution should be taken in their interpretation and use.

Action 6 evaluates different fixed closed seasons for the commercial sector to address the goal of rebuilding the gray triggerfish stock. Figure 2.6.1 illustrates that gray triggerfish is landed throughout the year by the commercial sector and there is no discernible trend in monthly landings from 2011-2014. In 2012, there were no landings from July to December, because the fishery was closed on July 1, 2012. Currently, the commercial sector closes when the harvest reaches or is projected to reach the ACT (quota). There is also a fixed closed season during the months of June and July. The June and July closure was implemented through Amendment 37 (GMFMC 2012) to reduce harvest during the peak spawning months for gray triggerfish in the Gulf. If an in-season closure is necessary because the ACT is determined to have been met, the harvest of gray triggerfish would be prohibited until January 1 of the next year.



**Figure 2.6.1.** Commercial landings of gray triggerfish in the Gulf of Mexico by month from 2011 through 2014. Source: SERO-ACL dataset.

**Alternative 1** (No Action) would continue to close the commercial harvest of gray triggerfish from June 1 through July 31, and prohibit further harvest when the ACT is projected to be reached. **Alternatives 2 and 3** would close different months of the year to achieve reductions in harvest. **Alternative 2** would close the commercial fishing season from March 1 through July 31, and is estimated to achieve a XX% reduction in landings from the status quo. **Alternative 3**

would close the commercial fishing season from June 1 through August 31, and is estimated to achieve a reduction of XX%. These alternatives, by themselves, do not reduce gray triggerfish landings to the 60,900 lbs ww, which is the ACT selected by the Council in Amendment 37. Thus, unless additional management measures are selected in combination with the seasonal closures to achieve the needed harvest reductions, fishing for gray triggerfish would still close later in the year after the ACT is met, per the commercial gray triggerfish AMs.

## 2.7 Action 7 - Modify the Commercial Trip Limit for Gray Triggerfish

**Alternative 1:** No Action. Maintain the commercial trip limit of 12 gray triggerfish per vessel per day.

**Alternative 2:** Increase the commercial trip limit for gray triggerfish to 14 fish per vessel per day.

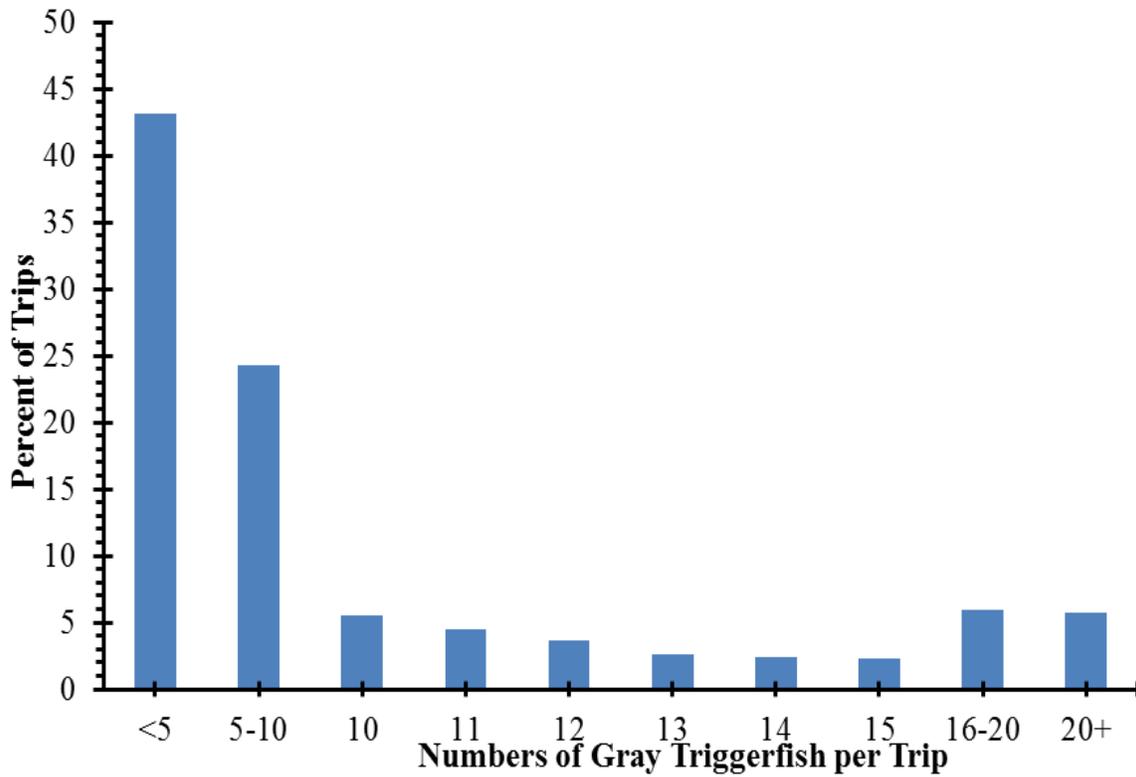
**Alternative 3:** Decrease the commercial trip limit for gray triggerfish to 10 fish per vessel per day.

### Discussion:

Action 7 evaluates different commercial trip limits as a measure to reduce or increase gray triggerfish commercial landings. The average weight of commercially harvested gray triggerfish was 3.93 lbs ww based on 406 observer samples from 2013 through 2015 (SERO-LAPP 2016). In Amendment 37, the Council based its decision to use trip limits in numbers of fish instead of weight based on the recommendations made by the Law Enforcement Advisory Panel (AP). The Law Enforcement AP felt it would be difficult to enforce such a low poundage of gray triggerfish per trip (i.e., 25, 50, and 75 lbs ww) and recommended the trip limit be set using numbers of fish.

Currently, the commercial trip limit for gray triggerfish is 12 fish. The gray triggerfish landings for each commercial trip were converted to numbers of gray triggerfish by dividing by the current average weight. Figure 2.7.1 provides the percent of commercial trips from 2013 through 2015 that landed at least 1 gray triggerfish. The majority (81%) of Gulf commercial trips from 2013 through 2015 landed 12 gray triggerfish or less on any particular trip (Figure 2.7.1). The commercial sector typically lands a relatively small number of pounds per trip, because gray triggerfish is one of the many species that is part of a multi-species reef fish fishery.

**Alternative 1** (No Action) would maintain the 12-gray triggerfish fish trip limit. Thus, no additional reductions in harvest would occur unless a longer commercial season closure is selected in Action 2. **Alternative 2** (14-gray triggerfish trip limit) is estimated to increase landings by XX%. Depending on the rebuilding plan selected by the Council and the corresponding catch levels a reduction in trip limit may not be necessary. Currently, the commercial sector is not landing their quota and the Reef Fish AP, suggested that the commercial trip limit is currently too low. **Alternative 3** (10 gray triggerfish trip limit) is estimated to reduce landings by XX%. It is unknown if the current commercial trip limit (**Alternative 1**) would not attain the needed reductions in harvest to achieve the management goals of the rebuilding plan.



**Figure 2.7.1.** Percent of commercial trips landing gray triggerfish in the Gulf of Mexico from 2013 through 2015 (n = 3,643 trips). The landings from the trips are separated into the number of gray triggerfish landed for each trip. SERO-commercial logbook dataset.

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# Appendix A. ACL/ACT Control Rule for the Commercial Sector

## ACL/ACT Buffer Spreadsheet

version 4.1 - April 2011

Commercial Gray Triggerfish

sum of points 2  
max points 6.0

Buffer between ACL and ACT (or ABC and ACL) Unweighted 6

Revised 3/24/2016

Min. Buffer	0	min. buffer	User adjustable
Max Unw. Buff	19	max unwt. Buff	
Max Wtd Buff	25	max wtd. buffer	User adjustable

Weighted 8

Component	Element score	Element	Selection	Element result
Stock assemblage	0	This ACL/ACT is for a single stock.	x	0
	1	This ACL/ACT is for a stock assemblage, or an indicator species for a stock assemblage		
Ability to Constrain Catch	0	Catch limit has been exceeded 0 or 1 times in last 4 years	x	1
	1	Catch limit has been exceeded 2 or more times in last 4 years		
		For the year with max. overage, add 0.5 pts. For every 10 percentage points (rounded up) above ACL	1.0	
		Not applicable (there is no catch limit)		
Precision of Landings Data Recreational	0	Apply this component to recreational fisheries, not commercial or IFQ fisheries		not applicable
	1	Method of absolute counting		
	2	MRIP proportional standard error (PSE) <= 20		
	2	MRIP proportional standard error (PSE) > 20		
		Not applicable (will not be included in buffer calculation)	x	
Precision of Landings Data Commercial	0	Apply this component to commercial fisheries or any fishery under an IFQ program		1
	1	Landings from IFQ program		
	1	Landings based on dealer reporting	x	
	2	Landings based on other		
		Not applicable (will not be included in buffer calculation)		
Timeliness	0	In-season accountability measures used or fishery is under an IFQ	x	0
	1	In-season accountability measures not used		

Sum 2

Weighting factor		Element weight	Element	Selection	Weighting
Overfished status	0	1.	Stock biomass is at or above $B_{OY}$ (or proxy).		0.3
	0.1	2.	Stock biomass is below $B_{OY}$ (or proxy) but at or above $B_{MSY}$ (or proxy).		
	0.2	3.	Stock biomass is below $B_{MSY}$ (or proxy) but at or above minimum stock size threshold (MSST).		
	0.3	4.	Stock is overfished, below MSST.	x	
	0.3	5.	Status criterion is unknown.		

Year	Catch	ACL	Over/Under %
2012	71,948	64,100	12%
2013	63,086	64,100	-2%
2014	42,532	64,100	-34%
2015	47,480	64,100	-26%

Greatest percent overage = 12% = 1 point  
 ACL exceeded 1 time in last 4 years  
 Data Source ACL Data set provided to IPT by Rich Malinowski to IPT on 2/26/2016

# Appendix B. ACL/ACT Control Rule for the Recreational Sector

## ACL/ACT Buffer Spreadsheet

version 4.1 - April 2011

Recreational Gray Triggerfis

sum of points 8.5  
max points 10.5

revised 3/24/2016  
Buffer between ACLand ACT (or ABC and ACL) Unweighted 16  
Weighted 20

Min. Buffer	0	min. buffer	User adjustable
Max Unw. Buff	19	max unwt. Buff	
Max Wtd Buff	25	max wtd. buffer	User adjustable

Component	Element score	Element	Selection	Element result
Stock assemblage	0	This ACL/ACT is for a single stock.	x	0
	1	This ACL/ACT is for a stock assemblage, or an indicator species for a stock assemblage		
Ability to Constrain Catch	0	Catch limit has been exceeded 0 or 1 times in last 4 years		6.5
	1	Catch limit has been exceeded 2 or more times in last 4 years	x	
		For the year with max. overage, add 0.5 pts. For every 10 percentage points (rounded up) above ACL Not applicable (there is no catch limit)	5.5	
Precision of Landings Data Recreational	0	Apply this component to recreational fisheries, not commercial or IFQ fisheries Method of absolute counting		2
	1	MRIP proportional standard error (PSE) <= 20		
	2	MRIP proportional standard error (PSE) > 20	x	
		Not applicable (will not be included in buffer calculation)		
Precision of Landings Data Commercial	0	Apply this component to commercial fisheries or any fishery under an IFQ program Landings from IFQ program		not applicable
	1	Landings based on dealer reporting		
	2	Landings based on other		
		Not applicable (will not be included in buffer calculation)	x	
Timeliness	0	In-season accountability measures used or fishery is under an IFQ	x	0
	1	In-season accountability measures not used		
Sum				8.5

Weighting factor	Element weight	Element	Selection	Weighting
Overfished status	0	1. Stock biomass is at or above $B_{OY}$ (or proxy).		0.3
	0.1	2. Stock biomass is below $B_{OY}$ (or proxy) but at or above $B_{MSY}$ (or proxy).		
	0.2	3. Stock biomass is below $B_{MSY}$ (or proxy) but at or above minimum stock size threshold (MSST).		
	0.3	4. Stock is overfished, below MSST.	x	
	0.3	5. Status criterion is unknown.		

Year	Catch	ACL	Over/Under %
2012	279,874	214,200	31%
2013	456,642	241,200	89%
2014	217,885	186,993	17%
2015	114,059	54,207	110%

preliminary

2014 and 2015 ACLs adjusted for prior year overages  
Greatest percentage overage = -117% = 6 points  
ACL exceeded 4 times in last 4 years  
Data Source ACL Data set provided to IPT by Rich Malinowski to IPT on 2/26/2016

Year	PSE
2012	16.2
2013	21.8
2014	26.3
2015	36.8 preliminary
Average	25.3 Avg PSE > 20