

# Amendment 53 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region

## Catch Level Adjustments, Rebuilding Schedule, and Allocations for Gag



Decision Document  
March 2022

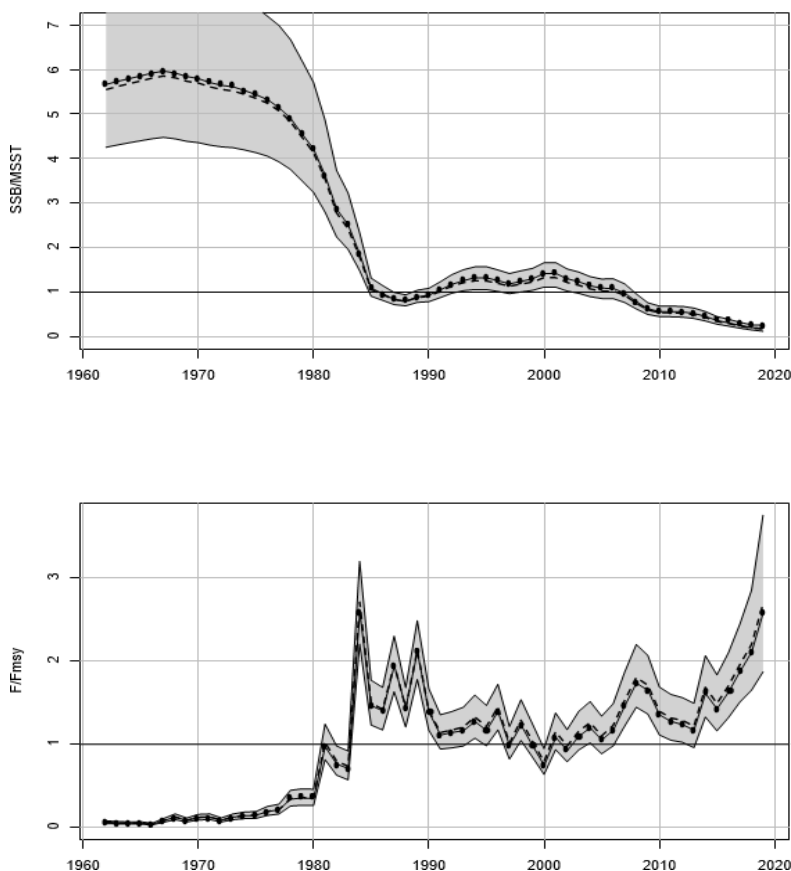
## Background

The most recent stock assessment for gag, SEDAR 71, was completed in 2021. The terminal year of the assessment is 2019. This assessment used revised estimates for recreational catch from the Marine Recreational

Information Program (MRIP) based on the Fishing Effort Survey (FES). The results of this assessment indicated that the stock is overfished and experiencing overfishing (Figure 1). The Council's SSC reviewed SEDAR 71 at their April 2021 meeting and determined that the assessment is based on the best scientific information available (BSIA). Gag management

History of Gag Stock Status		
Assessment	Overfished	Overfishing
SEDAR 10 (2006)		X
SEDAR 10 Update (2014)		X
SEDAR 71 (2021)	X	X

measures have been modified through past amendments to end overfishing and better achieve ACLs. These modifications have included changes to the bag limit, minimum size limit, and season length (Appendix A).



**Figure 1.** Estimated time series of spawning stock biomass (SSB) and fishing mortality (F) relative to benchmarks. Solid line indicates estimates from base run of the Beaufort Assessment Model; gray error bands indicate 5<sup>th</sup> and 95<sup>th</sup> percentiles of the ensemble modeling. Top panel: SSB relative to the minimum stock size threshold (MSST); if less than 1, stock is overfished. Bottom panel: F relative to  $F_{MSY}$ ; if  $> 1$  stock is undergoing overfishing. *Source: SEDAR 71 (2021).*

NMFS notified the Council on June 10, 2021, that management action is necessary for gag as the stock is undergoing overfishing and remains overfished. Once the Council is notified that a stock is undergoing overfishing and is overfished, the Magnuson-Stevens Fishery Conservation and Management Act requires the Council and NMFS to end overfishing immediately and implement a rebuilding plan within two years.

Assessment Link:

[http://sedarweb.org/docs/sar/SEDAR\\_71\\_SAR\\_4.19.21\\_final\\_withaddendum.pdf/](http://sedarweb.org/docs/sar/SEDAR_71_SAR_4.19.21_final_withaddendum.pdf/)

Fishery Overview: [https://safmc-shinyapps.shinyapps.io/SA\\_FisheryDataGag/](https://safmc-shinyapps.shinyapps.io/SA_FisheryDataGag/)

The Council reviewed the results of the assessment and the SSC's recommendations for the overfishing limit (OFL) at their June 2021 meeting and initiated a plan amendment to adjust catch levels to end overfishing and rebuild the stock. Under National Standard 1 guidelines, if a stock can be rebuilt in 10 years or less, then the rebuilding plan may not exceed 10 years. Assessment projections indicated the gag stock can rebuild in 7 years in the absence of fishing mortality; therefore, the rebuilding plan for gag may not exceed 10 years.

During their October 2021 meeting, the Snapper Grouper Advisory Panel (AP) reviewed a discussion document reviewing possible management responses to the assessment. AP comments are provided in the [AP Report](#).

In February 2022 the Law Enforcement Advisory Panel reviewed this amendment for potential enforcement issues. The AP discussed the following items:

- The AP would require more detail on the proposed spearfishing restrictions to provide useful input.
- It was noted that fishermen could claim they used a gaff to harvest a fish instead of spear and this could pose a difficulty for enforcement.
- Consider that any changes in federal regulations to spearfishing gear may require similar changes in state waters to facilitate enforcement.
- Consider identification issues between gag and black grouper, especially in South Florida.

## Acceptable Biological Catch and Overfishing Limit

The SSC reviewed the gag stock assessment (SEDAR 71 2021) at their May 2021 meeting. The SSC found that the assessment addressed the terms of reference appropriately, was conducted using the BSIA, was adequate for determining stock status and supporting fishing level recommendations and addressed uncertainty consistent with expectations and available information. The Council requested several different rebuilding projections including 50% and 70% probability of rebuilding under different recruitment scenarios, including recent low recruitment and longer-term modeled recruitment based on spawning stock size. At their October 2021 meeting, the SSC recommended OFL/ABC values based on a 70% probability of rebuilding in 10 years and recruitment based on the spawner-recruit relationship from the SEDAR 71 stock assessment (2021).

At the December 2021 Council meeting, the Council provided guidance to staff to request additional ABC recommendations based on a 60% probability of rebuilding to help minimize social and economic impacts while still preventing overfishing. The SSC met in February 2022 to review this scenario. After discussion, the SSC continued to recommend a 70% probability of rebuilding in 10 years and recruitment based on the spawner-recruit relationship from the SEDAR 71 stock assessment (2021) (Table 1).

**Table 1.** South Atlantic gag OFL and ABC recommendations based on a 70% probability of rebuilding in 10 years and recruitment based on the spawner-recruit relationship from the

SEDAR 71 (2021) (SSC Meeting Report, October 2021). Note: Commercial and recreational landings are expressed in pounds gutted weight (lbs gw).

<b>OFL RECOMMENDATIONS</b>		
<b>Year</b>	<b>Landings (lbs gw)</b>	<b>Landings (Numbers)</b>
2023	367,235	35,621
2024	494,338	44,843
2025	605,227	52,622
2026	706,366	60,151
2027	808,266	68,072
2028	912,033	75,932
2029	1,011,133	83,028
2030	1,098,379	88,942
2031	1,171,120	93,683
2032	1,230,363	97,454
<b>ABC RECOMMENDATIONS</b>		
<b>Year</b>	<b>Landings (lbs gw)</b>	<b>Landings (Numbers)</b>
2023	175,632	16,925
2024	261,171	23,158
2025	348,352	29,077
2026	435,081	34,954
2027	524,625	41,129
2028	617,778	47,415
2029	711,419	53,422
2030	800,088	58,772
2031	879,758	63,304
2032	948,911	67,043

**PREVIOUS GUIDANCE TO STAFF:** Ask the SSC to provide ABC under the additional probability of rebuilding scenario of 60% to minimize social and economic impacts while preventing overfishing. The Council is willing to deviate from the ABC Control Rule.

### **Snapper Grouper AP Comments/Recommendations :**

- The AP recommends that a 70% probability of rebuilding should be used instead of 50%

## **Proposed management changes in this amendment**

- Establish a rebuilding plan for gag in the South Atlantic
- Adjust catch levels (acceptable biological catch and annual catch limits) and revise annual optimum yield
- Revise sector allocations
- Consider other changes to management

## Objectives for this meeting

- Review scoping comments
- Provide guidance on options for development

## Tentative amendment timing

June 2021	Reviewed SEDAR 71 results and direct staff to begin a plan amendment
October 2021	Advisory Panel review / SSC recommended ABC
December 2021	Reviewed options/scoping paper, provided guidance to staff, and approved the amendment for scoping
February 2022	Conduct scoping
<b>March 2022</b>	<b>Review scoping comments, and provide guidance to staff</b>
April 2022	Advisory Panel review
June 2022	Review draft amendment and provide guidance to staff
September 2022	Review modifications to the amendment, select preferred alternatives, and approve for public hearings
Fall 2022	Conduct public hearings
December 2022	Review public hearing comments and approve all actions
March 2023	Review final amendment and approval for final review

# DRAFT Purpose and Need Statements

Note: This Purpose and Need statement is a draft version and may change, pending Council guidance at the March 2022 meeting.

The *purpose* of this fishery management plan amendment is to establish a rebuilding plan, set an acceptable biological catch, sector allocations, and annual catch limits for South Atlantic gag based on the results of the most recent stock assessment.

The *need* for this fishery management plan amendment is to end overfishing of South Atlantic gag, rebuild the stock, and achieve optimum yield while minimizing, to the extent practicable, adverse social and economic effects.

## Committee Action:

SUGGEST MODIFICATIONS AS APPROPRIATE

## Options for Proposed Actions

### 1. Establish a rebuilding plan for gag

- A rebuilding plan must be established to end overfishing and rebuild the stock of gag in the South Atlantic as a result of the overfished determination from the SEDAR 71 2021 stock assessment.
- Guidance on how to define the upper ( $T_{\max}$ ) and lower ( $T_{\min}$ ) bounds of a rebuilding schedule are specified in National Standard 1 (NS1) of the National Standard Guidelines.<sup>1</sup>
  - “ $T_{\min}$  means the amount of time the stock or stock complex is expected to take to rebuild to its MSY biomass level in the absence of any fishing mortality. In this context, the term “expected” means to have at least a 50 percent probability of attaining the  $B_{\text{msy}}$ , where such probabilities can be calculated. The starting year for the  $T_{\min}$  calculation should be the first year that the rebuilding plan is expected to be implemented.”
  - “If  $T_{\min}$  for the stock or stock complex is 10 years or less, then  $T_{\max}$  is 10 years.”
- Assessment projections indicated the gag stock can rebuild in 7 years in the absence of fishing mortality; therefore, the rebuilding plan for gag may not exceed 10 years.

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<sup>1</sup> National Standard Guidelines are available at the following web address:  
<https://www.fisheries.noaa.gov/national/laws-and-policies/national-standard-guidelines>.

## Options:

**Option 1 (No Change).** The South Atlantic stock of gag is currently not under a rebuilding plan.

**Option 2.** Establish a rebuilding plan with a rebuilding timeframe to equal the shortest possible time to rebuild in the absence of fishing mortality ( $T_{\min}$ ). This would equal 7 years with the rebuilding period ending in 2029. 2023 would be Year 1.

Note: this option assumes that fishing mortality is zero and discards are eliminated. Therefore, it can be expected that under this scenario rebuilding would take longer than 7 years if discards are assumed to be greater than zero.

**Option 3.** Establish a rebuilding plan with a rebuilding timeframe to equal  $T_{\max}$ . This would equal 10 years with the rebuilding period ending in 2032. 2023 would be Year 1.

**Others?**

## Committee Action:

PROVIDE GUIDANCE ON RANGE OF OPTIONS TO DEVELOP.

DRAFT MOTION: SELECT OPTION X AS THE PREFERRED OPTION FOR ACTION 1.

## 2. Revise the total acceptable biological catch, annual catch limit, and annual optimum yield for gag grouper

- New ACLs are needed because the SSC recommended new OFL and ABC values. The current gag ACL (734,350 pounds gutted weight) was established in 2015 through Regulatory Amendment 22 to the FMP and was set at 95% of the ABC.
- The current ACL does not include recreational landings estimates using the new MRIP FES method.
- The Council has specified  $OY=ACL=ABC$  for most snapper grouper species. NS 1 guidelines state that although a Council can establish an annual OY, it must establish a long-term OY.
- OFL and ABC recommendations are for landed catch, as discards are estimated elsewhere in the assessment.

### Snapper Grouper AP Comments/Recommendations :

- The AP would like the Council to ensure there is some available harvest for both sectors (bycatch fishery). Continued catch is crucial to inform science with fisheries dependent methods.
  - Closing the fishery could increase discard mortality

### Options:

**Table 2.** Summary of ACL, OY, and ABC options.

Option	ABC, total ACL, annual OY	Recreational landings data used
Option 1 (No Action)	ACL=OY=current ABC	MRIP-CHTS
Option 2	ACL=OY=updated ABC	MRIP-FES
Option 3	ACL=OY=95% updated ABC	MRIP-FES
Option 4	ACL=OY=90% updated ABC	MRIP-FES
Option 5	ACL=OY=80% updated ABC	MRIP-FES



**Table 3.** Total ACL values in pounds gutted weight for each proposed option under Action 2.

	ACL (pounds gw)									
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032*
<b>Option 1**</b>	734,350	734,350	734,350	734,350	734,350	734,350	734,350	734,350	734,350	734,350
<b>Option 2***</b>	175,632	261,171	348,352	435,081	524,625	617,778	711,419	800,088	879,758	948,911
<b>Option 3***</b>	166,850	248,112	330,934	413,327	498,394	586,889	675,848	760,084	835,770	901,465
<b>Option 4***</b>	158,069	235,054	313,517	391,573	472,163	556,000	640,277	720,079	791,782	854,020
<b>Option 5***</b>	140,506	208,937	278,682	348,065	419,700	494,222	569,135	640,070	703,806	759,129

\*2032 values would remain in place until modified.

\*\*The ACL for Option 1 is inclusive of recreational landings tracked using the MRIP Coastal Household Telephone Survey.

\*\*\*The ACLs for Options 2 through 5 would be inclusive of recreational landings tracked using the MRIP Fishing Effort Survey

**IPT Recommendation:** The IPT suggested removing Option 5 from Action 2.

### **Committee Action:**

- CONSIDER THE IPT'S RECOMMENDATION AND PROVIDE GUIDANCE ON RANGE OF OPTIONS TO DEVELOP. SELECT PREFERRED ALTERNATIVE TO FACILITATE ANALYSIS.

DRAFT MOTION: SELECT OPTION X AS THE PREFERRED OPTION FOR ACTION 2.

### 3. Revise the gag sector allocations and sector annual catch limits

- Allocations need to be reviewed since the recreational landings stream changed in the new assessment. Recreational landings are now estimated using data from the Fishing Effort Survey rather than the Coastal Household Telephone Survey.
- Sector allocations for gag were implemented through Amendment 16 to the FMP (SAFMC 2008) (commercial 51%, recreational 49%) using landings available at the time from 1999-2003.
- While not used for gag, an allocation formula was adopted through the Comprehensive ACL Amendment (SAFMC 2011) for unassessed snapper grouper species. The same formula has also been used to allocate the total ACL for some assessed species (e.g., golden tilefish). This formula was recently selected as the preferred method for red porgy (Amendment 50 to the FMP).
- Commercial landings of gag in the South Atlantic averaged 77% of the commercial ACL with a yearly average landings of 242,949 lbs gw from 2015-2019. There were no commercial closures (aside from the spawning season closure) from 2015-2019 (Table 4).

**Table 4.** Commercial landings of gag and the percentage of the commercial ACL landed each year from 2015-2019.

Year	Commercial Landings (lbs gw)	Commercial ACL (lbs gw)	ACL %
2019	258,591	347,301	75%
2018	239,810	335,188	72%
2017	196,807	318,231	62%
2016	234,997	297,882	79%
2015	284,540	295,459	96%

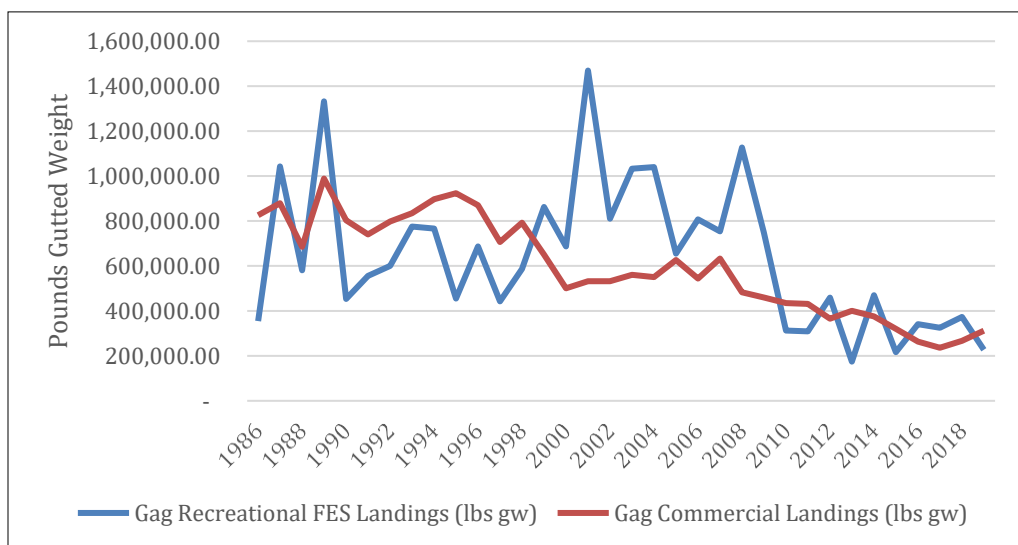
Source: <https://www.fisheries.noaa.gov/southeast/commercial-fishing/southeast-region-annual-catch-limit-acl-monitoring>

Note: the commercial ACLs include the Directed Commercial Quota established in Amendment 16 (2009).

- Recreational landings of gag in the South Atlantic averaged 33% of the recreational ACL with a yearly average of 109,534 lbs gw (in CHTS terms; i.e. not FES terms) from 2015-2019. There were no recreational closures (aside from the spawning season closure) from 2015-2019 (Table 5).
- While not applicable to the existing sector ACL, recreational landings were similar to commercial landings in recent years when examined in FES terms (Figure 2).

**Table 5.** Recreational landings of gag and the percentage of the recreational ACL landed each year from 2015-2019. Landings and sector ACL are in CHTS terms; i.e. not FES terms.

Year	Recreational Landings (lbs gw)	Recreational ACL (lbs gw)	ACL %
2015	58,348	310,023	19%
2016	151,456	312,351	48%
2017	114,117	331,902	34%
2018	129,355	348,194	37%
2019	94,394	348,194	27%



**Figure 2.** The recreational (MRIP FES) and commercial landings from 1986-2019

**PREVIOUS DIRECTION TO STAFF :**

Incorporate the additional allocation method as an option for action 3.  
 Include options for action 3 using ACL=ABC (option 2 action 2).

## Options:

**Table 6.** Summary of allocation options summary for proposed options under Action 3.  
**Note:** all options applied to the revised total ACL from previous action.

Option	Recreational/Commercial Allocation	Basis for Allocation
Option 1 (no change)	49%/51%	Landings distribution 1999-2003 used in Amendment 16
Option 2	63.63%/36.37	Updated landings distribution 1999-2003
Option 3	56.94%/43.06%	Allocation Formula
<b>Option 4</b>		
Option 4a	Changes each year depending on initial decrease and subsequent increases in ACL	Spilt reduction in landings in year 1 based on 2020 landings, split poundage increase each year thereafter
Option 4b	Changes each year depending on initial decrease and subsequent increases in ACL	Spilt reduction in landings in year 1 based on average landings from 2018-2020, split poundage increase each year thereafter
Option 4c	Changes each year depending on initial decrease and subsequent increases in ACL	Spilt reduction in landings in year 1 based on average landings from 2016-2020, split poundage increase each year thereafter

**Table 7.** Total ACL and allocations for proposed options under Action 3.

<b>Option 1</b>			
<b>Year</b>	<b>Total ACL lbs gw</b>	<b>Total Commercial ACL lbs gw (51%)</b>	<b>Recreational ACL lbs gw (49%)</b>
<b>2023</b>	175,632	89,572	86,060
<b>2024</b>	261,171	133,197	127,974
<b>2025</b>	348,352	177,660	170,692
<b>2026</b>	435,081	221,891	213,190
<b>2027</b>	524,625	267,559	257,066
<b>2028</b>	617,778	315,067	302,711
<b>2029</b>	711,419	362,824	348,595
<b>2030</b>	800,088	408,045	392,043
<b>2031</b>	879,758	448,677	431,081
<b>2032</b>	948,911	483,945	464,966
<b>Option 2</b>			
<b>Year</b>	<b>Total ACL lbs gw</b>	<b>Total Commercial ACL lbs gw (36.37%)</b>	<b>Recreational ACL lbs gw (63.63%)</b>
<b>2023</b>	175,632	63,877	111,755
<b>2024</b>	261,171	94,988	166,183
<b>2025</b>	348,352	126,696	221,656
<b>2026</b>	435,081	158,239	276,842
<b>2027</b>	524,625	190,806	333,819
<b>2028</b>	617,778	224,686	393,092
<b>2029</b>	711,419	258,743	452,676
<b>2030</b>	800,088	290,992	509,096
<b>2031</b>	879,758	319,968	559,790
<b>2032</b>	948,911	345,119	603,792
<b>Option 3</b>			
<b>Year</b>	<b>Total ACL lbs gw</b>	<b>Total Commercial ACL lbs gw (39.06%)</b>	<b>Recreational ACL lbs gw (60.94%)</b>
<b>2023</b>	175,632	75,627	100,005
<b>2024</b>	261,171	112,460	148,711
<b>2025</b>	348,352	150,000	198,352
<b>2026</b>	435,081	187,346	247,735
<b>2027</b>	524,625	225,904	298,721
<b>2028</b>	617,778	266,015	351,763
<b>2029</b>	711,419	306,337	405,082
<b>2030</b>	800,088	344,518	455,570
<b>2031</b>	879,758	378,824	500,934
<b>2032</b>	948,911	408,601	540,310

**Note:** The revised sector annual catch limits in Options 1 (No Action) through 4 reflect the revised total annual catch limit in Option 2 of Action 2. The revised total annual catch limit includes recreational landings from the Marine Recreational Information Program

using the Fishing Effort Survey method where appropriate, as well as updates to commercial and headboat landings used in the latest assessment (SEDAR 71).

**IPT RECOMMENDATION :** The IPT recommends using an average range of landings for either a 3- or 5-year period for **Action 3 Option 4**. Using a single year of landings, particularly 2020, may not be indicative of the how the fishery has historically operated or will operate in the near future.

**Committee Action:**

PROVIDE GUIDANCE ON RANGE OF OPTIONS TO DEVELOP.

## Other Possible Actions:

### 4. Modify gag grouper commercial management measures

- Modifying commercial management measures may be considered to ensure harvest is constrained to the reduced catch levels and that rebuilding occurs during the specified timeframe.

**Table 8.** A summary of the current gag commercial management measures.

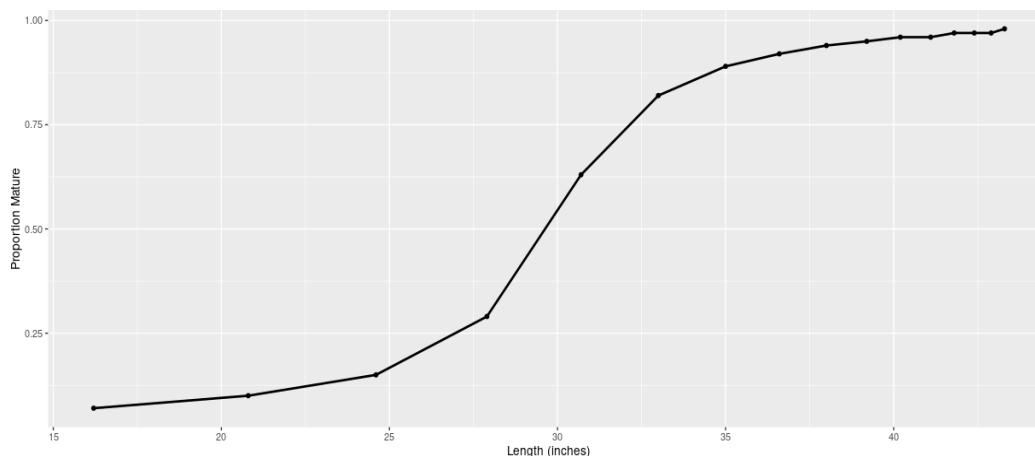
<b>Gag Grouper Commercial Management Measures</b>	
<b>Trip Limit</b>	1,000 lbs gw until 75% of the commercial ACL is met then the trip limit is 500 lbs gw
<b>Commercial Season</b>	May 1 – December 31
<b>Commercial Size Limit</b>	24 inches total length

- The current gag grouper commercial trip limit is 1,000 lbs gw until 75% of the commercial ACL is met, then the trip limit drops to 500 lbs gw for the remainder of the fishing year or until the commercial ACL is met. This trip limit was established through Regulatory Amendment 14 to the FMP (2014).
- Since its implementation in 2014, landings have gone above 75% of the commercial ACL a total of 3 years (2014-2016); however, the trip limit step down was implemented in 2015 only.
  - During this time period there has only been one commercial closure, which occurred in November of 2014 (Table 9).

**Table 9.** Commercial trip limit step downs from 2014 (implementation) to 2019.

<b>Year</b>	<b>% Commercial ACL Used</b>	<b>Trip Limit Reduction Y/N</b>	<b>Reduction Date</b>
2019	74.5	N	NA
2018	71.5	N	NA
2017	61.8	N	NA
2016	78.9	N	N
2015	96.3	Y	October 18, 2015
2014	102.9	N	N

- According to SEDAR 71, 50% of females were mature around 30 inches (Figure 3).



**Figure 3.** Gag female length at maturity based on SEDAR 71.

- Gag are protogynous hermaphrodites that change sex from female to male. According to SEDAR 71 the average age at transition is 10.5 years.

**Table 10.** The age, length, and proportion female for gag grouper

Age	Total Length (inches)	Proportion Female
10	39.2	61%
11	40.2	41%
12	41.1	24%
13	41.8	13%
14	42.4	6%
15	42.9	3%
16	43.3	1%

#### **PREVIOUS GUIDANCE TO STAFF :**

- 1) Include an action to reduce the commercial trip to 200-500 lbs gw.
- 2) Include an action to increase the commercial size limit.
- 3) Include an action to establish a commercial slot limit.
- 4) Include an action to restrict spear fishing gear (including powerheads) in the commercial sector, possibly only for certain times of the year.
- 5) Include an action to remove spearfishing gear during the rebuilding plan for the commercial sector.

#### **Snapper Grouper AP Comments/Recommendations :**

- The AP recommends increasing minimum size or implementing a slot limit to protect spawning females.
- The AP recommended expanding the spawning season closure – extend through May
  - It was noted that not much difference has been observed after spawning season closure enacted.
  - The AP recommended not extending the spawning closure below 28 degrees N. Latitude.
- The AP would prefer a 250 or 50 lbs gw trip limit versus 0 lbs.



- Reducing the trip limit for all shallow water grouper would be detrimental.

## Options:

**Table 11.** Summary of commercial management options for Action 4.

Option	Trip Limit	Size Limit	Spawning Season
<b>Option 1 (no change)</b>	1,000 lbs gw until 75% of the commercial ACL is met then 500 lbs gw	24 in total length	Jan 1 - May 1
<b>Option 2 (Reduce the commercial trip limit)</b>			
<b>Option 2a</b>	200 lbs gw		
<b>Option 2b</b>	300 lbs gw		
<b>Option 2c</b>	400 lbs gw		
<b>Option 2d</b>	500 lbs gw		
<b>Option 3 (Increase size limit or implement slot limit)</b>			
<b>Option 3a</b>		28 in total length	
<b>Option 3b</b>		30 in total length	
<b>Option 3c</b>		24-30 in total length	
<b>Option 4 (Modify the commercial spawning season closure)?</b>			
<b>Option 4a</b>			Jan 1 - May 31, one additional month in the spring
<b>Option 5b</b>			Dec 1 - May 1, one additional month in the winter
<b>Option 5c</b>			Dec 1 - May 1, two additional months. One in the winter and one in the spring.

**IPT RECOMMENDATION :** The IPT recommends the Council discuss the merits of keeping a trip limit step-down for gag. As discussed with other species (vermilion snapper, Spanish mackerel), trip limit step downs have not been found to substantially slow harvest enough to extend season lengths.

## Scoping Comments:

- Many commenters were in favor of commercial management changes instead of restrictions on spearfishing gear.
- Trip limit reductions of 500 and 100 lbs were suggested.
- Comments were received both in favor and in opposition of an increase in the minimum size limit or slot limit.

- Those in favor of a slot limit noted this would prevent the spearfishing sector from removing large individuals.
- Those opposed were concerned about release mortality.

**Committee Action:**

PROVIDE GUIDANCE ON ACTIONS TO DEVELOP TO MODIFY COMMERCIAL MANAGEMENT MEASURES.

## 5. Modify gag grouper recreational management measures

- Modifying recreational management measures may be considered to ensure harvest is constrained to the reduced catch levels and that rebuilding occurs during the specified timeframe.

**Table 12.** A summary of the current gag recreational management measures.

<b>Gag Grouper Recreational Management Measures</b>	
<b>Bag Limit</b>	1 fish/person/day within the 3-grouper aggregate
<b>Recreational Season</b>	May 1 - December 31
<b>Recreational Size Limit</b>	24 inches total length

- The gag grouper spawning season closure was established through Amendment 16 to the FMP (2009) to protect gag grouper, and other shallow water groupers, spawning aggregations from being prosecuted by the fishery (Coleman *et al.* 2000). Grouper within these spawning aggregates are particularly vulnerable to be removed with fishing gear due to aggression during these events (Thompson and Munro 1974; Gilmore and Jones 1992).
- In 2020, through Regulatory Amendment 30 to the FMP, the red grouper spawning season closure was extended from January 1 – April 30 to January 1 – May 31 in federal waters from North Carolina to Georgia only. Many fishermen noted observing spawning aggregations in May which led to concerns over the efficacy of the spawning season closure. The spawning season closure was extended to provide red grouper additional spawning opportunities.
- According to Farmer et al. (2017), gag grouper spawning occurs from January through May with peak spawning occurring February through April.

### PREVIOUS GUIDANCE TO STAFF:

- 1) Include an action to increase the recreational size limit.
- 2) Include an action to establish a recreational slot limit.
- 3) Include an action to establish a vessel limit of 1-6 fish per vessel for the recreational sector (including and excluding headboats).
- 4) Include an action to modify the recreational fishing season (accounting for regional differences) /modify the spawning season closure.
- 5) Include an action to restrict spear fishing gear (including bang sticks) in the recreational sector, possibly only for certain times of the year.
- 6) Include an action to remove spearfishing gear during the rebuilding plan for the recreational sector.

## **Snapper Grouper AP Comments/Recommendations :**

- The AP recommended expanding the spawning season closure – extend through May.
  - It was noted that not much difference has been observed after spawning season closure enacted.
  - The AP recommended not extending the spawning closure below 28 degrees N. Latitude.
- The AP recommends that there be a permit for the recreational sector.
- The AP recommends increasing minimum size or implementing a slot limit to protect spawning females.

## Options:

**Table 13.** Summary of recreational management options for Action 5.

Option	Bag Limit	Size Limit	Spawning Season
<b>Option 1 (no change)</b>	1 fish/person/day no vessel limit	24 in total length	Jan 1 - May 1
<b>Option 2* (Establish a vessel limit for all rec. vessels)</b>			
<b>Option 2a</b>	1 fish/vessel/day for all rec vessels		
<b>Option 2b</b>	2 fish/vessel/day for all rec vessels		
<b>Option 2c</b>	3 fish/vessel/day for all rec vessels		
<b>Option 2d</b>	4 fish/vessel/day for all rec vessels		
<b>Option 2e</b>	5 fish/vessel/day for all rec vessels		
<b>Option 2f</b>	6 fish/vessel/day for all rec vessels		
<b>Option 3* (Establish a vessel limit for private rec. vessels only)</b>			
<b>Option 3a</b>	1 fish/vessel/day for private rec vessels only		
<b>Option 3b</b>	2 fish/vessel/day for private rec vessels only		
<b>Option 3c</b>	3 fish/vessel/day for private rec vessels only		
<b>Option 3d</b>	4 fish/vessel/day for private rec vessels only		
<b>Option 3e</b>	5 fish/vessel/day for private rec vessels only		
<b>Option 3f</b>	6 fish/vessel/day for private rec vessels only		
<b>Option 4 (Increase size limit or implement slot limit)</b>			
<b>Option 4a</b>		28 in total length	
<b>Option 4b</b>		30 in total length	
<b>Option 4c</b>		24-30 in total length	
<b>Option 5 (Modify spawning season closure)</b>			
<b>Option 5a</b>			Jan 1 - May 31, one additional month in the spring
<b>Option 5b</b>			Dec 1 - May 1, one additional month in the winter
<b>Option 5c</b>			Dec 1-May 31, two additional months. One in the winter, one in spring

\*Option still retains the 1 fish/person/day limit in addition to the vessel limit, whichever is more restrictive.

### **Scoping Comments:**

- Many commenters were in favor of recreational management changes instead of restrictions on spearfishing gear.
- Several comments were opposed to a recreational vessel limit.
- One comment that was in favor of a vessel limit suggested a 1 fish/vessel/day with a tag lottery system for headboats.
- Comments were received both in favor and in opposition of an increase in the minimum size limit or slot limit.
  - Those in favor of a slot limit noted this would prevent the spearfishing sector from removing large individuals.
  - Those opposed were concerned about release mortality.
- Some comments were in favor of extending the spawning season while others suggested spatial spawning areas.
- One comment suggested evaluating the effectiveness of the spawning season closure before modifying.
- Multiple comments suggested creating a stamp/endorsement for the recreational sector to identify the universe of anglers.

### **Committee Action:**

PROVIDE GUIDANCE ON RANGE OF ACTIONS TO DEVELOP TO MODIFY RECREATIONAL MANAGEMENT MEASURES.

- For Option 5, provide guidance on whether there should be regional variations and what regions should be considered.

## 6. Restrict spearfishing gear (including powerheads) during the gag grouper rebuilding plan.

- The Council is considering restrictions on commercial and recreational spearfishing gear due to concerns over this gear type's efficiency in removing large males from the population. According to SEDAR 71, there is a lack of individuals in the larger/older size ranges.
- Currently spearfishing gear (including the use of powerheads) is a generally allowable gear to use in both the commercial and recreational fishery. Scuba gear may be used when spearfishing but there is an existing prohibition on the use of rebreathers (50 CFR § 622.180(b)).

### **§ 622.180 Prohibited gear and methods.**

*(b) Rebreathers and spearfishing gear. In the South Atlantic EEZ, a person using a rebreather may not harvest South Atlantic snapper-grouper with spearfishing gear. The possession of such snapper-grouper while in the water with a rebreather is **prima facie** evidence that such fish was harvested with spearfishing gear while using a rebreather.*

- In recent years, spearfishing gear has accounted for approximately a quarter of total commercial gag landings annually (Table 14).

**Table 14.** The percent of the commercial gag grouper landings by gear type from 2015-2019.

Year	Commercial Spearfishing Gear (lbs gw)	Spearfishing Gear (% of Total Commercial Landings)	All Other Gear (lbs gw)	All Other Gear (% of Total Commercial Landings)	Total Gag Commercial Landings (lbs gw)
2015	59,001	24%	188,079	76%	247,080
2016	58,722	29%	145,531	71%	204,253
2017	40,687	23%	136,566	77%	177,253
2018	52,818	24%	166,225	76%	219,043
2019	46,643	22%	161,483	78%	208,126

Source: SEFSC-SSRG Socioeconomic Panel.

- In 2019 a [white paper](#) pertaining to spearfishing was presented to the Council. Data pertaining to gag grouper can be found in Appendix D.

### **PREVIOUS GUIDANCE TO STAFF :**

- 1) Include an action to restrict spear fishing gear (including powerheads) for certain times of the year or remove spearfishing gear during the rebuilding plan for the recreational and commercial sector.

### **Options:**

**Table 16.** Recreational management options summary for Action 6.

Option	Allowable Gear	Season Restriction
Option 1 (no change)	hook and line and spearfishing gear	no seasonal gear restrictions
Option 2	hook and line gear only	
Option 3 (Seasonal restriction on spearfishing gear)		
Option 3a	hook and line and spearfishing gear	(Month) to (Month)
Option 3b	hook and line and spearfishing gear	(Month) to (Month)
Option 3c	hook and line and spearfishing gear	(Month) to (Month)

**Scoping Comments:**

- The majority of comments pertained to spearfishing and opposed any restriction to spearfishing gear.
- Eight comments suggested restricting the use of spearfishing only when using SCUBA gear.
- One commenter suggested restricting spearfishing gear for the commercial sector only.
- One comment suggested creating a spearfishing endorsement to the snapper grouper permits to place a cap on the number of vessels harvesting with this gear type.

**Committee Action:**

PROVIDE GUIDANCE ON RANGE OF ACTIONS TO DEVELOP.



## 7. Modify gag grouper accountability measures

- Modifying accountability measures may be considered to prevent landings from exceeding the adjusted sector ACLs and correct for overages if they occur.
- Current accountability measures:

**Table 17.** A summary of the current commercial and recreational accountability measures.

	In-Season AM		Post Season AM	
	Triggers	AM	Triggers	AM
<b>Commercial</b>	Commercial landings exceed/expected to exceed commercial ACL	Current commercial season closes	<ul style="list-style-type: none"> <li>• Commercial landings exceed/expected to exceed commercial ACL</li> <li>• Total ACL exceeded</li> <li>• Stock is overfished</li> </ul> <p><i>*All triggers must be present for AM to occur</i></p>	<ul style="list-style-type: none"> <li>• Commercial ACL for the following year reduced by the commercial overage</li> <li>• Commercial season for the following year is reduced by the amount of the commercial overage</li> </ul>
<b>Recreational</b>	Recreational landings exceed/expected to exceed recreational ACL	Current recreational season closes	<ul style="list-style-type: none"> <li>• Recreational landings exceed/expected to exceed recreational ACL</li> <li>• Total ACL exceeded</li> <li>• Stock is overfished</li> </ul> <p><i>*All triggers must be present for AM to occur</i></p>	<p>Recreational landings are monitored during the following year and if necessary:</p> <ul style="list-style-type: none"> <li>• Recreational ACL for the following year reduced by the recreational overage</li> <li>• Recreational season for the following year is reduced to ensure the recreational ACL is not exceeded</li> </ul>

### PREVIOUS GUIDANCE TO STAFF:

- 1) Include an action to modify AMs Post season – total ACL exceeded OR recreational ACL is exceeded the trigger for the post season AM

## Options:

**Table 18.** Summary of recreational accountability measure options for Action 7.

	In-Season AM		Post-Season AM	
	Triggers	AM	Triggers	AM
<b>Option 1 (no change)</b>	Recreational landings exceed/expected to exceed recreational ACL	Current recreational season closes	<ul style="list-style-type: none"> <li>• Recreational landings exceed/expected to exceed recreational ACL</li> <li>• Total ACL exceeded</li> <li>• Stock is overfished</li> </ul> <p><b>*All triggers must be present for AM to occur</b></p>	<p>Recreational landings are monitored during the following year and if necessary:</p> <ul style="list-style-type: none"> <li>• Recreational ACL for the following year reduced by the recreational overage</li> <li>• Recreational season for the following year is reduced to ensure the recreational ACL is not exceeded</li> </ul>
<b>Option 2</b>	NMFS will annually announce the recreational fishing season start and end dates			
<b>Option 3</b>	NONE		Recreational landings exceed recreational ACL	Recreational season for the following year is reduced by the amount necessary to prevent the recreational ACL from being exceeded
<b>Option 4</b>	NONE		<p>Recreational landings exceed recreational ACL  <b>OR</b> total ACL is exceeded</p> <p><b>*No longer tied to stock status?</b></p>	Recreational season for the following year is reduced by the amount necessary to prevent the recreational ACL from being exceeded

## Committee Action:

PROVIDE GUIDANCE ON THE RANGE OF OPTIONS TO DEVELOP.

## GUIDANCE TO STAFF:

# Appendices

## Appendix A. Management History

**Table A-1.** The gag amendment history and management changes.

Year	Amendment	Management Measure Change
1992	Amendment 4	20-inch TL minimum size, 5 gag bag limit
1999	Amendment 9	24-inch TL minimum size, 2 gag bag limit
2009	Amendment 16	shallow water grouper spawning season closure, established a directed commercial quota, allocations, reduced bag limit to 1 gag
2010	Amendment 17A	non-stainless steel circle hooks required for natural baits north of 28 degrees N. Latitude
2011	Amendment 17B	established aggregate ACLs and AMs
2012	Amendment 24	Removed aggregate ACLs
2013	Regulatory Amendment 15	Reduced commercial quota
2015	Regulatory Amendment 22	Revised ACLs
2016	Amendment 34	Modified AMs for snapper grouper species

**Table A-2.** The previous management measures and catch levels for South Atlantic gag. Note that for the commercial trip limit is 1,000 pounds gutted weight until 75% of the commercial ACL is met, then the trip limit is reduced to 500 pounds gutted weight.

Management Measures	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
ABC (lbs gw)	805,000	805,000	805,000	666,000	671,000	713,000	748,000	773,000	773,000	773,000	773,000	TBD
Total ACL (lbs gw)	693,000	666,782	666,782	632,700	677,350	710,060	734,350	734,350	734,350	734,350	734,350	TBD
Total Landings (lbs gw)	532,699	459,110	505,701	342,888	386,453	310,924	369,165	352,985	307,195	TBD	TBD	TBD
Total ACL Overage/Underage	76.9%	68.9%	75.8%	54.2%	57.1%	43.8%	50.3%	48.1%	41.8%	TBD	TBD	TBD
Directed Commercial Quota (lbs gw)	352,940	326,722	326,722	295,459*	297,882*	318,231*	335,188*	347,301*	347,301*	347,301*	347,301*	TBD
Com. Landings (lbs gw)	355,602	380,638	336,254	284,540	234,997	196,807	239,810	258,591	257,071	TBD	TBD	TBD
Com. % ACL	100.8%	116.5%	102.9%	96.3%	78.9%	61.8%	71.5%	74.5%	74.0%	TBD	TBD	TBD
Rec. ACL (lbs gw)	340,060	340,060	340,060	310,023	312,351	331,902	348,194	348,194	348,194	348,194	TBD	TBD
Rec. Landings, "Old" MRIP (lbs gw)	177,097	78,472	169,447	58,348	151,456	114,117	129,355	94,394	50,124	NA	NA	NA
Rec. % of ACL	52.1%	23.1%	49.8%	18.8%	48.5%	34.4%	37.2%	27.1%	14.4%	TBD	TBD	TBD
Rec. Bag Limit (person/day)	1	1	1	1	1	1	1	1	1	1	1	TBD
Rec. Size Limit (inches TL)	24	24	24	24	24	24	24	24	24	24	24	TBD
Rec. Season	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	TBD
Rec Allocation	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	TBD
Com. Trip Limit (lbs gw)	1000/500 (75% ACL)	1000/500 (75% ACL)	1000/500 (75% ACL)	1000/500 (75% ACL)	1000/500 (75% ACL)	1000/500 (75% ACL)	1000/500 (75% ACL)	1000/500 (75% ACL)	1000/500 (75% ACL)	1000/500 (75% ACL)	1000/500 (75% ACL)	TBD
Com. Size Limit (inches TL)	24	24	24	24	24	24	24	24	24	24	24	TBD
Com. Season	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	May-Dec	TBD
Com. Allocation	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	TBD


\* Directed Commercial Quota is equal to the commercial ACL – the estimated Post-Quota Bycatch Mortality (27,218 lbs gw)


## Appendix B. Action 3 Option 4 Allocations

Figure B-1.

**AMENDMENT 53**  
**GAG GROUPER**

NEW ALLOCATION METHOD  
(ACTION 3, OPTION 4)





**A NEW METHOD OF ALLOCATING THE TOTAL ALLOWABLE CATCH BETWEEN AND RECREATIONAL AND COMMERCIAL SECTOR WAS PROPOSED IN DECEMBER 2021**

**WHY?**

**STOCK STATUS**

The latest assessment indicated that gag is overfished and experiencing overfishing


☒ **EXPERIENCING OVERFISHING**

☒ **OVERFISHED**

**Overfishing** = The fishing rate is above levels that support sustainable harvest

**Overfished** = The biomass of the stock is below levels that support sustainable harvest

Because of this stock status, significant reductions in harvest will be required for each sector





This new method of allocating catch uses each sector's landings to proportionately distribute the reduction in harvest in the first year, then evenly distribute ACL increases in the following years

TO LEARN MORE ABOUT THIS AMENDMENT AND OTHERS IN DEVELOPMENT VISIT: [SAFMC.NET](http://SAFMC.NET)

**AMENDMENT 53**  
**GAG GROUPER**

NEW ALLOCATION METHOD  
(ACTION 3, OPTION 4)





**HOW?**

**THE INITIAL REDUCTION**

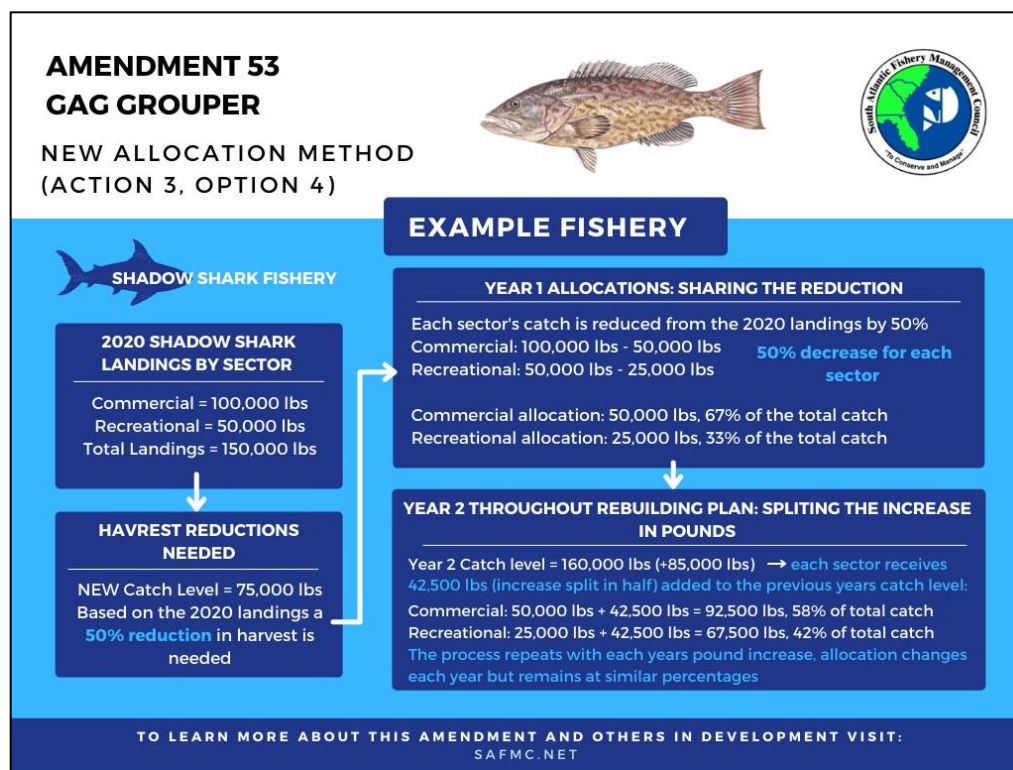
This method aims to share the reduction in harvest needed to reduce catch levels below the updated catch level. Reductions for each sector are based on previous landings so each sector takes a reduction proportional to the landings observed before the rebuilding plan was established, essentially a reduced status quo for each sector.

**AFTER THE INITIAL REDUCTION**

After the initial reduction in catch levels, the allowable catch increases throughout the remainder of the rebuilding plan. This allocation method aims to evenly split the increase in pounds each year between the sectors. Sector allocation percentages will fluctuate each year depending on the pound increase from the previous year.

Think of this allocation method as an allocation of poundage NOT percentage, as the percentage allocation is determined only after each sector is allocated its increase in pounds each year.

TO LEARN MORE ABOUT THIS AMENDMENT AND OTHERS IN DEVELOPMENT VISIT: [SAFMC.NET](http://SAFMC.NET)



**Table B-1.** Allocation option for Action 3, option 4a based on 2020 gag grouper landings. Recreational landings are based on MRIP FES methods.

based on MKR TEB methods.

Year	Commercial Landings lbs gw	Recreational Landings lbs gw	Total Landings lbs gw				
2020	258,565	157,008	415,573				
Year 1 Allocations							
Year	Total ACL lbs gw	Percent Reduction needed	Commercial ACL lbs gw	Commercial Allocation %	Recreational ACL lbs gw	Recreational Allocation %	
2023	175,632	58%	109,276	62%	66,356	38%	
Remaining Rebuilding Years Allocations							
Year	Total ACL lbs gw	Total Increase from Previous Year	Total Increase for each Sector	Commercial ACL	Commercial Allocation %	Recreational ACL	Recreational Allocation %
2024	261,171	85,539	42,770	152,046	58%	109,125	42%
2025	348,352	87,181	43,591	195,636	56%	152,716	44%
2026	435,081	86,729	43,365	239,001	55%	196,080	45%
2027	524,625	89,729	44,865	283,773	54%	240,852	46%
2028	617,778	89,544	44,772	330,349	53%	287,429	47%
2029	711,419	93,544	46,772	377,170	53%	334,249	47%
2030	800,088	88,669	44,335	421,504	53%	378,584	47%
2031	879,758	79,670	39,835	461,339	52%	418,419	48%
2032	948,911	69,153	34,577	495,916	52%	452,995	48%

**Table B-2.** Allocation option for Action 3, option 4b based on average gag grouper landings from 2018-2020. Recreational landings are based on MRIP FES methods.

Recreational landings are based on MKR PES methods.

Year	Average Commercial Landings lbs gw	Average Recreational Landings lbs gw	Total Landings lbs gw				
Average from 2018-2020	252,322	288,556	540,878				
Year 1 Allocations							
Year	Total ACL lbs gw	Percent Reduction needed	Commercial ACL lbs gw	Commercial Allocation %	Recreational ACL lbs gw	Recreational Allocation %	
2023	175,632	58%	81,933	47%	93,699	53%	
Remaining Rebuilding Years Allocations							
Year	Total ACL lbs gw	Total Increase from Previous Year	Total Increase for each Sector	Commercial ACL	Commercial Allocation %	Recreational ACL	Recreational Allocation %
2024	261,171	85,539	42,770	124,703	48%	136,468	52%
2025	348,352	87,181	43,591	168,293	48%	180,059	52%
2026	435,081	86,729	43,365	211,658	49%	223,423	51%
2027	524,625	89,729	44,772	256,430	49%	268,195	51%
2028	617,778	89,544	46,577	303,006	49%	314,772	51%
2029	711,419	93,544	46,821	349,827	49%	361,592	51%
2030	800,088	79,670	44,335	394,161	49%	405,927	51%
2031	879,758	79,670	39,835	433,996	49%	445,762	51%
2032	948,911	69,153	34,576	468,573	49%	480,338	51%

**Table B-3.** Allocation option for Action 3, option 4c based on average gag grouper landings from 2016-2020. Recreational landings are based on MRIP FES methods.

Recreational landings are based on MKR FES methods.

Year	Average Commercial Landings lbs gw	Average Recreational Landings lbs gw	Total Landings lbs gw			
Average from 2016-2020	237,754	330,588	568,342			
Year 1 Allocations						
Year	Total ACL lbs gw	Percent Reduction needed	Commercial ACL lbs gw	Commercial Allocation %	Recreational ACL lbs gw	Recreational Allocation %
2023	175,632	58%	73,472	42%	102,160	58%
Remaining Rebuilding Years Allocations						



Year	Total ACL lbs gw	Total Increase from Previous Year	Total Increase for each Sector	Commercial ACL	Commercial Allocation %	Recreational ACL	Recreational Allocation %
2024	261,171	85,539	42,770	116,241	45%	144,930	55%
2025	348,352	87,181	43,591	159,832	46%	188,520	54%
2026	435,081	86,729	43,365	203,196	47%	231,885	53%
2027	524,625	89,729	44,772	247,968	48%	276,657	53%
2028	617,778	89,544	46,577	294,545	48%	323,233	52%
2029	711,419	93,544	46,821	341,365	48%	370,054	52%
2030	800,088	88,669	44,335	385,700	48%	414,388	52%
2031	879,758	79,670	39,835	425,535	48%	454,223	52%
2032	948,911	69,153	34,577	460,111	48%	488,800	52%

## Appendix C. Accountability Measures

The accountability measures as listed in the Code of the Federal Register.

- Commercial
  - o If commercial landings for gag, as estimated by the SRD, reach or are projected to reach the commercial quota specified in [§ 622.190\(a\)\(7\)](#), the AA will file a notification with the Office of the Federal Register to close the commercial sector for gag for the remainder of the fishing year. Applicable restrictions after a commercial quota closure are specified in [§ 622.190\(c\)](#).
  - o If the commercial landings for gag, as estimated by the SRD, exceed the commercial ACL specified in [§ 622.193\(c\)\(1\)\(iii\)](#), and the combined commercial and recreational ACL specified in [§ 622.193\(c\)\(1\)\(iv\)](#), is exceeded during the same fishing year, and gag are overfished based on the most recent Status of U.S. Fisheries Report to Congress, the AA will file a notification with the Office of the Federal Register to reduce the commercial ACL for that following fishing year by the amount of the commercial ACL overage in the prior fishing year.
- Recreational
  - o If recreational landings for gag, as estimated by the SRD, reach or are projected to reach the recreational ACL, the AA will file a notification with the Office of the Federal Register to close the recreational sector for the remainder of the fishing year regardless if the stock is overfished, unless NMFS determines that no closure is necessary based on the best scientific information available. On and after the effective date of such notification, the bag and possession limits for gag in or from the South Atlantic EEZ are zero.
  - o If recreational landings for gag, as estimated by the SRD, exceed the recreational ACL, then during the following fishing year recreational landings will be monitored for a persistence in increased landings, and if necessary, the AA will file a notification with the Office of the Federal Register to reduce the length of the recreational fishing season and the recreational ACL by the amount of the recreational ACL overage, if the species is overfished based on the most recent Status of U.S. Fisheries Report to Congress, and if the combined commercial and recreational ACL specified in [§ 622.193\(c\)\(1\)\(iv\)](#) is



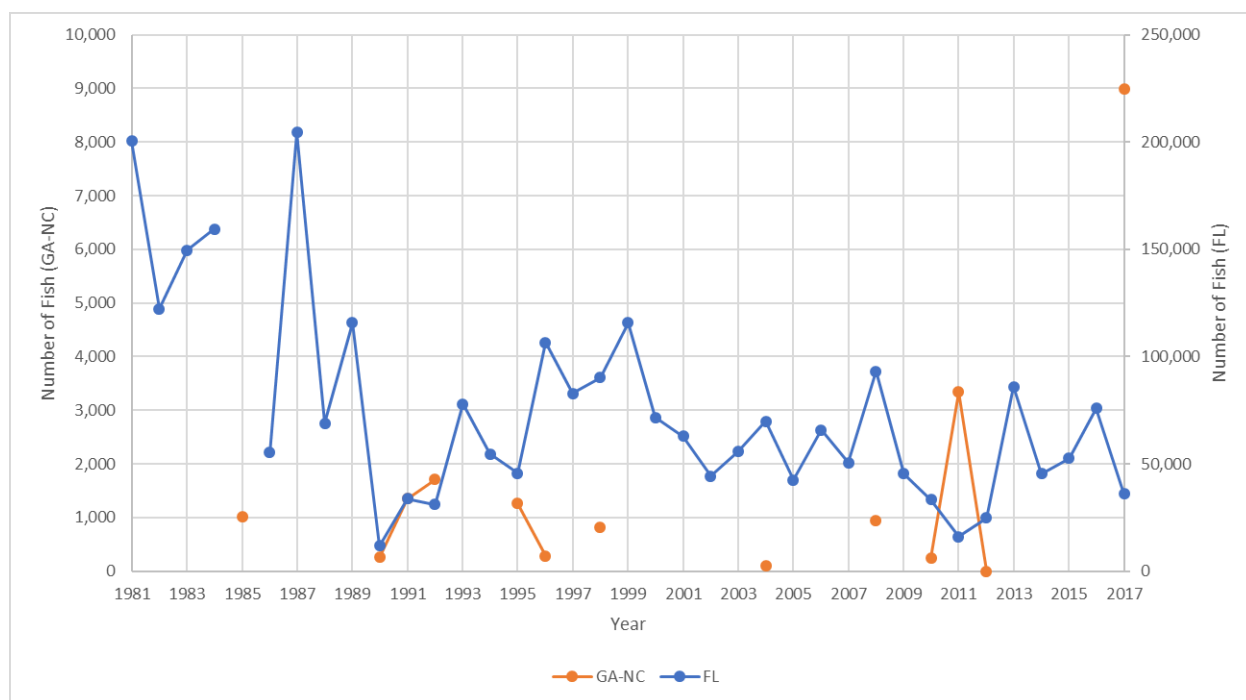
exceeded during the same fishing year. NMFS will use the best scientific information available to determine if reducing the length of the recreational fishing season and recreational ACL is necessary. When the recreational sector is closed as a result of NMFS reducing the length of the recreational fishing season and ACL, the bag and possession limits for gag in or from the South Atlantic EEZ are zero.

## Appendix D. Accountability Measures

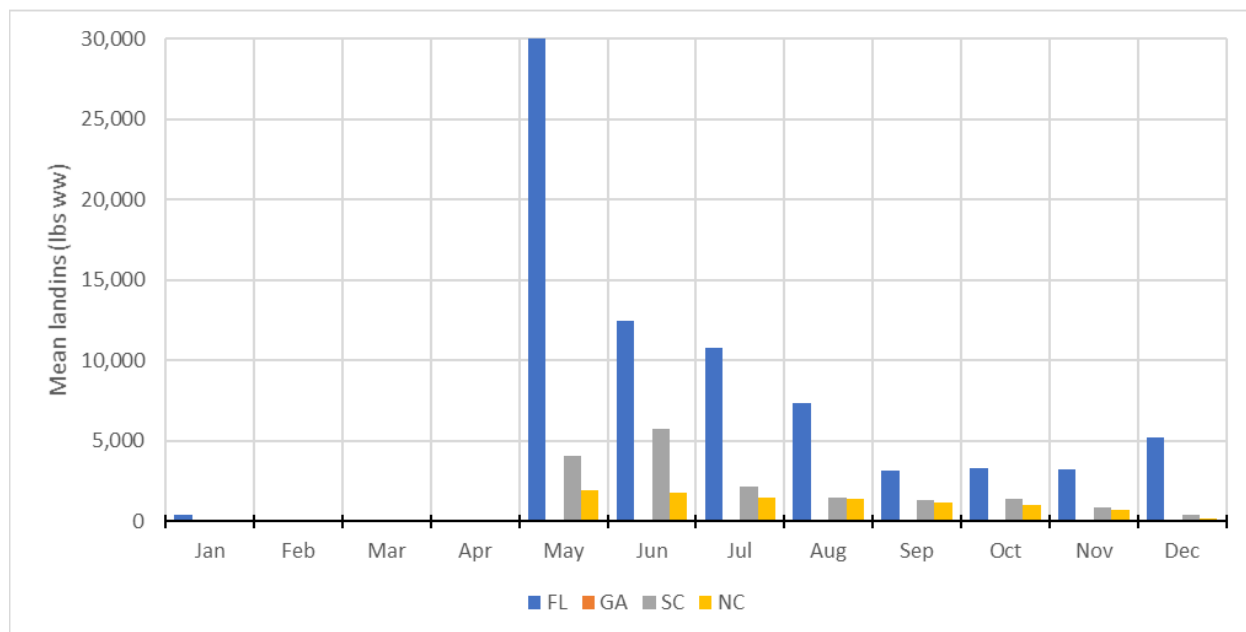
**Table 15.** Recreational landings estimates of **snapper grouper species** (lbs ww) with spearfishing gear in the South Atlantic region, 2013-2017.

Year	Total Recreational Landings (lbs ww)
2013	3,682,934
2014	3,207,606
2015	3,396,951
2016	3,422,745
2017	2,375,879

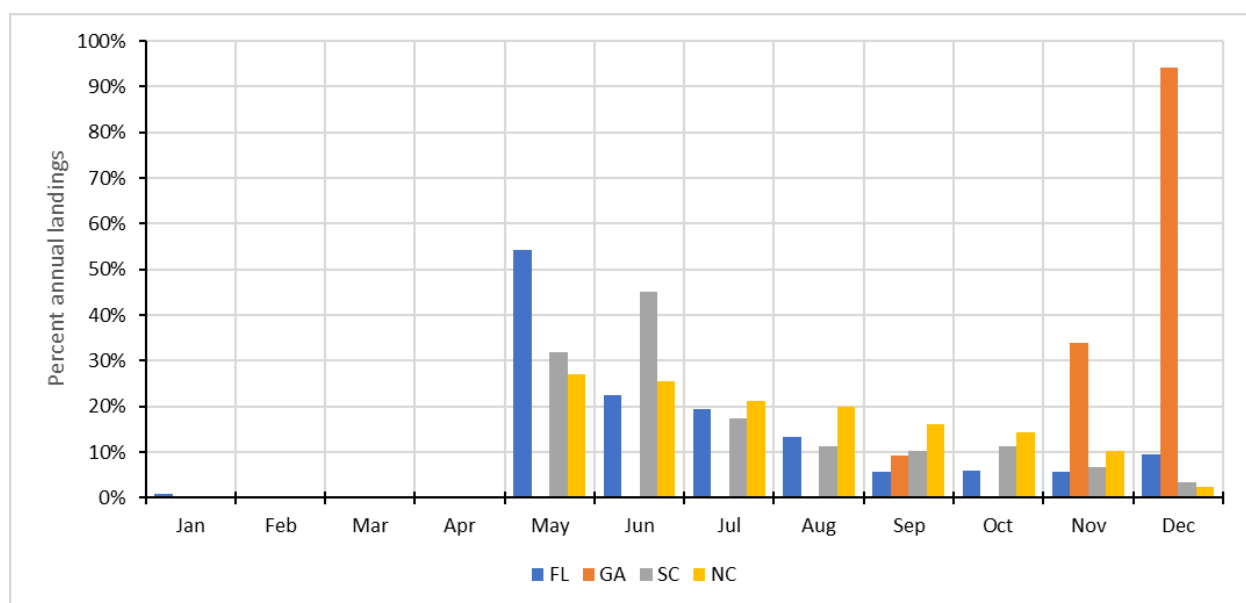
Source: MRIP



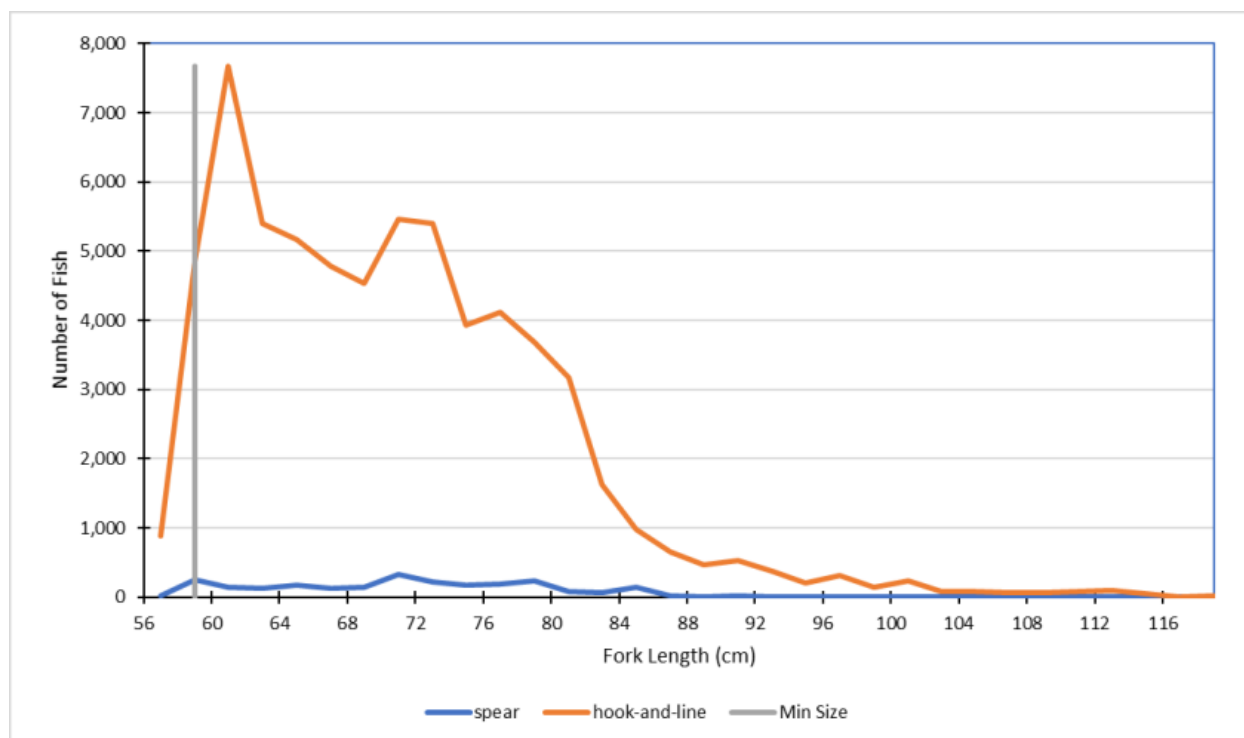
**Figure 4.** Recreational landings (in numbers of fish) of **gag and black grouper** caught with spearfishing gear in Florida (blue) and Georgia through North Carolina (orange) from 1981 through 2017.



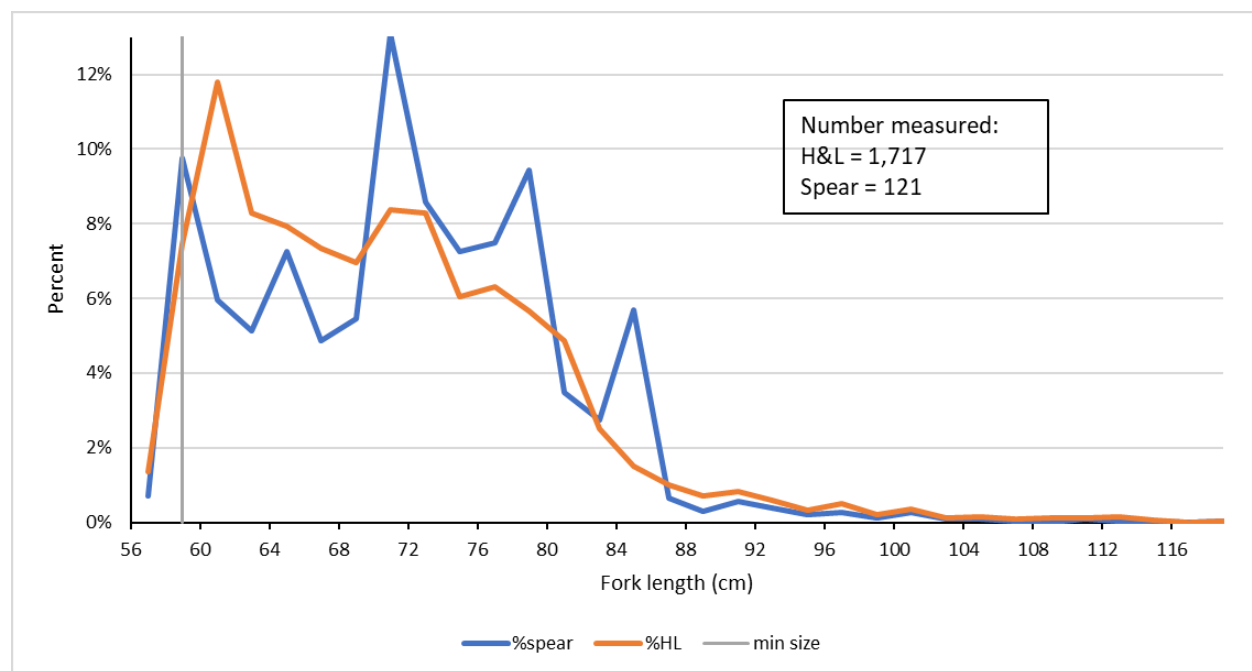
**Figure 5.** Average monthly commercial landings (lbs ww) of **gag and black grouper** attributed to spearfishing gear by state, 2009-2017.



**Figure 6.** Percent monthly commercial landings of **gag and black grouper** attributed to spearfishing gear by state, 2009-2017.



**Figure 7.** Length distribution of gag in numbers of fish from commercial hook-and-line (orange) and spear (blue) samples collected in North Carolina from 2007 through 2017. Minimum size shown in gray (converted to fork length using length conversion from SEDAR 10). Source: North Carolina Division of Marine Fisheries, 2019.



**Figure 8.** Length distribution of gag in percentage from commercial hook-and-line (orange) and spear (blue) samples collected in North Carolina from 2007 through 2017. Minimum size shown in gray (converted to fork length using length conversion from SEDAR 10). Source: North Carolina Division of Marine Fisheries, 2019.

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