

Modifications to Recreational and Commercial Management of Gulf of Mexico Gag and Black Grouper



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

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ENVIRONMENTAL ASSESSMENT COVER SHEET

Framework Action to the Fishery Management Plan for Reef Fish Resources of the Gulf of Mexico: Modifications to Recreational and Commercial Management of Gulf of Mexico Gag and Black Grouper.

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This Environmental Assessment is being prepared using the 2020 CEQ NEPA Regulations as modified by the Phase I 2022 revisions. The effective date of the 2022 revisions was May 20, 2022, and reviews begun after this date are required to apply the 2020 regulations as modified by the Phase I revisions unless there is a clear and fundamental conflict with an applicable statute. This Environmental Assessment began on **May 28, 2022**, and accordingly proceeds under the 2020 regulations as modified by the Phase I revisions.

ABBREVIATIONS USED IN THIS DOCUMENT

ABC	acceptable biological catch
ACL	annual catch limit
ACT	annual catch target
AM	accountability measure
AP	Advisory Panel
APAIS	Access Point Angler Intercept Survey
BiOp	biological opinion
BPA	bycatch practicability analysis
CFpA	net cash flow per angler
CFR	code of federal regulations
CHTS	coastal household telephone survey
Council	Gulf of Mexico Fishery Management Council
CS	consumer surplus
CVA	climate vulnerability analysis
DPS	distinct population segment
EA	environmental assessment
EEZ	exclusive economic zone
EFH	essential fish habitat
EFP	exempted fishing permit
EIS	environmental impact statement
EJ	environmental justice
E.O.	executive order
ESA	Endangered Species Act
F	fishing mortality
FES	fishing effort survey
FHS	for-hire telephone survey
FMP	Fishery Management Plan
FMSY	maximum sustainable yield
FWC	Florida Fish and Wildlife Conservation Commission
GRFS	Gulf Reef Fish Survey
GT	grouper-tilefish
Gulf	Gulf of Mexico
HAPC	habitat area of particular concern
HHI	Hertindahl-Hirschman Index
IFQ	individual fishing quota
IPCC	Intergovernmental Panel on Climate Change
IRFA	initial regulatory flexibility analysis
LAPP	Limited Access Privilege Program
LKE	lowest known entity
LQ	local quotient
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MFMT	maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
mp	million pounds

MPA	marine protected area
MRIP	Marine Recreational Information Program
MRFSS	Marine Recreational Fisheries Statistics Survey
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OFL	overfishing limit
OST	Office of Science and Technology
OY	optimum yield
PAH	polycyclic aromatic hydrocarbons
PS	producer surplus
PW	product weight
Reef Fish FMP	Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico
RFA	Regulatory Flexibility Act
RFFA	reasonably foreseeable future actions
RG	red grouper
RQ	regional quotient
RIR	regulatory impact review
RS	red snapper
SDC	status determination criteria
Secretary	Secretary of Commerce
SEDAR	Southeast Data and Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
SMZ	special management zone
SOI	segments of interest
SPR	spawning potential ratio
SSB	spawning stock biomass
SSC	Scientific and Statistical Committee
SRFS	State Reef Fish Survey
SRHS	Southeast Region Headboat Survey
SWG	shallow-water grouper
T	time
TF	tilefish
TL	total length
VOC	volatile organic compounds
ww	whole weight

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CHAPTER 1. INTRODUCTION

1.1 Background

Gulf of Mexico (Gulf) gag (*Mycteroperca microlepis*) and black grouper (*Mycteroperca bonaci*), are types of grouper managed under the Fishery Management Plan (FMP) for Reef Fish Resources of the Gulf of Mexico (Reef Fish FMP). Amendment 56 to the Reef Fish FMP (GMFMC 2023), was developed by the Gulf of Mexico Fishery Management Council (Council) to end overfishing of the Gulf gag stock and rebuild the stock, and follows the implementation of interim measures to reduce overfishing of Gulf gag during the 2023 fishing year.¹ The Gulf Council submitted Amendment 56 to the Secretary of Commerce for review in September 2023.

The gag stock is managed using a stock annual catch limit (ACL), which is divided between the commercial and recreational sectors. The commercial ACL is currently set at 39% of the stock ACL, and the recreational ACL is set at 61% of the stock ACL. This allocation was set in Amendment 30B to the Reef Fish FMP and was based on the average landings from 1986 – 2005 (GMFMC 2008a), which included recreational landings estimates generated using the federal Marine Recreational Fisheries Statistics Survey (MRFSS). The Marine Recreational Information Program (MRIP) replaced MRFSS in 2008, and MRIP replaced its Coastal Household Telephone Survey (CHTS) with the Fishing Effort Survey (FES) in 2018. To address the changes in recreational surveys, Amendment 56 proposed to adjust the commercial-recreational allocation. The proposed allocation was derived using the same time series, but replacing recreational landings estimates for Florida private and state-permitted for-hire vessels with those produced by the State of Florida’s State Reef Fish Survey (SRFS), combined with recreational shore and charter for-hire landing estimates produced by MRIP-FES, and headboat landings estimated by the Southeast Region Headboat Survey (SRHS). If approved and implemented, the revised sector allocation in Amendment 56 would result in 65% of the stock ACL allocated to the recreational sector, and 35% to the commercial sector. In order to obtain complete estimates of recreational catch for stock assessments, SRFS private and state-permitted for-hire vessel recreational landings and discard estimates are combined with recreational shore and charter for-hire catch informed by MRIP-FES, and with headboat landings and discard estimates informed by SRHS.

Black grouper is included in this action to address concerns related to misidentification of black grouper with gag, especially at sizes under and at the minimum size limit for both species (currently 24 inches total length [TL]). The black grouper stock is managed with scamp, yellowmouth grouper, and yellowfin grouper as part of the other shallow-water grouper (Other SWG) complex. Recreational harvest of the stocks included in Other SWG complex is constrained using a stock ACL, with commercial harvest limited by a commercial quota that is allocated to eligible shareholders in the Grouper-Tilefish individual fishing quota (IFQ) program.

Commercial Sector

¹ See 88 Fed. Reg. 27701 (May 3, 2023); 88 Fed. Reg. 69533 (Oct 6, 2023).

Commercial harvest of gag and black grouper has been managed under an IFQ program since 2010 (GMFMC 2008b). Anyone commercially fishing for gag or black grouper must possess a federal commercial reef fish permit and appropriate allocation under the IFQ program (i.e., “gag” allocation for gag, and “other shallow-water grouper” allocation for black grouper). IFQ allocation is determined at the beginning of each calendar year by multiplying a shareholder's IFQ shares (represented as a fraction of the total commercial quota) times the commercial quota for that species. The IFQ program acts as the accountability measure (AM) for the commercial gag and black grouper portions of the reef fish fishery, and the commercial quotas for these species have never been exceeded under the IFQ program.

Spawning and The Edges Marine Protected Area

The Edges is a 390-square nautical mile marine protected area (MPA), which is situated between the Madison-Swanson and Steamboat Lumps MPAs (Amendment 30B to the Reef Fish FMP; GMFMC 2008). All three of these MPAs were implemented to protect spawning reef fish, including gag. Gag spawning begins in January, peaks in February and March, and tapers off at the end of April (Lowerre-Barbieri et al., 2020). While Madison-Swanson and Steamboat Lumps are closed to all fishing year-round, The Edges is a seasonally closed MPA, with fishing prohibited from January 1 – April 30 annually. Gonad sampling of large gag landed from within The Edges in the years since its implementation in 2009 have indicated only sexually mature females and no males within the sampled population (n = 140 fish; S.K. Lowerre-Barbieri, pers. comm. Sept. 2023). Thus, it is possible that the seasonal nature of the protection offered within The Edges has not been sufficient to protect males from harvest outside of the closed season. However, the proportions of males in Madison Swanson and Steamboat Lumps has been estimated at just under 5% (Lowerre-Barbieri et al. 2020; SEDAR 72 2022). Further, a framework action to the Reef Fish FMP (GMFMC 2020) prohibited all fishing (not just bottom fishing) in the Madison Swanson and Steamboat Lumps MPAs as of 2021, due to observations of poaching of reef fish therein under the guise of surface trolling.

Recreational Sector

Gag

Both an in-season and a post-season AM apply to harvest of gag by the recreational sector. The in-season AM requires NMFS to close the recreational sector when gag recreational landings reach or are projected to reach the recreational ACL. If these landings exceed the gag ACL in a fishing year, the post-season AM requires NMFS to shorten the duration of the following recreational fishing year by the amount necessary to ensure landings do not exceed the prior year's ACT, unless NMFS determines that managing to the prior year's ACT in the following year is unnecessary. If gag is overfished and landings exceed the recreational sector ACL, the recreational ACL and ACT must be reduced in the following year by the amount of the previous year's overage. Amendment 56, if implemented, will modify these accountability measures by requiring NMFS to close the recreational sector when gag recreational landings reach or are projected to reach the recreational ACT, instead of the ACL. Amendment 56 will no longer require NMFS to shorten the duration of the following recreational fishing year by the amount

necessary to ensure landings do not exceed the prior year’s ACT. However, because gag is overfished, the amount of any overage of the ACL in a given year will be deducted from the ACL and ACT of the following year.

Black Grouper

A post-season AM applies to harvest of black grouper by the recreational sector. If Other SWG complex landings exceed the complex total ACL in a fishing year, NMFS is required in the following fishing year to close the fishing season when the stock SWG ACL is projected to be met. This AM has not been triggered since implemented.

Recreational Data: 2023 MRIP-FES Pilot Study

At the August 2023 Council meeting, the NOAA Office of Science and Technology (OST) discussed the release of a pilot study (NOAA 2023²), which evaluated potential respondents’ bias as recall error in the mail portion of the recreational FES survey used to estimate effort. The 2023 pilot study evaluated this bias for a portion of the year across several states, and preliminary results suggest the order of the questions in the survey has led to overestimation of fishing effort. A more comprehensive pilot study is planned for 2024, will be independently peer-reviewed in early 2025, and available for evaluation by data users (e.g., the Southeast Fisheries Science Center [SEFSC], Southeast Regional Office [SERO], and the Council) thereafter.

For Gulf gag, only the data used to evaluate the landings from the recreational shore mode are expected to be adversely affected by the results of the pilot study.

Recent Gulf landings of gag are shown in Table 1.1.1. Landings are shown by sector, with recreational landings shown in SRFS units, commensurate with the data that were used in the 2022 model run for SEDAR 72.

Table 1.1.1. Commercial and recreational landings of Gulf gag from 1986 – 2022. Recreational landings are shown in SRFS/MRIP-FES units (column: Recreational SRFS), commensurate with their use in the 2022 model run of SEDAR 72. Landings are in pounds gutted weight (lb gw).

Commercial		Recreational SRFS	
Year	lb gw	Year	lb gw
1986	862,116	1986	95,662
1987	744,331	1987	727,840
1988	585,161	1988	119,413
1989	746,175	1989	229,777
1990	935,001	1990	1,900,344

² <https://www.fisheries.noaa.gov/recreational-fishing-data/fishing-effort-survey-research-and-improvements>

Commercial		Recreational SRFS	
1991	1,100,329	1991	1,601,250
1992	1,467,349	1992	1,179,565
1993	1,748,451	1993	1,687,897
1994	1,514,781	1994	1,221,595
1995	1,576,527	1995	2,339,549
1996	1,498,447	1996	915,355
1997	1,647,768	1997	1,995,044
1998	2,649,811	1998	2,321,085
1999	2,053,390	1999	2,859,890
2000	2,258,656	2000	3,407,419
2001	3,277,225	2001	3,278,793
2002	3,140,484	2002	3,197,336
2003	2,698,157	2003	2,280,629
2004	3,069,788	2004	3,817,578
2005	2,718,304	2005	3,090,960
2006	1,452,644	2006	1,595,531
2007	1,370,119	2007	1,659,839
2008	1,496,740	2008	2,509,686
2009	844,660	2009	1,016,667
2010	496,826	2010	1,340,301
2011	318,663	2011	744,987
2012	523,138	2012	632,390
2013	575,335	2013	1,231,630
2014	586,377	2014	1,014,004
2015	542,774	2015	868,957
2016	910,996	2016	696,210
2017	492,095	2017	762,679
2018	492,934	2018	714,926
2019	532,015	2019	814,119
2020	475,714	2020	1,193,303
2021	562,849	2021	1,122,941
2022	693,616	2022	1,269,195

Source: Commercial data from 1986 – 2009: SERO ACL files; 2010 – 2022: SERO Catch Share Database (pulled September 2023).
Recreational data from 1986 – 2022: MRIP-FES (pulled September 2023); recreational data using SRFS from 2016 – 2022: FWC (pulled September 2023).

Table 1.1.2 shows the proportions of recreational landings of gag from 2017 – 2022 for the recreational fishing fleets. These data are shown as percentages instead of in lb gw due to confidentiality issues with the data, which preclude their public dissemination. Table 1.1.2 demonstrates that the majority of recreational gag landings are attributable to the private and

state-permitted for-hire vessel fleet, followed by the federal for-hire fleet, the headboat fleet, and lastly shore-based fishermen. Zeroes for the shore mode may be attributable to low survey sample sizes.

Table 1.1.2. Proportional recreational gag landings by fleet, 2017 – 2022. SRHS: headboats; MRIP-FHS: federal for-hire; MRIP-FES: shore; and, SRFS: private and state-permitted for-hire vessels.

Year	SRHS	MRIP-FHS	MRIP-FES: Shore	SRFS
2017	2.5%	21.3%	0.0%	76.2%
2018	2.9%	19.4%	3.4%	74.3%
2019	2.0%	21.9%	1.6%	74.4%
2020	1.6%	20.7%	0.8%	76.9%
2021	1.9%	28.7%	1.5%	67.9%
2022	2.2%	19.4%	0.0%	78.5%

During the development of Amendment 56, the Council initiated the development of this framework action to explore additional measures to increase the probability of rebuilding the Gulf gag stock. The Council has since identified the following goals for this framework action: reduce fishing mortality on male gag; constrain future harvests to the ACL; increase the probability of rebuilding the stock; avoid increasing discards; and, reduce vulnerability of gag during spawning to increase spawning success. The Council decided to include black grouper to attempt to address some of the misidentification issues.

1.2 Purpose and Need

The purpose of this action is to modify the recreational bag limit for Gulf gag, to consider a recreational vessel limit for Gulf gag and black grouper, and to consider a commercial spawning season closure for Gulf gag.

The need for this action is to use the best scientific information available to reduce fishing mortality on Gulf gag and rebuild the stock to a level commensurate with MSY, and to alleviate the perceived effect of misidentification between gag and black grouper, consistent with the authority under the Magnuson-Stevens Fishery Conservation and Management Act.

1.3 History of Management

Amendment 1, including an Environmental Assessment (EA), regulatory impact review (RIR), and regulatory flexibility analysis (RFA), 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-inch total length (TL) minimum size limit on gag and black grouper; set a five-grouper recreational daily bag limit; set an 11.0 million pound (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 longline gear 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, including an EA, RIR, and RFA implemented in February 1994, established restrictions on the use of fish traps in the Gulf exclusive economic zone; 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.

A Framework Action, including an EA, RIR, and RFA implemented in June 2000, increased the commercial size limit for gag and black grouper from 20 to 24 inch TL; increased the recreational size limit for gag from 20 to 22 inch 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.

A Framework Action, implemented in July and December of 2006, established a one-fish recreational bag limit for red grouper; a closed recreational season for red, gag, and black grouper from February 15 – March 15; and prohibited captain and crew of for-hire vessels from retaining grouper when under charter.

Amendment 29 including an EA, RIR, and RFA, implemented January 2010, established an IFQ system for the commercial harvest of grouper and tilefish, including gag and black grouper.

Amendment 30B including a final Supplemental Environmental Impact Statement (SEIS), RIR and an Initial Regulatory Flexibility Analysis (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 sectors, setting gag at 61% recreational and 39% commercial based on average landings from 1986 – 2005; 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 including a final SEIS, RIR and IRFA, implemented May 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. 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 lb gutted weight (gw); suspended the use of red grouper multi-use IFQ 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.

An Interim Rule, effective from June 1, 2011, through November 27, 2011, and was extended for another 186 days or until Amendment 32 was implemented. 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 on 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 lb gw (including the 100,000 lb gw previously allowed) for the 2011 fishing year, and temporarily suspended the use of red grouper multi-use 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.

Amendment 32, including a final Environmental Impact Statement (EIS), RIR and IRFA implemented in March 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 ACL 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 closure to the gag and red grouper recreational AMs to avoid exceeding the ACL.

Amendment 38, including EA, RIR, and RFA implemented in March 2013, revised the postseason 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.

A 2016 Framework Action revised the gag recreational closed season to January 1 to May 31, annually. This revised closed season was expected to reduce dead discards of gag during the Gulf recreational red snapper season that begins on June 1, annually, and extend the gag recreational fishing season. The framework action also increased the recreational minimum size limit in Gulf federal waters to 24 inches TL for gag and black grouper, to be consistent with the federal waters of the South Atlantic and state waters off Monroe County, Florida. Furthermore, gag are sometimes misidentified as black grouper and having the same recreational minimum size limit for gag and black grouper may assist the public in complying with the applicable regulations for gag and black grouper. Additionally, increasing the recreational minimum size limit for these species is expected to provide the opportunity for more gag and black grouper to become sexually mature and spawn. This final rule was effective May 25, 2016.

Reef Fish Amendment 44 standardized the MSST for certain reef fish species, including gag and black grouper. The MSST is used to determine whether or not a stock is considered to be overfished; if the biomass of the stock falls below the threshold, then the stock is considered to be overfished. The MSST for gag and black grouper, and other reef fish species, was set equal to 50% of the biomass at MSY. This amendment was approved on December 21, 2017.

A 2018 Framework Action increased the commercial minimum size limit for gag to 24 inches TL. This final rule was effective July 23, 2018.

NMFS implemented interim measures to reduce gag overfishing for the 2023 fishing year on May 3, 2023. This temporary rule decreases the stock ABC for Gulf gag to 661,000 lb gw. The sector allocation was retained at 61% recreational and 39% commercial. The recreational fishing season was modified to open on September 1 and close on November 10. The purpose of this interim rule is to reduce overfishing ahead of the development of Amendment 56 to the Reef Fish FMP.

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action 1: Modification of Gulf of Mexico (Gulf) Gag Recreational Bag Limit

Alternative 1: No Action. Maintain the recreational bag limit and possession limit at two gag per person per day as part of the aggregate recreational grouper bag limit and possession limit of four groupers of any species per person per day.

Alternative 2: Revise the recreational bag limit such that the bag and possession limit for gag would be reduced to 1-fish per person per day as part of the aggregate recreational grouper bag and possession limit of four groupers of any species per person per day.

Discussion:

This action would consider reducing the Gulf gag recreational bag and possession limit from 2-fish per person per day to 1-fish per person per day. This action would not change the recreational aggregate grouper bag limit of four total groupers per person per day. Further, no grouper may be retained by the captain or crew of a vessel operating as a charter vessel or headboat. The bag limit for such captain and crew is zero. There is only one alternative to no action because the bag/possession limit cannot practicably be reduced beyond 1-fish per person/day, and having alternatives that would increase the bag limit would function contrary to the purpose of this framework action. The Gulf of Mexico Fishery Management Council previously decided not to include black grouper in this action at its August 2023 meeting.

Alternative 1 would retain the current bag and possession limits for gag as defined in Amendment 30B to the Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico (Reef Fish FMP). The recreational bag limit and possession limit would be maintained at two gag per person per day as part of the recreational aggregate grouper bag limit of four total groupers per person per day.

Alternative 2 would reduce the recreational bag and possession limit to 1-fish per person per day as part of the recreational aggregate grouper bag limit of four total groupers per person per day. Recreational anglers, whether fishing from shore, from a private vessel, or from a for-hire (charter or headboat) vessel, would be able to possess only one gag, per person, per day, as part of the recreational aggregate grouper bag limit of four total groupers per person per day.

NMFS performed preliminary analyses to examine the predicted effect of a reduced gag bag limit on gag harvest (Table 2.1.1). These analyses suggest an approximately 22% decrease in gag landings per day on private and state-permitted charter vessels in Florida, but there is no predicted change in landings for shore-based fishermen (0%), federally permitted headboats (0%), or for gag harvested in Texas (0%). The data used to evaluate this effect include the Marine Recreational Information Program's Fishing Effort Survey (MRIP-FES) for the shore mode, the State of Florida's State Reef Fish Survey (SRFS) for private and state-permitted for-hire vessels, the Southeast Region Headboat Survey (SRHS) for headboats, the MRIP For-Hire

Telephone Survey (FHS) for federally permitted charter vessels, and the Texas Parks and Wildlife Department’s Sport Angler Survey (TPWD) for Texas private angler effort.

Table 2.1.1. The predicted percent change in landings per trip for Gulf gag from the current 2-fish per person per day recreational bag limit.

Proposed Bag Limit (# of fish)	MRIP Predicted Change in Landings	SRFS Predicted Change in Landings	SRHS Predicted Change in Landings	TPWD Predicted Change in Landings
2 pp/day	0%	0%	0%	0%
1 pp/day	0%	-22%	0%	0%

Analysis of the effects of a change in the daily bag/possession limit from two gag to one gag indicates that the decreased landings per trip projected for the private vessel component would result in a slightly increased recreational gag fishing season duration in future years (2024 – 2028 and subsequent years). This increase in recreational fishing season duration would range from a predicted 8 days (smallest increase in duration across years) in 2025 to 14 days in 2028 (largest increase in duration across years; Table 2.1.2). However, the recreational fishing season duration determinations, and effects of the decreased bag limit on the recreational fishing season duration, are highly uncertain, largely due to the lack of comparable data for a gag fishing season beginning on September 1, as well as uncertainty and variability associated with yearly gag fishing effort and landings (especially given the new opening date).

Table 2.1.2. The predicted recreational fishing season duration for gag for 2024-2028 and subsequent years, based on the change in the daily bag limit from 2-fish to 1-fish. ACL=Annual Catch Limit, ACT=Annual Catch Target. Catch limits are in pounds gutted weight.

Action 1, Alternative 1: No Action (2 gag per person per day)					
Year	ACL	ACT	Closure Date	Days Open	
2024	288,000	230,000	Oct 19	49	
2025	399,000	319,000	Nov 1	62	
2026	499,000	399,000	Nov 8	69	
2027	613,000	490,000	Nov 16	77	
2028	751,000	600,000	Nov 26	87	
Action 1, Alternative 2: Reduced bag limit (1 gag per person per day)					
Year	ACL	ACT	Closure Date	Days Open	Days Open % Change from Alt 1
2024	288,000	230,000	Oct 28	58	+18%
2025	399,000	319,000	Nov 9	70	+13%
2026	499,000	399,000	Nov 17	78	+13%
2027	613,000	490,000	Nov 27	88	+13%
2028	751,000	600,000	Dec 10	101	+14%

A change in the daily recreational bag and possession limit is not expected to result in a change in the annual gag harvest, since the ACT is likely to be harvested under both **Alternative 1** and

Alternative 2. A change in the daily recreational bag limit from 2-fish to 1-fish could result in a modest increase in discards when the season is open since the lower bag limit may result in more released fish after the lower bag limit is harvested by an angler. Conversely, if fishing pressure remains consistent, the increased recreational fishing season duration beyond the original projected season closure could result in lower numbers of regulatory discards, as all captured gag would otherwise be required to be released. Also, there may be greater potential for discards due to high-grading, as fishermen may be more inclined to release smaller but legal-sized fish in favor of bigger ones due to the reduced daily recreational bag limit.

2.2 Action 2: Establish a Recreational Vessel Limit for Gag and Black Grouper

Alternative 1: No Action. There is currently no vessel limit for Gulf gag or black grouper.

Alternative 2: Establish a 4-fish/vessel recreational limit for gag and black grouper combined. Individuals may not exceed the per person daily bag limit, or the recreational vessel trip limit, whichever is more restrictive.

Alternative 3: Establish a 3 fish/vessel recreational limit for gag and black grouper combined. Individuals may not exceed the per person daily bag limit, or the recreational vessel trip limit, whichever is more restrictive.

Alternative 4: Establish a 2 fish/vessel recreational limit for gag and black grouper combined. Individuals may not exceed the per person daily bag limit, or the recreational vessel trip limit, whichever is more restrictive.

Discussion:

This action would implement a recreational vessel trip limit for gag and black grouper combined. The action alternatives would set the recreational trip limit at either four, three, or two fish per vessel per trip. Fishermen would be constrained to the individual daily recreational bag limit for a species, or the recreational vessel trip limit, whichever is more restrictive. Alternatives for either four, three, or two fish per vessel per trip were based on preliminary analyses of recreational landings from 2017 – 2019, which indicated that recreational vessel limits greater than 4 fish per trip were unlikely to have a measurable effect on the recreational fishing season duration. Because no change in per-trip landings are expected in Texas under any Action 2 alternative, and because no vessels are included in MRIP-FES landings for the recreational shore mode, these fishery components will not be discussed further in this section of Chapter 2.

Alternative 1 would not establish a recreational vessel trip limit for gag or black grouper. Recreational anglers aboard any recreational vessel would continue to be bound only by the individual daily recreational bag limit for each recreational angler (as determined in Action 1) and the recreational aggregate grouper bag limit of four total groupers per day.

Alternative 2 would establish a vessel trip limit of not more than 4 gag and black grouper combined. Individual anglers would still be bound by the recreational daily bag limit (as determined in Action 1), whichever is more restrictive. Anglers aboard any recreational vessels would be permitted to harvest only 4 gags and/or black grouper total, per trip, aggregated across all anglers on that vessel on that recreational trip. **Alternative 2** is expected to result in reduced per-trip landings across all fishery components. This reduction would range from an estimated 14% for SRFS (private and state-permitted for-hire recreational vessels), to 24% for the MRIP For-hire Survey (FHS; federal for-hire vessels), to an estimated 46% reduction in SRHS

(headboats) landings per trip (Table 2.2.1). Black grouper landings per trip would be reduced on headboats (by approximately 18%), but for no other modes under **Alternative 2** (Table 2.2.2).

Table 2.2.1. The predicted percent change in landings per trip of Gulf gag with each of the proposed recreational vessel limits in Action 2.

Proposed Vessel Limit (# of fish)	MRIP Charter Predicted Change in Landings	SRFS Predicted Change in Landings	SRHS Predicted Change in Landings
No limit	0%	0%	0%
4 fish per trip	-24%	-14%	-46%
3 fish per trip	-36%	-24%	-54%
2 fish per trip	-50%	-38%	-64%

Table 2.2.2. The predicted percent change in landings per trip of Gulf black grouper with each of the proposed recreational vessel limits in Action 2.

Proposed Vessel Limit (# of fish)	MRIP Charter Predicted Change in Landings	SRFS Predicted Change in Landings	SRHS Predicted Change in Landings
No limit	0%	0%	0%
4 fish per trip	0%	0%	-18%
3 fish per trip	-2%	0%	-21%
2 fish per trip	-11%	0%	-25%

Under **Alternative 2**, the season duration would be increased by a range of 6 days in 2025 (smallest increase in duration across years) to 10 days in 2028 (largest increase in duration across years; Table 2.2.3). The range in season durations listed in Table 2.2.3 is based on the vessel limit applying equally to all fishing modes.

Table 2.2.3. The projected Gulf gag recreational landings (lb gw) and closure dates expected with each proposed vessel limit alternative for Action 2. The recreational fishing season start date set in Amendment 56 to the Reef Fish FMP is September 1.

Action 2, Alternative 1: No Action (No vessel limit)					
Year	ACL*	ACT	Closure Date	Days Open	
2024	288,000	230,000	Oct 19	49	
2025	399,000	319,000	Nov 1	62	
2026	499,000	399,000	Nov 8	69	
2027	613,000	490,000	Nov 16	77	
2028	751,000	600,000	Nov 26	87	
Action 2, Alternative 2: Establish a 4 fish per vessel limit					
Year	ACL*	ACT	Closure Date	Days Open	Days Open % Change from Alt 1
2024	288,000	230,000	Oct 26	56	+14%
2025	399,000	319,000	Nov 7	68	+10%
2026	499,000	399,000	Nov 15	76	+10%
2027	613,000	490,000	Nov 24	85	+10%
2028	751,000	600,000	Dec 6	97	+11%
Action 2, Alternative 3: Establish a 3 fish per vessel limit					
Year	ACL*	ACT	Closure Date	Days Open	Days Open % Change from Alt 1
2024	288,000	230,000	Nov 1	62	+27%
2025	399,000	319,000	Nov 11	72	+16%
2026	499,000	399,000	Nov 20	81	+17%
2027	613,000	490,000	Dec 1	92	+19%
2028	751,000	600,000	Dec 15	106	+22%
Action 2, Alternative 4: Establish a 2 fish per vessel limit					
Year	ACL*	ACT	Closure Date	Days Open	Days Open % Change from Alt 1
2024	288,000	230,000	Nov 7	68	+40%
2025	399,000	319,000	Nov 20	81	+31%
2026	499,000	399,000	Dec 2	93	+35%
2027	613,000	490,000	Dec 15	106	+38%
2028	751,000	600,000	No Closure	122	+40%

Note: All ACLs, ACTs and projected landings are in pounds gutted weight.

*The recreational ACLs and ACTs presented are inclusive of recreational landings tracked using MRIP-FES (shore), SRFS (private and state-permitted for-hire vessels), MRIP-FHS (federal for-hire), and SRHS (headboats).

Alternative 3 would establish a vessel trip limit of not more than 3 gag and black grouper combined. Individual anglers would still be bound by the recreational daily bag limit (as determined in Action 1), whichever is more restrictive. Anglers aboard any recreational vessels would be permitted to harvest only 3 gags and/or black grouper total, per trip, aggregated across all anglers on that vessel on that recreational trip. **Alternative 3** is expected to result in reduced per-trip landings across all fishery components. This reduction would range from an estimated 24% for SRFS (private and state-permitted for-hire recreational vessels), to 36% for MRIP-FHS (federal for-hire) landings, to an estimated 54% reduction in SRHS (headboat) landings per trip

(Table 2.2.1). Black grouper landings per trip would be reduced on federal headboats (by 21%) and slightly on federal charter boats (by 2%), but not under SRFS under **Alternative 3** (Table 2.2.2). Under **Alternative 3**, the recreational fishing season duration would be increased by a range of 10 days in 2025 (smallest increase in duration across years) to 19 days in 2028 (largest increase in duration across years; Table 2.2.3). The range in recreational fishing season durations listed in Table 2.2.3 are based the vessel limit applying to all fishing modes.

Alternative 4 would establish a vessel trip limit of not more than 2 gag and black grouper combined. Individual anglers would still be bound by the recreational daily bag limit (as determined in Action 1), whichever is more restrictive. Anglers aboard any recreational vessels would be permitted to harvest only 2 gags and/or black grouper total, per trip, aggregated across all anglers on that vessel on that recreational trip. **Alternative 4** is expected to result in reduced per-trip landings across all fishery components. This reduction would range from an estimated 38% for MRIP-FES (shore) and SRFS (private and state-permitted for-hire recreational vessels), to 50% for MRIP-FHS (federal for-hire vessels), to an estimated 64% reduction in SRHS (headboat) landings per trip (Table 2.2.1). Black grouper landings per trip would be reduced on federal headboats (by 25%) and slightly on federal charter boats (by 11%), but not under SRFS under **Alternative 4** (Table 2.2.2). Under **Alternative 4**, the recreational fishing season duration would be increased by a range of 19 days in 2025 (smallest increase in duration across years) to 35 days in 2028 (largest increase in duration across years; Table 2.2.3). The range in recreational fishing season durations listed in Table 2.2.3 are based on the vessel limit apply to all fishing modes.

Under **Alternatives 2 - 4**, the scope of the reduced landings for each fishing mode is likely associated with the number of fishermen aboard the vessel. Because charter vessels and especially headboats generally carry more anglers on board than private recreational vessels, the reduction in landings per trip would be greatest on these vessels. Further, the reduction in landings under each of **Alternatives 2 - 4** is most pronounced on federal charter and headboat vessels, which account for a historically smaller percentage of overall recreational gag landings relative to private recreational vessel landings. Therefore, this proposed reduction as applied to the federal charter and headboat vessels is expected to have a smaller overall effect on the projected recreational fishing season durations. Concurrently, these for-hire vessels also typically carry a larger number of passengers per trip than private vessels, and thus could be disproportionately negatively affected by the establishment of a recreational vessel trip limit.

2.3 Action 3: Establish a Commercial Spawning Season Closure for Gulf Gag

Alternative 1: No Action. There would be no commercial spawning season closure for Gulf gag.

Alternative 2: Prohibit commercial vessels from harvest or possession of Gulf gag in or from federal waters from February 15 – March 15, to protect the gag spawning stock.

Alternative 3: Prohibit commercial vessels from harvest or possession of Gulf gag in or from federal waters from February 1 – March 31, to protect the gag spawning stock.

Alternative 4: Prohibit commercial vessels from harvest or possession of Gulf gag in or from federal waters from January 1 – April 30, to protect the gag spawning stock.

Discussion:

This action would implement a commercial fishery closure at times surrounding and during the gag spawning season. The action alternatives would close the commercial fishery to the harvest of gag within or around the historic spawning season for Gulf gag (February – March, Lowerre-Barbieri et al. 2020), while potentially also including up to a 1-month buffer period before and after this empirically identified season. No commercial harvest of gag would be permitted in federal waters of the Gulf during this closure period, no matter the area fished or the gear type used for harvest.

Alternative 1 would retain the current protocol of no commercial spawning season closure for gag. Commercial fishermen could continue to harvest gag at any time during the year, provided they had an appropriate amount of gag individual fishing quota (IFQ) allocation available, including during the gag spawning season. This may be of economic benefit to these fishermen, since they could harvest gag any time during the year, and could make that decision based on economic factors, safety at sea, or other justification. **Alternative 1** is not expected to change the amount of fishing mortality attributable to the commercial sector or that sector's fishing behavior overall, and is not expected to impact the magnitude of commercial discards.

Alternative 2 would Prohibit commercial vessels from harvest or possession of Gulf gag in or from federal waters from February 15 – March 15, annually. Federally permitted commercial fishermen would not be permitted to harvest or possess gag during the closure period in federal waters, no matter the area fished or the gear type used. **Alternative 2** would not implement any additional restrictions outside of the closure period. **Alternative 2** would reduce the flexibility of commercial fishermen to fish in a manner that maximizes economic benefit and safety at sea in accordance with the original intent of the Grouper-Tilefish IFQ program as established in Amendment 29 to the Reef Fish FMP (GMFMC 2009), since those fishermen would not be permitted to fish in the closed period between February 15 and March 15. However, given the comparatively short duration of this spawning closure, it would not be expected to have a lasting

negative impact on these commercial fishermen, since they would still be able to fish anytime during the remaining eleven months when the commercial season was open. This closed season could result in an increase in gag discards, since any gag captured by commercial fishermen while fishing for other species during the closed season would be required to be discarded. This would result in both an increase in the number of discards and a corresponding increase in dead discards.

Spawning closures to protect stocks and increase recruitment have historically had mixed results. Studies indicate that in most cases, spawning closures need to reduce overall mortality on the species in order to be effective. If not, it is likely the measures will have little effect on long-term abundance trends (Shih et al., 2009). **Alternatives 2-4** are not expected to change the amount of fishing mortality attributable to the commercial sector or that sector's fishing behavior overall, because it is expected that the total annual commercial quota for the commercial sector would be harvested in the remaining months during which commercial harvest of gag was allowed. Spawning closures for gag could be effective if these closures would reduce the ratio of males harvested in the fishery and if the recruitment potential of the stock is in fact being limited by a low proportion of males present in the spawning stock biomass (SSB; S.K. Lowerre-Barbieri, pers. comm. and unpublished data, Sept. 2023). However, there is no indication that a spawning closure would reduce overall fishing pressure on male gag. If sperm is a limiting factor and a spawning closure reduces the ratio of males harvested each year relative to current levels, this could result in greater recruitment to the population. However, because a spawning season closure is temporary in nature, it would be expected that harvest could and would still occur on habitats used by male gag outside of the temporal spawning season closure. If a spawning season closure were to result in a decrease in average length and weight of harvested gag, this may result in greater comparative egg and sperm production by way of temporarily preserving the most fecund individuals in the SSB, which may result in increased long-term recruitment.

As explained in Chapter 1, gag spawning begins in January, peaks in February and March, and tapers off at the end of April (Lowerre-Barbieri et al., 2020). **Alternative 3** would close all commercial harvest of Gulf gag from February 1 – March 31 each year. Federally permitted commercial fishermen would not be permitted to harvest or possess gag during the closure period in federal waters, no matter the area fished or the gear type used. **Alternative 3** would not implement any restrictions outside of the closure period. Like **Alternative 2**, **Alternative 3** would close all commercial fishing for a period commensurate with the historic gag spawning season. As with **Alternative 2**, the caveats on the effectiveness of a spawning season closure for gag would still apply. In addition, **Alternative 3** is expected to further reduce the flexibility of the commercial gag fishery compared to **Alternative 2** by prohibiting harvest for two months compared to one month. Although this is unlikely to limit the commercial fishery's ability to harvest the gag, it could still have negative short term economic effects by limiting when harvest was permitted, which could force fishermen to harvest their gag allocation during less profitable or convenient times of the year.

Alternative 4 would close all commercial harvest of Gulf gag from January 1 – April 31 each year. Federally permitted commercial fishermen would not be permitted to harvest or possess gag during the closure period in federal waters, no matter the area fished or the gear type used.

Alternative 4 would not implement any restrictions outside of the closure period. Like **Alternatives 2 and 3**, **Alternative 4** would close all commercial fishing for a period including the historic gag spawning season. However, **Alternative 4** would prohibit commercial harvest from January 1 through April 30 to greatly reduce the likelihood of harvesting any spawning (or near-spawning) gag. As with **Alternatives 2 and 3**, the caveats on the effectiveness of a spawning season closure for gag would still apply. In addition, **Alternative 4** is expected to further reduce the flexibility of the commercial gag fishery compared to **Alternatives 2 and 3** by prohibiting harvest for four continuous months. Although this is unlikely to limit the commercial fishery's ability to harvest the gag in the short-term (due to the lower commercial quota), the four-month closure period could result in an inability to harvest the commercial allocation for some fishermen as catch limits increase over the course of the gag rebuilding plan.

Assuming the hypothesis that a spawning season closure is an effective tool for increasing gag recruitment and therefore abundance, this management measure would only be expected to be effective during times when both female and male spawning gag are present in an area simultaneously. The chances of this occurring are reduced outside of the primary spawning season (February – March, annually). Thus, while a longer closed season (as in **Alternatives 3 and 4**) may include a greater proportion of the actively spawning SSB, it not expected that longer closed seasons would result in appreciably higher recruitment. This is due in part to the fishing season continuing to be open for other species which co-occur with gag, thus continuing to result in gag discards, and to harvest of gag continuing to be open outside of any proposed spawning season closure.

CHAPTER 3. REFERENCES

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APPENDIX A. RECREATIONAL BAG AND VESSEL LIMIT ANALYSIS FOR GULF OF MEXICO GAG

Recreational Bag Limit and Season Projection Analyses for Gulf of Mexico Gag Southeast Regional Office LAPP/DM Branch September 2023

Gulf of Mexico (Gulf) gag are managed in federal waters under the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico (Reef Fish FMP). In January 2022, there was notification that the stock was overfished and experiencing overfishing. To address this notification, Amendment 56 to the Reef Fish FMP was implemented to adjust catch levels (annual catch limits and annual catch targets; ACLs and ACTs), revise sector allocations, and expand the recreational seasonal closure from January through May to January through August. To further address this notification, a framework action to the Reef Fish FMP proposes to adjust gag recreational bag and vessel limits. This analysis predicts recreational season closures based on recreational bag limit and vessel limit management options being considered. Black grouper are also analyzed here since gag and black grouper are sometimes misidentified for each other.

Bag limit analysis

Recent Gulf recreational catch-effort data (years: 2020 to 2022) from the Southeast Region Headboat Survey (SRHS), the Marine Recreational Information Program (MRIP) Fishing Effort Survey (FES; Florida, Alabama and Mississippi), and the Florida Fish and Wildlife Conservation Commission (FWC) State Reef Fish Survey (SRFS) had 4,930 trips that harvested gag and 150 trips that harvested black grouper. **Figure A1** and **Figure A2** provides the distribution of gag and black grouper harvested per angler, respectively. **Figure A3** and **Figure A4** provide the distribution of gag and black grouper harvested per vessel, respectively. Implementing a reduced bag limit from 2 fish per person to one fish per person of Gulf gag could potentially impact Florida private anglers (**Table A1**), but would functionally have no impact in all other sectors and regions. A reduced bag limit for Gulf black grouper would also functionally have no impact on landings (**Table A2**). On the other hand, implementing a recreational vessel limit for both Gulf gag and Gulf black grouper will likely reduce landings. About 13% of MRIP charter vessels, 30% of private recreational vessels in Florida, and 40% of headboats reported harvesting more than one gag. No vessels in Texas reported harvesting more than one gag. Meanwhile, 6% or less of vessels reported harvesting more than one black grouper in any sector. A vessel limit for Gulf gag and black grouper are projected to reduce landings between 14% and 64% (**Table A3**) and between 2% and 25% (**Table A4**), respectively.

All results to this point assume no effort shifting, however, an adjustment to bag limits may impact the frequency at which gag fishers participate in the fishery. Carter et al. (2022) analyzed how changes in gag grouper fishing regulations affect recreational fishing demand in the Gulf of Mexico. The researchers estimated a trip demand model based on survey data collected from Florida anglers.

One output of their model is an estimate of how the number of fishing trips change with different gag grouper bag limits. Equation (2) from their paper provides a formula to calculate the ratio of fishing trips under one bag limit scenario compared to trips under another bag limit scenario:

$$D1/D0 = \exp[(r1 - r0)(\delta + \lambda(r1 + r0))]$$

where:

D1 = Trips under the new bag limit scenario, D0 = Trips under the status quo bag limit scenario, r1 = New bag limit, r0 = Status quo bag limit, δ = Model parameter estimate for the bag limit, and λ = Model parameter estimate for the bag limit squared.

Applying this formula using the parameter estimates reported in Table 3 of Carter et. al (2022), we can quantify the change in effort expected from a change in the gag grouper bag limit. To estimate the impact of decreasing the gag limit from the current 2 fish to 1 fish we use:

- r1 (new bag limit) = 1
- r0 (status quo limit) = 2
- $\delta = 0.265$
- $\lambda = -0.036$

Plugging these values into the above equation gives a trip ratio of 0.855. Therefore, the model predicts there would be approximately 85.5% as many gag grouper fishing trips with a 1 fish bag limit compared to the current 2 fish limit. Alternatively, if the bag limit is reduced from 2 to 1 fish, then we would expect effort to decrease further by 14.5%.

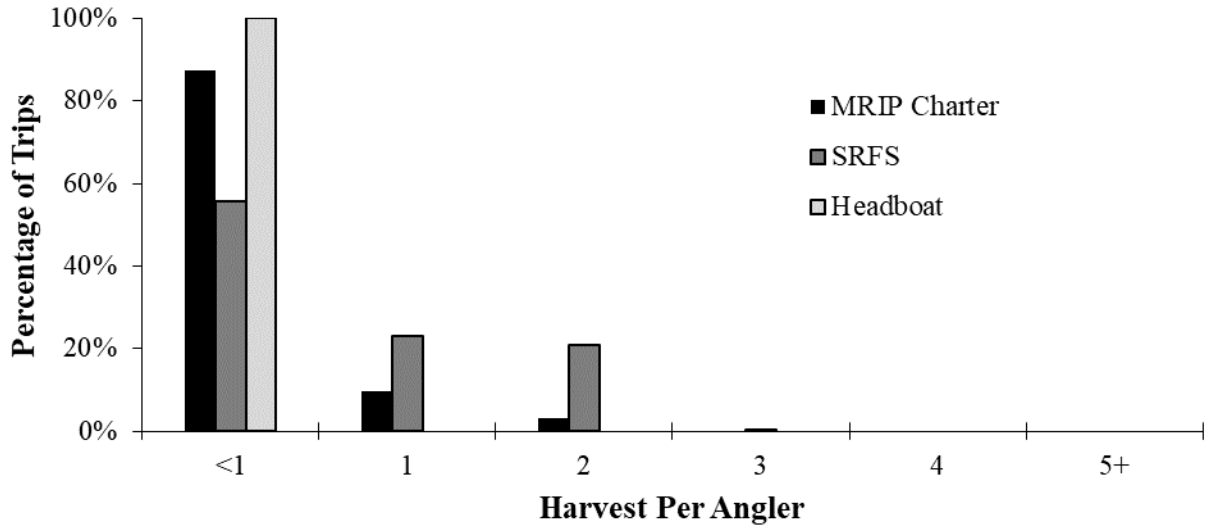


Figure A1. Distribution of Gulf of Mexico gag harvested per angler from the three recreational datasets: MRIP FES (n = 1,168 trips), SRFS (n = 397 trips), headboat (n = 3,359 trips) and TPWD (n=6 trips).

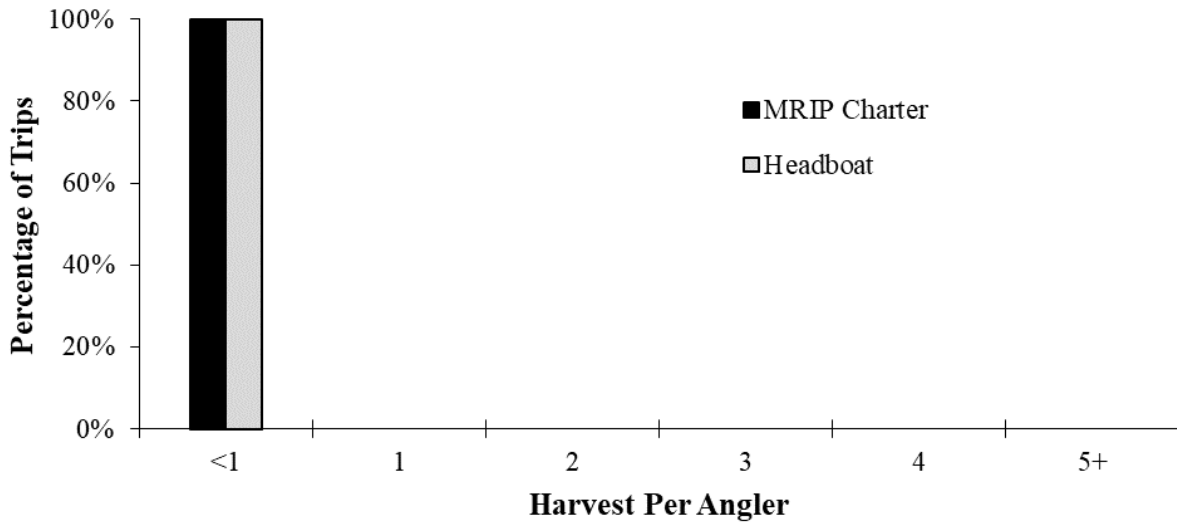


Figure A2. Distribution of Gulf of Mexico black grouper harvested per angler from the three recreational datasets: MRIP FES (n = 76 trips), headboat (n = 74 trips). No black grouper trips were reported in the SRFS and TPWD trip files.

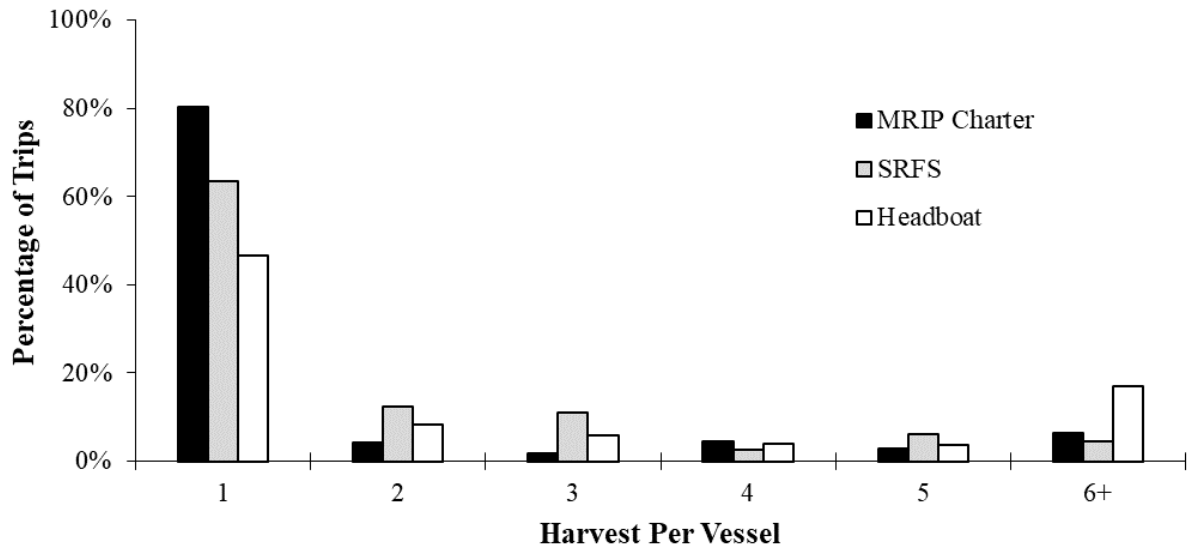


Figure A3. Distribution of Gulf of Mexico gag harvested per vessel trip from the three recreational datasets: MRIP FES (n = 1,168 trips), SRFS (n = 397 trips), headboat (n= 3,359 trips) and TPWD (n=6 trips).

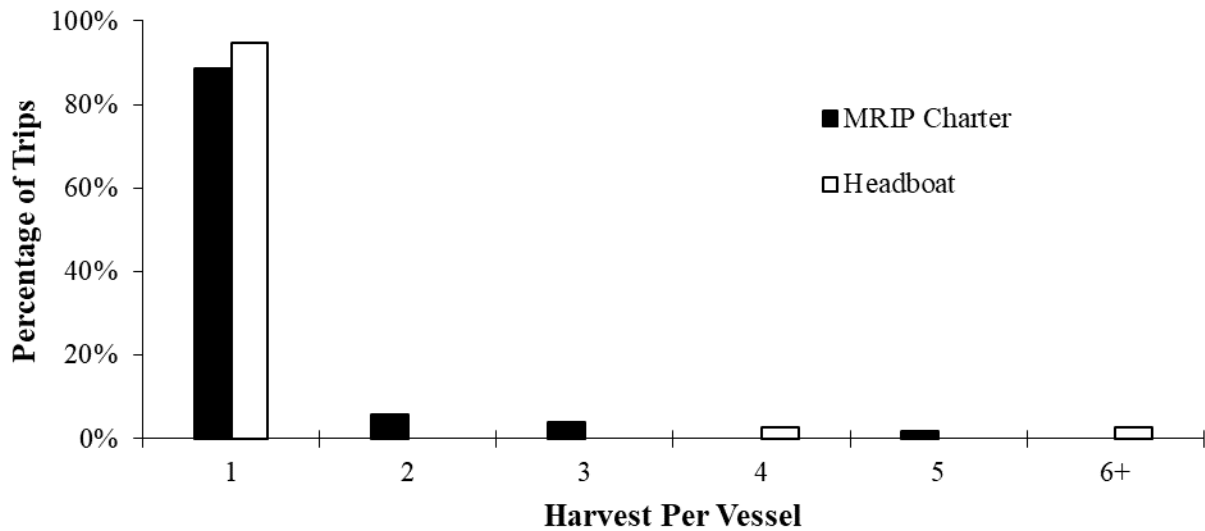


Figure A4. Distribution of Gulf of Mexico black grouper harvested per vessel trip from the three recreational datasets: MRIP FES (n = 76 trips), headboat (n= 74 trips). No black grouper trips were reported in the SRFS and TPWD trip files.

Table A1. The predicted percent change in landings per trip of Gulf gag from the current 2 fish per person per day limit.

Proposed Bag Limit (# of fish)	SRFS Predicted Change in Landings	SRHS Predicted Change in Landings
2 pp/day	0%	0%
1 pp/day	-22%	0%

Table A2. The predicted percent change in landings per trip of Gulf black grouper from the current 2 fish per person per day limit to one fish per person per day.

Proposed Bag Limit (# of fish)	SRFS Predicted Change in Landings	SRHS Predicted Change in Landings
2 pp/day	0%	0%
1 pp/day	0%	0%

Table A3. The predicted percent change in landings per trip of Gulf gag with each of the proposed vessel limits.

Proposed Vessel Limit (# of fish)	MRIP Charter Predicted Change in Landings	SRFS Predicted Change in Landings	SRHS Predicted Change in Landings
No limit	0%	0%	0%
4 fish per trip	-24%	-14%	-46%
3 fish per trip	-36%	-24%	-54%
2 fish per trip	-50%	-38%	-64%

Table A4. The predicted percent change in landings per trip of Gulf black grouper with each of the proposed vessel limits.

Proposed Vessel Limit (# of fish)	MRIP Charter Predicted Change in Landings	SRFS Predicted Change in Landings	SRHS Predicted Change in Landings
No limit	0%	0%	0%
4 fish per trip	0%	0%	-18%
3 fish per trip	-2%	0%	-21%
2 fish per trip	-11%	0%	-25%

Recreational landings and seasonal closure analysis

Gulf gag and black grouper recreational landings were obtained from the Southeast Fisheries Science Center (SEFSC) recreational ACL file (accessed June 2023). This dataset includes landings from MRIP FES, SRFS, SRHS, TPWD and Louisiana Department of Wildlife and Fisheries creel survey (LA Creel). The MRIP FES files contain estimates from MRIP’s Access Point Angler Intercept Survey (APAIS), FES (private angler effort estimates), and For-Hire

Telephone Survey (FHS; for-hire effort estimates). For 2020 and 2021, imputed MRIP FES catch estimates are used to account for disruptions in the dockside sampling due to COVID.

The Florida Fish and Wildlife Conservation Commission's (FWC) State Reef Fish Survey (SRFS; accessed January 2023) provides private angling landings for red snapper, gag and several other reef fish species harvested in state and federal water of the west coast of Florida. FWC SRFS data was determined best available data by the Scientific and Statistical Committee (SSC) at the July 2022 meeting for reporting and analyzing Florida private recreational landings of gag. As a result, Florida private recreational landings of gag in the MRIP FES landings file were replaced with SRFS landings that are calibrated to MRIP FES to generate a SRFS informed recreational landings time series with which future landings could be projected. SRFS landings are reported in whole weight, but were converted to pounds gutted weight (lb gw) using a revised gutted to whole weight conversion factor of 1.05 (SEDAR 72). All landings are reported in lb gw.

A three-year average (2020-2022) of monthly landings were used to predict future landings (**Figures A5 and A6**). Since MRIP data are provided in two month waves (e.g., January and February = wave 1, March and April = wave 2, etc.), data from other sources are shown in waves. Monthly landings were estimated for MRIP, TPWD and LA Creel by assuming equal daily catch rates for months within a wave and then combined with SRHS and SRFS, which are provided monthly. Monthly recreational landings in January through April were minimal due to the seasonal closure that runs January 1 through May 31. Landings for the month of May included those that were reported to SRHS and SRFS, while June landings were estimated by adding SRHS and SRFS landings for that month to all of the landings reported for wave 3 for the MRIP survey. Estimated monthly landings were then divided by the number of days in each month to provide a daily catch rate to project expected closure dates. These expected closure dates assume no effort shifting and that no landings are made during the spawning season closure.

Based on the cumulatively summed projected recreational landings of gag, the recreational sector can expect a fishing season between 49 and 68 days the first year following implementation depending on the management options selected (**Tables A2 and A3**). Season durations should increase in successive years as the annual catch limits increase. In contrast, black grouper recreational landings were confidential with less than 500 pounds landed per wave, and were not analyzed as no closure is expected.

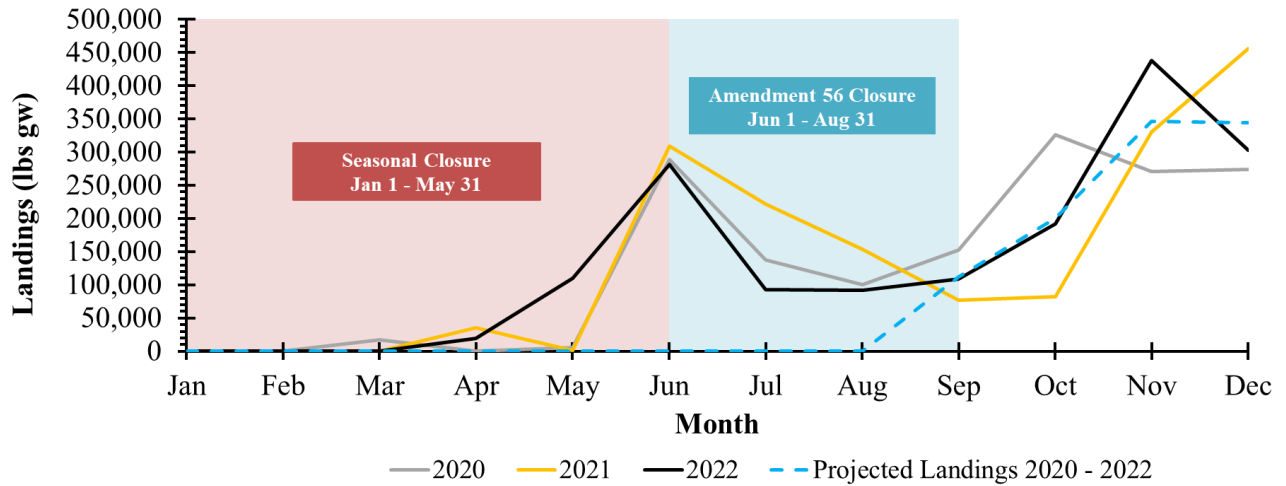


Figure A5. Gulf gag monthly recreational landings (lb gw) for 2020-2022, and average landings from 2020-2022. Source: SEFSC MRIP FES Recreational ACL Dataset (June 2023) and FWC SRFS (February 2023)

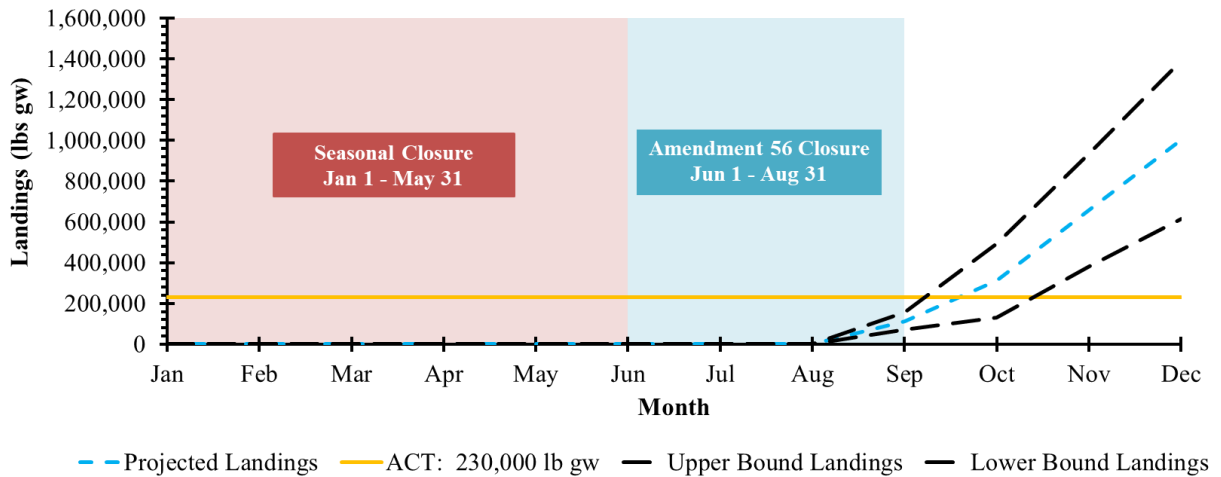


Figure A6. Cumulative monthly recreational landings (lb gw) for Gulf gag that were projected using an average 2020-2022 landings. Cumulative landings with an upper 95% confidence interval and lower 95% confidence interval are also provided. Projected landings are expected to exceed the 2024 ACT of 230,000 lb gw set by Amendment 56 to the Reef FMP on October 19th. Source: SEFSC MRIP FES Recreational ACL Dataset (June 2023) and FWC SRFS (February 2023)

Table A5. The projected Gulf gag recreational landings (lb gw) and closure dates expected with each proposed bag limit alternative for Action 1. The recreational fishing season start date set in Amendment 56 to the Reef Fish FMP is September 1.

Action 1, Alternative 1: No Action (2 gag per person per day)					
Year	ACL*	ACT	Predicted Landings (lb gw)	Closure Date	Days Open
2024	288,000	230,000	1,003,531	Oct 19	49
2025	399,000	319,000		Nov 1	62
2026	499,000	399,000		Nov 8	69
2027	613,000	490,000		Nov 16	77
2028	751,000	600,000		Nov 26	87
Action 1, Alternative 2: Reduced bag limit (1 gag per person per day)					
Year	ACL*	ACT	Predicted Landings (lb gw)	Closure Date	Days Open
2024	288,000	230,000	796,486	Oct 28	58
2025	399,000	319,000		Nov 9	70
2026	499,000	399,000		Nov 17	78
2027	613,000	490,000		Nov 27	88
2028	751,000	600,000		Dec 10	101

Note: All ACLs, ACTs and projected landings are in pounds gutted weight.

*The recreational ACLs and ACTs presented are inclusive of recreational landings tracked using the MRIP Fishing Effort Survey and FWC SRFS.

Table A6. The projected Gulf gag recreational landings (lb gw) and closure dates expected with each proposed vessel limit alternative for Action 2. The recreational fishing season start date set in Amendment 56 to the Reef Fish FMP is September 1.

Action 2, Alternative 1: No Action (No vessel limit)					
Year	ACL*	ACT	Predicted Landings	Closure Date	Days Open
2024	288,000	230,000	1,003,531	Oct 19	49
2025	399,000	319,000		Nov 1	62
2026	499,000	399,000		Nov 8	69
2027	613,000	490,000		Nov 16	77
2028	751,000	600,000		Nov 26	87
Action 2, Alternative 2: Establish a 4 fish per vessel limit					
Year	ACL*	ACT	Predicted Landings	Closure Date	Days Open
2024	288,000	230,000	842,843	Oct 26	56
2025	399,000	319,000		Nov 7	68
2026	499,000	399,000		Nov 15	76
2027	613,000	490,000		Nov 24	85
2028	751,000	600,000		Dec 6	97
Action 2, Alternative 3: Establish a 3 fish per vessel limit					
Year	ACL*	ACT	Predicted Landings	Closure Date	Days Open
2024	288,000	230,000	743,715	Nov 1	62
2025	399,000	319,000		Nov 11	72
2026	499,000	399,000		Nov 20	81
2027	613,000	490,000		Dec 1	92
2028	751,000	600,000		Dec 15	106
Action 2, Alternative 4: Establish a 2 fish per vessel limit					
Year	ACL*	ACT	Predicted Landings	Closure Date	Days Open
2024	288,000	230,000	600,632	Nov 7	68
2025	399,000	319,000		Nov 20	81
2026	499,000	399,000		Dec 2	93
2027	613,000	490,000		Dec 15	106
2028	751,000	600,000		No Closure	122

Note: All ACLs, ACTs and projected landings are in pounds gutted weight.

*The recreational ACLs and ACTs presented are inclusive of recreational landings tracked using the MRIP Fishing Effort Survey and FWC SRFS.

The reliability of these results is dependent upon the accuracy of the underlying data and input assumptions. The analysis intends to create a realistic baseline as a foundation for comparisons, under the assumption that projected future landings will accurately reflect actual future landings. These closure dates are our best estimate, but uncertainty still exists 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 any assumption.

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