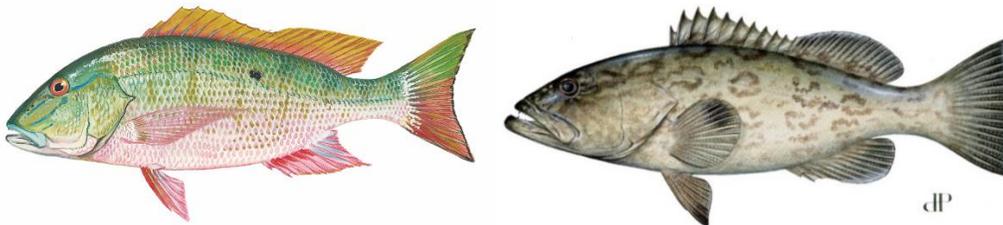


Modifications to Mutton Snapper and Gag Management Measures



Draft Framework Action to the Fishery Management Plan for Reef Fish Resources of the Gulf of Mexico

January 2017



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ENVIRONMENTAL ASSESSMENT COVER SHEET

Name of Action

Framework Action to the Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico to Modify Mutton Snapper and Gag Management Measures.

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Type of Action

Administrative Legislative
 Draft Final

Summary/Abstract

ABBREVIATIONS USED IN THIS DOCUMENT

ABC	Acceptable biological catch
ACL	Annual catch limit
ACT	Annual catch target
AMs	Accountability measures
B	Biomass
CPUE	Catch per unit effort
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EIS	Environmental impact statement
F	Instantaneous rate of fishing mortality
FL	Fork length
FLS	Federal logbook system
F _{30% SPR}	Fishing mortality corresponding to 30% spawning potential ratio
FMP	Fishery Management Plan
FWC	Florida Fish and Wildlife Commission
FWRI	Florida Wildlife Research Institute
GMFMC	Gulf of Mexico Fishery Management Council
IRFA	Initial regulatory flexibility analysis
M	Mortality
MFMT	Maximum fishing mortality threshold
mp	Million pounds
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
RFA	Regulatory Flexibility Act of 1980
RIR	Regulatory impact review
SEDAR	Southeast Data, Assessment and Review
SEFSC	Southeast Fisheries Science Center
SMZ	Special Management Zone
SSC	Scientific and Statistical Committee
SPR	Spawning potential ratio
TAC	Total allowable catch
ww	Whole weight
YPR	Yield per recruit

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CHAPTER 1. INTRODUCTION

1.1 Background

Mutton Snapper Annual Catch Limit, Recreational Bag Limit, and Minimum Size Limits

All mutton snapper in U.S. waters come from a single stock (Faunce et al. 2007) with the center of abundance in south Florida. A stock assessment for mutton snapper was completed (SEDAR 15A Update, 2015) by the Florida Fish and Wildlife Research Institute (FWRI) and reviewed by the South Atlantic and Gulf of Mexico (Gulf) Fishery Management Councils' (Council[s]) Scientific and Statistical Committees (SSCs). Based on this assessment, the SSCs agreed that the stock was not overfished and overfishing was not occurring (Table 1.1.1). However, the results of the stock assessment indicated that the adult population of mutton snapper is smaller than previously estimated (SEDAR 15A, 2008), and a reduction in harvest is necessary to ensure that overfishing does not occur. While the 2015 assessment does not indicate that management changes beyond a quota reduction are needed at this time, the Gulf Council will also be considering changes to recreational and commercial mutton snapper regulations.

Table 1.1.1. Status determination criteria and stock status of mutton snapper based on SEDAR 15A (2015) accepted by the SSC. Results indicate that the mutton snapper stock is not overfished (i.e., $SSB/SSB_{F30\%} > 1$) and is not experiencing overfishing (i.e., $F/F_{30\%SPR} < 1$).

	Definition	Value
Stock status	$SSB/SSB_{F30\%}$	1.13
Overfishing evaluation	$F/F_{30\%SPR}$	0.65
MFMT	$F_{30\%SPR}$	0.18
$F_{CURRENT}$	Geometric mean (2011-2013)	0.12
Biomass criteria		
Spawning stock biomass	$SSB_{30\%SPR}$ (females)	4,649,200 (lbs)
MSST	Pounds of females	4,137,700 (lbs)
MSY proxy	Yield at $F_{30\%SPR}$ (pounds)	912,500 (lbs)

Source: Table 4.8.1; SEDAR 15A Update 2015.

Although mutton snapper is a single stock in the southeast region, the Gulf and South Atlantic Councils manage mutton snapper independently within their respective jurisdictions (Figure 1.1.1), and the Florida Fish and Wildlife Conservation Commission (FWC) establishes their own size and bag limits in state waters. For the recreational sector, regulations are the same in state and federal waters (Table 1.1.2). For the commercial sector, bag limits are restricted to 10 fish per person per day, or per trip, in May and June (whichever is more restrictive) in Florida state waters and South Atlantic federal waters, while there is no commercial bag limit in Gulf federal waters (Table 1.1.3).

The mutton snapper acceptable biological catch (ABC) is apportioned between regions based on a jurisdictional apportionment that was established in the Generic Annual Catch Limit (ACL)/Accountability Measures (AM) Amendment (GMFMC 2011). This amendment established a stock overfishing limit (OFL) at 1.48 million pounds (mp) of landings whole weight (ww)¹, and a stock ABC equal to 1.13 mp (landings). The ABC for the South Atlantic is 82% of the stock ABC, and the Gulf ABC is 18% of stock ABC. This was established using 50% of the mean of the catch history from 1990-2008 plus 50% of the mean of the catch history from 2006-2008 (GMFMC 2011).

Table 1.1.2. Recreational fishing regulations for reef fish species in Florida state waters and federal waters of the Gulf and South Atlantic. Minimum size limits are in total length (TL); bag limits are per person per day. As of January 1, 2017, Florida increased the minimum size limit for mutton snapper to 18” TL. The South Atlantic has also selected 18” TL as their preferred alternative in Snapper Grouper Amendment 41, which is anticipated to be implemented in 2017.

Species	Recreational Regulations	Florida State Waters	Federal Waters Gulf of Mexico	Federal Waters South Atlantic
Mutton Snapper	Size Limit	18” TL	16” TL	
	Bag Limit	5 mutton snapper within 10 snapper aggregate bag limit	10 mutton snapper within 10 snapper aggregate bag limit	

Table 1.1.3. Commercial fishing regulations for reef fish species in Florida state waters and federal waters of the Gulf and South Atlantic. Minimum size limits are in total length (TL). Florida increased the minimum size limit for mutton snapper to 18” TL effective January 1, 2017. The South Atlantic has also selected 18” TL as their preferred Alternative in Snapper Grouper Amendment 41, which is anticipated to be implemented in 2017.

Species	Commercial Regulations	Florida Gulf/South Atlantic State Waters	Federal Waters Gulf of Mexico	Federal Waters South Atlantic
Mutton Snapper	Size Limit	18” TL	16” TL	
	Trip Limit	500 lb (July - March); 5/person (May - June)	No Trip Limit	10/person/day or 10/person/trip, whichever is more restrictive (May - June)

Mutton snapper are typically solitary animals; however, from April to August, they form large spawning aggregations timed with the full moon. Spawning peaks from April through early July (SEDAR Update Assessment 2015). These aggregations are highly predictable and make mutton snapper highly vulnerable to fishing pressure while spawning. The Council is considering changes to spawning season closures, bag limits, and size limits. The Council may want to consider developing compatible regulations with both the South Atlantic Council and State of

¹ These values do not include estimated discards, whereas the South Atlantic Council reports the OFL = 1.52 mp and ABC = 0.93 mp as the sum of landings and discards (SAFMC 2011).

Florida to simplify management and increase compliance for anglers harvesting this species in south Florida.

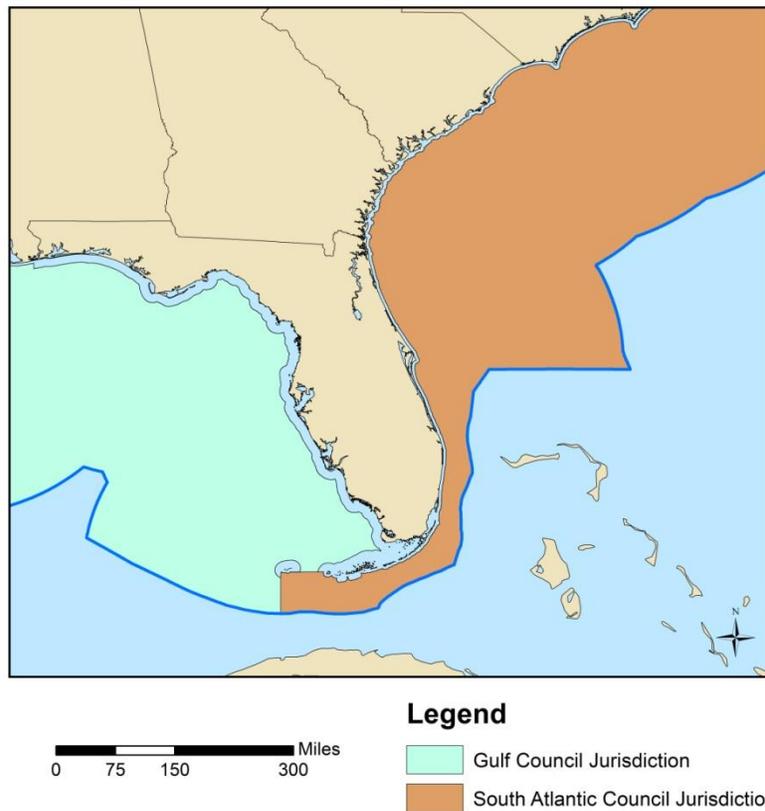


Figure 1.1.1. Jurisdictional boundaries of the Gulf (green) and South Atlantic (brown) Councils.

Landings data

The vast majority of mutton snapper landings occur in waters adjacent to Florida. Within the South Atlantic Council's jurisdiction, mutton snapper landings are predominantly from the recreational sector while harvest in the Gulf Council's jurisdiction is primarily from the commercial sector (Table 1.1.4).

Table 1.1.4. Commercial and recreational landings of mutton snapper by sector and region from 2010 through 2015. Recreational data includes all modes.

Year	South Atlantic			Gulf of Mexico			Stock Total
	Rec	Com	SA Total	Rec	Com	Gulf Total	
2010	477,647	74,737	552,384	1,541	54,242	55,783	608,167
2011	251,446	66,158	317,604	1,391	94,238	95,629	413,233
2012	505,583	77,122	582,705	7,156	88,695	95,851	678,556
2013	660,449	74,229	734,678	5,833	107,814	113,647	848,325
2014	538,122	91,173	629,295	6,669	109,792	116,461	745,756
2015	692,613	92,569	785,182	3,454	131,432	134,886	920,068
Mean	520,977	79,331	600,308	4,341	97,702	102,043	702,351

Gag Commercial Minimum Size Limit

Currently, the gag commercial minimum size limit is 22" TL in Gulf federal waters, while the recreational minimum size limit is 24" TL in Florida state waters and the federal waters of the Gulf and South Atlantic. This creates a compliance burden for fishermen in the south Florida area, particularly the Florida Keys, where commercial fishermen can fish in multiple jurisdictions on a single trip. The rationale for the commercial minimum size limit in Gulf waters is that the 22" TL minimum size limit reduces dead discards. Alternative 2 in Action 4 considers increasing the minimum size limit to 24" TL to be consistent with regulations in adjoining waters and to be consistent with the recreational sector.

Gag in the Gulf have a maximum recorded age of 31 years (sampled in 2005); however most recent aging (since 2005) estimates the maximum age at 28-29 years (Lombardi et al. 2013). Gag mature first as females and then transition to males at older ages. The age at which gag are sexually mature is recorded only for females. The age at maturity has decreased somewhat in the last couple decades: from 1991-1996, the age at which at least 50% of female gag were sexually mature (A_{50}) was 3.5 years, and the length at which at least 50% of gag were sexually mature females (L_{50}) was 538 mm fork length (FL) (554 mm TL, or 21.8"). From 1997-2012, these metrics decreased to $A_{50} = 3.3$ years, and $L_{50} = 502$ FL (516 mm TL, or 20.3") (SEDAR 33 2014). This decrease could be due in part to differences in recording lengths in TL versus FL, or changing life history characteristics induced by size selective mortality that has occurred in other intensively fished species (Hamilton et al. 2007).

Many minimum size limit regulations aim to prevent recruitment overfishing (i.e., the take of fish before maturing). In the case of gag in the Gulf, the current minimum size limit achieves this goal. Therefore, it is for the goal of making the commercial and recreational minimum size limit for gag consistent that the Council is exploring changing the commercial size limit for gag.

1.2 Purpose and Need

The purpose of this amendment is to modify the allowable harvest and management measures for the Gulf of Mexico mutton snapper as a result of the most recent Mutton Snapper Stock Assessment (SEDAR 15A Update, 2015) and to simplify management and increase compliance for anglers harvesting this species in south Florida.

The need for this action is that the Gulf ACL for mutton snapper established in the Generic ACL/AM Amendment exceeds the Gulf apportionment of the stock ABC for 2017 and beyond as recommended by the Scientific and Statistical Committee. This action also addresses a need to simplify management of commercially harvested gag by developing compatible commercial regulations in the Gulf, South Atlantic and Florida state waters.

1.3 History of Management

Reef Fish Fishery Management Plan (FMP)

Reef Fish FMP and its associated environmental impact statement (EIS), implemented in November 1984 established initial regulations, designed to rebuild declining reef fish stocks. It included prohibitions on the use of fish traps, roller trawls, and powerhead equipped spear guns within inshore stressed areas; and directed the National Marine Fisheries Service (NMFS) to develop data reporting requirements in the reef fish fishery.

Amendments to the Reef Fish FMP

Amendment 1, implemented in 1990, set objectives to stabilize long-term population levels of all reef fish species by establishing a survival rate of biomass into the stock of spawning age fish to achieve at least 20% spawning stock biomass per recruit by January 1, 2000. It also set a 20" TL minimum size limit on gag; set a five-grouper recreational daily bag limit; set an 11.0 mp commercial quota for grouper, with the commercial quota divided into a 9.2 mp shallow-water grouper (black grouper, gag, red grouper, Nassau grouper, yellowfin grouper, yellowmouth grouper, rock hind, red hind, speckled hind, and scamp) quota and a 1.8 mp deep-water grouper (misty grouper, snowy grouper, yellowedge grouper, and warsaw grouper, and scamp once the shallow-water grouper quota was filled) quota; allowed a two-day possession limit for charter vessels and headboats on trips that extend beyond 24 hours; established a longline and buoy gear boundary at the 50-fathom depth contour west of Cape San Blas, Florida, and the 20-fathom depth contour east of Cape San Blas, inshore of which the directed harvest of reef fish with longlines and buoy gear was prohibited, and the retention of reef fish captured incidentally in other longline operations (e.g., sharks) was limited to the recreational daily bag limit; limited trawl vessels to the recreational size and daily bag limits of reef fish; established fish trap permits (up to 100 fish traps per permit holder); and established a commercial reef fish vessel permit.

Amendment 5, implemented in February 1994, established restrictions on the use of fish traps in the Gulf exclusive economic zone (EEZ); implemented a three-year moratorium on the use of fish traps by creating a fish trap endorsement for fishermen with historical landings; created a

special management zone (SMZ) with gear restrictions off the Alabama coast; created a framework procedure for establishing future SMZ's; required that all finfish except for oceanic migratory species be landed with head and fins attached; and closed the region of Riley's Hump (near Dry Tortugas, Florida) to all fishing during May and June to protect mutton snapper spawning aggregations.

Regulatory Amendment, implemented in June 2000, increased the commercial size limit for gag and black grouper from 20 to 24" TL; increased the recreational size limit for gag from 20 to 22" TL; prohibited commercial sale of gag, black, and red grouper each year from February 15 to March 15 (during the peak of gag spawning season); and established two marine reserves (Steamboat Lumps and Madison-Swanson) that are closed year-round to fishing for all species under the Council's jurisdiction.

Regulatory Actions Since Gag Stock Was Declared Overfished

A rule under the **Endangered Species Act**, implemented October, 2009, prohibits bottom longlining for Gulf reef fish east of 85°30'W longitude (near Cape San Blas, Florida) shoreward of the 35-fathom depth contour; restricts the number of hooks on board to 1,000 hooks per vessel with no more than 750 hooks being fished or rigged for fishing at any given time; replaced the 50-fathom boundary emergency rule to relieve social and economic hardship on longline fishermen who were prevented from fishing for shallow-water grouper by the emergency rule, and to keep fishing restrictions consistent.

Amendment 29 (with Environmental Assessment [EA], Regulatory Impact Review [RIR], and Regulatory Flexibility Analysis [RFA]), implemented January, 2010, established an individual fishing quota (IFQ) system for the commercial harvest of grouper and tilefish.

An Emergency Rule (2010): In response to an uncontrolled oil spill resulting from the April 20 explosion and subsequent sinking of the *Deepwater Horizon* oil rig, NMFS issued an emergency rule to temporarily close a portion of the Gulf EEZ to all fishing [75 FR 24822]. The initial closed area extended from the mouth of the Mississippi River to south of Pensacola, Florida and covered an area of 6,817 square statute miles. The coordinates of the closed area were modified periodically in response to changes in the size and location of the area affected by the spill. At its largest size on June 1, 2010, the closed area covered 88,522 square statute miles, or approximately 37 percent of the Gulf EEZ. This closure was implemented for public safety.

Amendment 30B (FEIS/RIR/IRFA), implemented May 2009, established ACLs and AMs for gag and red grouper; managed shallow-water grouper to achieve optimum yield (OY) and improve the effectiveness of federal management measures; defined the gag minimum stock size threshold (MSST) and OY; set interim allocations of gag and red grouper between recreational and commercial fisheries; made adjustments to the gag and red grouper ACLs to reflect the current status of these stocks; established ACLs and AMs for the commercial and recreational gag harvest, and commercial aggregate shallow-water grouper harvest; adjusted recreational grouper bag limits and seasons; adjusted commercial grouper quotas; replaced the one-month February 15 through March 15 commercial grouper closed season with a four-month seasonal area closure at the Edges, a 390 square nautical mile area in the dominant gag spawning grounds;

eliminated the end date for the Madison-Swanson and Steamboat Lumps marine reserves; and required that vessels with federal commercial or charter reef fish permits comply with the more restrictive of state or federal reef fish regulations when fishing in state waters.

Amendment 31 (FEIS/RIR/IRFA), implemented May 26, 2010, prohibited the use of bottom longline gear shoreward of a line approximating the 35-fathom contour from June through August; established a longline endorsement; and restricted the total number of hooks onboard each reef fish bottom longline vessel to 1,000, only 750 of which may be rigged for fishing.

An **Interim Rule**, published December 1, 2010 [75 FR 74654]. While management measures for the gag rebuilding plan were being developed through Amendment 32, the **Interim Rule** reduced gag landings consistent with ending overfishing; implemented conservative management measures while a rerun of the update stock assessment was being completed; reduced the commercial quota to 100,000 lbs gutted weight (gw); suspended the use of red grouper multi-use individual fishing quota allocation so it would not be used to harvest gag, and; temporarily halted the recreational harvest of gag until recreational fishing management measures being developed in Amendment 32 could be implemented to allow harvest at the appropriate levels.

The gag 2009 update stock assessment was rerun in December 2010 addressing the problems with discards identified earlier in 2010. This assessment was reviewed in January 2011 by the Council's SSC and presented to the Council at its February 2011 meeting. The assessment indicated that the gag commercial quota implemented in the December 1, 2010 interim rule could be increased and that a longer recreational season could be implemented. In response, the Council requested an interim rule while they continued to work on long-term measures including a gag rebuilding plan in Amendment 32. The interim rule set the commercial gag quota at 430,000 pounds gw (including the 100,000 pounds previously allowed) for the 2011 fishing year, and temporarily suspended the use of red grouper multi-use individual fishing quota (IFQ) allocation so it could not be used to harvest gag. It also set a two-month recreational gag fishing season from September 16 through November 15. This temporary rule was effective from June 1, 2011 through November 27, 2011, and was extended for another 186 days or until Amendment 32 was implemented [76 FR 31874].

Amendment 32, implemented March 12, 2012, set the commercial and recreational gag ACLs and ACTs for 2012 through 2015 and beyond; implemented gag commercial quotas for 2012 through 2015 and beyond that included a 14% reduction from the ACT to account for additional dead discards of gag resulting from the reduced harvest; modified grouper IFQ multi-use allocations; reduced the commercial minimum size limit of gag from 24 to 22 inches TL to reduce discards; set the gag recreational season from July 1 through October 31 (the bag limit remained two gag in the four-grouper aggregate bag limit); simplified the commercial shallow-water grouper AMs by using the IFQ program to reduce redundancy; and added an overage adjustment and in-season measures to the gag and red grouper recreational AMs to avoid exceeding the ACL.

Amendment 38, implemented March 1, 2013, revised the post-season recreational AM that reduces the length of the recreational season for all shallow-water grouper in the year following a

year in which the ACL for gag or red grouper is exceeded. The modified AM reduces the recreational season of only the species for which the ACL was exceeded.

Generic Management Amendments

Generic Sustainable Fisheries Act Amendment was partially approved and implemented in November 1999. It set the Maximum Fishing Mortality Threshold (MFMT) for most reef fish stocks at a fishing mortality rate corresponding to 30% spawning potential ratio ($F_{30\% SPR}$).

Generic Tortugas Marine Reserves, implemented in August 2002, amended all seven FMPs and created two marine reserves where all fishing is prohibited. One 60 square mile reserve was created on a spawning aggregation site for mutton snapper in the Gulf Council's jurisdiction. The other (125 square miles) was created in the jurisdictions of the National Park Service, Florida Keys National Marine Sanctuary, Gulf Council, and State of Florida.

Generic ACL/AM Amendment, implemented in August 2011, established a jurisdictional apportionment of mutton snapper based on the Florida Keys (Monroe County) jurisdictional boundary between the Gulf and South Atlantic Councils. The ABC was based on the following method: South Atlantic = 82% of ABC and Gulf = 18% of ABC (established by using 50% of catch history from 1990-2008 + 50% of catch history from 2006-2008).

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action 1 - Establish Gulf of Mexico Apportioned Mutton Snapper Annual Catch Limits (ACLs)

Alternative 1: No Action. Maintain the current ACL and annual catch target (ACT) established in the Generic ACL/Accountability Measures (AMs) Amendment. The Gulf of Mexico (Gulf) ACL is 18% of the stock acceptable biological catch (ABC) based on the Gulf and South Atlantic apportionment. The ACL/ACT control rule established a 14% buffer between the ACL and the ACT.

OFL = 1.48 mp ww based upon equilibrium yield @ $F_{30\%SPR}$
 ABC = 1.13 mp ww based upon equilibrium yield @ $F_{40\%SPR}$
 ACL = ABC
 Gulf ACL = ACL * 0.18 (0.203 mp ww)
 Gulf ACT = Gulf ACL * 0.86 (0.175mp ww)

Alternative 2: Accept the OFLs and ABCs recommended by the Gulf and South Atlantic SSCs from 2017 through 2020. Establish the Gulf apportionment of the ACL equal to 18% of the stock ABC.

OFL and ABC Recommendations from the Gulf Council’s SSC:

OFL (ww)			ABC (ww)		
Landings	Discards	Total	Landings	Discards	Total
1,480,000	35,300	1,515,300	1,130,000	26,500	1,156,500

Option 2a: Remove Gulf ACT as a management target. **(Gulf Reef Fish AP Recommended)**

Option 2b: Apply the ACL/ACT control rule to establish a 12% buffer between the Gulf ACL and the Gulf ACT.

Year	Stock OFL	Stock ABC	Gulf ACL	Gulf ACT
2017	751,711	717,200	129,096	113,605
2018	793,823	746,800	134,424	118,293
2019	835,318	774,400	139,392	122,665
2020	850,077	798,300	143,694	126,451

Note: Gulf ACT established using the ACL/ACT control rule.

Alternative 3: Accept the OFLs and ABCs recommended by the Gulf and South Atlantic SSCs from 2017 through 2020. Establish the Gulf apportionment equal to 18% of the stock ABC. Apply the ACL/ACT control to this apportionment and set the Gulf ACL equal to 88% of the apportionment (i.e., 12% buffer). Do not establish a Gulf ACT.

Year	Stock OFL	Stock ABC	Gulf ACL	Gulf ACT
2017	751,711	717,200	113,605	NA

2018	793,823	746,800	118,293	NA
2019	835,318	774,400	122,665	NA
2020	850,077	798,300	126,451	NA

Note: The South Atlantic Fishery Management Council's (Council) Scientific and Statistical Committee (SSC) recommended that the overfishing limit (OFL) be set equal to the equilibrium maximum sustainable yield proxy, which is the yield at the fishing mortality level which achieves a 30% spawning potential ratio ($F_{30\%SPR}$), or 1.52 million pounds (mp) whole weight (ww), including estimated dead discards, and the ABC be set equal to the equilibrium optimum yield, which is the yield at $F_{40\%SPR} = 1.16$ mp ww, including estimated dead discards. The Gulf Council's SSC recommendation of OFL and ABC is consistent with the South Atlantic SSC, but OFL and ABC are established in landed weight rather than landed weight and dead discards as was recommended by South Atlantic SSC. Also, this yield stream assumes that the entirety of the recommended harvest will be caught in 2017 and beyond. If recent landings are largely different, the assessment may need to be updated with recent landings to produce an updated yield stream. Further, the accountability measures for the Gulf are based on the ACL, while the projected fishing season length is based on the ACT.

Discussion:

Mutton snapper is managed as a single stock that encompasses the U.S. South Atlantic and Gulf of Mexico, with more than 99% of landings occurring in Florida. In 2015, an update to the stock assessment for mutton snapper in the southeastern U.S. was conducted using data through 2013 (SEDAR 15A Update 2015). The result of the 2015 stock assessment indicated that the stock was not overfished or undergoing overfishing. However, the adult population was determined to be smaller than previously estimated in the 2008 stock assessment (SEDAR 15A 2008). Based on this result, reductions in allowable harvest are necessary to ensure overfishing does not occur. The SEDAR 15A update assessment was reviewed by the Gulf and South Atlantic Councils' SSCs, which recommended a yield stream of OFLs and ABCs from 2016 through 2020. This amendment will consider the yield stream from 2017 through 2020. This action considers alternatives that would incorporate this scientific advice into management of the mutton snapper stock. Consequently, the Council may modify existing management measures for mutton snapper (Actions 2 and 3) to achieve the desired combination of harvest and effort.

Alternative 1 (No Action) would retain the current harvest levels for mutton snapper including the OFL (1.48 mp ww), ABC (1.13 mp ww), Gulf ACL (0.203 mp ww) and Gulf ACT (0.175 mp ww). However, the current OFL (1.48 mp ww) and ABC (1.13 mp ww) exceed the SSC's OFL and ABC recommendations for 2017 through 2020, and are not consistent with the best scientific information available.

Both **Alternative 2** and **Alternative 3** would be consistent with the SSC recommendation to reduce harvest and would require substantial reductions in allowable landings. **Alternative 2** would set the Gulf ACL equal to the Gulf apportionment of the stock ABC (18%). **Option 2a** would remove the ACT as a management target. **Option 2b** would apply the ACL/ACT control rule to establish the ACT, resulting in a 12% buffer between the Gulf ACL and the Gulf ACT,

and retain the Gulf ACT as a management target. **Alternative 2** would reduce the ABC by 36% in 2017 and the ACT by 35% (**Option 2b**), compared to **Alternative 1** (Table 2.1.1).

Table 2.1.1. Comparison of Gulf ACL and ACT with the annual ACLs and ACTs under Alternative 2 for the years 2017 through 2020.

Year	Gulf ACL	Alt 2 Option 2a: Gulf ACL	ACL % Change	Gulf ACT	Alt 2 Option 2b: Gulf ACT	ACT % Change
2017	203,000	129,096	-36%	175,000	113,605	-35%
2018	203,000	134,424	-34%	175,000	118,293	-32%
2019	203,000	139,392	-31%	175,000	122,665	-30%
2020	203,000	143,694	-29%	175,000	126,451	-28%

Alternative 3 would accept the OFLs and ABCs recommended by the Gulf and South Atlantic SSCs from 2017 through 2020. **Alternative 3** would establish the Gulf ACL equal to 88% of the Stock ABC (i.e., 12% buffer) and would not establish a Gulf ACT. **Alternative 3** would reduce the ABC by 44% in 2017 compared to **Alternative 1** and eliminate the ACT as a management target (Table 2.1.2).

Alternative 2 and **Alternative 3** both result in substantial reductions in ACLs compared to **Alternative 1**. **Option 2b** in **Alternative 2** establishes the ACL at harvest levels above the ACT and prevents triggering accountability measures (AMs) due to minor, inter-annual variations in harvest. **Alternative 3** would not establish an ACT and the ACL for **Alternative 3** is set equal to the ACT in **Option 2b** of **Alternative 2**. **Alternative 3**, however, does not use an ACT; therefore, there is no mechanism to account for minor inter-annual variation in harvest without triggering AMs.

Table 2.1.2. A comparison of the current Gulf apportioned ACL in relation to the ACL under Alternative 3. Landings are in lbs ww.

Year	Gulf ACL	Alt 3: Gulf ACL	ACL % Change
2017	203,000	113,605	-44%
2018	203,000	118,293	-42%
2019	203,000	122,665	-40%
2020	203,000	126,451	-38%

Landings of mutton snapper in the Gulf have increased annually since 2010 (Table 1.1.4). Both **Alternative 2** and **Alternative 3** would result in allowable harvest levels which are below the most recent year's landings (2015: 134,886) by 5,790 lbs ww (**Alternative 2, Option 2a**), and 21,281 lbs ww (**Alternative 2, Option 2a** and **Alternative 3**), in 2017. These alternatives could therefore result in a reduction in effort which results in a seasonal closure of fishing effort for mutton snapper in the Gulf.

2.2 Action 2 - Modify the Gulf Mutton Snapper Recreational Bag Limit

Alternative 1: No Action. Mutton snapper remain part of the aggregate 10-snapper recreational bag limit in the Gulf.

Alternative 2: Retain mutton snapper within the aggregate 10-snapper recreational bag limit in the Gulf, but specify a bag limit for mutton snapper during spawning months (April – June).

Option 2a: 2 fish/person/day

Option 2b: 3 fish/person/day

Option 2c: 4 fish/person/day

Option 2d: 5 fish/person/day

Alternative 3: Retain mutton snapper within the aggregate 10-snapper recreational bag limit in the Gulf, but modify the bag limit for mutton snapper during the regular season i.e., non-spawning months (January – March and July – December).

Option 3a: 2 fish/person/day

Option 3b: 3 fish/person/day

Option 3c: 4 fish/person/day

Option 3d: 5 fish/person/day

Alternative 4: Retain mutton snapper within the aggregate 10-snapper recreational bag limit in the Gulf, but specify a bag limit for mutton snapper within the aggregate bag limit year round.

Option 4a: 2 fish/person/day

Option 4b: 3 fish/person/day

Option 4c: 4 fish/person/day

Option 4d: 5 fish/person/day **(Gulf Reef Fish AP Recommended)**

Discussion:

There is concern by the public regarding fishing effort on mutton snapper spawning aggregations during the April – June peak spawning season in the Florida Keys. Mutton snapper form spawning aggregations that increase their vulnerability to fishing during the spawning season. Catch rates may exhibit hyperstability; a condition where catch rates (an indicator of stock size) remain stable despite a declining stock size until the stock collapses. A reduction in the bag limit could reduce the risk associated with fishing during the spawning season. Currently, mutton snapper is part of the 10 fish snapper aggregate- recreational bag limit in the Gulf and current regulations for mutton snapper in the Gulf and South Atlantic are shown in Tables 1.1.2 and 1.1.3. Effective January 1, 2017, Florida decreased the mutton snapper recreational bag limit to 5 fish per person per day (year round) within the 10-snapper aggregate in Florida state waters. The South Atlantic Council has selected the same 5 fish per person per day (year round) aggregate bag limit as the preferred alternative in Snapper Grouper Amendment 41.

Table 2.2.1. Species composition of the aggregate 10 snapper recreational bag limit in the Gulf.

Gulf of Mexico
Gray snapper
Mutton snapper
Yellowtail snapper
Cubera snapper
Queen snapper
Blackfin snapper
Silk snapper
Wenchman

Alternative 1 would retain mutton snapper in the aggregate 10-snapper recreational bag limit, but would not facilitate a management strategy to lower recreational harvest that is necessary if the recreational catch level is reduced in Action 1. If the recreational bag limit is not reduced, the probability of a season closure for mutton snapper is more pronounced based on recent landings (Table 1.1.4) and the projected allowable landings in the alternatives presented in Action 1.

Alternative 2 would apply during the April – June peak spawning period. **Alternative 2** would retain mutton snapper within the aggregate 10-snapper recreational bag limit, but the maximum number of mutton snapper that could be harvested (per person/per day) would be reduced from 10 to 2 (**Option 2a**), 3 (**Option 2b**), 4 (**Option 2c**), or 5 (**Option 2d**). The intent of **Alternative 2** is to reduce fishing pressure on spawning aggregations, and the rate of harvest, that would be necessary if a reduction in the ACL is selected in Action 1.

Alternative 3 would apply outside of the peak spawning season (January – March and July – December). Similar to **Alternative 2**, mutton snapper would remain within the aggregate 10-snapper recreational bag limit in **Alternative 3**; however, the number of mutton snapper that could be harvested would be reduced from 10 to 2 (**Option 3a**), 3 (**Option 3b**), 4 (**Option 3c**), or 5 (**Option 3d**). **Alternatives 2** and **3** could be selected independently with different options, and both could be selected as preferred alternatives.

If similar regulations during the spawning and non-spawning seasons are preferred, **Alternative 4** would specify the same options as **Alternative 2** and **Alternative 3**: 2 fish (**Option 4a**), 3 fish (**Option 4b**), 4 fish (**Option 4c**), or 5 fish per person per day (**Option 4d**) on a year-round basis.

Alternatives 2, 3, and 4 each provide for some measure of reduction in recreational landings and effort, but this reduction depends largely on the option selected in each alternative. However, since recreational landings of mutton snapper in the Gulf account for only approximately 4% of the total landings for the Gulf (Table 1.1.4), the effect of **Alternatives 2, 3, and 4** on reducing the overall harvest of mutton snapper may be minimal. Further, the degree to which recreational landings of mutton snapper would be reduced, and by association the degree to which recreational landings of other species within the Gulf aggregate 10 snapper recreational bag limit may be affected, is unknown because of the aforementioned low recreational harvest levels of mutton snapper.

2.3 Action 3 - Modify the Mutton Snapper Minimum Size Limit in the Gulf

Alternative 1: No Action. The minimum size limit for both commercial and recreational mutton snapper in the Gulf is 16 inches TL. **(Gulf Reef Fish AP Recommended)**

Alternative 2: Increase the minimum size limit for commercial and recreational mutton snapper in the Gulf to 18 inches TL.

Alternative 3: Increase the minimum size limit for commercial and recreational mutton snapper in the Gulf to 20 inches TL.

Discussion:

This action includes alternatives to increase the recreational and commercial minimum size limit for mutton snapper in the Gulf. **Alternative 1** would maintain the current 16" TL minimum size limit. Other alternatives consider larger size limits that increase the age (Figure 2.4.1) and likelihood of individuals reaching sexual maturity before entering the fishery. Increasing the size limit would also reduce the proportion of retained catch and slow the harvest rate. This would contribute to achieving the harvest reductions necessary that are being considered in Action 1 of this document. Both the South Atlantic Council and the State of Florida are increasing the minimum size limit of mutton snapper to 18" TL for both fishing sectors. For this reason, the recreational and commercial sectors are not considered separately in this action.

Alternatives 2 and 3 increase the minimum size limit relative to **Alternative 1** with the objective of reducing the rate of retained catch. **Alternative 2** is consistent with the actions being taken by the South Atlantic Council and State of Florida and would simplify the harvest regulations for both anglers and law enforcement by reducing the burden of regulatory compliance. Mutton snapper primarily occur in south Florida and anglers routinely fish in waters managed by the Gulf Council, South Atlantic Council, and/or the State of Florida in a single trip. Achieving consistent regulations would likely increase compliance, and aid enforcement efforts in the region.

According to the SEDAR 15 stock assessment, the length at which 50% of females achieved sexual maturity (L_{50}) was 353 mm maximum TL (tail pinched, TL_{max}), or ~14" TL_{max} , and 2.07 years of age. These estimates were lower than those from studies in adjacent Cuban (Claro 1981) and Puerto Rican (Figuerola and Torres 2001) waters. The Cuban estimate showed the L_{50} to be 520 mm fork length (FL; ca. 574 mm TL_{max} , or 22.6" TL_{max}) and 5-6 years of age. Similarly, the Puerto Rican estimate, using histological criteria, reported a L_{50} of 414 mm FL (ca. 459 mm TL_{max} , 16.3" TL_{max}) and 3 years of age.

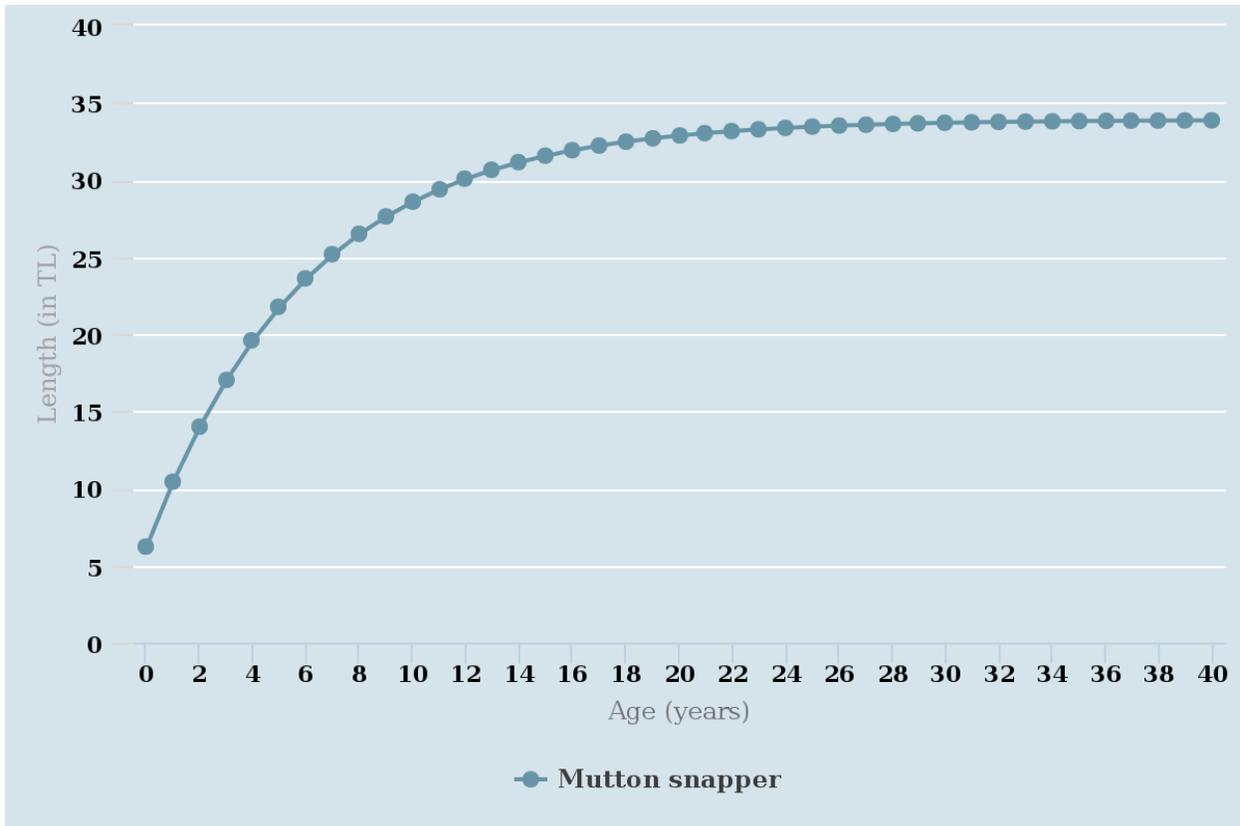


Figure 2.4.1. Age and growth relationship for mutton snapper based on data from the SEDAR 15A Update stock assessment (2015). Mutton snapper are approximately 2.6 years old at the current 16” TL minimum size limit. Individuals are approximately 3.4 years old at 18” TL and 4.2 years old at 20” TL. A sample size of 13,052 individuals was used to calculate the above von Bertalanffy growth curve. Approximately 50% of individuals are mature (both sexes) by 20” TL.

The smaller length and age at sexual maturity from fish sampled in US waters may be indicative of growth overfishing, whereby fish are harvested at an average size or age which is smaller than the size or age which produces the maximum yield per recruit, or the number of offspring produced by a sexually mature individual. If indeed growth overfishing is occurring in US waters, then increasing the size limit may help to correct this condition. Recreational landings of mutton snapper in the Gulf are very low (Table 1.1.4), and as a result the effect of a change in the size limit on recreational landings and effort cannot be quantified. For the commercial sector, an increase in the minimum size limit to 18” TL would result in a reduction in landings of approximately 0.2% (**Alternative 2**), while an increase in the minimum size limit to 20” TL would result in a reduction in landings of approximately 1% (**Alternative 3**) (see Appendix C).

2.4 Action 4 - Modify the Commercial Gag Minimum Size Limit in the Gulf

Alternative 1: No Action. The commercial minimum size limit for gag in the Gulf is 22 inches TL.

Alternative 2: Increase the commercial minimum size limit for gag in the Gulf to 24 inches TL. **(Gulf Reef Fish AP Recommended)**

Discussion:

This action evaluates whether the current 22” TL gag commercial minimum size limit in the Gulf should be made consistent with the Gulf recreational and South Atlantic 24” TL minimum size limit. The range of alternatives is based on retaining inconsistent size limits (**Alternative 1**) or adopting a minimum size limit to be consistent with the Gulf’s recreational and the South Atlantic’s recreational and commercial minimum size limit (**Alternative 2**). Therefore, **Alternative 2** is considered the only reasonable modification to the size limit to address the purpose and need. These alternatives also encompass the range of estimated sizes where 50% of female gag attain maturity. The SEDAR 33 (2014) assessment estimated that 50% of females are mature at 22” TL, but earlier assessments estimated the size at 24” TL.

The National Marine Fisheries Service’s (NMFS) Southeast Fisheries Science Center (SEFSC) provided yield-per-recruit (YPR) and spawning potential ratio (SPR) analysis results from the SEDAR 33 assessment model for both the 22” and 24” TL minimum size limits (Table 2.5.1). This analysis assumes equilibrium conditions and recruitment are constant, and was run for current stock conditions (e.g., recent estimate of fishing mortality rate). The analysis incorporated discard mortality of released gag and focused only on the recreational sector. The results showed that increasing the size limit from 22” to 24” TL will give a very slight reduction in YPR; however, this results in a substantial increase in SPR. Therefore, raising the size limit has the potential to slightly reduce landings but will likely impact the stock positively by increasing the abundance of the spawning stock.

Table 2.5.1. YPR in kilograms (kg) and spawning biomass per recruit (SBPR; kg) analysis results from the SEDAR 33 assessment model for the two size limits of 22 and 24 inches TL. Recruits are considered to be true age-0 fish.

Size Limit (inches TL)	YPR	SPR
22	0.405	0.508
24	0.383	0.947

Alternative 1 (No Action) is inconsistent with the Gulf recreational minimum size limit which increased to 24” TL in 2016 (GMFMC 2016), and South Atlantic recreational and commercial minimum size limits, which were set to 24” TL in 1999 (SAFMC 1999). The 22” TL recreational minimum size limit was implemented in the Gulf for gag and black grouper in 2000 (GMFMC 1999a). At that time, the commercial minimum size limit for gag and black grouper

was set at 24" TL, which was estimated to be the size at which 50% of female gag reach reproductive maturity (Schirripa and Goodyear 1994). The Council proposed a further increase in the recreational minimum size limit by one inch per year until it reached 24" TL. However, that proposal was disapproved by NMFS on the basis that setting both the commercial and recreational minimum size limits at 24" TL would disproportionately impact the recreational sector, which catches smaller fish on average than the commercial sector. In 2012, Amendment 32 to the Reef Fish Fishery Management Plan reduced the commercial minimum size limit for gag to 22" TL to reduce discard mortality. A more recent analysis has estimated the size at which 50% of the female gag reach reproductive maturity to be 22" TL (SEDAR 33 2014a). Therefore, **Alternative 1** would keep the gag commercial size limit at the size at which 50% of females reach reproductive maturity, but it would be inconsistent with the Gulf recreational and South Atlantic's 24" TL minimum size limit.

Based on the von Bertalanffy growth equation used in SEDAR 33², gag take approximately seven months to grow from 22" TL to 24" TL (Figure 2.5.1). Given the rapid growth rate during this period and low release mortality rate (< 30 m: 12-16% recreational; > 30 m: 27% commercial)), any increase in dead discards from increasing the size limit is expected to be minor. Further, an analysis of the effect of increasing the minimum size limit of gag on commercial fishermen (Appendix D) shows that approximately 94.5% of all gag landed commercially in the Gulf are at least 24" TL (Figure 1 in Appendix D).

² $l_t = L_{\infty} * (1 - e^{-k(t-t_0)})$ where L_{∞} (mm FL) = 1277.95, $k = 0.1342$, and $t_0 = -0.6687$

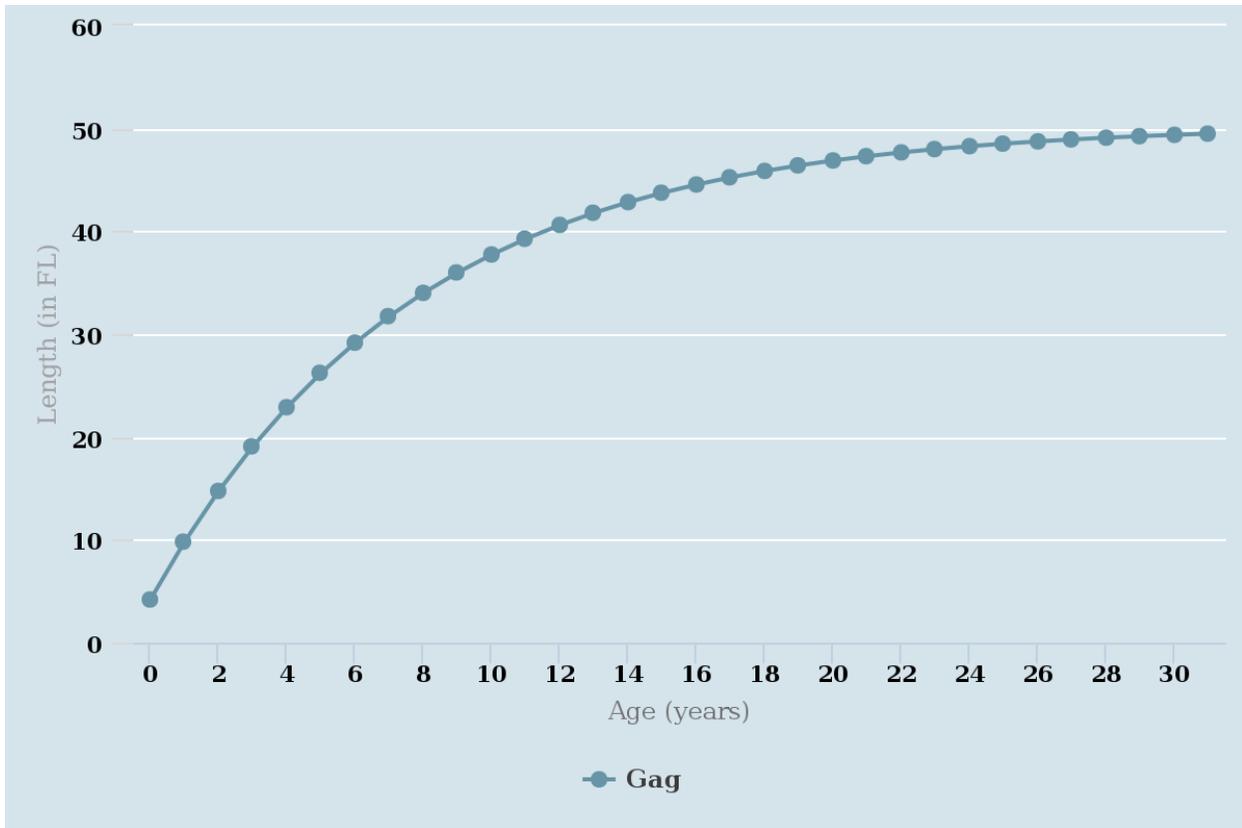


Figure 2.5.1. Age and growth relationship for gag based on data from SEDAR 33 (2014). Gag are approximately 3.8 years old at the current 22” TL commercial minimum size limit, and 4.3 years old at 24” TL.

CHAPTER 3. REFERENCES

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APPENDIX A: GULF OF MEXICO MUTTON SNAPPER TRIP LIMIT ANALYSIS

Action 3 of the Gulf Council’s Framework Action considered a trip limit in pounds of fish during the regular season (non-spawning months, January through March and July through December) and a trip limit in numbers of fish within the spawning season (April to June). The rationale behind these modifications was concern regarding mutton snapper harvest during the spawning season. Currently, there is no trip limit for mutton snapper in the Gulf of Mexico.

Commercial logbook data (accessed April 25, 2016) from the Southeast Fisheries Science Center (SEFSC) was analyzed to determine the harvest of mutton snapper per trip. The most recent years of complete data (2013-2015) had 1,274 trips that harvested mutton snapper in the Gulf of Mexico. The Framework Action was examining different trip limits outside and within the spawning season, therefore, the commercial trips were separated by the different seasons (regular season and spawning). The distribution of the pounds of mutton snapper harvested per trip in the regular season is displayed in Figure 1. Within the spawning season the Framework Action was proposing a trip limit in numbers of mutton snapper in both fish per person and fish per vessel. The pounds of mutton snapper per trip from the logbook data were converted to numbers of mutton snapper by dividing the pounds by the average weight. Current average weight of Gulf of Mexico mutton snapper in the commercial sector was determined to be 3.5 pounds whole weight (lbs ww) in the most recent assessment (SEDAR 15A). Figure 2 provides the distribution of both the fish per person and fish per vessel within the spawning season.

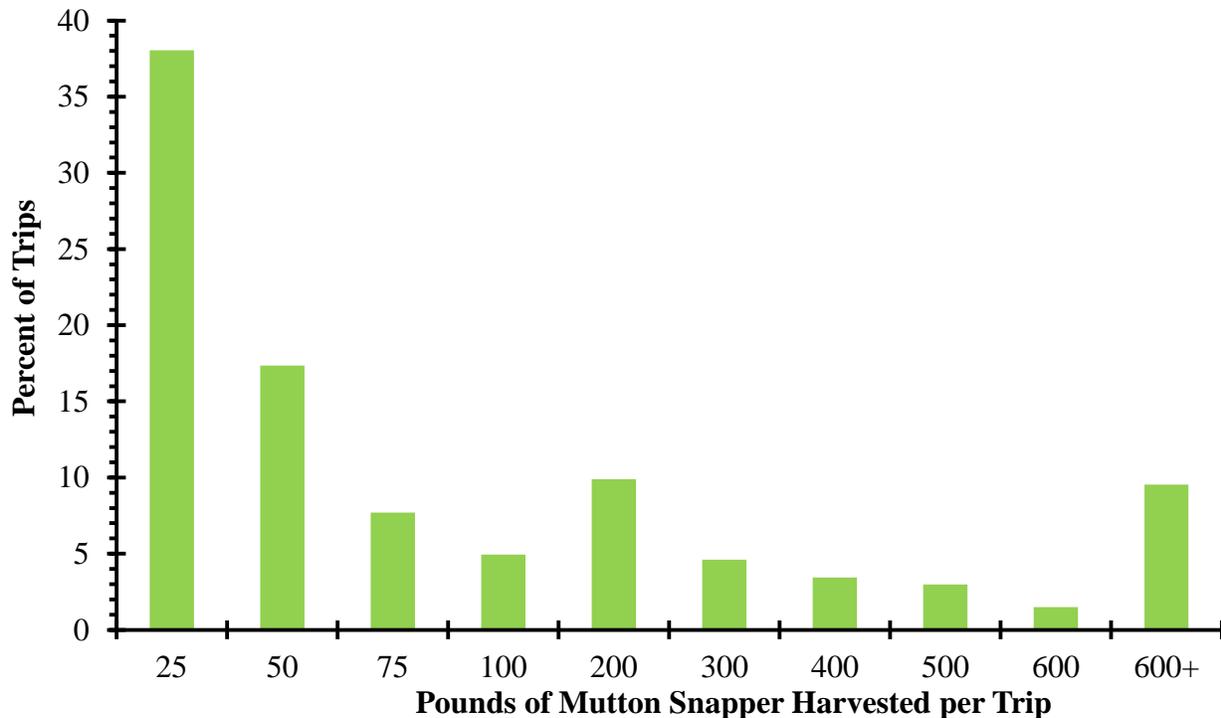


Figure 1. Distribution of the mutton snapper harvested per trip (lbs ww) during the regular season in the Gulf of Mexico region. The regular season is from January through March then

July through December. Data comes from the commercial logbook dataset from 2013 to 2015 (n = 870 trips).

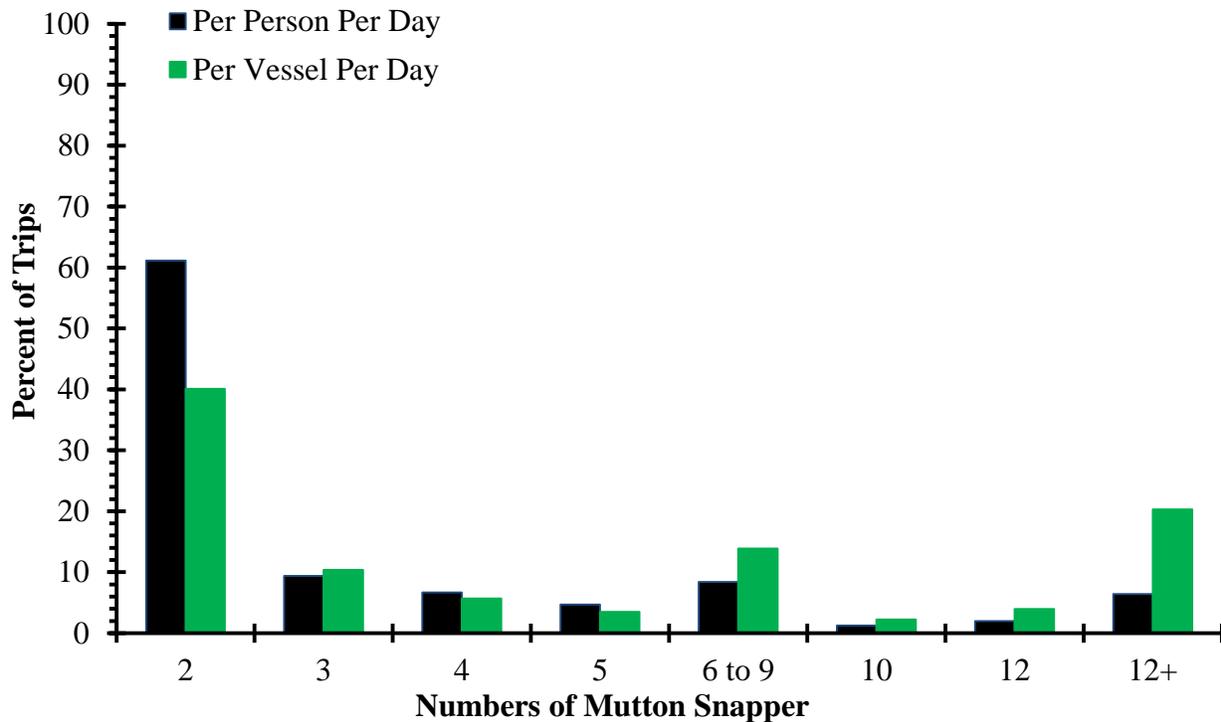


Figure 2. Distribution of the number of mutton snapper harvested both per person per day and per vessel per day during the spawning season in the Gulf of Mexico region. The spawning season is from April to June. Data comes from the commercial logbook dataset from 2013 to 2015 (n = 404 trips).

Trip Limit Analysis

Alternative 2 of Action 3 considered implementing a trip limit during the regular season of 300, 400, and 500 pounds whole weight (lbs ww). The SEFSC logbook data were analyzed by imposing the proposed trip limits under Alternative 2 only during the regular season. For example, a trip in the regular season that harvested 600 lb ww of mutton snapper was reduced to 300 lbs ww to analyze the proposed 300 lbs ww trip limit, while landings during the spawning season were not reduced. The reduced landings from the imposed trip limit were compared to the total annual unmodified landings to estimate the percent reduction in landings (Table 1).

Table 1. Percent decreases in total landings for various commercial trip limits proposed under Alternative 2 in Action 3. This analysis only modified landings for the trip limits being proposed in the regular season (January through March and July through December). Landings outside the regular season were not modified. Data comes from the commercial logbook dataset for 2013 through 2015.

Trip Limit	Percent Reduction
300 lbs ww	42.5%

400 lbs ww	38.1%
500 lbs ww	34.7%

The commercial logbook data provides landings in pounds; however, the proposed trip limits during the spawning season (April to June) are specified in numbers of fish. To conduct the analysis, landings in pounds were converted to numbers of fish by dividing the harvest by the average weight of mutton snapper in the commercial sector. Average weight of mutton snapper in the Gulf of Mexico was determined to be 3.5 lbs ww in the commercial sector in the most recent stock assessment (SEDAR 15A).

Alternative 3 of Action 3 proposed commercial trip limits in the spawning season in numbers of fish in two ways: per person per day, and per vessel per day. Specifically the Sub-alternatives under Alternative 3 proposed limits of 2 fish/person/day (Option 3a), 3 fish/person/day (Option 3b), 10 fish/vessel/day (Option 3c), 12 fish/vessel/day (Option 3d), and no retention (Option 3e) during the spawning season. The per-person trip limits were analyzed by dividing the total catch by the total number of people, including the captain, on the commercial trip. The per-vessel trip limit analysis focused on trip level data and ignored the number of people on the boat. The per-day part of the analysis was analyzed by dividing the catch per trip by the number of days at sea reported. Figure 2 provides the distribution of the percentage of trips for the harvest of mutton snapper in numbers of fish for both per person per day and per vessel per day during the spawning season from 2013 through 2015. An examination of this commercial logbook mutton snapper trip data during the spawning season revealed only 4% of the trips (n = 16 trips) had only 1 person on the trip, and some trips had as much as 6 people. Therefore, the majority of the trips had more than one person. An examination of the number of days for a trip had only 28% (n = 114 trips) of the mutton snapper commercial fishing trips during the spawning season as one-day trips. Therefore, the majority of the commercial trips harvesting mutton snapper are multiday trips.

Percent reductions in commercial landings were calculated for the proposed trip limits of 0, 2, and 3 mutton snapper per person per day by reducing trips that exceeded the proposed trip limit to match the trip limit being considered. For example, to analyze the reduced trip limit of 3 fish/person/day, a trip that reported harvest of 9 mutton snapper/person/day was reduced to 3 mutton snapper/person/day. Landings during the regular season were not modified. The reduced total annual landings were then compared against unmodified total annual landings to determine the percent reduction in landings from the trip limit being considered.

Table 2. Percent decrease in landings for various commercial trip limits proposed in Alternative 3 of Action 3. The estimates were calculated from mutton snapper commercial logbook data from 2013 through 2015, and the reductions were calculated for changes to the trip limit inside the spawning season. The spawning season is April to June.

Trip Limit	Percent Reduction
2 Fish/Person/Day	18%
3 Fish/Person/Day	15%
10 Fish/Vessel/Day	16%

12 Fish/Vessel/Day	14%
No Retention	28%

This analysis attempted to predict realistic changes to the landings from the various trip limit options presented in the amendment. Uncertainty exists in these projections, as economic conditions, weather events, changes in catch-per-unit effort, fisher response to management regulations, and a variety of other factors may cause departures from this assumption. The bounds of this uncertainty are not captured by the model as currently configured; as such, it should be used with caution as a ‘best guess’ for future dynamics. In addition to the aforementioned sources of uncertainty, the modeled reductions associated with management measures assume that past performance in the fishery is a good predictor of future dynamics. An attempt was made to constrain the range of data considered to recent years to reduce the unreliability of this assumption.

References

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APPENDIX B: CONSIDERED BUT REJECTED ACTIONS AND ALTERNATIVES

Action 3: Modify Mutton Snapper Commercial Trip Limit in the Gulf of Mexico

Alternative 1: No action. There is no trip limit for the commercial sector in the Gulf of Mexico.

Alternative 2. Establish a commercial trip limit for mutton snapper during the regular season (i.e., non-spawning months in the Gulf of Mexico).

Option 2a. 300 pounds whole weight

Option 2b. 400 pounds whole weight

Option 2c. 500 pounds whole weight

Alternative 3. Specify a commercial trip limit for mutton snapper during the spawning months of May and June in the Gulf of Mexico.

Option 3a. 2 fish/person/day

Option 3b. 3 fish/person/day

Option 3c. 10 fish/vessel/day

Option 3d. 12 fish/vessel/day

Option 3e. No retention

Rationale:

The Council reviewed Action 3, which considered changes to commercial trip limits. The Council discussed that trip limits may not be an effective management measure to reduce harvest when using bottom longline gear and that imposing commercial trip limits would result in unnecessary regulatory discards.

Action 4: Modify mutton snapper minimum size limit in the Gulf of Mexico

Alternative 2: Increase the minimum size limit for mutton snapper in the Gulf of Mexico to 17 inches TL.

Alternative 4: Increase the minimum size limit for mutton snapper in the Gulf of Mexico to 19 inches TL.

Rationale:

The Council reviewed Action 4 which considers changes to the minimum size limit for mutton snapper. The Council discussed the necessity of Alternatives 2 and 4 as the other Alternatives capture a reasonable range, and determined that Alternatives 2 and 4 were not necessary.

APPENDIX C: GULF OF MEXICO MUTTON SNAPPER COMMERCIAL MINIMUM SIZE LIMIT ANALYSIS

The Gulf of Mexico Fishery Management Council is considering modifying the mutton snapper minimum size limit for the commercial sector through a framework action to the current Fishery Management Plan. The length measurements of Gulf of Mexico mutton snapper harvested by the commercial sector were collected from two different programs: 1) dock-side intercepts of commercial fishers from the Southeast Fisheries Science Center's (SEFSC) Trip Intercept Program (TIP), and 2) at-sea fishery observer data from the Galveston, TX SEFSC Reef Fish Observer Program (RFOP). Length measurements were used from both programs to increase the sample size of Gulf of Mexico mutton snapper harvested in the commercial sector.

TIP is a shore-based sampling program to collect detailed data for individual trips with samplers placed strategically throughout the Southeast. The emphasis for the TIP is to sample more individual trips rather than take a large number of samples from a few trips (Saari and Beerkircher, 2014). Fishing trips are selected to be representative of each region with every effort to sample from as many vessels and gear types as possible. A random subsample of fish measurements are obtained in roughly the same proportion for each species comprising the entire landings.

In contrast, the RFOP samples a more limited number of trips than TIP; however, observer protocol is to provide a census of measurements for all species captured during that trip (NMFS, 2016). The RFOP selects vessels randomly by quarter based on sampling effort stratified by season and gear for the eastern and western Gulf of Mexico. Additionally, TIP samplers do not sample vessels that carried an observer for a trip to avoid double sampling.

Both datasets were filtered to the years 2013 to 2015 which resulted in 994 mutton snapper in the TIP data and 1,475 mutton snapper in the RFOP data. Only retained mutton snapper were used in the RFOP data. The distributions of the lengths from the two programs were compared (Figure 1) and the means were not statistically different (t-test, t-value = 1.04, df = 1,797, P = 0.298).

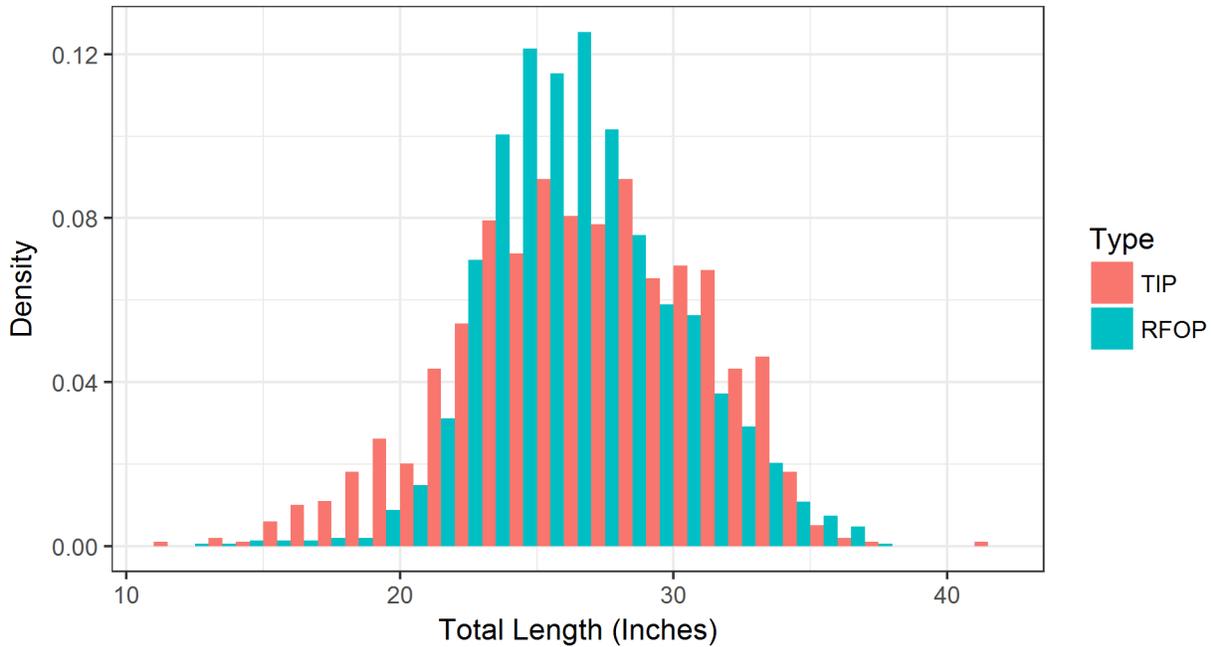


Figure 1. Histogram comparing Gulf of Mexico mutton snapper total length distribution generated from commercial TIP (n=994) and RFOP (n=1,475) data from 2013 to 2015.

All lengths were converted to inches total length (TL) using standard conversion factors and equations used in SEDAR 15A (2015). The size limit analysis estimated the percent reduction in whole weight. Thus the weight of each fish was required. When whole weight data was available it was used, and gutted weights were converted using the SEFSC conversion factor of 1.11. When weight data was unavailable, it was estimated from length using the mutton snapper weight-length equations defined in SEDAR 15A (2015).

Figure 2 provides the Gulf of Mexico commercial sector mutton snapper length distribution from both TIP and RFOP in 1 inch increments from 2013 to 2015. The majority of the mutton snapper are harvested well above any of the minimum size limits being considered. The largest minimum size limit being considered in the framework action is 20 inches TL and more than 95% of the lengths were above this length.

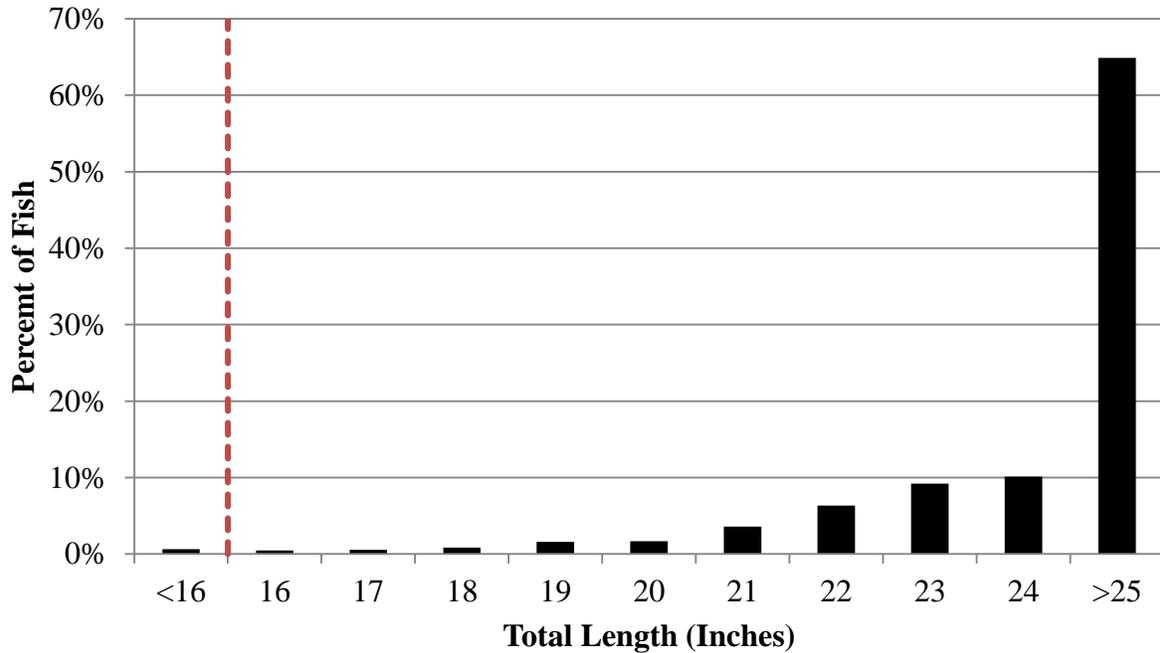


Figure 2. Gulf of Mexico mutton snapper total length distribution generated from commercial TIP (n=994) and RFOP (n=1,475) data from 2013 to 2015. The dashed red line denotes the current commercial minimum size limit of 16 inches TL.

Reductions in landings in weight were calculated for minimum size limits (MSL) at 1 inch intervals between 16-20 inches TL as follows:

Percent reduction = $((C - (G+R)) - B)/C$, where:

C = catch in pounds

G = weight of fish that are greater than or equal to the MSL

R = release mortality multiplied against the fish that are larger than the 16-inch TL MSL and are less than the MSL being considered

B = weight of fish smaller than the 16-inch TL MSL (non-compliance)

Percent reductions associated with MSL were normalized to a 0% reduction at the commercial status quo size limit of 16 inches total length. Data were pooled for the three years of complete data (2013-2015) with the assumption that recent lengths will likely reflect future lengths harvested in the fishery. All of the weights used in the analysis are in pounds whole weight. Release mortality was incorporated into the analysis, and was determined to be 15% following SEDAR 15A (2015).

Table 1. The estimated percent reduction in whole weight of commercial mutton snapper landings for each of the minimum size limits considered in the modification. The reductions were generated with TIP and RFOP data from 2013 to 2015, and came from a sample of 2,469 fish.

Minimum Size Limit (inches TL)	Percent Reduction
16	0.0
17	0.1
18	0.2
19	0.5
20	1.0

The reliability of this analysis is dependent upon the accuracy of the underlying data and input assumptions. This analysis assumes that the commercial harvest of mutton snapper size distribution from 2013 to 2015 will reflect the size distribution of mutton snapper commercial harvest in the future.

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APPENDIX D: GULF OF MEXICO GAG COMMERCIAL MINIMUM SIZE LIMIT ANALYSIS

The Gulf of Mexico Fishery Management Council is considering modifying the gag grouper minimum size limit for the commercial sector through a framework action to the current Fishery Management Plan. The length measurements of Gulf of Mexico gag grouper harvested in the commercial sector were collected from two different programs: 1) dock-side intercepts of commercial fishers from the Southeast Fisheries Science Center's (SEFSC) Trip Intercept Program (TIP), and 2) at-sea fishery observer data from the Galveston, TX SEFSC Reef Fish Observer Program (RFOP). Length measurements were used from both programs to increase the sample size of Gulf of Mexico gag grouper harvested in the commercial sector.

TIP is a shore-based sampling program to collect detailed data for individual trips with samplers placed strategically throughout the Southeast. The emphasis for the TIP is to sample more individual trips rather than take a large number of samples from a few trips (Saari and Beerkircher, 2014). Fishing trips are selected to be representative of each region with every effort to sample from as many vessels and gear types as possible. A random subsample of fish measurements are obtained in roughly the same proportion for each species comprising the entire landings.

In contrast, the RFOP samples a more limited number of trips than TIP; however, observer protocol is to provide a census of measurements for all species captured during that trip (NMFS, 2016). The RFOP selects vessels randomly by quarter based on sampling effort stratified by season and gear for the eastern and western Gulf of Mexico. Additionally, TIP samplers do not sample vessels that carried an observer for a trip to avoid double sampling. All lengths were converted to inches total length (TL) using standard conversion factors and equations used in SEDAR 33 (2014).

Gulf of Mexico gag grouper length distributions distribution for the commercial sector from both TIP and RFOP are shown in Figure 1. The distribution is shown in 1 inch increments using the lengths from 2013 to 2015. In the commercial sector, > 94% of the gag grouper harvested are above the minimum size limit being considered of 24 inches TL. In Figure 2, the length distributions between gear types, bottom longline and other gear (primary vertical line))))) were compared since a significant difference between mean lengths was detected. For bottom longline gear, > 99% of gag grouper harvested are above the proposed minimum size limit compared to vertical line gear where > 91% of gag grouper harvested are above the minimum 24 inch TL size limit being considered.

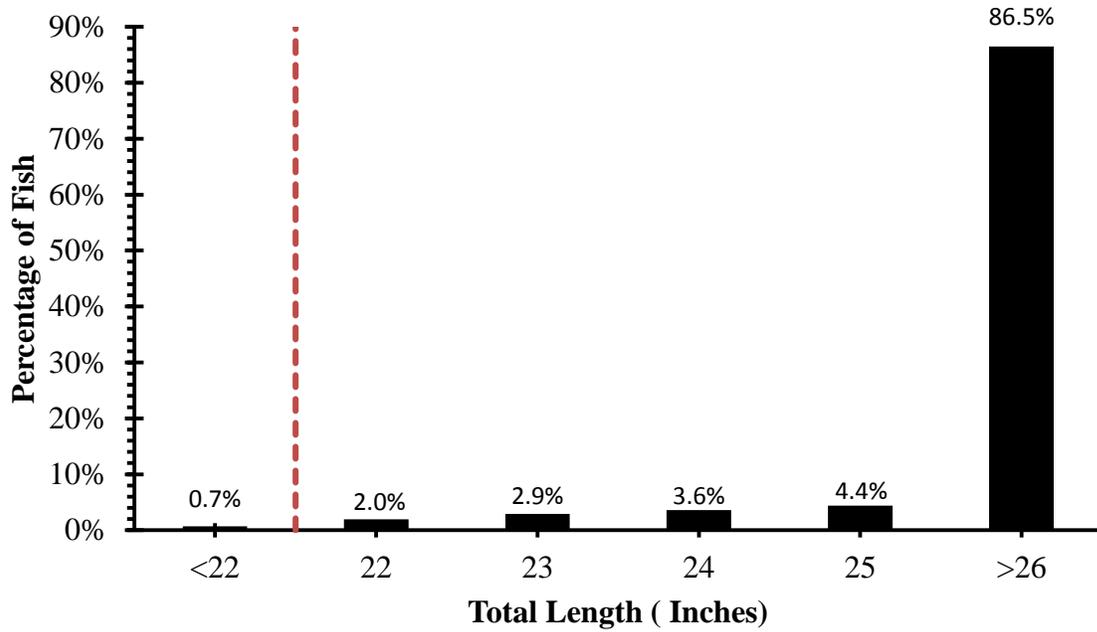


Figure 1. Gulf of Mexico gag grouper total length distribution generated from commercial TIP (n=8,559) and RFOP (n=4,505) data from 2013 to 2015. The dashed red line denotes the current commercial minimum size limit of 22 inches TL.

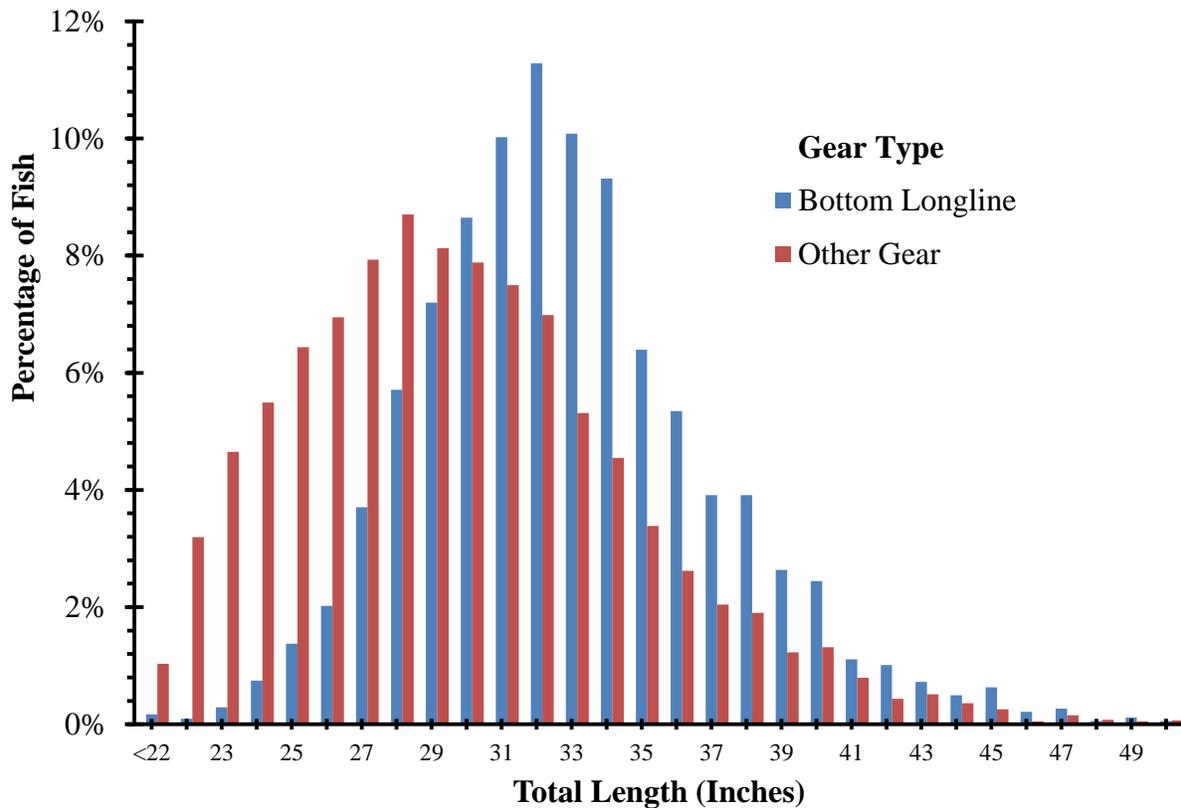


Figure 2. Gulf of Mexico gag grouper total length distribution for gear types bottom longline (n=5,237) and other gear (n=7,827) from 2013 to 2015.

The size limit analysis estimated the percent reduction in whole weight. Thus the weight of each fish was required. When whole weight data was available it was used. If gutted weights were available they were converted to whole weight using the SEFSC conversion factor of 1.18. When weight data was unavailable, it was estimated from length using the gag grouper weight-length equations defined in SEDAR 33 (2014). Reductions in landings in weight were calculated for minimum size limits (MSL) at 1 inch intervals between 22-28 inches TL as follows:

$$\text{Percent reduction} = ((C - (G+R)) - B)/C, \text{ where:}$$

C = catch in pounds

G = weight of fish that are greater than or equal to the MSL

R = release mortality multiplied against the fish that are larger than the 22-inch TL MSL and are less than the MSL being considered

B = weight of fish smaller than the 22-inch TL MSL (non-compliance)

Percent reductions associated with MSL were normalized to a 0% reduction at the commercial status quo size limit of 22 inches total length. Data were pooled for the three years of complete data (2013-2015) with the assumption that recent lengths will likely reflect future lengths harvested in the fishery. All of the weights used in the analysis are in pounds whole weight. A release mortality point estimate of 30% was incorporated into the analysis. The mean depth of

capture (202 feet) from the RFOP data set for gag grouper was used to approximate mortality at that depth from the meta-analysis model used in SEDAR 33 (2014).

Table 1. The estimated percent reduction of commercial gag grouper landings for each of the minimum size limit considered in the framework action. The reductions were generated with TIP and RFOP data from 2013 to 2015, and came from a sample of 13,064 fish.

Minimum Size Limit (inches TL)	Percent Reduction
22	0.0
23	0.5
24	1.3
25	2.4
26	4.0
27	6.0
28	8.7

The reliability of this analysis is dependent upon the accuracy of the underlying data and input assumptions. This analysis assumes that the commercial harvest of gag grouper size distribution from 2013 to 2015 will reflect the size distribution of gag grouper commercial harvest in the future.

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