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Interim Action to Reduce Overfishing of Gag in the Gulf of Mexico

Interim Action
Under the Fishery Management Plan for
Reef Fish Resources in the Gulf of Mexico

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

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ENVIRONMENTAL ASSESSMENT COVER SHEET

Interim Measures under the Fishery Management Plan for Reef Fish Resources of the Gulf of Mexico: Interim Action to Reduce Overfishing of Gag in the Gulf of Mexico, including Environmental Assessment, Regulatory Impact Review, and Regulatory Flexibility Act Analysis.

Responsible Agencies and Contact Persons

Gulf of Mexico Fishery Management Council (Council) 4107 W. Spruce Street, Suite 200 Tampa, Florida 33607 Ryan Rindone (ryan.rindone@gulfcouncil.org)	813-348-1630 813-348-1711 (fax) gulfcouncil@gulfcouncil.org Gulf Council Website
National Marine Fisheries Service (Lead Agency) Southeast Regional Office 263 13th Avenue South St. Petersburg, Florida 33701 Daniel Luers (daniel.luers@noaa.gov)	727-824-5305 727-824-5308 (fax) SERO Office Website

Type of Action

( ) Administrative	( ) Legislative
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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
ALDCNR	Alabama Department of Conservation and Natural Resources
AM	accountability measure
AP	Advisory Panel
APAIS	Access Point Angler Intercept Survey
BiOp	biological opinion
CFR	code of federal regulations
CHTS	coastal household telephone survey
Council	Gulf of Mexico Fishery Management Council
CS	consumer surplus
DLMToolkit	Data Limited Methods Toolkit
DPS	distinct population segment
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
FES	fishing effort survey
FHS	for-hire survey
FMP	Fishery Management Plan
F_{MSY}	maximum sustainable yield
FWC	Florida Fish and Wildlife Commission
GRFS	Gulf Reef Fish Survey
GRSC	Great Red Snapper Count
Gulf	Gulf of Mexico
HAPC	habitat area of particular concern
IFQ	individual fishing quota
IPCC	Intergovernmental Panel on Climate Change
LAPP	Limited Access Privilege Program
LDWF	Louisiana Department of Wildlife and Fisheries
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MDMR	Mississippi Department of Marine Resources
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
NMFS	National Marine Fisheries Service

NOAA	National Oceanic and Atmospheric Administration
OFL	overfishing limit
OST	Office of Science and Technology
PAH	polycyclic aromatic hydrocarbons
Reef Fish FMP	Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico
RFA	Regulatory Flexibility Act
RFFA	reasonably foreseeable future actions
RIR	regulatory impact review
Secretary	Secretary of Commerce
SEDAR	Southeast Data and Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
SPR	spawning potential ratio
SRHS	Southeast Region Headboat Survey
SSB	spawning stock biomass
SSC	Scientific and Statistical Committee
TL	total length
TNS	Tails n' Scales
TPWD	Texas Parks and Wildlife Department
VOC	volatile organic compounds
ww	whole weight

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CHAPTER 1. INTRODUCTION

1.1 Background

Gulf of Mexico (Gulf) gag, a type of grouper, is managed under the Fishery Management Plan (FMP) for Reef Fish Resources of the Gulf of Mexico (Reef Fish FMP). This interim action to reduce overfishing of Gulf gag is being developed by the National Marine Fishery Service (NMFS) as recommended by the Gulf of Mexico Fishery Management Council (Council), to address overfishing and is based on a recent Southeast Data, Assessment, and Review (SEDAR) 72 (2021) stock assessment, which estimated that gag is overfished and is undergoing overfishing (SEDAR 72 2021) as of 2019. NMFS informed the Council of this determination on January 26, 2022.

Under the Reef Fish FMP, of which gag is part of the fishery management unit, the gag stock is managed under a stock annual catch limit (ACL), which is further 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.

Commercial Sector

Commercial harvest of gag has been managed under an individual fishing quota (IFQ) program since 2010 (GMFMC 2008a). Anyone commercially fishing for gag must possess a commercial reef fish permit and gag allocation under the IFQ program. IFQ allocation is determined at the beginning of each calendar year by multiplying a shareholder's IFQ gag share (represented as a percentage of the total commercial quota) times the commercial quota for gag. The commercial annual catch target (ACT) is set equal to optimum yield, and the commercial quota is set at 14 percent below the ACT. The current quota is approximately 22.8 % below the commercial quota, and the difference between the commercial ACL and quota allows for multi-use allocation, as described below. The IFQ program acts as the accountability measure (AM) for the commercial gag portion of the reef fish fishery.

Gag multi-use (GGM) Allocation

At the time the commercial quota for gag is distributed to IFQ shareholders, a percentage of each shareholder's initial gag allocation is converted to gag multi-use (GGM) allocation. This percentage is determined by a formula based on the gag and red grouper ACLs and quotas (ACTs for red grouper) in a given year (See Section 2.1). GGM allocation may be used to possess, land, or sell either gag or red grouper under certain conditions. GGM allocation can only be used to possess, land, or sell gag after an IFQ account holder's (shareholder or associated vessel accounts) gag allocation has been landed and sold, or transferred; and to possess, land, or sell red grouper, only after both red grouper and red grouper multi-use (RGM) allocation have been landed and sold, or transferred from all the IFQ account holder’s accounts. However, if red grouper is under a rebuilding plan, the percentage of GGM is equal to zero.

Red grouper multi-use (RGM) allocation

At the time the commercial quota for red grouper is distributed to IFQ shareholders, a percentage of each shareholder's initial red grouper allocation is converted to RGM allocation. This percentage is by a formula based on the red grouper and gag ACLs and quotas (ACTs for red grouper) in a given year (See Section 2.1). RGM allocation may be used to possess, land, or sell either red grouper or gag under certain conditions. RGM allocation can only be used to possess, land, or sell red grouper after an IFQ account holder's (shareholder or associated vessel accounts) red grouper allocation has been landed and sold, or transferred; and to possess, land, or sell gag, only after both gag and gag multi-use allocation have been landed and sold, or transferred from all the IFQ account holder's accounts. However, if gag is under a rebuilding plan, the percentage of RGM allocation is equal to zero.

Recreational Sector

Both in-season and post-season AMs apply to harvest by the recreational sector. The in-season AM for gag requires NMFS to close the recreational sector when gag landings reach or are projected to reach the recreational ACL. If landings exceed the gag ACL in a fishing year, the post-season AM requires NMFS to shorten the duration of the following fishing year by the amount necessary to ensure landings do not exceed the ACT, unless NMFS determines that managing to the ACT in the following year is unnecessary. If gag is overfished and landings exceed the sector ACL, the ACL and ACT must be reduced in the following year by the amount of the previous year's overage.

Gag Recreational Data

NMFS created the Marine Recreational Fisheries Statistics Survey (MRFSS) in 1979. In the Gulf, MRFSS collected recreational catch and effort data, including for gag, since 1981. MRFSS included both offsite telephone surveys and onsite interviews at marinas and other points where recreational anglers fish. In 2008, the Marine Recreational Information Program (MRIP) replaced MRFSS to meet increasing demand for more precise, accurate, and timely recreational catch estimates. Until 2013, recreational catch, effort, and participation were estimated through a suite of independent but complementary surveys: telephone surveys of households and for-hire vessel operators that collected information about recreational fishing activity; and an angler intercept survey that collected information about the fish that were caught.

The MRIP Access Point Angler Intercept Survey (APAIS) began incorporating a new survey design in 2013. This new design addressed concerns regarding the validity of the survey approach, specifically that trips recorded during a given time period are representative of trips for a full day (Foster et al. 2018). The more complete temporal coverage with the new survey design provides for consistent increases or decreases in APAIS angler catch rate statistics, which are used in stock assessments and management, for at least some species (NOAA Fisheries 2019).

MRIP also transitioned from the legacy Coastal Household Telephone Survey (CHTS) to a new mail survey (Fishing Effort Survey [FES]) beginning in 2015, and in 2018, MRIP-FES replaced

MRIP-CHTS. Both survey methods collect data needed to estimate marine recreational fishing effort (number of fishing trips) by shore and private/rental boat anglers on the Atlantic and Gulf coasts. MRIP-CHTS used random-digit dialing of homes in coastal counties to contact anglers. The new mail-based FES uses angler license and registration information as one way to identify and contact anglers (supplemented with data from the U.S. Postal Service, which includes virtually all U.S. households). Because FES and CHTS are so different, NMFS conducted side-by-side testing of the two methods and found that in general, total recreational fishing effort estimates generated from the FES are higher — and in some cases substantially higher — than the CHTS estimates (NOAA Fisheries 2019). This is because the FES is designed to more accurately measure fishing activity than the CHTS, albeit with a greater degree of uncertainty. This increase in estimated effort is not because there was a sudden rise in fishing effort, but rather because FES better targets actual fishery participants through the directed mail survey. Likewise, the increase in uncertainty about the effort estimates reflects uncertainty that was likely also present in CHTS, but went unaccounted due to biases that were identified as FES was developed. NMFS developed a calibration model to allow historic effort estimates using MRIP-CHTS to be compared to new estimates from MRIP-FES. The new effort estimates alone do not lead to conclusions about past or present stock size or status.

Current Management and Landings

The current allocation between the commercial and recreational sector is 39% and 61%, respectively. Commercial gag landings have ranged from about 0.3 (2011) to 3.3 (2001) million pounds (mp) gutted weight (gw) between 1986 and 2021 (Table 1.1.1). Commercial landings since implementation of the IFQ program peeked at 0.9 mp gw in 2016, and landing have been substantially lower since. Recreational landing (in MRIP-FES) peeked at nearly 11.2 mp gw in 2004, and have been in the range of 2.0 to 3.0 mp gw since they bottomed out in 2016 at just below 2.0 mp gw.

Table 1.1.1. Gag landings for the commercial and recreational sectors (in MRIP-CHTS and MRIP-FES) in pounds gutted weight (gw) from 1986-2021.

Year	Commercial	MRIP-CHTS	MRIP-FES
1986	862,116	3,133,100	6,265,404
1987	744,331	2,949,303	6,309,885
1988	585,161	3,645,130	5,954,254
1989	746,175	2,984,837	6,272,971
1990	935,001	1,616,295	5,083,882
1991	1,100,329	2,121,985	4,672,847
1992	1,467,349	1,870,450	4,681,105
1993	1,748,451	2,584,185	6,019,967
1994	1,514,781	2,054,181	3,728,156
1995	1,576,527	3,011,248	6,970,327
1996	1,498,447	2,023,124	3,744,673
1997	1,647,768	2,937,491	6,272,092
1998	2,649,811	4,199,563	9,099,607
1999	2,053,390	4,048,637	9,089,569
2000	2,258,656	5,529,176	10,283,747
2001	3,277,225	4,371,848	9,321,001
2002	3,140,484	4,288,703	9,904,826
2003	2,698,157	3,753,472	6,788,877
2004	3,069,788	5,213,628	11,191,910
2005	2,718,304	3,800,378	9,029,661
2006	1,452,644	2,581,207	4,962,693
2007	1,370,119	2,429,726	4,680,935
2008	1,496,740	3,300,228	6,959,786
2009	844,660	1,577,256	3,283,394
2010	496,826	1,678,879	4,114,337
2011	318,663	723,141	2,131,406
2012	523,138	987,159	1,995,142
2013	575,335	1,554,545	3,352,774
2014	586,377	1,220,383	2,740,718
2015	542,774	939,904	2,394,461
2016	910,996	911,398	1,965,832
2017	492,095	786,321	2,388,215
2018	492,934	1,016,938	2,538,889
2019	532,015	867,472	2,187,540
2020	475,714	909,845	2,949,058
2021	562,849	1,225,803	2,627,698

Recent Gag Stock Assessments

The Gulf gag stock was most recently assessed in SEDAR 72 (2021). Prior to SEDAR 72, gag was assessed in 2016 (SEDAR 33 Update) using female-only spawning stock biomass (SSB) and a proxy for fishing mortality (F) at maximum sustainable yield (MSY) of F_{MAX}, and was found to be sustainably managed at the time. Several data inputs used in the SEDAR 33 Update were modified in SEDAR 72. Most notably was the change in the recreational catch and effort data to MRIP-FES from MRIP-CHTS. Additionally, since gag is vulnerable to episodic red tide mortality, SEDAR 72 accounted for observations of these disturbances in 2005, 2014, 2018, and 2021 (projections only) directly within the model. Lastly, changes were made to improve retention and recreational fleet selectivities, and to better quantify commercial discards by differentiating between black grouper and gag. Updated information on the maturity schedule, sex transition timing, and these influences on the observed sex ratio were informed by recent research. The base model for SEDAR 72 found gag to be overfished and undergoing overfishing for both females-only and sexes-combined estimates of SSB. The Council's Scientific and Statistical Committee (SSC) reviewed the results in November 2021 and concluded that the SEDAR 72 stock assessment base model, using the sexes-combined SSB estimate, an F_{MSY} proxy of $F_{30\%SPR}$, and a moderate estimate of red tide mortality in 2021 compared to 2005, was consistent with the best scientific information available and suitable for informing fisheries management. The Council's SSC agreed with revising the F_{MSY} proxy from F_{MAX} to the more conservative $F_{30\%SPR}$, in light of the stock's vulnerability to episodic red tide mortality, and low recruitment despite the increased overall productivity estimated by way of the use of the MRIP-FES landings estimates.

Development of Reef Fish Amendment 56

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires that the Council prepare and implement a rebuilding plan within two years of notification that the stock is overfished. The Council was notified of the overfished status of the gag stock in January 2022 and began development of Amendment 56 to the Reef Fish FMP to establish a rebuilding plan by January 2024. Amendment 56 would modify the Gulf gag overfishing limit (OFL), acceptable biological catch (ABC), sector allocations, sector ACLs, and sector ACTs and quotas, and include other management measures to rebuild the stock. The gag stock ACLs would need to be reduced initially by over 80% (per Southeast Fisheries Science Center (SEFSC) projections based on the SSC's recommended SEDAR 72 model run from November 2021).

Recreational harvest for the 2023 fishing year is scheduled to begin on June 1,[1] and if no changes are made to the current recreational catch limits and closed seasons (which are currently in MRIP-CHTS units[2]), NMFS expects recreational landings to significantly exceed the SEDAR 72-projected 2023 recreational ACT and ACL (which are in MRIP-FES units), which projections from SEDAR 72 suggest are higher than what the stock can sustain at this time. As explained above, current regulations require that in the year after an overage of the gag recreational ACL, the recreational stock is managed to the previous year's ACT, and if the stock is overfished, a payback of any overage is required. Therefore, at the June 2022 meeting, the Council voted to request that NMFS implement interim measures to reduce overfishing and change the start of the recreational fishing season for Gulf gag while long-term management measures and regulations to end overfishing are developed. Accordingly, the Council sent a letter to NMFS, dated June 27, 2022 (Appendix A), *requesting a reduction of the Gulf gag stock ACL to 661,901 lb ww, while maintaining the recreational allocation split at 61% recreational and 39% commercial, and maintaining RGM and GGM. In addition, the Council requested that the recreational fishing season begin on September 1 (rather than the traditional date of June 1), and that the season close on November 10.* This action would modify to the stock, commercial, and recreational ACLs, as well as the commercial quota and the recreational ACT. It would also implement a September 1 through November 10 open season for recreational gag fishing.

Alternative Base Model Run for SEDAR 72

At its January 2022 meeting, the Council requested that the SEFSC update the SEDAR 72 base model by supplanting the MRIP-FES calibrated landings for the private angling and state charter vessels for those estimated by the State of Florida's State Reef Fish Survey (SRFS). This alternative model run ("SRFS Run") was presented to the SSC for consideration at its July 2022 meeting. SRFS has been in place for several species, including gag, since 2017, and its sampling frame includes over 95% of gag landed by private anglers and state charter vessels, making it an appropriate survey for estimating landings of gag. The calibration of SRFS to historical gag landings was reviewed and approved by peer-review through the NOAA Office of Science and Technology in May 2022. SRFS was created to be comparable to MRIP-CHTS, and estimates a historically larger harvest by private anglers and state charter vessels, but does so to a much lesser magnitude than MRIP-FES. Unlike MRIP, which reports landings for two-month waves 45 days after the end of each wave, SRFS reports landings monthly (although some MRIP data will also be necessary to use in analyzing total landings). The SSC evaluated the SRFS run and found it to be consistent with the best scientific information available. However, considerate of the decrease in stock size and relative productivity compared to that estimated in the original MRIP-FES run, and with further consideration of gag's susceptibility to episodic mortality from red tide, the SSC determined that an MSY proxy of $F_{40\%SPR}$ was more appropriate for gag

[1] Four Florida counties (Franklin, Wakulla, Jefferson, and Taylor) have different season dates and are open April 1-June 30 and September 1-December 31. The Florida Fish and Wildlife Commission is considering eliminating these special early seasons for 2023.

[2] Although both MRIP-CHTS and MRIP-FES generate estimates measured in pounds of fish, these estimates are not directly comparable because FES generates larger estimates than CHTS, as described above. The references to "MRIP-CHTS units" and "MRIP-FES units" signify that the estimates use different scales.

management. The SSC concluded that the higher spawning potential ratio target of $F_{40\%SPR}$ for the MSY proxy would allow the gag stock to rebuild to a more robust level of SSB, making it more resilient to environmental influences like red tide, and to changes in fishing mortality. Using an MSY proxy of $F_{40\%SPR}$, the SSC determined that gag is overfished and undergoing overfishing as of 2019. An alternative SRFS run was not available at the time this document was initiated, so the interim measures in the document are in MRIP-FES units.

Need for interim measures

Under section 305(c) of the Magnuson-Stevens Act, interim measures to reduce overfishing are effective for 180 days with the option to extend those measures for another 186 days. Given that the rebuilding plan in Amendment 56 is not expected to be implemented before the first 180 days lapse, NMFS anticipates that it would be necessary to have the interim measures in effect from implementation (likely in early 2023) until Amendment 56 is implemented (by January 26, 2024). Therefore, the analyses in this environmental assessment assume that the applicable management measures would be in place for most of the 2023 fishing year.

NMFS would promulgate these interim measures to reduce overfishing while the Gulf gag stock rebuilding plan is developed. Delaying the implementation of the changes to the recreational catch limits and season dates and duration until the rebuilding plan is implemented may require more substantial cuts to catch limits in the rebuilding plan, as well as increasing the time required for the stock to rebuild.

Therefore, NMFS intends to reduce the stock and sector ACLs, the sector ACTs and quotas, and implement a recreational fishing season of September 1, 2023 through November 10, 2023. However, if the best available scientific data for the recreational sector projects that the recreational sector ACL would be met or exceeded prior to November 10, NMFS would close harvest for gag at the time the projected landings are expected to meet the ACL.

1.2 Purpose and Need

The purpose of this action is to reduce overfishing of Gulf gag.

The need for this action is to use the best scientific information available to reduce overfishing of Gulf gag while a rebuilding plan is developed, consistent with the authority under the Magnuson-Stevens Act.

1.3 History of Management

Amendment 1, including EA, RIR, and 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; 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 longlines and buoy gear was prohibited, and the retention of reef fish captured incidentally in other longline operations (e.g., sharks) was limited to the recreational daily bag limit; limited trawl vessels to the recreational size and daily bag limits of reef fish; established fish trap permits (up to 100 fish traps per permit holder); and established a commercial reef fish vessel permit.

Amendment 5, including environmental assessment (EA), regulatory impact review (RIR), and a regulatory flexibility analysis (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 Regulatory Amendment, including 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.

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

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 fisheries; made adjustments to the gag and red grouper ACLs to reflect the current status of these stocks; established ACLs and AMs for the commercial and recreational gag harvest, and commercial aggregate shallow-water grouper harvest; adjusted recreational grouper bag limits and seasons; adjusted commercial grouper quotas; replaced the one-month February 15 through March 15 commercial grouper closed season with a four-month seasonal area closure at the Edges, a 390 square nautical mile area in the dominant gag spawning grounds; eliminated the end date for the Madison-Swanson and Steamboat Lumps marine reserves; and required that vessels with federal commercial or charter reef fish permits comply with the more restrictive of state or federal reef fish regulations when fishing in state waters.

Amendment 31 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 pound (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 in the December 1, 2010 interim rule could be increased and that a longer recreational season could be implemented. In response, the Council requested an interim rule while they continued to work on long-term measures including a gag rebuilding plan in Amendment 32. The interim rule set the commercial gag quota at 430,000 lb gw (including the 100,000 lb 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 EIS, RIR and IRFA implemented in March 2012, set the commercial and recreational gag ACLs, ACTs, and quotas 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 is expected to reduce dead discards of gag during the Gulf

recreational red snapper season that begins on June 1, annually, and to extend the gag recreational fishing season. The framework action also increased the recreational minimum size limit in Gulf federal waters to 24 inches TL to be consistent with the federal waters of the South Atlantic and state waters off Monroe County, Florida. This final rule was effective May 25, 2016.

Reef Fish Amendment 44 standardized the minimum stock size threshold for certain reef fish species, including gag. The minimum stock size threshold 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 minimum stock size threshold for gag and other reef fish species was set equal to 50% of the biomass at maximum sustainable yield. This final rule was effective 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.

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action 1: Modification of Gulf of Mexico (Gulf) Gag Catch Limits and Sector Allocation

Alternative 1: No Action. Retain the current catch limits and sector allocation for gag. The current overfishing limit (OFL), acceptable biological catch (ABC), annual catch limits (ACL), and annual catch targets (ACT) were derived, in part, using Marine Recreational Information Program's Coastal Household Telephone Survey (MRIP-CHTS) data and the recreational ACL and ACT are in MRIP-CHTS units. These catch limits in pounds (lb) gutted weight (gw) are as follows:

OFL	4,180,000
ABC	3,120,000
Stock ACL	3,120,000
Commercial ACL (39% of Stock ACL)	1,217,000
Commercial Quota	939,000
Recreational ACL (61% of Stock ACL)	1,903,000
Recreational ACT	1,708,000

Preferred Alternative 2: Revise the catch limits for gag based on the "T_{Min}*2" (twice the minimum time for gag stock to rebuild with zero fishing mortality [F = 0]) rebuilding scenario. The stock ACL is derived, in part, using MRIP Fishing Effort Survey (FES) data, and would be 661,901 lb gw. The recreational ACL and ACT are in MRIP-FES units. The sector allocation would remain at 61% to the recreational sector and 39% to the commercial sector. The catch limits in lbs gw are as follows:

OFL	4,180,000
ABC	3,120,000
Stock ACL	661,901
Commercial ACL (39% of Stock ACL	258,142 (258,000)
Commercial Quota	199,157 (199,000)
Recreational ACL (61% of Stock ACL)	403,759
Recreational ACT	362,374 (Based on 89.75% ACL)

Note: Consistent with the current quotas for IFQ species, commercial catch limits will be rounded to the nearest thousand pounds (in parentheses) when implemented.

Alternative 3: Revise the catch limits for Gulf gag based on the "T_{Min}*2" rebuilding scenario using a sector allocation of 79.5% recreational and 20.5% commercial, based on applying the MRIP-FES calibrated historical landings to the reference period used in Amendment 30B to set the gag sector allocations (1986 – 2005). The stock ACL is derived, in part, using MRIP Fishing Effort Survey (FES) data, and would be 611,578 lb gw. The recreational ACL and ACT are in MRIP-FES units. The catch limits in lbs gw are as follows:

OFL	4,180,000
ABC	3,120,000
Stock ACL	611,578
Commercial ACL (20.5% of Stock ACL)	125,374 (125,000)
Commercial Quota	97,726 (98,000)
Recreational ACL (79.5% of Stock ACL)	486,204
Recreational ACT	436,368 (Based on 89.75% ACL)

Note: Consistent with the current quotas for IFQ species, commercial catch limits will be rounded to the nearest thousand pounds (in parentheses) when implemented.

Alternative 4: Revise the catch limits for Gulf gag based on the "T_{Min}*2" rebuilding scenario. using a sector allocation of 82% recreational and 18% commercial, based on the proportional sector-specific landings compared to the total landings for the 2017 – 2019 fishing years. The stock ACL is derived, in part, using MRIP Fishing Effort Survey (FES) data, and would be 605,165 lb. The recreational ACL and ACT are in MRIP-FES units. The catch limits in lbs gw are as follows:

OFL	4,180,000
ABC	3,120,000
Stock ACL	605,165
Commercial ACL (18% of Stock ACL	108,930 (109,000)
Commercial Quota	84,039 (84,000)
Recreational ACL (82% of Stock ACL)	496,235
Recreational ACT	445,370 (Based on 89.75% ACL)

Note: Consistent with the current quotas for IFQ species, commercial catch limits will be rounded to the nearest thousand pounds (in parentheses) when implemented.

Discussion:

This action would modify Gulf gag ACLs, ACTs, and quotas to reduce overfishing of gag in 2023 while the Gulf of Mexico Fishery Management Council (Council) continues to develop permanent measure through Amendment 56 Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico (Reef Fish FMP). All Alternatives 1-4 would maintain the gag multi-use provision at levels specified for each alternative in Table 2.1.1. Both the gag and red grouper share categories have a multi-use provision that allows a portion of the gag quota to be harvested under the red grouper allocation, and vice versa. Each year, the program may assign a portion of each shareholder's gag and red grouper allocation as a multi-use allocation category. The intent of the multi-use provision is to provide for allocation if either gag or red grouper are landed as incidental catch. The formulas for determining red grouper multi-use (RGM) and gag multi-use (GGM) allocation is as follows:

$$RGM\ allocation = 100 * \frac{(Gag\ ACL - Gag\ Commercial\ Quota)}{Red\ Grouper\ Commercial\ ACT}$$

$$GGM\ allocation = 100 * \frac{(Red\ Grouper\ ACL - Red\ Grouper\ Commercial\ ACT)}{Gag\ Commercial\ Quota}$$

Table 2.1.1. Changes in Multi-Use Based on Alternative Chosen

Action 1	RGM %	GGM %
Alternative 1	9.90%	15.90%
Preferred Alternative 2	2.10%	75.30%
Alternative 3	1.00%	100%
Alternative 4	0.80%	100%

Alternative 1 would retain the current catch limits for gag and thus would not reduce overfishing, which is the purpose of the interim measures. **Alternative 1** would result in removals in excess of those projected to be sustainable by the SEDAR 72 (2021) stock assessment, which was determined to be consistent with the best scientific information available at the time of its review by the Scientific and Statistical Committee (SSC) in November 2021. **Alternative 1** is expected to result in a season length that lasts from the current June 1 start date until the end of the fishing year on December 31 (214 days) as shown in Table 2.1.2.

Table 2.1.2. Projected Gulf recreational (Rec) closure dates based on season start dates and ACLs with each proposed management option, with upper /lower 95% confidence intervals (CI).

Action 1 Alternative	Rec ACL	Rec Season Open Dates	Projected Rec Closure Date (95% CI)	Projected Rec Fishing Days (95% CI)	Commercial ACL (Rounded)
Alt 1	1,903,000 (MRIP-CHTS)	Jun 1-Dec 31	None	214	939,000
Preferred Alt 2	403,759 (MRIP-FES)	Jun 1-Dec 31	June 16 (Jun 14-18)	16 (14-18)	258,142 (258,000)
		Sep 1-Dec 31	Nov 19 (Nov 10-Dec 9)	80 (71-100)	
		Oct 1- Dec 31	Nov 24 (Nov 16-Dec 13)	55 (47-74)	
		Nov 1- Dec 31	Nov 29 (Nov 21-Dec 17)	29 (21-47)	
Alt 3	486,204 (MRIP-FES)	Jun 1-Dec 31	Jun 19 (Jun 17 – Jun 21)	19 (17 - 21)	125,374 (125,000)
		Sep 1-Dec 31	Nov 25 (Nov 16-Dec 18)	86 (77 - 109)	
		Oct 1- Dec 31	Nov 30 (Nov 20-Dec 22)	61 (51 - 83)	
		Nov 1- Dec 31	Dec 5 (Nov 26- Dec 27)	35 (26 - 57)	
Alt 4	496,235 (MRIP-FES)	Jun 1- Dec 31	June 19 (Jun 17-22)	19 (17-22)	108,930 (109,000)
		Sep 1-Dec 31	Nov 25 (Nov 15-Dec 19)	86 (76-110)	
		Oct 1-Dec 31	Dec 1 (Nov 20-Dec 24)	62 (51-85)	
		Nov 1-Dec 31	Dec 6 (Nov 26-Dec 28)	36 (26-58)	

Source: SEFSC Recreational ACL Dataset (March 17, 2022); Southeast Regional Office's (SERO) Catch Share Program database (3/25/2022)

Preferred Alternative 2, and **Alternatives 3** and **4,** would set the stock ACL for 2023 using the "T_{Min}*2" rebuilding scenario. The yield under the "T_{Min}*2" scenario is based on the estimated landings that would allow the gag stock to rebuild within the time frame equal to twice the minimum time to rebuild assuming no direct fishing effort. Using this rebuilding scenario, the estimated stock ACL for gag (which will be used as a proxy for fishery yield) would range from 605,165 lb gw (**Alternative 4**) to 661,901 lb gw (**Preferred Alternative 2**) depending on the sector allocation in the chosen alternative. Each of these alternatives would result in substantial reductions to allowable and realized catch.

Preferred Alternative 2 would reduce overfishing of gag by setting the stock ACL at 661,901 lb gw, and would use the current sector allocation of 61% recreational/39% commercial. The

recreational sector ACL would be 403,759 lb gw, and the commercial sector ACL would be 258,000 lb gw (after rounding to nearest thousand pounds). NMFS rounded the commercial catch limits to the nearest thousand pounds to retain consistency with the other quotas for species managed under the IFQ program. However, recreational landings are not rounded, and neither are the stock ACLs. Thus, adding the (rounded) commercial ACL and the (unrounded) recreational ACL, does not equal the (unrounded) stock ACL, although the difference is minor (ranging from 70 to 370 lb). NMFS recognizes this difference between the commercial and recreational catch limits considered in this Environmental Assessment, and expects the long-term catch levels developed in Amendment 56 to take a consistent approach on rounding. **Preferred Alternative 2** would result in a large reduction in both allowable catch and realized catch to both the recreational and commercial sectors, and is projected to result in a recreational fishing season that lasts between 14 and 100 days depending on recreational season start date chosen (Action 2). The reduction in catch levels relative to **Alternative 1** would be proportionally higher for the recreational sector if **Preferred Alternative 2** is selected because recreational landings estimated using MRIP-FES would be directly compared to the recreational catch limits rather than calibrated to MRIP-CHTS, upon which current estimates of recreational harvest are based. Since MRIP-FES estimates approximately three times more private angling fishing effort, and thereby landings, compared to MRIP-CHTS, this change is expected to result in the recreational catch limit being harvested more quickly, resulting in reduced relative catch compared to the commercial sector and reduced actual catch compared to recent recreational fishing seasons.

Alternative 3 would reduce overfishing of gag by setting the stock ACL at 611,578 lb gw, and would revise the sector allocation to 79.5% recreational and 20.5% commercial. This allocation is derived using the calibrated MRIP-FES landings and the allocation formula used in Amendment 30B to the Reef Fish FMP (GMFMC 2008). Amendment 30B used average commercial and recreational landings from the reference period from 1986 – 2005 (MRIP-FES) for determining the gag sector allocation. **Alternative 3** would set the recreational sector ACL at 486,204 lb gw and the commercial sector ACL at 125,000 lb gw (after rounding), and is projected to result in a recreational fishing season that lasts between 17 and 109 days depending on recreational season start date chosen (Action 2). This alternative would result in a lower ACL for the commercial sector and a higher ACL for the recreational sector than under **Preferred Alternative 2**. However, **Alternative 3** would set the allocation at a percentage that is estimated to mirror the historical catch percentages from each sector as recalibrated by MRIP-FES.

Alternative 4 would reduce overfishing of gag by setting the stock ACL at 605,165 lb gw, and would revise the sector allocation using percentages of commercial and recreational landings (MRIP-FES) compared to the total landings from 2017 – 2019. This equates to an allocation of 82% recreational (496,235 lb gw) and 18% commercial (109,000 lb gw rounded), and is projected to result in a recreational fishing season that lasts between 17 and 110 days depending on recreational season start date chosen (Action 2). Because neither the commercial nor recreational ACL for gag was landed (using MRIP-CHTS for monitoring recreational landings) for any year from 2017-2019, the catch percentages for each sector over this time period may be indicative of catch percentages that would occur for each sector if no catch limits were in place. However, this cannot be assumed to be the primary reason for sector landing percentages during this time period, as many factors (e.g., market forces, red tides, etc.) could confound what drives

catch in each sector. **Alternative 4** would result in a lower ACL for the commercial sector and a higher ACL for the recreational sector than either **Preferred Alternative 2** or **Alternative 3**.

Alternative 1 is not expected to reduce overfishing, and continued overfishing would be expected to have negative overall effects on gag and negative effects relative to the other alternatives. **Preferred Alternative 2** and **Alternatives 3** and **4** would reduce overfishing, and the overall effects are expected to be similar for each. **Preferred Alternative 2** would result in the highest commercial ACL and lowest recreational ACL of these alternatives, and given the change from MRIP-CHTS to MRIP-FES, would result in a disproportionate impact on the recreational sector. **Alternatives 3** and **4** would result in much lower commercial ACLs than **Preferred Alternative 2**, although the difference between **Alternatives 3** and **4** with regard to commercial ACLs is minor. However, the Council determined that it was not appropriate to modify the sector allocation (as in **Alternatives 3** and **4**) through interim measures. Furthermore, these proposed changes would only be in effect for one year and, as shown in Table 2.1.2, the projected recreational season duration under **Preferred Alternative 2** is only between 3 and 10 days shorter than the projected season duration under **Alternatives 3 or 4**. Therefore, the overall effects between these alternatives is expected to be minimal. The Council will consider the sector allocation in the more thorough review provided in Amendment 56 to the Reef Fish FMP.

2.2 Action 2: Modification of Gulf Gag Recreational Fishing Season Start Date

Alternative 1: No Action. Retain the current June 1 recreational fishing season opening for gag. NMFS would close harvest when the ACL is projected to be met. Currently, the season is estimated to last 16-19 days.

Preferred Alternative 2: The federal recreational fishing season for Gulf gag would open on 12:01 am local time on September 1 and close at 12:01 am local time on November 10, or when the ACL is projected to be met, whichever occurs first.

Alternative 3: The federal recreational fishing season for Gulf gag would open on October 1. NMFS would close harvest when the ACL is projected to be met. Currently, NMFS projects a fishing season duration of 55-62 days, with a projected minimum season duration of 27 days.

Alternative 4: The federal recreational fishing season for Gulf gag would open on November 1. NMFS would close harvest when the ACL is projected to be met. Currently, NMFS projects a fishing season duration of 29 – 36 days, with a projected minimum season duration of 19 days.

Discussion:

This action would modify the start date for the Gulf federal gag recreational fishing season, and may select a closure date for the fishing season. The intent of this action is to maximize the number of days the season would be open while also minimizing bycatch, especially of male gag. This focus on reducing fishing mortality of male gag is based on the low proportion of males comprising the total spawning stock biomass, currently estimated in SEDAR 72 (2021) to be only 2%. In addition, this action would consider uncertainty in landings estimates for each alternative, since having the ability to accurately estimate landings is of paramount concern in maintaining landings below the new revised ACL for the recreational sector. To that end, NMFS would update projections for appropriate closure dates in 2023 using the most current data (including possibly in-season data) and implement season closure dates that reduce the likelihood that the implement ACL would be exceeded.

The season durations discussed in this section are based on the alternatives chosen in Action 1. Because Alternative 1 in Action 1 would not reduce overfishing, it is not included in the discussion of Action 2 alternatives.

Alternative 1 would maintain the June 1 season start date for recreational gag fishing. Based on the 95% upper confidence limit (UCL) for landings from 2017-2019, NMFS projects a season starting June 1 to last 16 – 21 days depending on the alternative chosen in Action 1 (Table 2.2.1). However, when analyzing observed landings for 2017-2021, the data show that the 2023 recreational ACL proposed in **Alternative 1** of Action 1 has been landed in as few as 15 days during the 2017-2021 time period. Because the recreational gag fishing season has traditionally started on June 1, the estimated season duration is less uncertain relative to the other alternatives in Action 2, and thus may more likely constrain landings to the ACL. However, because the

season would be greatly compressed, the "derby-like" nature of the expected fishing effort under **Alternative 1** is expected to make predicting the actual season duration problematic.

Because the seasons proposed in all alternatives in Action 2 would be too brief for landings data to be available in time to analyze in-season, the initial season duration would be based solely upon the NMFS projection. Under **Alternative 1**, if landings (when received after the season closure) were found to be substantially below the gag recreational ACL, NMFS may reopen the fishing season prior to the end of the fishing year, allowing for harvest of the remaining recreational allocation.

Table 2.2.1. Season duration, start date, and projected end date for Action 2 alternatives based on start date. Note that under **Preferred Alternative 2**, the end date for the recreational fishing season will be fixed at November 10, prior to the projected end dates calculated from the catch limit and allocation alternatives from Action 1.

Action 2 Alternative	Rec ACL (Action 1 Alt)	Start Date	Number of Days*	Projected End Date*	Earliest Season End Date**
1	403,759 (Alt 2)	**June 1**	16	June 16	June 15
	486,204 (Alt 3)		19	June 19	June 18
	496,235 (Alt 4)		19	June 19	June 18
2 (Preferred)	403,759	**Sept 1**	70	Nov 10	Sep 27
	486,204		70	Nov 10	Oct 3
	496,235		70	Nov 10	Oct 3
3	403,759	**Oct 1**	55	Nov 24	Oct 27
	486,204		61	Nov 30	Nov 1
	496,235		62	Dec 1	Nov 2
4	403,759	**Nov 1**	29	Nov 29	Nov 19
	486,204		35	Dec 5	Nov 23
	496,235		36	Dec 6	Nov 23

*95% UCL based on 2017-2019 landings.
**Based on highest observed landings 2017-2021. Note that projected end dates are based on data from a June 1 season start date.

Preferred Alternative 2 would set the gag recreational fishing season start date at September 1. Based on NMFS estimates of recent fishing effort and catch rates, the Council recommended a season end date of November 10, which equates to a 70 – day season. NMFS projections using data from 2017 – 2019 (95% UCL) indicate that the recreational ACL is likely to be harvested in 80 – 96 days given a September 1 start date. However, when analyzing observed landings for 2017 – 2021, the data show that the 2023 catch limit proposed in **Preferred Alternative 2** of Action 1 has been landed in as few as 27 days. Also, because the recreational gag season has never opened on September 1, there is substantial uncertainty associated with effort and catch rates under **Preferred Alternative 2**. NMFS estimates are based on recent effort and catch rates for September – November, but because the gag season has traditionally already been open for three months by September 1, these projected harvest rates may underestimate effort and catch for a season that opens on September 1. This is because there may be increased fishing pressure by anglers that can no longer target gag in June and could shift that effort to the new season. Because **Preferred Alternative 2** proposes a season of 70 days, there would likely be no data

available to analyze in-season to verify whether landings would exceed the ACL. This is because wave 5 data (September/October) would not be expected to be available until six weeks, after the end of the ways (i.e. mid-December), which is after the scheduled season closure. The Council also requested a fixed fishing season closure at November 10. This makes **Preferred Alternative 2** more conservative than the NMFS season projections, which would otherwise estimate a season duration of 80 – 96 days. The more conservative nature of this fishing season closure date is anticipated to help constrain landings to the recreational ACL.

Alternative 3 would set the gag recreational fishing season start date at October 1. NMFS projections using data from 2017 – 2019 indicate that the recreational ACL is likely to be harvested in 55 – 62 days (Table 2.2.1). However, when analyzing observed landings for 2017 – 2021, the data show that the 2023 catch limit proposed in Preferred Alternative 2 of Action 1 has been landed in as few as 27 days. As with the September 1 season start date proposed in **Preferred Alternative 2**, the recreational gag season has never opened on October 1; thus, there is substantial uncertainty about effort and catch rates based on that start date. NMFS estimates are based on recent effort and catch rates starting on October 1, but because the gag season has traditionally already been open for four months by October 1, these rates may underestimate fishing pressure during this time period by anglers that normally target gag in June, and may shift their effort to the new season. Since a recreational gag season beginning October 1 is projected to span about two months, there would likely be no data available in-season to verify that landings would not exceed the ACL.

Alternative 4 would set the gag recreational fishing season start date at November 1. NMFS projections using data from 2017 – 2019 indicate that the recreational ACL is likely to be harvested in 29 – 36 days (Table 2.2.1). However, when analyzing observed landings for 2017 – 2021, data show that the 2023 catch limit proposed in Preferred Alternative 2 of Action 1 has been landed in as few as 19 days. As with the September 1 and October 1 start dates, the recreational gag season has never had a November 1 start date, and thus there is substantial uncertainty about effort and catch rates based on that start date. November is traditionally a month where gag fishing effort and landings increase dramatically from the previous two months as gag are caught more frequently in nearshore waters. Given that there could be a substantial increase in effort compared to previous years due to the November opening, it is possible that the gag recreational ACL would be harvested more quickly than the 29 – 36 day projection. Because a season starting November 1 is projected to last less than one month, there would be no data available to examine in-season catch rates, and thus the season duration would be based solely on the NMFS projection prior to receiving any landings data.

When compared to the other alternatives, **Alternative 1** is projected to have the shortest fishing season (16 – 19 days). Like the other alternatives, there would be no opportunity for management based on in-season landings data. However, **Alternative 1** is the only alternative that would allow for a potential reopening of the gag season if the ACL is not harvested during the season.

Preferred Alternative 2 is projected to result in the longest fishing season (70 days) of the any alternatives. **Alternative 3** is projected to have the second longest fishing season (55 – 62 days), and **Alternative 4** is projected to have the second shortest fishing season (24 – 28 days).

Because each of these alternatives would not allow fishing until the fall, unlike **Alternative 1**, none of them would provide NMFS with enough time to evaluate landings after a closure and reopen the fishing season if the ACL has not been reached. Compared to **Alternative 1**, each of these alternatives increase the uncertainty in projecting a closure that would constrain landings to the recreational ACL because the season has never started at the beginning of September (**Preferred Alternative 2**), October (**Alternative 3**), or November (**Alternative 4**). However, given the reduction in the recreational ACL required to reduce overfishing under Action 1, it is uncertain how fishing behavior may change even with a June 1 (**Alternative 1**) start date. Under any of the alternative season start dates, NMFS would have to evaluate available information and consider the sources of uncertainty when evaluating closure projections.

CHAPTER 3. AFFECTED ENVIRONMENT

3.1 Description of the Physical Environment

General Description of the Physical Environment

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

The Gulf has a total area of approximately 600,000 square miles (1.5 million km^2), including state waters (Gore 1992). It is a semi-enclosed, oceanic basin connected to the Atlantic Ocean by the Straits of Florida and to the Caribbean Sea by the Yucatan Channel (Figure 3.1.1).

Oceanographic conditions are affected by the Loop Current, discharge of freshwater into the northern Gulf, and a semi-permanent, anti-cyclonic gyre in the western Gulf. The Gulf includes both temperate and tropical waters (McEachran and Fechhelm 2005). Gulf water temperatures range from 54º F to 84º F (12º C to 29º C) depending on time of year and depth of water. Mean annual sea surface temperatures ranged from 73º F through 83º F (23-28º C) including bays and bayous (Figure 3.1.1) between 1982 and 2009, according to satellite-derived measurements (NODC 2011).[3] In general, mean sea surface temperature increases from north to south with large seasonal variations in shallow waters.

[3] http://accession.nodc.noaa.gov/0072888

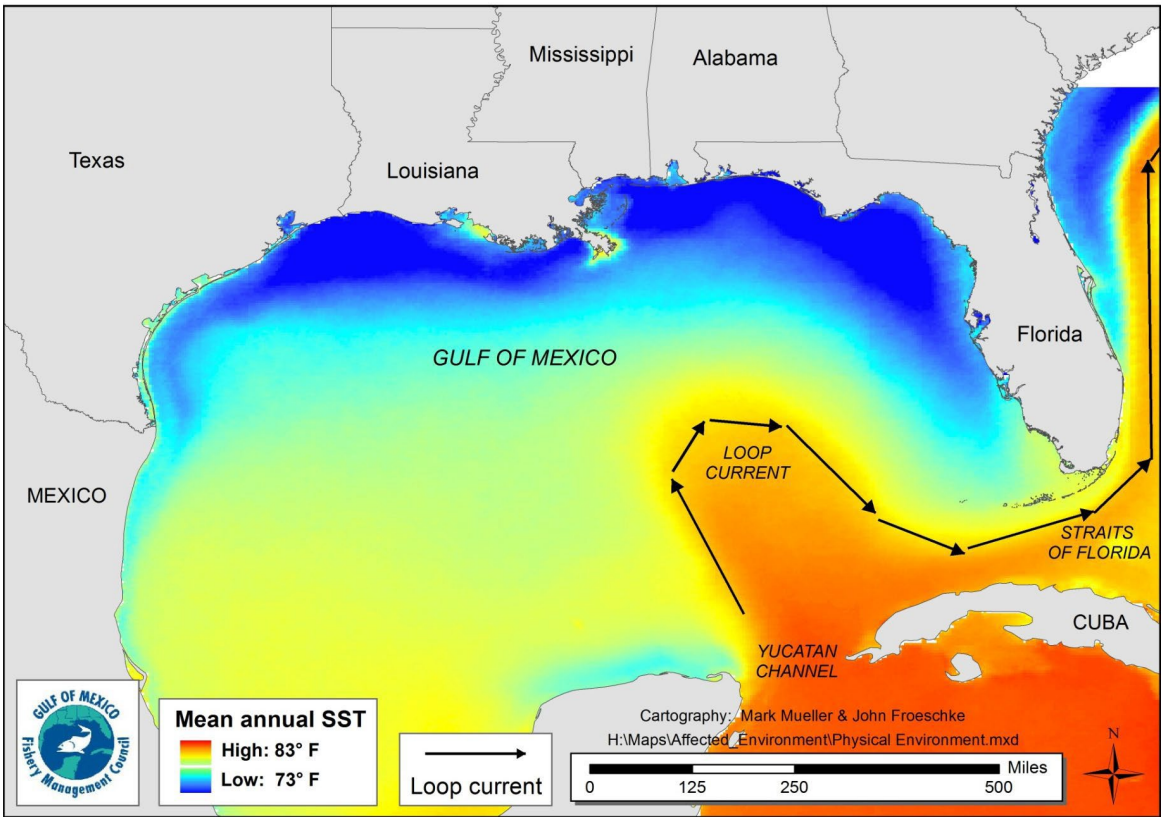

Figure 3.1.1. Mean annual sea surface temperature derived from the Advanced Very High-Resolution Radiometer Pathfinder Version 5 sea surface temperature data set.[4]

General Description of the Reef Fish Physical Environment

In general, reef fish are widely distributed in the Gulf, occupying both pelagic and benthic habitats during their life cycle. They generally have a planktonic larval stage that lives in the water column and feeds on zooplankton and phytoplankton (GMFMC 2004). Juvenile and adult reef fish are typically demersal and usually associated with bottom topographies on the continental shelf (less than 100 m) which have high relief, i.e., coral reefs, artificial reefs, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings. However, several species are found over sand and soft-bottom substrates. For example, some juvenile snapper (e.g., mutton, gray, red, dog, lane, and yellowtail snappers) and grouper (e.g., goliath, red, gag, and yellowfin groupers) are associated with inshore seagrass beds, mangrove estuaries, lagoons, and larger bay systems.

Gag are primarily caught on the west coast of Florida from Lee County north into the Florida Panhandle, and very occasionally off Alabama (Schirripa and Goodyear 1994). Newly settled juveniles are estuarine dependent, occurring in shallow seagrass beds during late spring and summer (Koenig and Coleman 1998; Strelcheck et al. 2003). At the onset of the first winter,

[4] http://pathfinder.nodc.noaa.gov

juvenile gag begins to migrate offshore, although some juvenile gag may remain in inshore waters during winter (Heinisch and Fable 1999). As gag mature, they move to deeper, offshore waters to spawn. Adults are most commonly encountered in Apalachee Bay and the Florida Middle Grounds, and throughout areas deeper than 40m west of the Florida Shelf, including Pulley Ridge. The may also be found south of Mississippi and Alabama, and in deeper areas along the continental shelf of Louisiana and Texas, albeit very rarely (Grüss et al. 2017a). Adult females are generally found in waters at a mean bottom depth of 50 m during the spawning season, and at a slightly deeper 58 m outside of the spawning season. Adult males are usually only found in regions of the West Florida Shelf to the South of Apalachicola in bottom depths exceeding 60 m (including the Madison-Swanson and Steamboat Lumps marine protected areas), and may rarely be captured on the continental shelf of LA and TX. Adult males are generally found at an average depth of 93 m (Grüss et al. 2017a).

Habitat Areas of Particular Concern (HAPC) and Environmental Sites of Special Interest

Detailed information pertaining to HAPCs is provided in Generic Amendment 3 (GMFMC 2005) and Amendment 9 to the Fishery Management Plan for the Coral and Coral Reefs of the Gulf of Mexico, U.S. Waters (GMFMC 2018). Detailed information pertaining to the Gulf area closures and marine reserves is provided in Amendment 32 to the Fishery Management Plan for the Reef Fish Resources in the Gulf of Mexico (Reef Fish FMP; GMFMC 2011b). There are environmental sites of special interest that are discussed in the Generic EFH Amendment (GMFMC 2004) that are relevant to Reef Fish management. These documents are hereby incorporated by reference.

Northern Gulf of Mexico Hypoxic Zone

Every summer in the northern Gulf, a large hypoxic zone forms. It is the result of allochthonous materials and runoff from agricultural lands resulting in increasing nutrient inputs to multiple rivers. These tributaries feed in to the Mississippi River, which disperses to the Gulf, and creates a temperature and salinity dependent layering of waters. The nutrient rich fresh waters from the Mississippi create seasonal, large algal blooms at the surface that eventually die, sink to the bottom, and decompose. This creates the oxygen-poor, hypoxic, bottom water layer unless front or storm events occur, which allows for mixing of the layers (Rabalais and Turner 2019). Mapping of the hypoxic zone began in 1985. For 2021, the extent of the hypoxic area was 6,334 square miles, almost triple what it was in 2020 (2,116 square miles), but still less than the extent of the 2017 hypoxic area (8,776 square miles). The changes in hypoxic area can be attributed to changing amounts of river discharge and its associated nutrient load and storm events. The major factor for the reduced size in 2020 was the active storm season with Hurricane Hanna passing right over the zone, allowing for mixing of the waters. The 2021 hypoxia area was higher than the 5-year hypoxic area average (5,408 square miles) and much larger than the 1,930 square mile goal set by the Interagency Mississippi River and Gulf of Mexico Hypoxia Task Force to be reached by 2035.[5] The hypoxic conditions in the northern Gulf directly impact less mobile benthic macroinvertebrates (e.g., polychaetes) by influencing density, species richness,

[5] http://gulfhypoxia.net

and community composition (Baustian and Rabalais 2009; Breitburg et al. 2018). However, more mobile macroinvertebrates and demersal fishes, such as gag, are able to detect lower dissolved oxygen levels and move away from hypoxic conditions. Therefore, these organisms are indirectly affected by limited prey availability and constrained available habitat (Baustian and Rabalais 2009; Craig 2012).

Greenhouse Gases

The Intergovernmental Panel on Climate Change (IPCC) has indicated greenhouse gas emissions are one of the most important drivers of recent changes in climate. Perez (2017) inventoried the sources of greenhouse gases in the Gulf from sources associated with oil platforms and those associated with other activities such as fishing. A summary of the results of the inventory are shown in Table 3.1.1 with respect to total emissions and fishing. Commercial fishing and recreational vessels make up a small percentage of the total estimated greenhouse gas emissions from the Gulf (2.04% and 1.67%, respectively).

Table 3.1.1. Total Gulf greenhouse gas 2014 emissions estimates (in tons per year) from oil platform and non-oil platform sources, commercial fishing, and percent greenhouse gas emissions from commercial fishing vessels of the total emissions*.

Emission source	CO_2	Greenhouse CH_4	Gas N_2O	Total CO_{2e}**
Oil platform	5,940,330	225,667	98	11,611,272
Non-platform	14,017,962	1,999	2,646	14,856,307
Total	**19,958,292**	**227,665**	**2,743**	**26,467,578**
Commercial fishing	531,190	3	25	538,842
Recreational fishing	435,327	3	21	441,559
Percent commercial fishing	2.66%	>0.01%	0.91%	2.04%
Percent recreational fishing	2.18%	>0.01%	0.77%	1.67%

*Compiled from Tables 6–11, 6–12, and 6–13 in Perez (2017). **The CO_2 equivalent (CO_{2e}) emission estimates represent the number of tons of CO_2 emissions with the same global warming potential as one ton of another greenhouse gas (e.g., CH_4 and N_2O). Conversion factors to CO_{2e} are 21 for CH_4 and 310 for N_2O.

3.2 Description of the Biological/Ecological Environment

The biological environment of the Gulf, including for gag, is described in detail in the Generic EFH Amendment (GMFMC 2004), Generic ACL/AM Amendment (GMFMC 2011a), and Reef Fish Amendments 30A (GMFMC 2008) and 35 (GMFMC 2012) which are hereby incorporated by reference and summarized below.

Gag Life History and Biology

Newly settled gag juveniles are estuarine dependent and are usually found in shallow seagrass beds during late spring and summer (Koenig and Coleman 1998; Strelcheck et al. 2003). As gag matures, it moves to deeper, offshore waters to spawn. Gag is protogynous, transitioning from female to male at older ages. Age and size at which 50% of females undergo sexual transition is

approximately 11 years and 42-43 inches total length (TL; 108.5 - 110 cm TL: SEDAR 10, 2006). Maximum age is estimated to be 31 years (Lombardi-Carlson et al. 2006b), and females are mature by 3.7 years of age and 23 inches TL (58.5 cm TL; Fitzhugh et al. 2006b). Gag forms spawning aggregations at depths ranging from 160-400 feet (Coleman et al. 1996). In the eastern Gulf, the spawning season is estimated to extend from late January to mid-April, with a peak in March (Fitzhugh et al 2006b). Often, immature female gag are found with spawning aggregations (Coleman et al. 1996). Gag can reach a maximum length and weight of 54 inches (138 cm TL) and 68 lb (31 kg) (Lombardi et al 2006b).

Status of the Gag Stock

See Chapter 1.1: Background, for more information. In summary, according to SEDAR 72 (2021), gag is overfished and undergoing overfishing as of 2019.

Bycatch

Details of bycatch in the gag portion of the reef fish fishery can be found in Chapter 7 (Bycatch Practicability Analysis [BPA]) of Amendment 38 (GMFMC 2012b) to the Reef Fish FMP and in Chapter 4 (BPA) to Amendment 30B to the Reef Fish FMP (GMFMC 2005), and is hereby incorporated by reference.

Gag is part of the reef fish complex, and may be captured incidentally while fishing for other species, especially other groupers and snappers which are also known to be captured while targeting gag. None of these species is currently undergoing overfishing. However, the overfished status deep-water groupers is unknown (National Marine Fisheries Service [NMFS] 2nd quarter 2022 Update Summary of Stock Status for non-Federal Strategic Sourcing Initiative [FSSI] stocks).[6] Minimum size limits are estimated to be the greatest source of regulatory discards for the majority of reef fish species. Both fishing sectors are currently constrained to a 24-inch fork length (FL) minimum size limit. The bag limit (2 gag per person as part of a 4-total grouper recreational bag limit) can also contribute to bycatch, although not as substantial a role as minimum size limits. Because gag habitat and fishing grounds overlap with many other commonly targeted reef fish species, catch (and potentially discards) of gag while targeting other species, and vice versa, may occur frequently. Interactions with other species such as sea turtles and sea birds are known to occur, but are minimal (see next section).

This assessment considers temporary measures that are expected to affect gag discard mortality due to reducing allowable catch and shortening/moving the starting date of the gag fishing season. However, there is some biological benefit to the managed species that outweigh any increases in discards by allowing more fish to remain in the water due to the reduced catch limit and change in the open fishing season duration. Discard mortality rates for reef fish have been positively correlated with warmer water temperatures (Pulver 2017), and all of the alternatives in Action 2 correspond to a recreational season that is closed when water temperatures are warmest. However, there may be an increase in discards during warmer water months because any gag

[6] https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates

captured while fishing for other species (especially red snapper, which experiences peak fishing pressure in June and July) would be required to be released. Ultimately, overall mortality of Gulf gag would be expected to be substantially lower under this rule due to the changes in the recreational fishing season and the reduced catch limits.

Protected Species and Protected Species Bycatch

NMFS manages marine protected species in the Southeast region under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). A brief summary of these two laws and more information is available on NMFS Office of Protected Resources website.[7] ESA-listed species or Distinct Population Segments (DPS) of marine mammals, sea turtles, fish, and corals occur in the exclusive economic zone (EEZ) of the Gulf. There are numerous stocks of marine mammals managed within the Southeast region. All marine mammals in U.S. waters are protected under the MMPA.

The five whale species that may be present in the Gulf (blue, sperm, sei, fin, and Rice's[8]) are listed as endangered under the ESA. Rice's whales are the only resident baleen whales in the Gulf. Manatees, listed as threatened under the ESA, also occur in the Gulf and are the only marine mammal species in this area managed by the U.S. Fish and Wildlife Service.

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

The most recent biological opinion (BiOp) for the FMP was completed on September 30, 2011. The BiOp determined the operation of the Gulf reef fish fishery managed under the Reef Fish FMP is not likely to adversely affect ESA-listed marine mammals or coral, and was not likely to jeopardize the continued existence of sea turtles (loggerhead, Kemp's ridley, green, hawksbill, and leatherback) or smalltooth sawfish. Since issuing the opinion, in memoranda dated September 16, 2014, and October 7, 2014, NMFS concluded that the activities associated with the Reef Fish FMP are not likely to adversely affect critical habitat for the Northwest Atlantic Ocean loggerhead sea turtle DPS and four species of corals (lobed star, mountainous star, boulder star, and rough cactus).

[7] https://www.fisheries.noaa.gov/about/office-protected-resources

[8] The Gulf of Mexico Bryde's whale has recently been identified as morphologically and genetically distinct from other whales under the Bryde's whale complex, warranting classification as a new species of baleen whale living in the Gulf of Mexico to be named *Balaenoptera ricei* or Rice's whale.

On April 6, 2016, NMFS and the U.S. Fish and Wildlife Service published a final rule (81 FR 20057) removing the range-wide and breeding population ESA-listings of the green sea turtle and listing eight DPSs as threatened and three DPSs as endangered. Two of the green sea turtle DPSs, the North Atlantic DPS and the South Atlantic DPS, occur in the Gulf and are listed as threatened. In addition, on June 29, 2016, NMFS published a final rule (81 FR 42268) listing Nassau grouper as threatened under the ESA. NMFS has reinitiated consultation on the FMP to address these listings. In a memorandum dated September 29, 2016, NMFS determined that fishing under the Reef Fish FMP during the re-initiation period is not likely to jeopardize the continued existence of the North Atlantic and South Atlantic DPSs of green sea turtles or Nassau grouper.

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

NMFS published a final rule on April 15, 2019, listing the Gulf Bryde's whale (now Rice's whale, see footnote 7 above) as endangered. In a memorandum dated June 20, 2019, NMFS revised the re-initiation request to include the Gulf Bryde's whale (Rice's whale) and determined that fishing under the Reef Fish FMP during the re-initiation period will not jeopardize the continued existence of any of the newly listed species discussed above.[9]

There is no information to indicate marine mammals and birds rely on gag for food, and they are not generally caught by fishermen harvesting gag. The primary gear in the Gulf Reef Fish fishery used to harvest gag is hook-and-line, and they are occasionally captured on bottom longlines and with spearfishing gear. These gear types are classified in the 2023 Marine Mammal Protection Act Proposed List of Fisheries as a Category III fishery (87 FR 55348), meaning the annual mortality and serious injury of a marine mammal resulting from the fishery is less than or equal to 1% of the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. Additionally, there is no evidence that the Gulf gag portion of the reef fish fishery as a whole is adversely affecting seabirds. Dolphins are the only species documented as interacting with the reef fish fishery. Bottlenose dolphin prey upon bait, catch, and/or released discards of fish from the reef fish fishery. They are also a common predator around reef fish vessels, feeding on discards.

Deepwater Horizon MC252 Oil Spill

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

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

In addition to the crude oil, over a million gallons of the dispersant, Corexit 9500A®, was applied to the ocean surface and an additional hundreds of thousands of gallons of dispersant was pumped to the mile-deep wellhead (National Commission 2010). No large-scale applications of dispersants in deep water had been conducted until the *Deepwater Horizon* MC252 oil spill. Thus, no data exist on the environmental fate of dispersants in deep water. Twenty-first century dispersant applications are thought to be less harmful than their predecessors. However, the combination of oil and dispersants has proven to be more toxic to marine fishes than either dispersants or crude oil alone. Marine fish which are more active (e.g. a pelagic species versus a demersal species) appear to be more susceptible to negative effects from interactions with weathered oil/dispersant emulsions. These effects can include mobility impairment and inhibited respiration (Swedmark et al. 1973). The effect of oil, dispersants, and the combination of oil and dispersants on fishes of the Gulf remains an area of concern. More information about the *Deepwater Horizon* MC252 oil spill is available on the NOAA Southeast Regional Office website.[10]

Climate Change

Climate change projections predict increases in sea-surface temperature and sea level; decreases in sea-ice cover; and changes in salinity, wave climate, and ocean circulation (IPCC).[11] These changes are likely to affect plankton biomass and fish larvae abundance that could adversely impact fish, marine mammals, seabirds, and ocean biodiversity. Kennedy et al. (2002) and Osgood (2008) have suggested global climate change could affect temperature changes in coastal and marine ecosystems that can influence organism metabolism and alter ecological processes such as productivity and species interactions; change precipitation patterns and cause a rise in sea level which could change the water balance of coastal ecosystems; altering patterns of wind and water circulation in the ocean environment; and influence the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs. The National Oceanic and Atmospheric Association (NOAA) Climate Change Web Portal[12] predicts the average sea surface temperature in the Gulf and South Atlantic will increase by 2-4ºF (1–3ºC) for 2010–2070 compared to the

[10] https://www.fisheries.noaa.gov/news/deepwater-horizon-10-years-later-10-questions
[11] http://www.ipcc.ch/
[12] https://www.esrl.noaa.gov/psd/ipcc/

average over the years 1950–2010. For reef fishes and snapper-grouper species, Burton (2008) and Morley et al. (2018) speculated climate change could cause shifts in spawning seasons, changes in migration patterns, and changes to basic life history parameters such as growth rates.

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

The Southeast Fisheries Science Center (SEFSC) has developed climate vulnerability analyses (CVA)[13] that can be used to determine the vulnerability of gag to climate change stressors. According to the SEFSC CVA, Gulf gag vulnerabilities are summarized as follows and in Table 3.2.1.

- High overall vulnerability, trait-based sensitivity (life history), and climate exposure (environmental factors) scores. This is out of four categories: Low, Moderate, High, and Very High.
- The highest sensitivity scores (nominal range from 1 to 4) were in Population Growth Rate (3.2), Spawning Cycle (2.9), Stock size/status (2.8), and Early Life History Survival and Settlement (2.6).
- The highest exposure scores were Temperature (4.0) and Ocean Acidification (4.0). These two were followed by Salinity (2.9), Sea Level Rise (2.4), and Hypoxia (2.2).
- Gag had Low Potential for Distributional Change (this is the worst out of the four rankings). When combined with the High overall climate vulnerability, it points to a difficulty in moving to offset the impacts of climate change.

Generally, the Gulf is projected by the SEFSC models used (CMIP5) to become warmer, saltier, less oxygenated, and more acidic everywhere during the current fifty years. Conditions will have similar, but amplified, patterns in the 2056–2099 period (Quinlan et al., in press).

[13] https://www.fisheries.noaa.gov/national/climate/climate-vulnerability-assessments

Mycteroperca microlepis		Attribute Mean	Data Quality	Expert Scores Plots (tallies by bin)
Sensitivity Attributes	Habitat Specificity	2.8	3	
	Prey Specificity	1.8	2.6	
	Adult Mobility	2.6	3	
	Dispersal of Early Life Stages	2.1	2.2	
	Early Life History Survival and Settlement Requirements	2.6	2	
	Complexity in Reproductive Strategy	3	3	
	Spawning Cycle	2.9	3	
	Sensitivity to Temperature	2	2.8	
	Sensitivity to Ocean Acidification	2	2	
	Population Growth Rate	3.2	3	
	Stock Size/Status	2.8	2.6	
	Other Stressors	2.3	2	
	Sensitivity Score	High		
Exposure Factors	Air Temperature	1	0	
	Hypoxia	2.2	1.6	
	Ocean Acidification	4	2	
	Precipitation	1	0	
	Primary Productivity	1.6	2	
	Salinity	2.9	3	
	Sea Level Rise	2.4	2.4	
	Sea Surface Temperature	4	3	
	Exposure Score	High		
Overall Vulnerability Rank		High		

Low
Moderate
High
Very High

Figure 3.2.1. Gag biological processes analyzed for climate change sensitivities.

3.3 Description of the Economic Environment

Detailed descriptions of the gag component of the Gulf Reef Fish FMP can be found in Amendments 38 (GMFMC 2012b) and 44 (GMFMC 2017a). Additionally, this section and Section 3.4 provide information on the respective economic and social environments of the fishery.

3.3.1 Commercial Sector

Permits

Any fishing vessel that harvests and sells any of the reef fish species, including gag, managed under the Reef Fish FMP from the Gulf EEZ must have a valid Gulf commercial reef fish permit. The commercial sector of the reef fish fishery has been managed under a limited access program since 1992, which in turn capped the number of commercial reef fish permits. Therefore, new entrants must buy a permit in order to participate in the commercial sector. The introduction of the IFQ program in 2010 further limited participation in harvesting gag. To harvest gag, commercial fishermen must have both the limited access permit and sufficient allocation to account for all harvested gag. As shown in Table 3.3.1.1, the number of permits that were valid or renewable in a given year has continually decreased in the years after the red snapper (RS)-individual fishing quota (IFQ) program was implemented in 2007. This decline has continued since the grouper-tilefish (GT)-IFQ program was implemented in 2010, but at a slower rate. As of July 8, 2021, there were 825 valid or renewable commercial reef fish permits, 748 of which were valid. A renewable permit is an expired limited access permit that cannot be actively fished, but can be renewed for up to one year after expiration.

As of July 8, 2021, there were 825 valid or renewable commercial reef fish permits, 748 of which were valid. A renewable permit is an expired limited access permit that cannot be actively fished, but can be renewed for up to one year after expiration.

Table 3.3.1.1. Number of valid or renewable Gulf commercial reef fish permits, 2009-2020.

Year	Number of Permits
2009	998
2010	969
2011	952
2012	917
2013	895
2014	882
2015	868
2016	852
2017	850
2018	845
2019	842
2020	837

Source: NMFS SERO Sustainable Fisheries (SF) Access permits database

A single permit is attached to a single vessel and many businesses only own one vessel. However, some businesses hold or own multiple permits and vessels. Multiple vessels owned by a single business are often referred to as a "fleet." Although each vessel is often legally organized under an individual corporate or other business name, for economic purposes, the fleet is treated as a single business because the same, or mostly the same, individuals are determining how those vessels operate. A single business may include other types of operations that possess shares in addition to fishing vessels.

As illustrated in Table 3.3.1.2, as of July 8, 2021, 93 businesses owned two or more valid or renewable reef fish permits. Although these businesses represented only 14.9% of the businesses with permits; they held 36.0% of the permits, which illustrates some degree of concentration in the ownership of permitted vessels. The maximum number of permitted vessels held by a single business was 17.

Table 3.3.1.2. Vessels and businesses with a commercial reef fish permit end as of July 8, 2021.

No. of Vessels Owned by a Business	No. of Businesses	No. of Total Permitted Vessels	% of Businesses	% of Permitted Vessels
1	531	531	85.1%	64.4%
2	63	126	10.1%	15.3%
3	13	39	2.1%	4.7%
4	2	8	0.3%	1.0%
5-7	8	42	1.3%	5.1%
8-10	4	36	0.6%	4.4%
11-17	3	43	0.5%	5.2%
Total	**624**	**825**	**100%**	**100.0%**

Source: NMFS SERO permits and IFQ databases, July 8, 2021.

Although all permitted vessels may harvest non-IFQ reef fish species (e.g., vermilion snapper), not all permitted vessels are eligible to harvest gag (GG). A permitted vessel must be linked to an active IFQ account in order to be eligible to harvest GG and other IFQ species.[14] Thus, because some vessels are not linked to an active IFQ account, fewer permitted vessels are eligible to harvest IFQ species and, in turn, fewer businesses may accrue revenue from the harvest of IFQ species.

[14] The vessel account must have a valid permit and be linked to an active IFQ account. The vessel account must also have annual allocation in it in order for the permitted vessel to harvest IFQ species. Vessel accounts are considered active when a permit is valid. A renewable permit status is not an active status. An IFQ account status is active if the account holder submitted an affirmative answer to the bi-annual citizenship requirement

Table 3.3.1.3. IFQ eligible vessels and businesses with a Gulf reef fish permit.

No. of Vessels Owned by a Business	No. of Businesses	No. of Total Permitted Vessels	% of Businesses	% of Permitted Vessels
1	445	445	83.0%	60.5%
2	61	122	11.4%	16.6%
3	13	39	2.4%	5.3%
4	2	8	0.4%	1.1%
5-7	8	42	1.5%	5.7%
8-10	4	36	0.7%	4.9%
11-17	3	43	0.6%	5.9%
Total	**536**	**735**	**100%**	**100.0%**

Source: NMFS SERO permits and IFQ databases, July 8, 2021.

Table 3.3.1.3 shows that as of July 8, 2021, only 735 permitted vessels were linked to an IFQ account, and these vessels were owned by 536 businesses. Thus, 90 permitted vessels were not eligible to harvest IFQ species and 88 businesses with reef fish permits could not accrue revenue from the harvest of IFQ species. The degree of concentration among IFQ-eligible permitted vessels is slightly greater than with all permitted vessels, as businesses owning multiple IFQ-eligible vessels represent only 17.0% of the businesses but hold 39.5% of the permitted vessels that can harvest IFQ species.

IFQ Accounts with GG Shares

As of July 8, 2021, there were 672 IFQ accounts with shares in one or more share categories. Of these accounts, 506 held gag (GG) shares. The total percentage of GG shares held by accounts with GG shares does not sum to 100% in Table 3.3.1.4 because a small percentage of GG shares were reclaimed under Reef Fish Amendment 36A.[15] The total percentages for other share categories also do not sum to 100% because some accounts with GG shares do not possess shares in other categories, though a small amount of shares in the other categories were also reclaimed under Reef Fish Amendment 36A.

On average (mean), each of these 506 accounts holds just under 0.2% of the GG shares. However, as discussed in Reef Fish Amendment 36A, the distribution of shares within the GG share category, and in fact all categories, is highly skewed. In other words, some accounts have a relatively high percentage of the shares in a category while others have no or a very low percentage of the shares. For accounts that hold GG shares, the largest or maximum percent of shares held by a single account in each category ranges from 2.33% for GG to 4.27 % for red grouper (RG), 3.65% for RS, 4.44% for shallow water grouper (SWG), 8.23% for deep water grouper (DWG), and 9.95% for Tilefish (TF).

[15] Shares were reclaimed from accounts that had never been activated since the start of the GT-IFQ program

The account that has the highest percentages of GG shares is near the share cap of 2.349%. The account that has the highest percentage of RG shares was 98% of the total 4.331% share cap for RG. The account that has the highest percentage of TF shares was 81% of the total 12.211% share cap for TF. Thus, in percentage terms, these estimates indicate there are some relatively large shareholders in the GG, RG, and TF categories in particular. Even though the concentration of shares is relatively high for RG and TF, concentration levels across all categories, as well as combined categories are still considered to be "unconcentrated" and thus quota share markets are considered to be competitive (i.e., no business or other entity has the ability to exercise market power by controlling an "excessive" amount of the shares and thereby share prices).[16]

Table 3.3.1.4. Quota share statistics (in percent) for accounts with GG shares, July 8, 2021.

Statistic	DWG Shares	RG Shares	GG Shares	SWG Shares	TF Shares	RS Shares
Max	8.219	4.265	2.330	4.433	9.945	3.648
Sum	72.735	90.685	99.659	93.877	68.212	66.513
Average	0.144	0.179	0.197	0.186	0.135	0.131

Source: NMFS SERO IFQ database accessed 7/8/2021.

As with permitted vessels, although it is common for a single IFQ account with shares to be held by a single business, some businesses have multiple IFQ accounts with shares. The 507 IFQ accounts with GG shares are owned by 455 businesses. Further, although some IFQ accounts with GG shares are linked to a single permitted vessel, others are linked to multiple permitted vessels or are not linked to a permitted vessel at all. The latter accounts are held by businesses that are likely to sell their annual allocation rather than harvest it. Of the 507 IFQ accounts with GG shares, 354 accounts were linked to one or more permitted vessels, while 152 accounts were not linked to a permitted vessel. The 354 accounts were linked to 468 permitted vessels and these accounts and vessels were owned by 307 businesses. Most businesses only own one or two accounts and permitted vessels. However, one business has 12 accounts, and 3 businesses own 10 or more permitted vessels. The 152 accounts that were not linked to a vessel were owned by 148 businesses and 3 businesses held two or more accounts with GG shares.

[16] These conclusions hold regardless of the measure of concentration (e.g., the Herfindahl-Hirschman Index (HHI), C5, or C3) or the unit of analysis (e.g., IFQ account, lowest known entity (LKE), and affiliated accounts/businesses). The Horizontal Merger Guidelines from the US Department of Justice and the Federal Trade Commission identify markets with an HHI below 1,500 to be Unconcentrated (no concerns over the exercise of market power), HHI between 1,500 and 2,500 to be Moderately Concentrated (possible concern with market power being exercised given a sufficient increase in concentration), and above 2,500 to be Highly Concentrated (exercise of market power is likely, particularly if concentration increases further).

As shown in Table 3.3.1.5, the 307 businesses that own GG shares and permitted vessels hold the vast majority of shares held by businesses that own GG shares in all share categories, ranging from a low of just over 55% of the RS shares to a high of over 77% of the GG shares. On average, these 307 businesses own between 0.16% and 0.23% of the shares in each category. The maximum percentage of shares owned by a business varies considerably, ranging from about 3.64% of the RS shares to 9.9% of the TF shares.[17]

As shown in Table 3.3.1.6, the 148 businesses that own GG shares, but do not own permitted vessels, own less shares in total compared to the businesses that own permitted vessels. Specifically, these businesses own slightly more than 17% of the RG shares and slightly more than 15% of the SWG shares. These businesses own between 0.1% and 0.2% of the shares in each category on average. The maximum percentage of shares owned by one of these businesses varies somewhat, ranging from about 1.62% of the SWG shares to 4.48% of the TF shares.

In general, the information in Tables 3.3.1.5 and 3.3.1.6 can be used to determine the distribution of annual allocation, the market value of shares, the market value of annual allocation, and the potential ex-vessel value of annual allocation if used for harvesting between businesses with GG shares that own permitted vessels and businesses with GG shares that do not own permitted vessels. However, ex-vessel value would not accrue to businesses that do not possess a permit because a permit is needed to harvest IFQ species, including GG.

Table 3.3.1.5. Quota share statistics (in percent) for businesses with GG shares and permitted vessels, July 8, 2021.

Statistic	DWG Shares	RG Shares	GG Shares	SWG Shares	TF Shares	RS Shares
Max	8.219	3.662	2.279	4.433	9.945	3.648
Sum	61.569	67.045	77.484	77.032	55.796	54.703
Average	0.182	0.198	0.229	0.227	0.165	0.161

Source: NMFS SERO IFQ database (accessed 07/08/2021)

Table 3.3.1.6 Quota share statistics (in percent) for businesses with GG shares and no permitted vessels, July 8, 2021.

Statistic	DWG Shares	RG Shares	GG Shares	SWG Shares	TF Shares	RS Shares
Max	2.317	3.494	2.330	1.621	4.481	2.332
Sum	8.908	17.596	19.515	15.012	11.459	11.343
Average	0.110	0.217	0.241	0.185	0.141	0.140

Source: NMFS SERO IFQ database (accessed 07/08/2021).

The amount of annual allocation (quota pounds) that an account holder receives each year is not only conditional on the percentage of shares held in a category, but also the commercial quota applicable to that category. The 2021 quotas for each share category were as follows: 6,937,838

[17] Share caps are applied at the IFQ account and LKE levels, but not at the business level as defined here. Thus, it is possible for a business to control a share percentage above the cap.

pounds (lb) gutted weight (gw) for RS, 3,000,000 lb gw for RG, 1,024,000 lb gw for DWG, 582,000 lb gw for TF, and 525,000 lb gw for SWG. Table 3.3.1.7 presents statistics regarding annual allocation to IFQ accounts based on the share statistics in Table 3.3.1.4 and these quotas. Based on this information, the average account holder with GG shares received 2,171 lb gw of GG allocation in 2021, while the largest account holder received almost 22,000 lb gw. Across all categories, the average account holder with GG shares received about 23,000 lb gw of allocation in 2021 (Table 3.3.1.7).

Table 3.3.1.7 Annual allocation (lb gw) statistics for accounts with GG shares, July 8, 2021.

Statistic	DWG Allocation	RG Allocation	GG Allocation	SWG Allocation	TF Allocation	RS Allocation
Max	84,164	109,868	21,879	23,275	57,880	253,078
Sum	721,680	2,538,948	909,722	483,167	391,420	4,582,151
Average	1,722	6,060	2,171	1,153	934	10,936

Source: NMFS SERO IFQ database (accessed 07/08/2021)

Table 3.3.1.8 provides statistics regarding the amount of allocation held by the 307 businesses that possess GG shares and at least one permit. Information in this table reflects that these businesses control just over 75% of the GG allocation, or around 728,000 lb gw. The largest amount of GG allocation controlled by a single business with GG shares and a permit is almost 22,000 lb gw. The average amount of GG allocation held by a business with a permit is about 2,200 lb gw.

Table 3.3.1.9 provides statistics regarding the amount of allocation held by the 87 businesses that possess shares but are not associated with a permit. Information in this table reflects that these businesses control almost 20% of the GG allocation, or around 183,250 lb gw. The largest amount of allocation controlled by a single business with GG shares but without a permit is slightly less than 22,000 lb gw. The average amount of GG allocation held by a business without a permit is almost 2,300 lb gw.

Table 3.3.1.8. Annual allocation (lb gw) statistics for businesses with GG shares and permitted vessels, July 8, 2021.

Statistic	DWG Shares	RG Shares	GG Shares	SWG Shares	TF Shares	RS Shares
Max	84,164	109,868	21,400	23,275	57,880	253,078
Sum	630,470	2,011,354	727,570	404,419	324,731	3,795,201
Average	1,860	5,933	2,146	1,193	958	11,195

Source: NMFS SERO IFQ database (accessed 07/08/2021)

Table 3.3.1.9. Annual allocation (lb gw) statistics for businesses with GG shares and no permitted vessels, July 8, 2021.

Statistic	DWG Shares	RG Shares	GG Shares	SWG Shares	TF Shares	RS Shares
Max	23,729	104,808	21,879	8,512	26,080	161,774
Sum	91,217	527,876	183,248	78,813	66,689	786,950
Average	1,126	6,517	2,262	973	823	9,715

Source: NMFS SERO IFQ database (accessed 07/08/2021)

Quota shares have value in multiple ways. First, shares have value because they are an asset. The asset value of each account's shares is determined by the market price of the shares and the amount of shares it contains. Statistics regarding the value of the shares held by accounts with GG shares are in Table 3.3.1.10. The total value of all shares held by accounts with GG shares is just under $246 million (2021 dollars),[18] with the bulk of that value coming from ownership of RS shares, which accounts for more than 85% of the combined total value. This is also true for the average account that holds GG shares. The average value of an account that holds GG shares is about $587,000, though only about 3% of that value is based on GG shares. The account with the largest asset value of shares is worth about $11.6 million, with RS shares representing the bulk of that value (99%).

Table 3.3.1.10. Quota share value statistics for accounts with GG shares (2021 dollars).

Statistic	DWG	RG	GG	SWG	TF	RS	All
Max	$937,587	$703,157	$179,189	$130,804	$531,340	$11,482,169	$13,964,247
Sum	$8,039,514	$16,249,270	$7,450,622	$2,715,400	$3,593,237	$207,892,189	$245,940,231
Average	$19,187	$38,781	$17,782	$6,481	$8,576	$496,163	$586,970

Note: Share value estimates are based on average 2021 share prices per pound.
Source: NMFS SERO IFQ database (accessed 07/08/2021)

The information in Table 3.3.1.10 reflects the asset value of shares based on 2021 share prices. As illustrated in Table 3.3.1.11, average share prices have fluctuated greatly across the share categories. Specifically, RS was the only share category to have a continuous increase in the average share price. The average RS share price increased 19% in 2021 relative to 2017. GG share prices declined continuously from 2017-2021 falling by 20%. RG share prices have been relatively steady, after experiencing a decline in 2018. Compared to conditions in 2017, GG shares currently represent a far smaller percentage of a GG share account holder's IFQ asset portfolio, which was around 29% at that time. The same is true for the other GT share categories, with RS shares now dominating that portfolio.

[18]Converted to 2021 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

Table 3.3.1.11. Average share prices by share category, 2017-2021 (2021 dollars).

Year	DWG	RG	GG	SWG	TF	RS
2017	$13.88	$5.68	$17.45	$9.55	$9.56	$38.23
2018	$11.72	$4.40	$10.49	$5.23	$11.48	$38.91
2019	$9.63	$6.00	$10.07	$5.92	$10.01	$40.37
2020	$14.54	$6.43	$9.19	$5.29	$8.83	$41.26
2021	$11.14	$6.40	$8.19	$5.62	$9.18	$45.37
Average	**$12.18**	**$5.78**	**$11.08**	**$6.32**	**$9.81**	**$40.83**

Source: SERO Catch Share Database (July 2022)

Table 3.3.1.12 provides statistics regarding the value of the shares held by the 307 businesses that possess GG shares and at least one permit. Information in this table again reflects that these businesses control just over 77% of the total GG share value. The largest GG share value controlled by a single business with a permit a little over $175,000, while the average value of GG shares held by a business with a permit is just over $17,500. GG shares only represent about 3% of the total share value held by these businesses, while RS shares represent about 85% of the total share value held by these businesses.

Table 3.3.1.12. Quota share value statistics for businesses with GG shares and permitted vessels, July 8, 2021 (2021 dollars).

Statistic	DWG	RG	GG	SWG	TF	RS
Max	$937,587	$703,157	$175,267	$130,804	$531,340	$11,482,169
Sum	$7,023,441	$12,872,666	$5,958,801	$2,272,836	$2,981,029	$172,188,251
Average	$20,718	$37,972	$17,578	$6,705	$8,794	$507,930

Note: Share value estimates are based on average 2021 share prices per pound from SERO Catch Share Database (July 2022).
Source: NMFS SERO IFQ database (accessed 07/08/2021)

Table 3.3.1.13 provides statistics regarding the value of the shares held by the 87 businesses that possess GG shares but are not associated with a permit. Information in this table again reflects that these businesses control about 19.5% of the total GG share value. The largest GG share value controlled by a single business without a permit is about $179,000, while the average value of shares held by a business with GG shares but without a permit is just over $18,500. GG shares only represent about 3% of the total share value held by these businesses, while RS shares represent almost 84% of the total share value held by these businesses.

Table 3.3.1.13. Quota share value statistics for businesses with GG shares but no permitted vessels, July 8, 2021 (2021 dollars).

Statistic	DWG	RG	GG	SWG	TF	RS
Max	$264,336	$670,774	$179,189	$47,838	$239,415	$7,339,687
Sum	$1,016,156	$3,378,407	$1,500,804	$442,929	$612,208	$35,703,938
Average	$12,545	$41,709	$18,528	$5,468	$7,558	$440,789

Note: Share value estimates are based on average 2021 share prices per pound from SERO Catch Share Database (July 2022).
Source: NMFS SERO IFQ database (accessed 07/08/2021)

In addition to their asset value, shares have value because they result in annual allocation, which can either be sold or used for harvesting purposes (i.e., landings). Annual allocation that is sold results in revenue for the business holding the allocation. This revenue likely represents an equivalent amount of profit as the business does not pay cost recovery fees when selling allocation and any other monetary costs associated with selling allocation are likely trivial. Statistics regarding the potential market value associated with the annual allocation for each account with GG shares are provided in Table 3.3.1.14.

The average market value of annual allocation should approximate the expected net revenue or economic profit of the annual allocation in the short-term (i.e., in a given year). Thus, if the annual allocation held by accounts with GG shares was harvested, economic profits from those landings would be expected to be about $21.1 million, with the bulk of those profits (83%) arising from the harvest of RS, while GG would only account for about 3%. Although one account would be expected to earn about $1.19 million in short-term profits, if the account holders with GG shares retain their initial annual allocations, the average short-term profit per account would only be expected to be around $50,000.[19] Realized value in the form of actual annual revenue and profits is likely less from GG allocation and other allocation in the GT-IFQ program as quota utilization for those species is typically well below 100% in those categories (67% for GG in 2021). Thus, annual profit from the sale of GG allocation is more likely to be around $488,000 in total and $1,164 per business on average.

Table 3.3.1.14. Potential market value of annual allocation in 2022 for all accounts with GG shares (2021 dollars).

Statistic	DWG	RG	GG	SWG	TF	RS	All
Max	$87,531	$71,414	$17,503	$13,732	$36,465	$964,229	$1,190,874
Sum	$750,547	$1,650,316	$727,778	$285,069	$246,595	$17,457,995	$21,118,300
Average	$1,791	$3,939	$1,737	$680	$589	$41,666	$50,402

Note: Annual allocation market value estimates are based on average 2021 allocation prices from SERO Catch Share Database (July 2022).
Source: NMFS SERO IFQ database (accessed 07/08/2021)

The information in Table 3.3.1.14 reflects the potential market value of allocation based on 2021 allocation prices and commercial quotas. However, with the exception of RS allocation and RG somewhat, allocation prices for other share categories have declined over the past 5 years, as illustrated in Table 3.3.1.15. Specifically, GG allocation prices have declined by 50% during

[19] "Accounts" do not actually harvest landings and thus do not earn profits per se; rather, vessels and the businesses that own them do. Further, annual allocation is often transferred, so the actual distribution of short-term profits would likely differ from the potential distribution based on the distribution of annual allocation at the beginning of the year. The purpose of these estimates is to characterize the distribution of annual allocation and its value across accounts in the short-term.

this time. The declines for DWG and TF allocation prices have been less, but are still noticeable. If these trends continue, then the estimates in Table 3.3.1.14 may overestimate the market value of these allocations in 2022.[20] Conversely, RS allocation price has increased by 4%. Thus, if the upward trend in the RS allocation price continues, the estimated market value of RS allocation in Table 3.3.1.14 may underestimate actual market value in 2022. Compared to conditions in 2017, GG allocation currently represent an even smaller percentage of a GG share account holder's allocation portfolio, which was around 5% at that time. The same is true for the other GT-IFQ share categories, with RS allocation now dominating that portfolio.

Table 3.3.1.15. Average allocation prices by share category, 2017-2021 (2021 dollars).

Year	DWG	RG	GG	SWG	TF	RS
2017	$1.29	$0.46	$1.59	$0.63	$0.79	$3.65
2018	$1.06	$0.34	$1.09	$0.57	$0.77	$3.65
2019	$1.10	$0.62	$0.90	$0.62	$0.76	$3.88
2020	$1.09	$0.49	$0.76	$0.59	$0.65	$3.80
2021	$1.04	$0.65	$0.80	$0.59	$0.63	$3.81
Average	**$1.12**	**$0.51**	**$1.03**	**$0.60**	**$0.72**	**$3.76**

Source: 2021 Gulf of Mexico Grouper-Tilefish Individual Fishing Quota Report and 2021 Red Snapper Individual Fishing Quota Report

Similar to shares, annual allocation tends to be "unconcentrated" across accounts. According to NMFS (2022), RS, RG, and SWG as well as the aggregate quantity of all species groups have always been unconcentrated. However, there does exist a more consistent pattern of concentration for TF. Notably, the allocation market for TF starts out unconcentrated at the beginning of each year and becomes more concentrated during the year. These concentration patterns occur with a mixture of different suppliers in different years, and appear to be more consistent with a small number of harvesters chasing a relatively small amount of fish that likely is not by itself a relevant market, rather than an attempt to exercise market power (NMFS).

Table 3.3.1.16 provides statistics regarding the value of the allocation held by the 307 businesses that possess GG shares and at least one permit. Information in this table again reflects that these businesses control just about 80% of the total value of GG allocation. The largest value of GG allocation controlled by a single business with a permit is worth almost $17,200, while the average value of GG allocation held by a business with a permit is just over $1,700. Realized value in the form of actual annual revenue and profits is likely less from GG allocation as quota utilization is typically well below 100% (67% in 2021). Thus, annual profit for these businesses from the sale of GG allocation is more likely to be around $390,000 in total and $1,150 per business on average.

[20] It should be noted that gag allocation price is 1.04 in early 2022 per: https://noaa-sero.s3.amazonaws.com/drop-files/cs/Issue8.pdf. This indicates a higher rate of harvest for GG in 2022.

Table 3.3.1.16. Allocation value statistics for businesses with GG shares and permitted vessels, July 8, 2021 (2021 dollars).

Statistic	DWG	RG	GG	SWG	TF	RS
Max	$87,531	$71,414	$17,120	$13,732	$36,465	$964,229
Sum	$655,689	$1,307,380	$582,056	$238,607	$204,580	$14,459,714
Average	$1,934	$3,857	$1,717	$704	$603	$42,654

Table 3.3.1.17 provides statistics regarding the value of the allocation held by the 87 businesses that possess shares but are not associated with a permit. Information in this table again reflects that these businesses control about 20% of the total value of GG allocation. The largest value of GG allocation controlled by a single business without a permit is worth approximately $17,500, while the average value of allocation held by a business without a permit is approximately $1,800. Again, realized value in the form of actual annual revenue and profits is likely less from RG allocation, as quota utilization is typically well below 100% (67% in 2021). Thus, annual profit for these businesses from the sale of GG allocation is more likely to be around $98,000 in total and $1,200 per business on average.

Table 3.3.1.17. Allocation value statistics for businesses with GG shares but no permitted vessels, July 8, 2021 (2021 dollars).

Statistic	DWG	RG	GG	SWG	TF	RS
Max	$24,678	$68,125	$17,503	$5,022	$16,430	$616,359
Sum	$94,866	$343,119	$146,599	$46,500	$42,014	$2,998,281
Average	$1,171	$4,236	$1,810	$574	$519	$37,016

Note: Annual allocation market value estimates are based on average 2021 allocation prices.
Source: NMFS SERO IFQ database (accessed 07/08/2021)

These same general findings regarding the market value of annual allocation also apply to the potential ex-vessel value of that annual allocation. The markets for landed product largely have the same characteristics as the markets for annual allocation (i.e., unconcentrated overall and for most categories, except landings of TF which are "moderately concentrated"). Thus, markets for landed product of IFQ species are thought to be competitive. Even if market power is not detected in these markets, the Council may have distributional or "fairness" concerns, as the distributions of shares, allocation, landings, and revenue in the Gulf IFQ programs are highly unequal. In fact, they are the most unequal of any catch share program in the U.S. (GMFMC and NMFS, 2018).

Table 3.3.1.18. Potential ex-vessel value of annual allocation in 2022 for accounts with GG shares (2021 dollars).

Statistic	DWG	RG	GG	SWG	TF	RS	All
Max	$478,893	$574,611	$135,212	$137,787	$178,850	$1,353,970	$2,859,323
Sum	$4,106,358	$13,278,700	$5,622,081	$2,860,350	$1,209,488	$24,514,508	$51,591,486
Average	$9,800	$34,479	$12,354	$6,561	$5,315	$62,225	$130,735

Source: NMFS SERO IFQ database (accessed 07/08/2021)

The information in Table 3.3.1.18 reflects the potential ex-vessel value of allocations in 2022 based on 2021 ex-vessel prices and commercial quotas in 2021. Again, realized ex-vessel value will likely be less for GG and other species in the GT-IFQ program as quota utilization rates are typically well below 100%. Only businesses with IFQ accounts that are linked to a permit are allowed to harvest IFQ species. Therefore, estimates of ex-vessel value are not germane to businesses that do not possess permits.

As illustrated in Table 3.3.1.19, ex-vessel prices at the share category level have fluctuated from 2017 through 2021. With the exception of TF, and to a more minor extent RS, ex-vessel prices have increased in 2021, relative to 2017. Ex-vessel prices for DWG, RG, GG, and SWG have increased by 9%, 12%, 7%, and 13%, respectively. Although not shown here, this increase is also seen at the individual species level within the DWG, SWG, RG, and TF categories, with the exception golden tilefish in the TF category, which declined by 3.0%. The ex-vessel price for all species in the TF category decreased by 2.0% in 2021, relative to 2017. The ex-vessel price for SWG and RG has increased by 11.5 and 13.2%, respectively. These trends are nearly the opposite of the trends for allocation prices, suggesting that it is likely becoming relatively more profitable for those with shares to harvest their allocation rather than sell it, all other things being equal[21].

Table 3.3.1.19. Average ex-vessel prices by share category, 2017-2021 (2021 dollars).

Year	DWG	RG	GG	SWG	TF	RS
2017	$5.20	$4.69	$5.77	$5.23	$3.26	$5.46
2018	$5.45	$5.10	$6.07	$5.59	$3.03	$5.47
2019	$5.91	$5.60	$6.37	$5.86	$3.04	$5.57
2020	$5.48	$5.29	$6.13	$5.76	$2.91	$5.28
2021	$5.69	$5.23	$6.18	$5.92	$3.09	$5.35
Average	**$5.55**	**$5.18**	**$6.10**	**$5.67**	**$3.07**	**$5.43**

Source: 2021 Gulf of Mexico Grouper-Tilefish Individual Fishing Quota Report and 2021 Red Snapper Individual Fishing Quota Report

Vessels

[21] GG ex-vessel price increased to $6.86 in yearly 2022 per: https://noaa-sero.s3.amazonaws.com/drop-files/cs/Issue8.pdf .

The information in Table 3.3.1.20 describes the landings and revenue for vessels that harvested GG in each year from 2016 through 2020, as well as their revenue from other IFQ species, Gulf non-IFQ fisheries, and South Atlantic non-IFQ fisheries. Although a majority of these vessels' gross revenue came from harvesting IFQ species (85%), a significant portion came from harvesting non-IFQ species in the Gulf (12%), with a minor amount coming from harvests in the South Atlantic (4%).

Some important trends can be seen in Table 3.3.1.20. In general, vessel participation in the IFQ programs tends to be very fluid. However, the number of vessels that harvested GG in each year from 2016 through 2020 declined slightly each year. The number of vessels that harvested GG declined by 10% in 2020, relative to 2016. GG landings and revenue have decreased significantly from 2016 through 2020, with landings falling by 51% and revenue decreasing by 48%. The decrease in revenue was slightly less because of the increase in ex-vessel price that occurred during this time. However, not only did revenue from GG landings decrease, so did revenue from other IFQ species and even from non-IFQ species in the Gulf, which declined by about 53% and 75%, respectively. As a result, total revenue for these vessels declined by 33% from 2016 through 2020. From 2016-2020, GG represented about 11% of these vessels' total revenue on average, suggesting relatively little dependency on GG.

Table 3.3.1.20. Landings and revenue statistics for vessels harvesting GG by year, 2016-2020 (2021$).

Year	Number of Vessels	Statistic	GG Landings (gw)	GG Revenue	Other IFQ Revenue	Gulf Non-IFQ Revenue	South Atlantic Revenue	Total Revenue
2016	376	Maximum	40,746	$234,114	$561,770	$862,425	$798,765	$1,804,977
		Total	938,208	$5,373,129	$29,241,983	$5,600,654	$2,077,970	$42,293,736
		Mean	2,495	$14,290	$77,771	$14,895	$5,527	$112,483
2017	369	Maximum	24,350	$140,103	$600,512	$206,059	$705,602	$1,333,182
		Total	479,854	$2,764,772	$23,884,055	$4,077,068	$1,050,961	$31,776,856
		Mean	1,300	$7,493	$64,726	$11,049	$2,848	$86,116
2018	364	Maximum	23,452	$143,610	$635,844	$290,927	$779,927	$1,456,446
		Total	478,327	$2,898,321	$21,394,842	$3,875,647	$1,275,582	$29,444,392
		Mean	1,314	$7,962	$58,777	$10,647	$3,504	$80,891
2019	354	Maximum	27,848	$178,262	$483,221	$174,449	$469,084	$927,945
		Total	535,115	$3,417,464	$23,481,332	$3,632,380	$1,228,212	$31,759,388
		Mean	1,512	$9,654	$66,331	$10,261	$3,470	$89,716
2020	340	Maximum	18,742	$116,922	$752,950	$160,071	$312,622	$760,392
		Total	455,105	$2,817,583	$22,240,136	$2,643,644	$521,722	$28,223,086
		Mean	1,339	$8,287	$65,412	$7,775	$1,534	$83,009

Source: NMFS SERO IFQ database accessed 07/08/2021 and SEFSC Socioeconomic Panel (Jan22 Version)

These estimates reflect the interdependency between species harvested in the commercial sector of the reef fish fishery (i.e., biological or economic factors that affect the commercial harvest of one species can and often do affect the commercial harvest of other species). The GG commercial quota has remained constant for the past seven years, as have DWG, SWG, and TF. However, the RG commercial quota has changed multiple times from 2016-2020. In late 2016, based on a stock assessment, the RG quota increased from 5.72 million pounds (mp) to 7.78 mp gw, and remained at this level through the end of 2018. Updated projections reduced the RG quota to 3.0 mp gw in 2019. On June 1, 2022, Amendment 53 to the Reef Fish FMP set the commercial ACL at 2.53 mp gw, and the commercial quota at 2.4 mp gw. Later in 2022, the Modification of Gulf of Mexico Red Grouper Catch Limits Framework action set the quota to 2.79 mp gw (NMFS 2022). In addition, the RS commercial quota increased from approximately 6.097 mp gw in 2016 to 6.937 mp gw in 2019, and remained at that level through 2020.

The maximum annual gross revenue earned by a single vessel during this time was about $1.80 million (2021 dollars) in 2016, though the average gross revenue per vessel was only about $112,000 that year. Similar to the trends in total revenue for GG vessels, these values had

decreased to $83,000 by 2020, representing a 33% decline in total revenue per vessel. Average gag landings and revenue per vessel also decreased from 2,495 lb gw and $14,290 to 1,339 lb gw and $8,287 per vessel or by about 46% and 42%, respectively.

Economic Value

Changes in commercial gag landings may result in economic effects because of potential changes in ex-vessel prices due to less (or more) domestic gag being available in markets. In turn, if the ex-vessel price is expected to change, gross revenue and thus consumer surplus (CS) would also be expected to change. The potential effects on ex-vessel price, gross revenue, and CS can be estimated utilizing the work by Keithly and Tabarestani (2018). According to the results of their Habit Formation model, they estimated an own-price flexibility for "other groupers," inclusive of gag, of -0.386. The own-price flexibility is the percentage change in a product's price relative to the percentage change of a product's quantity sold, and thus estimates the responsiveness of a product's price to the quantity being sold. The own-price flexibility estimate in Keithly and Tabarestani (2018) is not compensated for income. An income compensated estimate would likely be lower, which would in turn yield smaller changes in the ex-vessel price and thus smaller changes in gross revenue and PS. Thus, any estimates based on their analysis should be considered maximum expected changes in ex-vessel price, gross revenue, and CS in the commercial sector.

Estimates of economic returns have not been available historically for the commercial sector of the Gulf reef fish fishery. Reports such as Overstreet, Perruso, and Liese, 2017; Overstreet and Liese, 2018a; and Overstreet and Liese, 2018b provided the first such estimates. Liese (pers. comm. 2022) recently provided average estimates of economic returns across 2014-2018 for vessels that caught gag. These estimates are the most useful for current purposes, and thus findings from that report are summarized below. Given the declines in landings and revenue for GG vessels discussed above, it is quite likely that economic returns were different by 2020 than they were in 2018, and thus the estimates below should be used with some caution. However, some of the findings for 2014-2018 seem to be consistent with the results above for 2016-2020.

Estimates in these reports are based on a combination of Southeast Coastal Logbook data, a supplemental economic add-on survey to the logbooks, and an annual economic survey at the vessel level. The economic surveys collect data on gross revenue, variable costs, fixed costs, as well as some auxiliary economic variables (e.g., market value of the vessel). The report provides estimates of critical economic variables for the commercial sector of the Gulf reef fish fishery as a whole, but also provides estimates by "subsets" within this sector. These subsets are referred to as Segments of Interest (SOI). SOIs are generally defined at the individual species (e.g., red snapper) or species group (e.g., Jacks). In addition, estimates are provided at the trip level and the annual vessel level for each SOI. For current purposes, the most important results are those for vessels that harvested GG.

From an economic returns perspective, two of the most critical results at the trip level are the estimates of trip net cash flow and trip net revenue. Trip net cash flow is trip revenue minus the costs for fuel, bait, ice, groceries, miscellaneous, hired crew, and purchases of annual allocation from other allocation holders. Thus, this estimate represents the amount of cash generated by a

typical reef fish trip over and above the cash cost of taking the trip (i.e., variable costs of the trip) and is a proxy for producer surplus[22] (PS) at the trip level. Trip net revenue is trip revenue minus the costs for fuel, bait, ice, groceries, miscellaneous, hired crew, and the opportunity cost of owner's time as captain. By including opportunity cost of the owner's time and excluding purchases of annual allocation, trip net revenue is a measure of the commercial fishing trip's economic profit.

Table 3.3.1.21 illustrates the economic "margins" generated on gag trips, i.e., trip net cash flow and trip net revenue as a percentage of trip revenue. As shown in this table, 29.8%, 6.1%, and 16.5% (or 52.4% in total) of the average revenues generated on RG trips were used to pay for crew costs, fuel/supplies costs, and purchases of annual allocation, while the remaining 35% was net cash flow back to the owner(s). The margin associated with trip net revenue was higher at 45%. Thus, trip cash flow and trip net revenue were both positive on average from 2014 through 2018, generally indicating that gag trips were profitable during this time.

Table 3.3.1.22 provides estimates of the important economic variables at the annual level for all vessels that had GG landings from 2014 through 2018. Similar to the trip level, three of the most important estimates of economic returns are net cash flow, net revenue from operations,[23] and economic return on asset value. Of these measures, net revenue from operations most closely represents economic profits to the owner(s). Net revenue from operations is total annual revenue minus the costs for fuel, other supplies, hired crew, vessel repair and maintenance, insurance, overhead, and the opportunity cost of an owner's time as captain as well as the vessel's depreciation. Net cash flow is total annual revenue minus the costs for fuel, other supplies, hired crew, vessel repair and maintenance, insurance, overhead, loan payments, and purchases of annual allocation. Economic return on asset value is calculated by dividing the net revenue from operations by the vessel value. Net cash flow and net revenue from operations at the annual vessel level were both positive from 2014-2018, generally indicating that GG vessels in the commercial sector were profitable, though some vessels earned much greater profits than others did. Net cash flow and net revenue from operations averaged 26% and 32%, respectively, while the economic return on asset value was approximately 46.3% during this time.

In general, producer surplus (PS) is the difference between total annual revenue and variable costs. PS is a measure of net economic benefits to producers. Overstreet and Liese (2018b) state that "sale of IFQ allocation or shares is also not accounted for, as these transactions cannot be associated with a vessel." If revenue from the sale of allocation is not accounted for, then the cost of buying allocation should also not be considered in the calculation of PS. Therefore, a more accurate estimate of PS in percentage terms would be 50% of gross revenue based on estimates of variable costs in Table 3.3.1.22.[24]

[22] Producer surplus is the difference between the amount a producer is paid for a unit of a good and the minimum amount the producer would accept to supply that unit (i.e., marginal cost).
[23] Net revenue from operations accrues to the vessel owner and, when applicable, the IFQ shareholder, who may not be the same entity.
[24] PS =TR%-(Labor%+Fuel&Supplies%)

Table 3.3.1.21. Economic characteristics of GG trips 2014-2018 (2021$).

	2014	2015	2016	2017	2018	Average
Number of Observations	667	771	992	819	676	
Response Rate (%)	80%	84%	95%	94%	93%	
Trips						
Owner-Operated	66%	58%	61%	52%	64%	60%
Fuel Used per Day at Sea (gallons/day)	44	42	37	44	43	42
Total Revenue	100%	100%	100%	100%	100%	100%
Costs (% of Revenue)						
IFuel	7.3%	5.8%	4.4%	5.7%	7.2%	6.1%
Bait	3.5%	3.9%	3.9%	4.6%	5.1%	4.2%
Ice	1.5%	1.6%	1.7%	1.8%	2.0%	1.7%
Groceries	2.9%	3.0%	3.7%	4.2%	3.7%	3.5%
Miscellaneous	2.3%	3.1%	3.5%	2.3%	3.6%	3.0%
Hired Crew	29.9%	32.0%	30.0%	30.2%	27.1%	29.8%
IFQ Purchase	14.1%	19.8%	17.2%	14.3%	17.1%	16.5%
Owner-Captain Time	6.8%	6.2%	6.7%	5.2%	9.2%	6.8%
Trip Net Cash Flow	39.0%	30.8%	35.7%	36.9%	34.2%	35.0%
Trip Net Revenue	46%	44%	46%	46%	42%	45%
Labor - Hired & Owner	37%	38.2%	36.7%	35.4%	36.3%	36.7%
Fuel & Supplies	17%	17.4%	17.1%	18.6%	21.6%	18%
Input Prices						
Fuel Price (per gallon)	$3.99	$2.88	$2.26	$2.51	$2.91	$2.91
Hire Crew Wage (per crew-day)	$332	$317	$284	$261	$240	$286
Productivity Measures						
Landings/Fuel Use (lb/gallon)	12.7	11.2	11.2	9.8	8.7	11.0
Landings/Labor Use (lb/crew-day)	198	176	159	156	144	167

Table 3.3.1.22. Economic characteristics of GG vessels 2014-2018 (2021$).

	2014	2015	2016	2017	2018	Average
Number of Observations	64	81	96	94	80	
Response Rate (%)	65%	79%	85%	80%	79%	
Vessels						
Owner-Operated	73%	63%	74%	62%	87%	68%
For-Hire Active	5%	19%	13%	19%	10%	13%
Vessel Value	$144,262	$116,207	$100,982	$120,250	$111,028	$118,546
Total Revenue	100%	100%	100%	100%	100%	100%
Costs (% of Revenue)						
Fuel	7.6%	7.1%	6.1%	6.4%	7.6%	7.0%
Other Supplies	10.4%	10.8%	10.9%	11.6%	12.8%	11.3%
Hired Crew	28.3%	29.9%	24.9%	25.5%	24.6%	26.6%
Vessel Repair & Maintenance	7.0%	8.0%	7.9%	9.9%	10.2%	8.6%
Insurance	0.6%	1.0%	0.9%	1.2%	0.8%	0.9%
Overhead	3.9%	5.7%	4.5%	5.8%	3.3%	4.6%
Loan Payment	0.4%	1.6%	1.4%	1.4%	1.3%	1.2%
IFQ Purchase	11.9%	14.3%	13.6%	11.3%	16.5%	13.5%
Owner-Captain Time	5.4%	5.0%	5.6%	4.9%	5.8%	5.3%
Net Cash Flow	30.0%	21.6%	29.9%	26.9%	22.9%	26.0%
Net Revenue for Operations	33.0%	29.2%	36.3%	31.2%	30.8%	32.0%
Depreciation	3.6%	3.4%	3.0%	3.5%	4.1%	3.5%
Fixed Costs	12.0%	14.7%	13.3%	16.9%	14.2%	14.0%
Labor - Hired & Owner	34.0%	34.8%	30.4%	30.4%	30.5%	32.0%
Fuel & Supplies	18.0%	17.9%	17.0%	18.0%	20.4%	18.0%
Economic Return (on asset value)	45.9%	43.1%	61.2%	44.0%	37.3%	46.3%

Dealers

The information in Table 3.3.1.23 illustrates the purchasing activities of dealers that bought GG landings from vessels from 2016 through 2020.[25] Like vessels, dealer participation in the GG component of the GT-IFQ program is fluid and not all dealers purchased GG in each year during this time. Unlike the number of vessels harvesting GG during this time, the number of dealers that purchased GG fluctuated over this time, but increased by 9% in 2020 relative to 2016. The average number of dealers purchasing GG from 2016-2020 was 86.

Trends in purchases of GG landings by dealers mimics the trend in GG vessel revenues, as do the trends in purchases of other IFQ species and Gulf non-IFQ species. For example, purchases of GG landings in the Gulf by dealers decreased significantly (over 39%) from 2016 through 2020. Further, purchases of other-IFQ species in the Gulf also decreased by 8% during this time.

South Atlantic purchases by dealers who purchased Gulf GG landings do not mirror the trends for Gulf gag vessels South Atlantic landings. On the contrary, purchases of South Atlantic non-IFQ landings by dealers who purchased Gulf GG landings was nonexistent until 2018. From 2018-2020 purchases of landings from the South Atlantic have increased dramatically, but the total value of the GG dealers' purchases declined by 10% from 2016 through 2020. Still, this decline is less than the decline in revenues experienced by GG vessels, reflecting the greater diversity in the purchasing portfolios of GG dealers, which in turn allowed them to be more flexible and adaptive to changes in the GG component of the GT-IFQ program. In combination with the increase in the number of GG dealers, the average value of purchases per GG dealer actually decreased by 48% from 2016 through 2020.

On average, purchases of GG represented approximately 4% of all seafood purchases by GG dealers during this time, which suggests a low dependency on GG purchases, but slightly greater percentage of revenue GG represents for commercial vessels (2%). Further, their dependency on GG purchases steadily declined from 2016 through 2020, as GG purchases accounted for 5% of their total seafood purchases in 2016 but only 3% of their total seafood purchases in 2020. In addition, federally permitted dealers' ability to change which species they purchase is greater than commercial vessels' ability to change which species they harvest. Unlike commercial vessel permits, dealer permits do not restrict which species dealers can purchase.
Keithly and Wang (2018) estimated the mark-ups between the ex-vessel price and dealer sales price for GG and certain other grouper and tilefish species. However, those estimates are insufficient to estimate PS or profit for GG dealers, or changes to such as a result of regulatory changes, in part because costs other than the raw fish costs (which are equivalent to the ex-vessel value) are not taken into account. NMFS does not have estimates of those other costs for GG dealers or seafood dealers more broadly, and thus does not have estimates of net cash flow or net revenue from operations for GG dealers comparable to those in the commercial harvesting sector. Thus, while it is likely that the harvest of GG generates some PS and profit for GG

[25] The estimates in this table are based on Accumulated Landings System (ALS) data, which tends to produce slightly different estimates of ex-vessel landings and value for RG compared to the IFQ data due to waterbody code assignment issues in the Keys.

dealers, NMFS does not possess the data to estimate PS and profit. Additionally, because of federal dealers' ability to switch to purchasing other species, changes to those values as a result of the management measures considered in this amendment are likely to be relatively small. Similarly, any additional PS and profit generated from GG sales further up the distribution chain to wholesalers/distributors, grocers, and restaurants is likely minimal, given the vast number of seafood and other products they handle and their even greater ability to shift to purchasing other products.

Table 3.3.1.23. Dealer statistics for dealers that purchased GG landings by year, 2016-2020. All dollar estimates are in 2021$.

Year	Number Dealers	Statistic	GG Purchases	Other IFQ Purchases	Gulf Non-IFQ Purchases	South Atlantic Purchases	Total Purchases
2016	81	Maximum	$1,003,988	$8,012,184	$5,047,573	$0	$8,012,184
		Total	$5,201,576	$52,622,762	$44,691,818	$0	$102,516,156
		Mean	$64,217	$649,664	$558,648	$0	$1,265,632
2017	77	Maximum	$446,098	$6,558,574	$3,110,153	$0	$6,558,574
		Total	$2,732,987	$46,584,336	$33,691,026	$0	$83,008,349
		Mean	$35,493	$604,991	$437,546	$0	$1,078,031
2018	80	Maximum	$599,503	$7,275,182	$3,260,640	$26,419	$7,275,182
		Total	$2,829,081	$44,595,617	$38,033,872	$177,583	$85,917,365
		Mean	$35,364	$571,739	$475,422	$160,237	$1,073,966
2019	94	Maximum	$790,426	$8,580,634	$2,723,894	$2,000,871	$8,580,634
		Total	$3,359,867	$47,009,373	$44,366,286	$3,904,605	$98,640,130
		Mean	$35,743	$510,971	$471,981	$3,711,602	$1,049,362
2020	88	Maximum	$395,751	$8,467,263	$1,680,686	$2,468,988	$8,467,263
		Total	$2,943,664	$45,201,975	$27,913,490	$10,114,856	$86,173,986
		Mean	$33,451	$519,563	$317,199	$680,095	$979,250

Source: SEFSC Fishing Communities Web Query Tool, Version 1.

Imports

Imports of foreign seafood products compete in the domestic seafood market, and have in fact dominated many segments of the seafood market. Imports aid in determining the price for domestic seafood products and tend to set the price in the market segments in which they dominate. Seafood imports have downstream effects on the local fish market. At the harvest level for gag, imports affect the returns to fishermen through the ex-vessel prices they receive for their landings. As substitutes to domestic production of reef fish, imports tend to cushion the adverse economic effects on consumers resulting from a reduction in domestic landings. The

following describes the imports of fish products that directly compete with domestic harvest of gag. All monetary estimates are in 2021 dollars.

According to NMFS' foreign trade data,[26] snapper are not exported from the U.S. to other countries. Thus, the following describes the imports of fresh and frozen snapper products, which directly compete with domestic harvest of snapper species. As shown in Table 3.3.1.24, imports of fresh snapper products were 30.6 million lb product weight (pw) in 2016. They peaked at 32.8 million lb pw in 2020, an increase of 6% relative to 2016. Total revenue from snapper imports increased from $101.3 million (2021 dollars) in 2016 to a five-year high of $115.3 million in 2019. The average price per pound for fresh snapper products was $3.28 from 2016-2020. Imports of fresh snapper products primarily originated in Mexico or Central America and primarily entered the U.S. through the port of Miami.

Snappers

Table 3.3.1.24. Annual pounds and value of fresh snapper imports and share of imports by country, 2016-2020.

	2016	2017	2018	2019	2020
Pounds of fresh snapper imports (product weight, million pounds)	30.6	31.2	30.5	32.8	32.4
Value of fresh snapper imports (millions $, 2021$)	101.3	99.0	103.5	115.3	113.4
Average price per lb (2021$)	$3.32	$3.17	$3.39	$3.52	$3.50
Share of Imports by Country					
Mexico	32.7	35.8	32.5	34.9	40.4
Nicaragua	15.6	15.4	17.0	14.6	15.1
Panama	14.0	14.8	16.6	13.9	11.0
All others	37.6	33.9	33.9	36.6	33.5

Source: NOAA Foreign Trade Query Tool, accessed 05/14/22

As shown in Table 3.3.1.25, imports of frozen snapper products were 14.4 million lb pw in 2016. They peaked at 15.9 million lb pw in 2020, an increase of 10% relative to 2016. Total revenue from snapper imports increased from $42.6 million (2021$) in 2016 to a five-year high of $48.4 million in 2020. The average price per pound pw for frozen snapper products was $3.06 from 2016-2020. Imports of frozen snapper products primarily originated in Mexico or Central America and primarily entered the U.S. through the port of Miami.

[26] https://www.fisheries.noaa.gov/foss

Table 3.3.1.25. Annual pounds and value of frozen snapper imports and share of imports by country, 2016-2020.

	2016	2017	2018	2019	2020
Pounds of frozen snapper imports (product weight, million pounds)	14.4	12.8	12.2	11.4	15.9
Value of frozen snapper imports (millions $, 2021$)	42.6	38.2	37.6	36.7	48.4
Average price per lb (2021$)	$2.96	$2.98	$3.08	$3.22	$3.05
Share of Imports by Country					
Mexico	65.3	61.0	63.8	54.6	55.4
Nicaragua	7.8	11.0	11.3	6.8	5.4
Panama	9.3	7.9	6.9	13.5	10.3
All others	17.6	20.1	17.9	25.0	28.9

Source: NOAA Foreign Trade Query Tool, accessed 05/14/22

Groupers

According to NMFS' foreign trade data,[27] grouper are not exported from the U.S. to other countries. Thus, the following describes the imports of fresh and frozen grouper products, which directly compete with domestic harvest of reef fish species. As shown in Table 3.3.1.26, imports of fresh grouper products were 11.5 million lb pw in 2016. They peaked at 12.4.million lb pw in 2018, but declined to 10.4 .million lb pw by 2020. Total revenue from fresh grouper imports decreased from $53.1 million (2021$) in 2016 to a five-year low of $40.6 million in 2020. The average price per pound for fresh grouper products was $4.47 from 2016-2020, however, the average price in 2020 was 19% less than 2016-2019. Imports of fresh grouper products primarily originated in Mexico, Panama and Brazil.

[27] https://www.fisheries.noaa.gov/foss/

Table 3.3.1.26. Annual pounds and value of fresh grouper imports and share of imports by country, 2016-2020.

	2016	2017	2018	2019	2020
Pounds of fresh Grouper imports (product weight, million pounds)	11.5	12.3	12.4	11.3	10.4
Value of fresh Grouper imports (millions $, 2021$)	53.1	55.7	57.2	53.0	40.6
Average price per lb (2021$)	$4.63	$4.54	$4.61	$4.68	$3.89
Share of Imports by Country					
Mexico	65.9	58.8	58.0	57.9	67.6
Panama	12.7	12.2	9.0	8.1	8.0
Brazil	4.9	10.1	15.9	16.9	12.3
All others	16.4	19.0	17.1	17.0	12.2

Source: NOAA Foreign Trade Query Tool, accessed 05/14/22

As shown in Table 3.3.1.27, imports of frozen grouper products were 0.8 million lb pw in 2016. They peaked at 4.6.million lb pw in 2018, but declined to 0.8 million lb pw by 2020. Total revenue from frozen grouper increased from $1.7 million (2021 dollars) in 2016 to $6.2 million in 2018, but subsequently declined to $1.5 million in 2020. The average price per pound for frozen grouper products was $1.62 from 2016-2020, and increased by 13% in 2020 relative to 2016-2019. Imports of frozen grouper products primarily originated in Mexico, India, and Indonesia.

Table 3.3.1.27. Annual pounds and value of frozen grouper imports and share of imports by country, 2016-2020.

	2016	2017	2018	2019	2020
Pounds of frozen Grouper imports (product weight, million pounds)	0.8	1.4	4.6	3.5	0.8
Value of frozen Grouper imports (millions $, 2021$)	1.7	2.0	6.2	4.8	1.5
Average price per lb (2021$)	$2.08	$1.46	$1.34	$1.37	$1.85
Share of Imports by Country					
Mexico	24.7	47.2	79.2	79.2	33.7
India	45.4	29.3	11.2	11.2	25.9
Indonesia	9.0	16.3	4.0	3.0	1.1
All others	20.8	7.2	5.5	6.5	39.3

Source: NOAA Foreign Trade Query Tool, accessed 05/14/22

Economic Impacts

The commercial harvest and subsequent sales and consumption of fish generates business activity as fishermen expend funds to harvest the fish and consumers spend money on goods and

services, such as red grouper purchased at a local fish market and served during restaurant visits. These expenditures spur additional business activity in the region(s) where the harvest and purchases are made, such as jobs in local fish markets, grocers, restaurants, and fishing supply establishments. In the absence of the availability of a given species for purchase, consumers would spend their money on substitute goods and services. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic impacts may be distributed through regional markets and should not be interpreted to represent the impacts if these species are not available for harvest or purchase.

In addition to these types of impacts, economic impact models can be used to determine the sources of the impacts. Each impact can be broken down into direct, indirect, and induced economic impacts. "Direct" economic impacts are the results of the money initially spent in the study area (e.g., country, region, state, or community) by the fishery or industry being studied. This includes money spent to pay for labor, supplies, raw materials, and operating expenses. The direct economic impacts from the initial spending create additional activity in the local economy, i.e., "indirect" economic impacts. Indirect economic impacts are the results of business-to-business transactions indirectly caused by the direct impacts. For example, businesses initially benefiting from the direct impacts will subsequently increase spending at other local businesses. The indirect economic impact is a measure of this increase in business-to-business activity, excluding the initial round of spending which is included in the estimate of direct impacts. "Induced" economic impacts are the results of increased personal income caused by the direct and indirect economic impacts. For example, businesses experiencing increased revenue from the direct and indirect impacts will subsequently increase spending on labor by hiring more employees, increasing work hours, raising salaries/wage rates, etc. In turn, households will increase spending at local businesses. The induced impact is a measure of this increase in household-to-business activity.

Estimates of the U.S. average annual business activity associated with the commercial harvest of gag in the Gulf were derived using the model[28] developed for and applied in NMFS (2022) and are provided in Table 3.3.1.28. Specifically, these impact estimates reflect the expected impacts from average annual gross revenues generated by landings of Gulf red grouper from 2016 through 2020. This business activity is characterized as jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), value-added impacts (the difference between the value of goods and the cost of materials or supplies), and output impacts (gross business sales). Income impacts should not be added to output (sales) impacts because this would result in double counting.

The results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species; specifically reef fish in this case. Separate models for individual species such as gag are not available. Between 2016 and 2020, landings of Gulf gag resulted in approximately $3.45 million (2021 dollars) in gross

[28] A detailed description of the input/output model is provided in NMFS (2011). "A Users Guide to the National and Coastal State I/O Model." www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.pdf

revenue on average. In turn, this revenue generated employment, income, value-added, and output impacts of 413 jobs, $12.6 million, $17.8 million, and $34.3 million per year, respectively, on average.

Table 3.3.1.28. Average annual economic impacts of gag in the commercial sector of the Gulf reef fish fishery. All monetary estimates are in thousands of 2021 dollars and employment is measured in full-time equivalent jobs.

Harvesters	**Direct**	**Indirect**	**Induced**	**Total**
Employment impacts	69	11	14	94
Income impacts	1,719	319	772	2,810
Total value-added impacts	1,833	1,149	1,321	4,302
Output Impacts	3,184	2,591	2,564	8,338
Primary dealers/processors				
Employment impacts	14	6	10	30
Income impacts	561	517	489	1,567
Total value-added impacts	598	660	921	2,178
Output impacts	1,805	1,360	1,799	4,965
Secondary wholesalers/distributors				
Employment impacts	7	1	6	15
Income impacts	334	99	351	785
Total value-added impacts	356	167	600	1,123
Output impacts	895	326	1,167	2,389
Grocers				
Employment impacts	29	3	6	38
Income impacts	687	228	345	1,261
Total value-added impacts	733	368	584	1,685
Output impacts	1,175	598	1,147	2,919
Restaurants				
Employment impacts	178	12	29	219
Income impacts	2,757	836	1,579	5,173
Total value-added impacts	2,939	1,495	2,661	7,095
Output impacts	5,375	2,339	5,251	12,965
Harvesters and seafood industry				
Employment impacts	297	33	66	397
Income impacts	6,059	2,000	3,537	11,596
Total value-added impacts	6,459	3,838	6,087	16,384
Output impacts	12,434	7,214	11,929	31,577

Harvesters	**Direct**	**Indirect**	**Induced**	**Total**
Employment impacts	72	11	15	98

Harvesters	Direct	Indirect	Induced	Total
Income impacts		1,865	346	837	3,049
Total value-added impacts		1,988	1,247	1,433	4,667
Output Impacts		3,454	2,810	2,781	9,046
Primary dealers/processors					
Employment impacts		15	6	10	31
Income impacts		609	561	530	1,700
Total value-added impacts		649	716	999	2,363
Output impacts		1,959	1,475	1,952	5,386
Secondary wholesalers/distributors					
Employment impacts		7	2	7	15
Income impacts		363	108	381	852
Total value-added impacts		386	181	651	1,219
Output impacts		971	354	1,267	2,592
Grocers					
Employment impacts		30	3	7	40
Income impacts		746	248	374	1,368
Total value-added impacts		795	399	634	1,828
Output impacts		1,274	648	1,244	3,167
Restaurants					
Employment impacts		186	12	30	229
Income impacts		2,991	907	1,713	5,612
Total value-added impacts		3,189	1,622	2,887	7,697
Output impacts		5,831	2,538	5,697	14,065
Harvesters and seafood industry					
Employment impacts		310	34	69	413
Income impacts		6,573	2,170	3,837	12,580
Total value-added impacts		7,007	4,164	6,603	17,774
Output impacts		13,489	7,826	12,941	34,255

3.3.2 Recreational Sector

The Gulf recreational sector is comprised of the private and for-hire modes. The private mode includes anglers fishing from shore (all land-based structures) and private/rental boats. The for-hire mode is composed of charter boats and headboats (also called party boats). Charter boats generally carry fewer passengers and charge a fee on an entire vessel basis, whereas headboats carry more passengers and payment is per person. The type of service, from a vessel- or passenger-size perspective, affects the flexibility to search different fishing locations during the

course of a trip and target different species since larger concentrations of fish are required to satisfy larger groups of anglers.

Landings

Private vessels accounted for the majority of gag landings on average (2016 through 2020), followed by charter vessels, then headboats, and with some recorded landings from shore (Table 3.3.2.1). Although not shown in the table, approximately 99.4% of gag landings on average were recorded in the state of Florida. As a result, landings in some states may be confidential and landings by state and mode outside of Florida are confidential in most instances. Therefore, landings by state or by state and mode are not presented.

Table 3.3.2.1. Recreational landings (lb gw) and percent distribution of gag across all states by mode for 2016-2020.

	Landings (pounds ww)					**Percent Distribution**			
	Charter vessel	**Headboat**	**Private**	**Shore**	**Total**	**Charter vessel**	**Headboat**	**Private**	**Shore**
2016	201,718	23,913	1,819,957	0	2,045,588	10%	1%	89%	0%
2017	219,347	25,412	2,212,170	0	2,456,929	9%	1%	90%	0%
2018	192,528	28,437	2,357,820	33,638	2,612,424	7%	1%	90%	1%
2019	246,777	22,537	1,963,173	18,332	2,250,819	11%	1%	87%	1%
2020	330,120	24,951	2,676,395	13,275	3,044,741	11%	1%	88%	0%
AVG	**238,098**	**25,050**	**2,205,903**	**13,049**	**2,482,100**	**10%**	**1%**	**89%**	**1%**

Angler Effort

Recreational effort derived from the MRIP database can be characterized in terms of the number of angler trips as follows:
• Target effort - The number of individual angler trips, regardless of duration, where the intercepted angler indicated that the species or a species in the species group was targeted as either the first or the second primary target for the trip. The species did not have to be caught.
• Catch effort - The number of individual angler trips, regardless of duration and target intent, where the individual species or a species in the species group was caught. The fish did not have to be kept.
• Total recreational trips - The total estimated number of recreational trips in the Gulf, regardless of target intent or catch success.
Other measures of effort are possible, such as directed trips (the number of individual angler trips that either targeted or caught a particular species). All of the estimated target trips and almost all of the estimated catch trips for Gulf red grouper occurred in Florida from 2017 through 2021

(Table 3.3.2.2 and Table 3.3.2.3). The majority of estimated target and catch effort came from the private angling mode, followed by charter vessels. A small number of gag target and catch trips were recorded for the shore mode. The trends in total target effort were more variable from 2017-2021 than landings. Target effort increased by 68% in 2019, but declined by 27% in 2020 relative to 2017. However, target effort in the shore mode increased dramatically in 2019 and declined in 2020 and 2021. Catch effort also decreased in total and by mode from 2017 through 2021, but increased in the charter mode in 2018-2020. Thus, the reduction in catch effort (22%) was relatively less than the reduction in target effort from 2017 through 2021, though catch effort in the charter mode rose by 62%. Estimates of gag target or catch effort for additional years, and other measures of directed effort, are available on the NOAA website.[29]

[29] https://www.st.nmfs.noaa.gov/recreational-fisheries/data-and-documentation/queries/index

Table 3.3.2.2. Number of gag recreational target trips, by mode and state, 2017-2021.*

Mode	Year	Florida	Alabama	Louisiana	Total
Shore	2017	147,837	0	0	147,837
	2018	172,821	0	0	172,821
	2019	665,579	0	0	665,579
	2020	349,279	0	0	349,279
	2021	137,519	0	0	137,519
	Average	294,607	0	0	294,607
Charter	2017	23,806	0	62	23,868
	2018	20,580	0	0	20,580
	2019	24,818	0	0	24,818
	2020	29,190	0	0	29,190
	2021	48,186	0	0	48,186
	Average	29,316	0	12	29,328
Private/Rental	2017	576,300	0	201	576,501
	2018	611,440	0	0	611,440
	2019	659,232	0	0	659,232
	2020	603,857	2,491	0	606,348
	2021	578,616	2,183	0	580,799
	Average	605,889	935	40	606,864
All	2017	747,943	0	263	748,206
	2018	804,841	0	0	804,841
	2019	1,349,629	0	0	1,349,629
	2020	982,326	2,491	0	984,817
	2021	764,321	2,183	0	766,504
	Average	929,812	935	53	930,799

Sources: MRIP Survey Data available at https://www.fisheries.noaa.gov/recreational-fishing-data/recreationalfishing-data-downloads. Effort estimates for Texas are from the Texas Parks and Wildlife Department's Marine Sport-Harvest Monitoring Program and assumed equivalent to MRIP-FES estimates. Target effort estimates for most reef fish species in Texas are unavailable. Louisiana recreational effort estimates came from the Louisiana Department of Wildlife and Fisheries Recreational Creel Survey.
*No target effort occurred in Texas or Mississippi.

Table 3.3.2.3. Number of gag recreational catch trips, by mode and state, 2017-2021.*

Mode	Year	Florida	Alabama/Mississippi	Louisiana	Texas	Total
Shore	2017	207,541	0	0	0	207,541
	2018	192,167	0	0	0	192,167
	2019	376,527	0	0	0	376,527
	2020	341,205	0	0	0	341,205
	2021	271,620	0	0	0	271,620
	Average	277,812	0	0	0	277,812
Charter	2017	74,695	945	61	0	75,701
	2018	76,276	433	84	0	76,793
	2019	76,918	1,498	776	0	79,192
	2020	153,209	670	40	82	154,001
	2021	121,909	347	163	0	122,419
	Average	100,601	779	225	16	101,621
Private/Rental	2017	1,131,723	6,051	318	86	1,138,178
	2018	978,690	1,802	1,020	182	981,694
	2019	746,334	5,523	1,410	76	753,343
	2020	1,015,776	3,984	590	0	1,020,350
	2021	718,557	0	2,981	23	721,561
	Average	918,216	3,472	1,264	73	923,025
All	2017	1,413,959	6,996	379	86	1,421,420
	2018	1,247,133	2,235	1,104	182	1,250,654
	2019	1,199,779	7,021	2,186	76	1,209,062
	2020	1,510,190	4,654	630	82	1,515,556
	2021	1,112,086	347	3,144	23	1,115,600
	Average	1,296,629	4,251	1,489	90	1,302,458

Sources: MRIP Survey Data available at https://www.fisheries.noaa.gov/recreational-fishing-data/recreationalfishing-data-downloads. Effort estimates for Texas are from the Texas Parks and Wildlife Department's Marine Sport-Harvest Monitoring Program and assumed equivalent to MRIP-FES estimates. Target effort estimates for most reef fish species in Texas are unavailable. Louisiana recreational effort estimates came from the Louisiana Department of Wildlife and Fisheries Recreational Creel Survey.

As shown in tables 3.3.2.4 and 3.3.2.5, across all modes, target and catch effort was the highest in wave 3 (May-June) and wave 6 (Nov-Dec). Target effort is the lowest in wave 1 (Jan-Feb) and wave 5 (Sept-Oct) while catch effort is the lowest in wave 1 (Jan-Feb) across all modes. For

the private mode, target effort was highest in wave 6 and lowest in wave 1. For the charter mode, target effort was highest in wave 3 and lowest in wave 1.

Table 3.3.2.4. Number of gag target trips by wave and mode, 2017 – 2021.*

	1 (Jan-Feb)	2 (Mar-Apr)	3 (May-Jun)	4 (Jul-Aug)	5 (Sep-Oct)	6 (Nov-Dec)	Total
	Shore						
2017	2,080	0	62,306	23,197	10,505	49,749	147,837
2018	0	8,434	23,153	55,429	4,027	81,777	172,820
2019	0	15,543	270,766	68,574	123,507	187,189	665,579
2020	23,477	8,254	17,130	118,217	114,371	67,830	349,279
2021	10,562	0	58,293	11,318	48,295	9,052	137,520
Average	7,224	6,446	86,330	55,347	60,141	79,119	294,607
	Charter						
2017	0	0	6,437	1,017	1,338	15,075	23,867
2018	0	186	11,776	90	480	8,047	20,579
2019	0	423	5,956	3,462	3,496	11,481	24,818
2020	0	217	18,376	4,281	3,213	3,104	29,191
2021	660	951	10,570	14,586	7,784	13,635	48,186
Average	132	355	10,623	4,687	3,262	10,268	29,328
	Private/Rental						
2017	31,044	34,829	104,600	53,528	69,255	283,245	576,501
2018	2,479	27,577	116,860	182,120	108,835	173,567	611,438
2019	14,242	1,158	204,431	163,052	86,504	189,845	659,232
2020	0	37,953	130,089	111,866	96,393	230,048	606,349
2021	11,546	12,199	85,538	135,785	59,714	276,017	580,799
Average	11,862	22,743	128,304	129,270	84,140	230,544	606,864
	All						
2017	33,124	34,829	173,343	77,742	81,098	348,069	748,205
2018	2,479	36,197	151,789	237,639	113,342	263,391	804,837
2019	14,242	17,124	481,153	235,088	213,507	388,515	1,349,629
2020	23,477	46,424	165,595	234,364	213,977	300,982	984,819
2021	22,768	13,150	154,401	161,689	115,793	298,704	766,505
Average	19,218	29,545	225,256	189,304	147,543	319,932	930,799

Sources: MRIP Survey Data available at https://www.fisheries.noaa.gov/recreational-fishing-data/recreationalfishing-data-downloads. Effort estimates for Texas are from the Texas Parks and Wildlife Department's Marine Sport-Harvest Monitoring Program and assumed equivalent to MRIP-FES estimates. Target effort estimates for most reef fish species in Texas are unavailable. Louisiana recreational effort estimates came from the Louisiana Department of Wildlife and Fisheries Recreational Creel Survey.

* Texas and headboat information unavailable.

Table 3.3.2.5. Number of gag catch trips by wave and mode, 2017 – 2021.

	1 (Jan-Feb)	2 (Mar-Apr)	3 (May-Jun)	4 (Jul-Aug)	5 (Sep-Oct)	6 (Nov-Dec)	Total
	Shore						
2017	58,763	28,848	21,972	29,963	15,246	52,749	207,541
2018	5,237	101,349	59,987	3,596	-	21,998	192,167
2019	27,879	4,202	21,383	129,013	102,216	91,835	376,528
2020	22,199	3,793	18,574	27,141	242,776	26,722	341,205
2021	23,356	181,055	35,331	13,207	14,951	3,720	271,620
Average	27,487	63,849	31,449	40,584	75,038	39,405	277,812
	Charter						
2017	11,539	8,099	17,387	5,240	8,904	24,533	75,702
2018	15,741	4,641	30,000	10,346	2,584	13,482	76,794
2019	7,830	2,564	25,516	14,297	7,281	21,704	79,192
2020	28,924	3,366	53,136	45,577	9,492	13,505	154,000
2021	7,403	19,617	40,826	19,310	17,901	17,361	122,418
Average	14,287	7,657	33,373	18,954	9,232	18,117	101,621
	Private/Rental						
2017	102,082	104,272	322,571	144,839	129,625	334,790	1,138,179
2018	84,656	150,466	322,509	215,708	109,792	98,563	981,694
2019	27,235	35,730	252,973	171,185	86,813	179,406	753,342
2020	111,037	96,258	187,558	136,675	263,073	225,748	1,020,349
2021	111,332	65,169	182,116	126,882	41,046	195,016	721,561
Average	87,268	90,379	253,545	159,058	126,070	206,705	923,025
	All						
2017	172,384	141,219	361,930	180,042	153,775	412,072	1,421,422
2018	105,634	256,456	412,496	229,650	112,376	134,043	1,250,655
2019	62,944	42,496	299,872	314,495	196,310	292,945	1,209,062
2020	162,160	103,417	259,268	209,393	515,341	265,975	1,515,554
2021	142,091	265,841	258,273	159,399	73,898	216,097	1,115,599
Average	129,043	161,886	318,368	218,596	210,340	264,226	1,302,458

Sources: MRIP Survey Data available at https://www.fisheries.noaa.gov/recreational-fishing-data/recreationalfishing-data-downloads. Effort estimates for Texas are from the Texas Parks and Wildlife Department's Marine Sport-Harvest Monitoring Program and assumed equivalent to MRIP-FES estimates. Target effort estimates for most reef fish species in Texas are unavailable. Louisiana recreational effort estimates came from the Louisiana Department of Wildlife and Fisheries Recreational Creel Survey.

Permits

There are no specific federal permitting requirements for recreational anglers to fish for or harvest reef fish, including gag. Instead, private anglers are required to either possess a state recreational fishing permit that authorizes saltwater fishing in general, or be registered in the federal National Saltwater Angler Registry system, subject to appropriate exemptions. As a

result, it is not possible to identify with available data how many individual anglers would be expected to be affected by the actions in this amendment.

A federal charter/headboat (for-hire) vessel permit is required for fishing from a for-hire vessel in federal waters for Gulf reef fish. Gulf reef fish for-hire permits are limited access permits. From a historical perspective, the number of permits that were valid in a given year has continually decreased over the past several years, as illustrated in Table 3.3.2.6. However, the rate of attrition with for-hire reef fish permits has been relatively slow and far less compared to commercial reef fish permits.

As of July 8, 2021, there were 1,286 valid or renewable for-hire reef fish permits, 1,179 of which were valid. A renewable permit is an expired limited access permit that cannot be actively fished, but is renewable for up to one year after expiration. Although the for-hire permit application collects information on the primary method of operation,[30] the permit itself does not identify the permitted vessel as either a headboat or a charter vessel and vessels may operate in both capacities. However, if a vessel meets the selection criteria used by the SRHS and is selected to report by the Science Research Director of the SEFSC, it is determined to operate primarily as a headboat and is required to submit harvest and effort information to the SRHS.

Information on Gulf charter vessel and headboat operating characteristics is included in Savolainen et al. (2012) and is incorporated herein by reference. The average charter vessel operation took 46 full-day (9 hours) and 55 half-day (5 hours) trips per year, carried 4.8 and 4.6 passengers per trip type, respectively, targeted reef fish species on 64% of all trips, and took 68% of all trips in the EEZ. The average headboat operation took 83 full-day (10 hours) and 37 half-day (6 hours) trips per year, carried 13.1 and 14.6 passengers per trip type, respectively, targeted reef fish species on 84% of all trips, and took 81% of all trips in the EEZ.

[30] In 2020, of the 1,289 vessels with valid for-hire permits, 87 were primarily used for commercial fishing, 79 were primarily used as headboats, and 1,122 were primarily used as charter vessels.

Table 3.3.2.6. Number of valid or renewable for-hire Gulf reef fish permits, 2009-2020.

Year	Number of Permits
2009	1417
2010	1385
2011	1353
2012	1336
2013	1323
2014	1310
2015	1294
2016	1282
2017	1280
2018	1279
2019	1277
2020	1289

The number of federally permitted Gulf headboats in the SRHS has been slightly variable from 2016-2020. In 2016, there were 69 federally permitted Gulf headboats in the SRHS. In 2017, the number of federally permitted Gulf headboats increased to 73, but subsequently declined to 69 in 2020. Souza and Liese (2019) estimate that approximately 10% of all permitted Southeast (Gulf and South Atlantic) for-hire vessels determined to be headboats were not actively fishing in 2017.[31] Further, of those that were active, 14% were not active in offshore waters. Thus, approximately 23% of the permitted Southeast headboats were likely not active in the EEZ. With respect to permitted Gulf charter vessels, they estimate that 24% were not active in 2017, while 10% of those that were active were not active in offshore waters. Thus, approximately 34% of the permitted Gulf charter vessels were likely not active in the EEZ in 2017. Similar analysis of recreational effort is not possible for the headboat mode in the Gulf because headboat data are not collected at the angler level. Estimates of effort by the headboat mode are provided in terms of angler days, or the number of standardized 12-hour fishing days that account for the different half-, three-quarter-, and full-day fishing trips by headboats. The stationary "fishing for demersal (bottom-dwelling) species" nature of headboat fishing, as opposed to trolling, suggests that most, if not all, headboat trips and, hence, angler days, are demersal or snapper grouper trips by intent.

Headboat angler days declined overall across the Gulf States from 2018 through 2020, but increased by about 9% in 2021, relative to 2018 (Table 3.3.2.7). Texas, however, saw little decline in headboat angler days from 2018-2020, and had significant increase in 2021. On

[31] Sample sizes were too small to generate reliable estimates for Gulf and South Atlantic headboats separately.

average (2018 through 2021), Florida accounted for the majority of headboat angler days reported, followed by Texas and Alabama; whereas, Mississippi and Louisiana combined, accounted for only a small percentage (Table 3.3.2.8). Headboat effort in terms of angler days for the entire Gulf was concentrated most heavily during the summer months of June through August on average (2018 through 2021; Table 3.3.2.8).

Table 3.3.2.7. Gulf headboat angler days and percent distribution by state (2017 through 2021).

	Angler Days				**Percent Distribution**			
	FL	**AL**	**MS-LA***	**TX**	**FL**	**AL**	**MS-LA***	**TX**
2017	178,814	17,839	3,186	51,570	71.1%	7.1%	1.3%	20.5%
2018	171,996	19,851	3,235	52,160	69.6%	8.0%	1.3%	21.1%
2019	161,564	18,607	2,632	52,456	68.7%	7.9%	1.1%	22.3%
2020	126,794	13,091	1,728	51,498	65.7%	6.8%	0.9%	26.7%
2021	181,632	13,844	3,197	71,344	67.3%	5.1%	1.2%	26.4%
Average	160,497	16,348	2,698	56,865	67.8%	7.0%	1.1%	24.1%

Source: NMFS Southeast Regional Headboat Survey (SRHS) (February, 2022).
*headboat data from Mississippi and Louisiana are combined for confidentiality purposes.

Table 3.3.2.8. Gulf headboat angler days and percent distribution by month (2018 – 2021).

	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
	Headboat Angler Days											
2017	8,998	14,007	21,032	19,383	19,186	47,673	54,028	22,984	10,289	11,054	11,299	11,488
2018	5,524	13,694	20,762	17,584	16,876	54,251	53,304	24,819	13,235	10,633	8,183	8,377
2019	2,330	12,819	21,796	16,299	18,271	46,046	47,594	24,212	11,369	13,687	10,389	10,447
2020	8,147	10,906	11,426	385	11,130	43,930	42,021	20,647	12,190	14,497	8,710	9,122
2021	6,871	8,584	21,301	17,746	22,019	51,773	55,201	24,978	15,768	20,446	12,117	13,213
Avg	5,718	11,501	18,821	13,004	17,074	49,000	49,530	23,664	13,141	14,816	9,850	10,290
	Percent Distribution											
2017	3.6%	5.6%	8.4%	7.7%	7.6%	19.0%	21.5%	9.1%	4.1%	4.4%	4.5%	4.6%
2018	2.2%	5.5%	8.4%	7.1%	6.8%	21.9%	21.6%	10.0%	5.4%	4.3%	3.3%	3.4%
2019	1.0%	5.4%	9.3%	6.9%	7.8%	19.6%	20.2%	10.3%	4.8%	5.8%	4.4%	4.4%
2020	4.2%	5.6%	5.9%	0.2%	5.8%	22.7%	21.8%	10.7%	6.3%	7.5%	4.5%	4.7%
2021	2.5%	3.2%	7.9%	6.6%	8.2%	19.2%	20.4%	9.3%	5.8%	7.6%	4.5%	4.9%
Avg	2.4%	4.9%	8.0%	5.5%	7.2%	20.7%	21.0%	10.0%	5.6%	6.3%	4.2%	4.4%

Source: NMFS SRHS (Feb, 2022)

Economic Value

Participation, effort, and harvest are indicators of the value of saltwater recreational fishing. However, a more specific indicator of value is the satisfaction that anglers experience over and above their costs of fishing. The economic value of this satisfaction is referred to as consumer surplus (CS). The value or benefit derived from the recreational experience is dependent on several quality determinants, which include fish size, catch success rate, and the number of fish kept (bag limit). These variables help determine the value of a fishing trip and influence total demand for recreational fishing trips. The two most recent publications with estimates of angler willingness-to-pay for gag bag limits used data from a survey of Gulf of Mexico anglers in 2013. Table 2 in Carter, Lovell, and Liese (2020) shows that anglers fishing from a private boat were willing to pay $92.80 (2021$) on average to keep 2 gag instead of zero (closed season). Similarly, Table 3 in Carter, Liese, and Lovell (2022) reports that anglers fishing from a charter boat were willing to pay $72.90 (2021$) on average to keep 2 gag instead of zero. There is no estimate available for anglers fishing from the shore mode. In general, the estimate for private boat anglers can be used for aggregate analyses over all anglers (D. Carter Personal Comm. 2022).

Estimates of average annual gross revenue for charter vessels in 2009 are provided in Savolainen et al. (2012). According to Savolainen et al. (2012), the average annual gross revenue for a Gulf headboat is $286,500, while the average annual gross revenue for a Gulf charter vessel is $94,552 (2021 dollars). More recent estimates of average annual gross revenue for Gulf headboats are provided in Abbott and Willard (2017) and D. Carter (SEFSC, pers. comm., 2018). Abbott and Willard (2017) suggest that Savolainen et al.'s (2012) estimate of average annual gross revenue for headboats may be an underestimate as data in the former suggest that average gross revenue in 2009 for the vessels in their sample was about $505,972 (2021 dollars). Further, their data suggest average annual gross revenue per vessel had increased to about $611,383 (2021$) by 2014. However, Abbott and Willard's estimates are based on a sample of 17 headboats that chose to participate in the Headboat Collaborative Program in 2014, while Savolainen et al.'s (2012) are based on a random sample of 20 headboats. The headboats that participated in the Collaborative may be economic highliners, in which case Abbott and Willard's (2017) estimates would overestimate average annual gross revenue for Gulf headboats. D. Carter (SEFSC, pers. comm., 2018) recently estimated that average annual gross revenue for Gulf headboats was approximately $450,737 (2021$) in 2017, while the maximum gross revenue for a single headboat was about $1.45 million. This estimate is likely the best current estimate of annual gross revenue for Gulf headboats as it is based on a relatively large sample of 63 boats, or more than 90% of the active fleet, and is more recent.

However, gross revenues overstate the annual economic value and profits generated by for-hire vessels. Economic value for for-hire vessels can be measured by annual producer surplus (PS). In general, PS is the amount of money a vessel owner earns in excess of variable (trip) costs. Economic profit is the amount of money a vessel owner earns in excess of variable and fixed costs, inclusive of all implicit costs, such as the value of a vessel owner's time as captain and as entrepreneur, and the cost of using physical capital (i.e., depreciation of the vessel and gear). In 2021$, Savolainen et al. (2012) estimated the annual PS for Gulf headboats and charter vessels

was approximately $200,456 and $62,181, respectively.[32] Their best estimates of economic profit were $83,632 and $27,948 (2021$), respectively. Estimates of PS and economic profit for headboats is not available from Abbott and Willard (2017) or D. Carter (SEFSC, pers. comm., 2018) as they did not collect comprehensive cost data at the vessel level.[33]

With regard to for-hire trips, economic value can be measured by PS per angler trip, which represents the amount of money that a vessel owner earns in excess of the cost of providing the trip. Estimates of revenue, costs, and trip net revenue trips taken by headboats and charter vessels in 2017 are available from Souza and Liese (2019). They also provide estimates of trip net cash flow per angler trip, which are approximates of PS per angler trip. As shown in Table 3.3.2.9, after accounting for transactions fees, supply costs, and labor costs, net revenue per trip was 42% of revenue for Gulf charter vessels and 54% of revenue for Southeast headboats, or $824and $1,912 (2021$), respectively. Given the respective average number of anglers per trip for each fleet, PS per trip is estimated to be $150 for charter vessels and $68 for headboats.

Table 3.3.2.9. Trip economics for offshore trips by Gulf charter vessels and Southeast headboats in 2017 (2021$).

	Gulf Charter Vessels	**Southeast Headboats**
Revenue	100%	100%
Transaction Fees (% of revenue)	3%	6%
Supply Costs (% of revenue)	27%	19%
Labor Costs (% of revenue)	27%	22%
Net Revenue per trip including Labor costs (% of revenue)	42%	54%
Net Revenue per Trip	$824	$1,912
Average # of Anglers per Trip	5.5	28.2
Trip Net Cash Flow per Angler Trip	$150	$68

Source: Souza and Liese (2019)

Economic Impacts

The desire for recreational fishing generates economic activity as consumers spend their income on various goods and services needed for recreational fishing. This spurs economic activity in

[32] Although Savolainen, et al. (2012) account for all explicit variable and fixed costs, they do not account for implicit costs, and thus they over-estimate actual economic profits for these vessels.
[33] Abbott and Willard (2017) do report revenue net of fuel costs, but this ignores important costs such as processing fees, commissions, ice, bait, tackle, and labor.

the region where recreational fishing occurs. It should be clearly noted that, in the absence of the opportunity to fish, the income would presumably be spent on other goods and services and these expenditures would similarly generate economic activity in the region where the expenditure occurs. As such, the analysis below represents a distributional analysis only.

Estimates of the business activity (economic impacts) associated with recreational angling for Gulf gag were calculated using average trip-level impact coefficients derived from the 2019 Fisheries Economics of the U.S. report (NMFS 2022)[34] and underlying data provided by the National Oceanic and Atmospheric Administration (NOAA) Office of Science and Technology. Economic impact estimates in 2018 dollars were adjusted to 2021 dollars using the annual, not seasonally adjusted gross domestic product (GDP) implicit price deflator provided by the U.S. Bureau of Economic Analysis.

Business activity for the recreational sector is characterized in the form of jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), value-added impacts (the difference between the value of goods and the cost of materials or supplies), and output impacts (gross business sales). Estimates of the average gag target effort by mode and state (2017 through 2021) and the associated business activity are provided in Table 3.3.2.10.

[34] A detailed description of the input/output model is provided in Lovell, S. S. Steinback, and J. Hilger (2013).

Table 3.3.2.10. Estimated economic impacts from average annual Gulf gag recreational target trips by state and mode (2017-2021), using state-level multipliers. All monetary estimates are in thousands of 2021$ and employment is in full-time equivalent jobs.*

	FL	AL	LA
Charter Mode			
Target Trips	$29,316	$0	$12
Value Added Impacts	$10,257	$0	$6
Sales Impacts	$17,224	$0	$11
Income Impacts	$5,994	$0	$3
Employment (Jobs)	$158	$0	$0
Private/Rental Mode			
Target Trips	$605,889	$0	$40
Value Added Impacts	$21,843	$0	$6
Sales Impacts	$33,855	$0	$10
Income Impacts	$11,462	$0	$3
Employment (Jobs)	$310	$0	$0
Shore			
Target Trips	$294,607	$935	$0
Value Added Impacts	$10,792	$66	$0
Sales Impacts	$16,866	$114	$0
Income Impacts	$5,685	$34	$0
Employment (Jobs)	$155	$1	$0
All Modes			
Target Trips	$929,812	$935	$52
Value Added Impacts	$42,892	$66	$12
Sales Impacts	$67,944	$114	$21
Income Impacts	$23,140	$34	$7
Employment (Jobs)	$623	$1	$0

Source: MRIP Survey Data available at https://www.fisheries.noaa.gov/recreational-fishing-data/recreational-fishing-data-downloads

* Headboat information is unavailable. Louisiana effort estimates are not currently available. However, landings were negligible and thus target effort is likely zero. No target effort occurred in Mississippi or Texas.

The estimates provided in Table 3.3.2.10 use state-level multipliers and thus only apply at the state-level. For example, estimates of business activity in Florida represent business activity in Florida only and not to other states (for e.g., a good purchased in Florida may have been

manufactured in a neighboring state) or the nation as a whole. The same holds true for each of the other states. Income impacts should not be added to output (sales) impacts because this would result in double counting. The results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species.

Addition of the state-level estimates to produce a regional (or national) total may underestimate the actual amount of total business activity because state-level impact multipliers do not account for interstate and interregional trading. National-level multipliers must be used to account for interstate and interregional trading. Between 2017 and 2021, and using national-level multipliers, gag target effort generated employment, income, value-added, and output (sales) impacts of 193 jobs, $9.2 million, $16.3 million, and $28.8 million per year, respectively, on average.

Estimates of the economic impacts resulting from headboat target effort for reef fish are not available. Headboat vessels are not covered in MRIP so, in addition to the absence of estimates of target effort, estimates of the appropriate business activity coefficients for headboat effort have not been generated.

3.4 Description of the Social Environment

This interim action primarily affects commercial and recreational management of gag in the Gulf and therefore the following section focuses on gag. However, commercial red grouper is impacted to a lesser extent because of IFQ multi-use rules and the social description of the Red Grouper Framework (NMFS 2022) is incorporated by reference herein. The following description includes a permits related to the commercial and recreational reef fish fishing by state in order to provide a geographic distribution of fishing involvement. Top communities based on the number of permits are presented. Commercial and recreational landings by state are included to provide information on the geographic distribution of fishing involvement. Descriptions of GG-IFQ accounts with shares, GG-IFQ accounts with allocation but without shares, and GG-IFQ dealers are included at the state and community level. The top communities in the Gulf by commercial landings are identified, commercial engagement and reliance are described, and the local quotient for these communities are included. Descriptions of the top communities based on recreational engagement are also included. Community level data are presented in order to meet the requirements of National Standard 8 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), which requires the consideration of the importance of fishery resources to human communities when changes to fishing regulations are considered. Lastly, social vulnerability data are presented to assess the potential for environmental justice concerns.

Additional detailed information about communities in the following analysis can be found on the SERO Community Snapshots website.[35]

3.4.1 Gag Commercial Sector

Permits

Gulf reef fish permits are issued to individuals in Florida (81.4% of Gulf reef fish vessels), Texas (7.8%), Alabama (4.5%), Louisiana (3.8%), and Mississippi (0.9%) (SERO permit office, July 8, 2021). Residents of other states (Arkansas, Georgia, Illinois, Maryland, Missouri, North Carolina, New York, Oklahoma, and South Carolina) also hold commercial reef fish permits, but these states represent a smaller percentage of the total number of issued permits.

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

[35] https://www.fisheries.noaa.gov/southeast/socioeconomics/snapshots-human-communities-and-fisheries-gulf-mexico-and-south-atlantic

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

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

Source: SERO permit office, July 8, 2021

Landings

Nearly all the commercial gag catch is landed along the west coast of Florida (average of 99.1% from 2016-2020), followed by Louisiana (0.5%), Texas (0.2%), and Alabama and Mississippi (0.2%, NMFS SERO IFQ database accessed 7/7/21).

IFQ Accounts

To land IFQ-managed species, such as gag, fishermen need a permitted vessel and sufficient IFQ allocation in the vessel's account to land the fish. Some accounts are held in the name of an individual, or more than one individual, while others form business entities and open accounts in the name of the business. This makes it more difficult to talk about the social environment, because we don't always know who is behind the account, and whether the holders of an account reside in the same area. In the following analysis, accounts are described at the state and community level based on the mailing address of the individual; business; or primary entity which equates to the primary individual listed on the account, if the account is held by more than one individual.

Also called shareholder accounts, an IFQ account is required to hold shares and allocation. The number of accounts is used here as a proxy to represent the number of participants.

Shareholders

As of July 8, 2021, a total of 506 IFQ accounts held shares of GG-IFQ (IFQ database; includes active and suspended accounts). The majority of accounts with GG-IFQ shares have a mailing address in Florida (81.4% of accounts with GG-IFQ shares, Table 3.4.1.2), followed by Texas (6.1%), Alabama (4.5%), and Louisiana (3.8%). Accounts with mailing addresses in Mississippi and in other states (Arkansas, Georgia, Michigan, North Carolina, New York, South Carolina, Tennessee, Utah, and Wyoming) also hold GG-IFQ shares, but these states represent a smaller percentage of the total number of accounts with shares.

The greatest proportion of GG-IFQ shares are held in accounts with mailing addresses in Florida, followed by Texas (Table 3.4.1.2). Accounts in Alabama, Louisiana, Mississippi, and other states also hold GG-IFQ shares, but these states represent a smaller percentage of shares.

Table 3.4.1.2. Number of IFQ accounts with gag shares by state, including the percentage of shares by state by share category.

State	Accounts	GG Shares (%)
AL	23	1.632
FL	412	88.602
LA	19	1.047
MS	5	0.181
TX	31	4.380
Other	16	3.817
Total	**506**	**99.659**

Source: NMFS SERO IFQ database accessed 7/8/21.
Note: Includes active and suspended accounts.

Accounts with GG-IFQ shares are held by people with mailing addresses in a total of 180 communities (IFQ database accessed 7/8/21). Communities with the most accounts with GG-IFQ shares are located in Florida and Texas (Table 3.4.1.3). The community with the most accounts with GG-IFQ shares is Panama City, Florida (8.3% of accounts with shares), followed by Key West, Florida (4.7%), Largo, Florida (3.4%), and St. Petersburg, Florida (3%).

Table 3.4.1.3. Top communities by number of IFQ accounts with gag shares, including the percentage of shares by community by share category.

State	Community	Accounts	GG Shares (%)
FL	Panama City	42	18.343
FL	Key West	24	0.372
FL	Largo	17	5.778
FL	St. Petersburg	15	2.597
FL	Destin	14	1.084
FL	Cortez	13	1.714
FL	Pensacola	12	0.577
FL	Steinhatchee	10	2.796
FL	Tampa	10	1.004
FL	Clearwater	9	4.353
FL	Seminole	9	1.761
FL	Tarpon Springs	9	2.644
FL	Apalachicola	8	6.347
FL	Tallahassee	8	1.227
TX	Galveston	8	0.795

Source: NMFS SERO IFQ database accessed 7/8/21.

The largest or maximum percent of GG-IFQ shares held in a community is 18.343% in Panama City, Florida (IFQ database accessed 7/8/21). The percentage of shares by community varies widely and a large number of accounts with shares may not necessarily correlate to a large percentage of shares in a particular category (Table 3.4.1.3). Some communities with a relatively smaller number of accounts may have a larger percentage of shares in a particular share category or categories.

Allocation Holders without Shares

In 2020, a total of 224 IFQ accounts held GG-IFQ allocation without GG-IFQ shares (IFQ database accessed 2/25/22). However, these accounts may be related to accounts with gag shares. The majority of accounts with GG-IFQ allocation, but without GG-IFQ shares have mailing addresses in Florida (81.7% of accounts with gag allocation, but without gag shares, Table 3.4.1.4), followed by Texas (7.1%), Louisiana (4.9%), and Alabama and Mississippi (3.6%). Account holders with gag allocation, but without gag shares also have mailing addresses in other states (Georgia, Illinois, North Carolina, New York, Ohio, and South Carolina), but these states represent a smaller percentage of the total number of accounts with gag allocation, but without gag shares.

Table 3.4.1.4. Number of IFQ accounts with gag allocation, but without gag shares by state, 2020.

State	Accounts
AL/MS	8
FL	183
LA	11
TX	16
Other	6
Total	**224**

Source: NMFS SERO IFQ database accessed 2/25/22.

IFQ accounts with GG-IFQ allocation, but without GG-IFQ shares have mailing addresses in a total of 96 communities (IFQ database accessed 2/25/22). Communities with the most accounts with allocation, but without shares are located in Florida and Texas (Table 3.4.1.5). The community with the most accounts with allocation, but without shares is Panama City, Florida (7.6% of accounts with allocation, but without shares, Table 3.4.1.5), followed by St. Petersburg, Florida (6.7%), and Galveston, Texas (4.9%).

Table 3.4.1.5. Top communities by number of IFQ accounts with gag allocation, but without gag shares, 2020.

State	Community	Accounts
FL	Panama City	17
FL	St. Petersburg	15
TX	Galveston	11
FL	Largo	10
FL	Madeira Beach	7
FL	Seminole	6
FL	Clearwater	5
FL	Pensacola	5

Source: NMFS SERO IFQ database accessed 2/25/22

Dealers

The majority of GG-IFQ dealer facilities are located in Florida (average of 86.9% of Gulf gag IFQ dealer facilities for 2016-2020, Table 3.4.1.6), followed by Louisiana (5.1%), Alabama and Mississippi (5%), and Texas (3%).

Table 3.4.1.6. Number of Gulf gag IFQ dealer facilities by state for 2016-2020.

Year	AL/MS	FL	LA	TX
2016	6	98	5	5
2017	7	100	5	3
2018	5	103	8	3
2019	6	94	6	3
2020	4	96	5	3

Source: NMFS SERO IFQ database accessed 7/7/21

Gulf GG-IFQ dealer facilities are located in a total 81 communities (IFQ database accessed 7/7/21, includes Gulf GG-IFQ dealers with gag landings 2016-2020). Communities with the most Gulf GG-IFQ dealer facilities are located in Florida and Louisiana (Table 3.4.1.7). The community with the most Gulf GG-IFQ dealer facilities is Panama City, Florida (7.1% of Gulf GG-IFQ dealer facilities, Table 3.4.1.7), followed by Madeira Beach, Florida (5.7%), and Key West, Florida (4.7%).

Table 3.4.1.7. Top communities by number of Gulf gag IFQ dealer facilities with gag landings during 2016-2020.

State	Community	*Dealer Facilities
FL	Panama City	15
FL	Madeira Beach	12
FL	Key West	10
FL	Steinhatchee	8
FL	Bokeelia	7
FL	Destin	7
FL	St. Petersburg	7
FL	Panacea	6
FL	Crystal River	5
FL	St. James City	5
LA	Golden Meadow	5

Source: NMFS SERO IFQ database accessed 7/7/21.
*Multiple dealers can use the same facility and a dealer can operate at multiple facilities.

Regional Quotient

Regional Quotient (RQ) is the proportion of IFQ gag landed within a community out of the total amount of IFQ gag landed within the Southeast region. It is an indicator of the percent contribution in pounds or value of IFQ gag landed within that community relative to the regional fishery. The RQ is reported individually only for the top 10 communities by total landings for

the years of 2016 through 2020. All other communities that landed IFQ gag are grouped as "Other Communities." Figure 3.4.1.1 shows the RQ in percentage of pounds from 2016 to 2020. The dominant communities for IFQ gag pounds landed included the communities of Madeira Beach, Florida; Apalachicola, Florida; and Panama City, Florida (Figure 3.4.1.1).

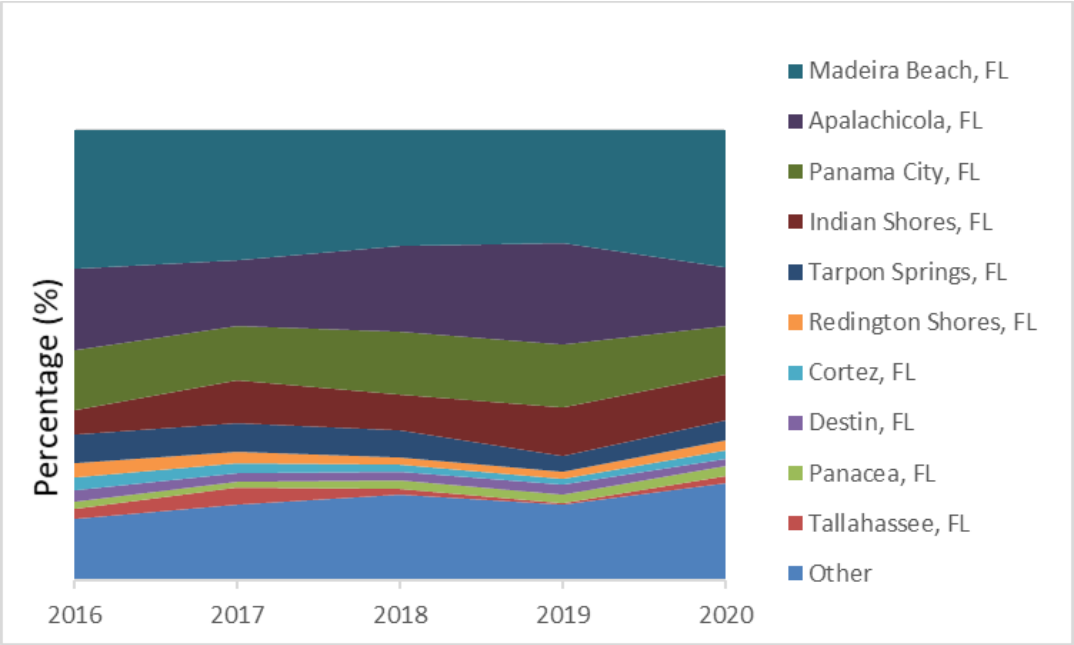

Figure 3.4.1.1. Regional Quotient (pounds) for top communities by landings in the Gulf of Mexico GG-IFQ Program from 2016 through 2020.
Source: IFQ database accessed 7/7/21.

Local Quotient

The community Local Quotient (LQ) is the proportion of Gulf gag landings out of the total landings for all species for the community and that year, and is a relative measure. It is an indicator of the contribution in pounds or value of IFQ gag to the overall landings in a community. The LQ is reported individually only for communities with the greatest commercial landings of gag as depicted in Figure 3.4.1.1. Indian Shores, Florida is not included because data are not available. Figure 3.4.1.2 shows the LQ in both pounds and value for 2020. The community of Redington Shores, Florida ranks first for LQ pounds and includes the greatest proportion of gag landings out of the total landings for that community. Tallahassee, Florida ranks second for LQ pounds, but first for LQ value of gag.

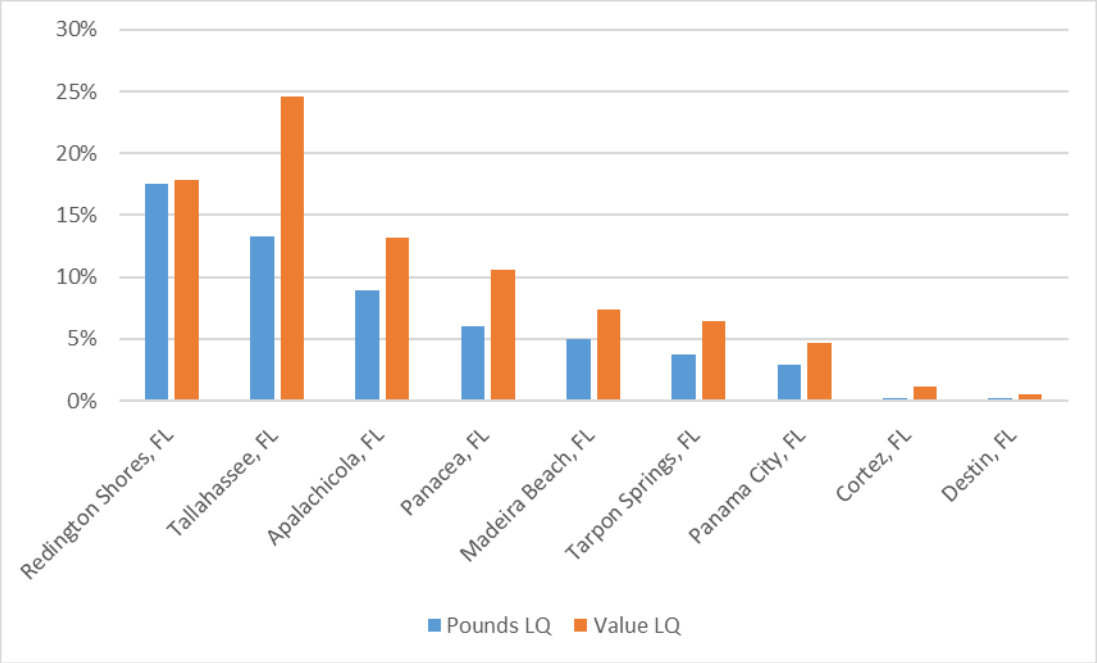

Figure 3.4.1.2. Local Quotient for top communities by landings in the Gulf of Mexico GG-IFQ Program.
Source: SERO, Community ALS 2020.

Engagement and Reliance

The gag specific commercial fishing engagement and reliance index scores are presented in Figure 3.4.1.3. The index is an indicator of the importance of IFQ gag fishing in a community relative to other communities and includes the top communities by gag landings as depicted in Figure 3.4.1.1. It is a measure of the presence of IFQ gag fishing activity including pounds and value of gag, number of reef fish permits, and number of reef fish dealers within the community. Most communities in Figure 3.4.1.3 would be considered to be highly or moderately engaged, as one is at or above 1 standard deviation of the mean factor score and most are at or above ½ standard deviation. Indian Shores, Redington Shores, and Panacea, Florida show the least amount of engagement; however, Panacea shows the highest reliance of all the included communities. Tallahassee, Florida is not included in Figure 3.4.1.3 because these data are not available for this community.

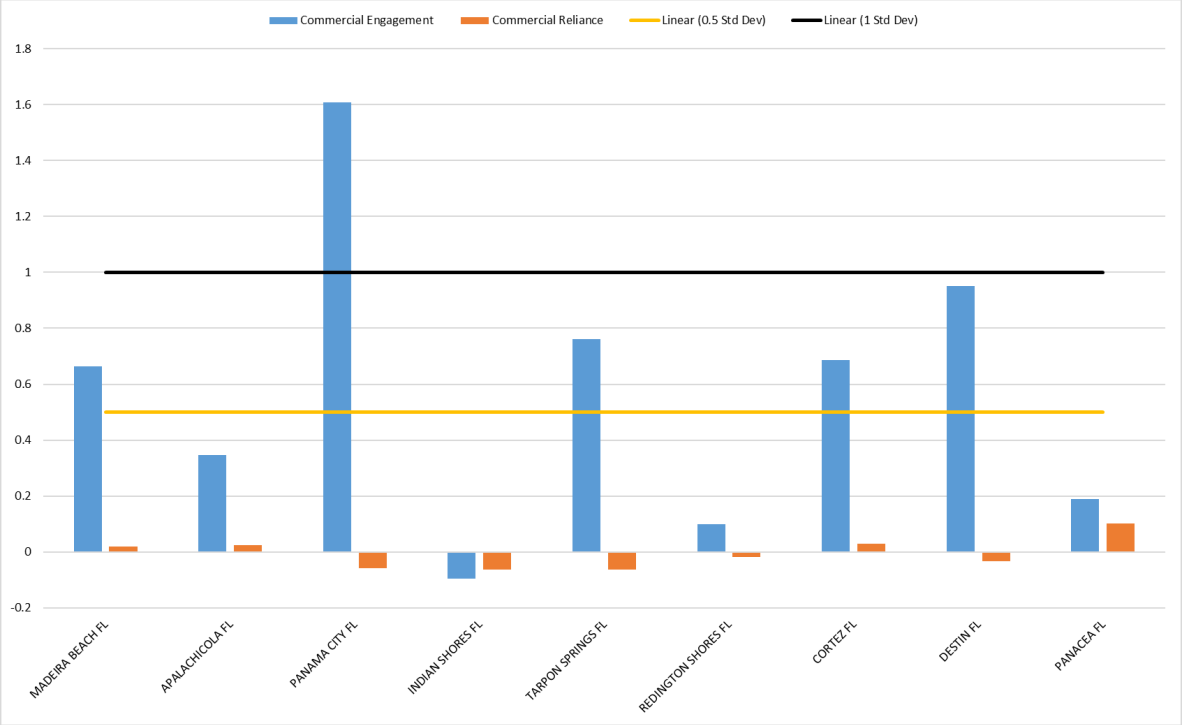

Figure 3.4.1.3. Commercial fishing engagement and reliance for top gag communities.
Source: PIMS, SERO Community ALS, and Community Social Vulnerability Indicators Database 2020.

3.4.2 Gag Recreational Sector

Permits

Charter/headboat for reef fish permits are issued to individuals in Florida (60% of charter/headboat for reef fish vessels), Texas (15.7%), Alabama (10.6%), Louisiana (7.4%), and Mississippi (2.6%, SERO permit office, July 8, 2021). Residents of other states (Arkansas, Arizona, California, Colorado, Georgia, Illinois, Michigan, Missouri, Montana, North Carolina, New Jersey, New York, Ohio, Oklahoma, Tennessee, Virginia, and Wisconsin) also hold charter/headboat permits, but these states represent a smaller percentage of the total number of issued permits.

Charter/headboat for reef fish permits are held by individuals with mailing addresses in 355 communities (SERO permit office, July 8, 2021). Communities with the most charter/headboat for reef fish permits are located in Florida, Alabama, and Texas (Table 3.4.2.1). The communities with the most charter/headboat permits are Panama City, Florida (4.6% of charter/headboat permits), Destin, Florida (4.4%), and Orange Beach, Alabama (4.1%).

Table 3.4.2.1. Top communities by number of Gulf charter/headboat for reef fish permits.

State	Community	Charter/Headboat for Reef Fish Permits (RCG)
FL	Panama City	65
FL	Destin	62
AL	Orange Beach	57
FL	Naples	45
FL	Key West	43
FL	Pensacola	30
FL	Sarasota	27
FL	St. Petersburg	23
TX	Galveston	21
FL	Panama City Beach	19
TX	Corpus Christi	19
FL	Cape Coral	18
FL	Clearwater	18
FL	Fort Myers	18
FL	Crystal River	16
FL	Tampa	16
FL	Gulf Breeze	14

Source: SERO permit office, July 8, 2021

Landings

Nearly all recreational gag landings are from the waters adjacent to the west coast of Florida (average of 99.4%% from 2017-2021), followed by Alabama (0.4%), Louisiana (0.2%), Texas (less than 0.1%, SEFSC MRIP-FES Recreational ACL Dataset and LA Creel).

Engagement and Reliance

Landings for the recreational sector are not available by species at the community level, making it difficult to identify communities as dependent on recreational fishing for gag. Because limited data are available concerning how communities are engaged and reliant on specific species in the recreational sector, indices were created using secondary data from permit and infrastructure information for the southeast recreational fishing sector at the community level (Jepson and Colburn 2013, Jacob et al. 2013). Recreational fishing engagement is represented by the number of recreational permits and vessels designated as "recreational" by homeport and owners address. Fishing reliance includes the same variables as fishing engagement, divided by population. Factor scores of both engagement and reliance were plotted by community.

Figure 3.4.2.1 identifies the Gulf communities located in Florida that are the top communities by engagement upon recreational fishing in general. Two thresholds of one and one-half standard deviation above the mean were plotted to help determine a threshold for significance. Communities are presented in ranked order by fishing engagement and all included communities demonstrate high levels of recreational engagement, although this is not specific to fishing for gag. Because the analysis used discrete geo-political boundaries, Panama City and Panama City Beach had separate values for the associated variables. Calculated independently, each still ranked high enough to appear in the top list, suggesting a greater importance for recreational fishing in that area. The communities of Tavernier and Islamorada, Florida demonstrate the highest reliance on recreational fishing. The communities of Marathon, Crystal River, Destin, Crystal River, and Port Saint Joe, Florida demonstrate a moderate to high reliance.

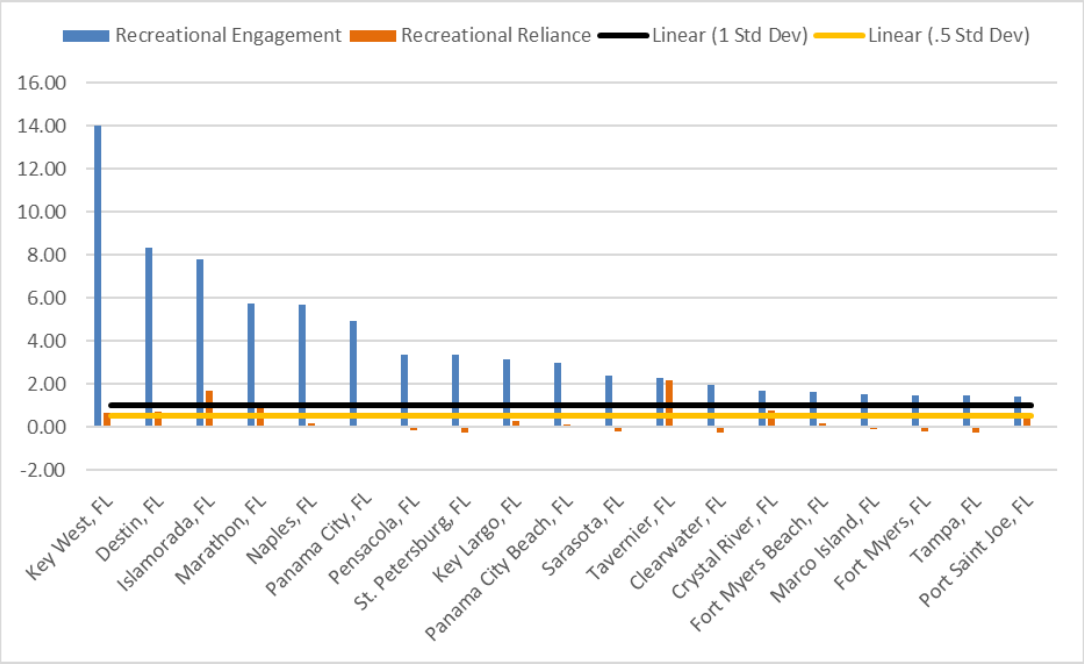

Figure 3.4.2.1. Recreational fishing engagement and reliance for top Florida communities.
Source: SERO, Community Social Vulnerability Indicators Database 2019

The description of fishing activities presented here highlights which communities may be most involved in Gulf gag fishing. It is expected that the impacts from the regulatory action in this interim rule, whether positive or negative, will most likely affect those communities identified above.

3.4.3 Environmental Justice, Equity, and Underserved Communities

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

E.O. 12898 requires federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The main focus of E.O. 12898 is to consider "the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories…" This E.O. is generally referred to as environmental justice (EJ).

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

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

E.O. 14008 calls on agencies to make achieving EJ part of their missions "by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts." Census data are available to examine the status of communities with regard to minorities and low-income populations. These data describe geographically based communities (e.g., Panama City, Florida) and are descriptive of the total population, not limited to the fishing components of the community. Information is not available at this time to examine the status of underserved populations engaged in Gulf fisheries. To help assess whether EJ concerns may be present within regional place-based communities, a suite of indices were created using census data to examine the social vulnerability of coastal communities within the region. The three indices are

poverty, population composition, and personal disruption. The variables included in each of these indices have been identified through the literature as being important components that contribute to a community's vulnerability. Poverty includes poverty rates for different groups; population composition includes more single female-headed households, households with children under the age of five, minority populations, and those that speak English less than well; and personal disruption includes disruptions such as higher separation rates, higher crime rates, and unemployment. Increased rates in the indicators are signs of populations experiencing vulnerabilities. Again, for those communities that exceed the threshold it would be expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

Figures 3.4.3.1 and 3.4.3.2 provide social vulnerability rankings for place-based communities identified in Section 3.4 as important to commercial and recreational fishing for gag specifically or fishing for reef fish in general. Several communities exceed the threshold of one standard deviation above the mean for at least one of the indices (Bokeelia, Florida; Crystal River, Florida; Panacea, Florida; and Golden Meadow, Louisiana). These communities would be the most likely to exhibit vulnerabilities to social or economic disruption resulting from regulatory change.

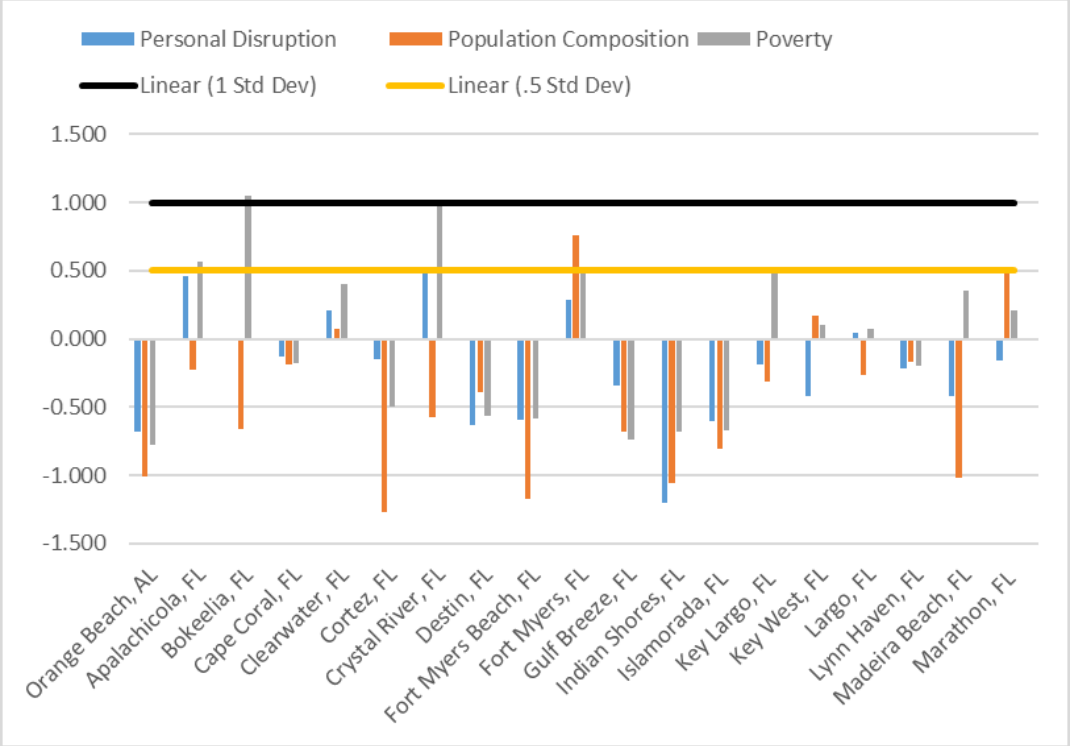

Figure 3.4.3.1. Social vulnerability indices for top commercial and recreational reef fish and gag communities.
Source: SERO, Community Social Vulnerability Indicators Database 2019

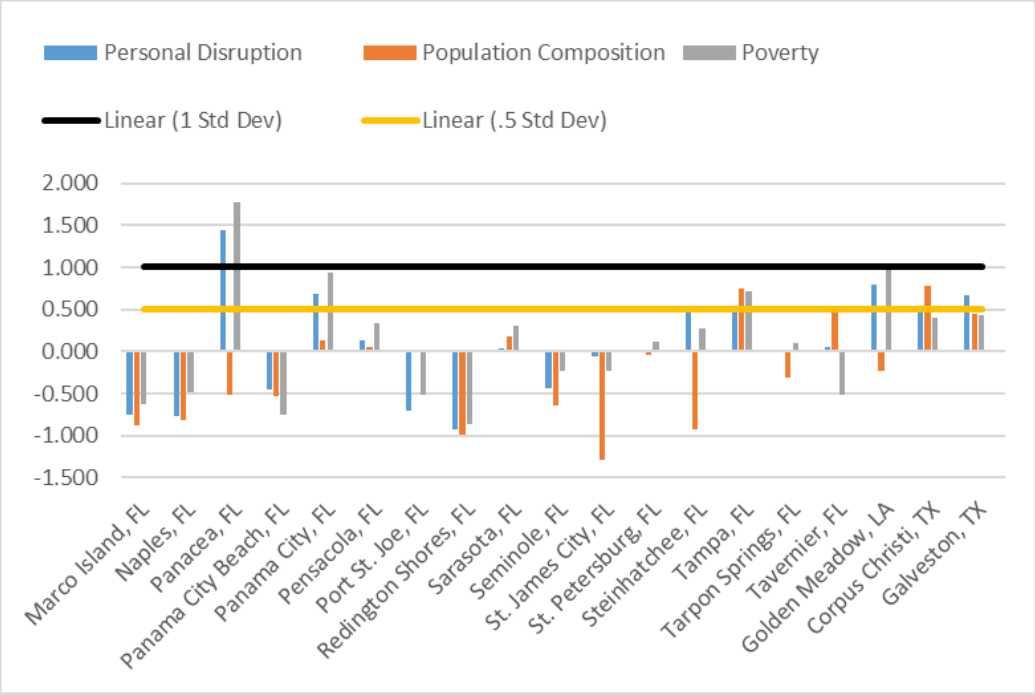

Figure 3.4.3.2. Social vulnerability indices for top commercial and recreational reef fish and gag communities continued.
Source: SERO, Community Social Vulnerability Indicators Database 2019

People in these communities may be affected by fishing regulations in two ways: participation and employment. Although the place-based communities identified in Figures 3.4.3.1 and 3.4.3.2 may have the greatest potential for EJ concerns, complete data are not available on the race and income status for those involved in the local fishing industry (employment), or for their dependence on gag specifically (participation). The potential effects of the actions on place based communities and non-place based communities, such as such as commercial fishermen and recreational stakeholders are discussed in Sections 4.1.4 and 4.2.4. There are no known populations that rely on the consumption of gag for subsistence. Although no EJ issues have been identified, the absence of potential EJ concerns cannot be assumed.

3.5 Description of the Administrative Environment

3.5.1 Federal Fishery Management

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

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

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

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

3.5.2 State Fishery Management

The purpose of state representation at the Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters. The state governments of Texas, Louisiana, Mississippi, Alabama, and Florida have the authority to manage their respective state fisheries. Each of the five states exercises legislative and regulatory authority over their states' natural resources through discrete administrative units. Although each agency is the primary administrative body with respect to the states' natural resources, all states cooperate with numerous state and federal regulatory agencies when managing marine resources. A more detailed description of each state's primary regulatory agency for marine resources is provided on their respective web pages (Table 3.6.1.1).

Table 3.5.2.1. State marine resource agencies and web pages.

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

CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

4.1 Action 1 – Modification of Gulf of Mexico (Gulf) Gag Catch Limits and Sector Allocations

4.1.1 Direct and Indirect Effects on the Physical Environment

Modifying the gag catch limits is not expected to significantly impact the physical environment, despite decreasing fishing effort and catch for gag. Effects on the physical environment from fishing are associated with gear coming into contact with the bottom. Hook-and-line gear has the potential to snag and entangle bottom structures and cause tear-offs or abrasions (Barnette 2001). If gear is lost or improperly disposed of, it can entangle marine life. Entangled gear often becomes fouled with algal growth. If fouled gear becomes entangled on corals, the algae may eventually overgrow and kill the coral. Improper spear deployment near habitat can damage it if hit. Furthermore, physical impacts to the environment could occur when gear such as weights, hooks, and anchors hit and damage the substrate and surrounding habitat.

Different gear types have different levels of impact. Commercial fishermen use vertical line gear (rod and reel, bandit gear), and also capture gag using bottom longline gear. Both of these gear types can interact with and affect the bottom habitat, and longline gear interacts with bottom habitat over the length of the deployed gear. Recreational fishermen most frequently use rod-and-reel gear and, to a lesser degree, spear fishing gear, both of which can interact with and affect bottom habitat. Anchor damage is also associated with vertical line fishing vessels, particularly by the recreational sector where anglers may repeatedly visit well-marked fishing locations. Preferred fishing sites, including reefs, are targeted and revisited multiple times (Bohnsack 2000). Effects from fishing on the physical environment are generally tied to fishing effort. The greater the fishing effort, the more gear interacts with the bottom.

Alternative 1 in Action 1 proposes catch limits that would not reduce overfishing, resulting in continued negative impacts to the gag stock. **Preferred Alternative 2**, **Alternative 3**, and **Alternative 4** include a substantial reduction in allowable catch, and would provide benefits to the stock when compared to **Alternative 1**. Although there are differences in allowable catch among **Preferred Alterative 2**, **Alternative 3**, and **Alternative 4**, the differences in biological effects on gag between these alternatives are expected to be negligible.

Modifications to Gulf gag catch limits are not expected to result in significant effects to the physical environment. Despite the large reduction in catch limits proposed in **Alternatives 2, 3,** and **4**, no significant change in overall fishing effort under the Reef Fish FMP is expected. Fishing for reef fish species in the Gulf is historically a multi-species endeavor for both commercial and recreational fishermen, and especially so for the latter. Therefore, changes in effort targeting gag are not expected to change the overall universe of fishing effort for reef fish species in the Gulf. Further, the changes in the catch limits proposed in the action would be effective for a maximum of one year. Therefore, **Preferred Alternative 2**, and **Alternatives 3** and **4** in Action 1 are each expected to have a negligible impact on the physical environment.

4.1.2 Direct and Indirect Effects on the Biological/Ecological Environment

Management actions that affect the biological environment mostly relate to the impacts of fishing on a species' population size, life history, and the role of the species within its habitat. Removal of fish from the population through fishing can reduce the overall population size if harvest is not maintained at sustainable levels. Indirect impacts of these alternatives on the biological environment would depend on the resulting reduction in the level of fishing as a result of each alternative. Reductions in gag catch limits are likely to result in positive biological effects on the gag stock, since they would support a level of harvest (and fishing mortality) that would allow the stock size to rebuild.

Alternative 1 in Action 1 proposes catch limits that would not reduce overfishing, resulting in continued negative impacts to the stock that are contrary to the intent of these interim measures. **Preferred Alternative 2**, **Alternative 3**, and **Alternative 4** include a substantial reduction in allowable catch, and would provide benefits to the stock when compared to **Alternative 1**. Although there are differences in allowable catch among these alternatives, the differences in biological effects on gag when comparing them are expected to be negligible among each of the action alternatives.

Overall, this action is expected to have positive effects on the gag stock and the biological environment, because it will reduce fishing mortality to a level that will promote rebuilding. However, because the overall prosecution of the Reef Fish fishery is not expected to change and these changes would be in effect for only one year, no significant impacts are expected. For these same reasons, no significant impacts to non-target species, including species protected under the Endangered Species Act are anticipated as a result of this action.

4.1.3 Effects on the Economic Environment

Alternative 1 (No Action) would maintain the current acceptable biological catch (ABC) and the recreational and commercial annual catch limits (ACL) and annual catch targets (ACT) for gag. Therefore, **Alternative 1** would not be expected to change fishing practices or recreational and commercial gag harvests and would not be expected to result in economic effects.

Preferred Alternative 2 and **Alternatives 3-4** would maintain the current ABC and would decrease the ACLs, ACTs, and quotas for gag. **Preferred Alternative 2** would maintain the current allocation of the gag ACL between the recreational and commercial sectors (61% to the recreational sector and 39% to the commercial sector). **Alternatives 3** and **4** would increase the percentage allotted to the recreational sector to 79.5% (reducing the commercial allocation to 20.5%) and 82% (reducing the commercial allocation to 18%), respectively.

For the commercial sector, because gag are currently managed under an individual fishing quota (IFQ) program, short term economic effects expected to result from changes to the commercial gag quota can be measured by changes in the value of annual IFQ allocation. Between 2017 and 2021, annual allocation transfer prices per pound (lb) gutted weight (gw) averaged $1.03 ($2021) (Table 3.3.1.15). Because IFQ share values represent the net present value of the expected profit from harvesting one unit of quota in the long-run, longer-term economic effects expected to

result from quota changes can be evaluated based on changes in the value of IFQ shares. Between 2017 and 2021, IFQ share transfer prices averaged $11.08 per lb gw ($2021) (Table 3.3.1.11). For each alternative, commercial gag quotas, and estimated changes in quota, annual allocation value, and IFQ share value relative to **Alternative 1** are provided in Table 4.1.3.1.

Table 4.1.3.1. Commercial Gag quotas, changes in quota and in annual allocation, and IFQ share values by alternative in $2021.

	Quota (lb gw)	Differences in Quota relative to Alternative 1		
		Pounds (gw)	Annual Allocation Value	IFQ Share Value
Alternative 1	939,000			
Preferred Alternative 2	199,000	-740,000	-$762,200	-$8,199,200
Alternative 3	96,000	-843,000	-$868,290	-$9,340,440
Alternative 4	84,000	-855,000	-$880,650	-$9,473,400

Preferred Alternative 2 and **Alternatives 3-4** would decrease the commercial gag quota by 740,000 lb gw, 843,000 lb gw, and 855,000 lb gw, respectively. Associated losses in annual allocation value are estimated to range from $0.76 million (**Preferred Alternative 2**) to $0.88 million (**Alternative 4**). Long term economic effects, as measured by changes in lost IFQ share value, are estimated to range from $8.20 million (**Preferred Alternative 2**) to $9.47 million (**Alternative 4**). Gag IFQ shares and annual allocation prices are also expected to increase due to the reduced supply of shares and annual allocation that would result from the decreases in ACL proposed in this action.

In addition to decreases in IFQ share and annual allocation values, **Preferred Alternative 2** and **Alternatives 3-4** would modify the percentages of multi-use shares distributed to IFQ shareholders. Relative to **Alternative 1**, which would annually issue 9.9% of the red grouper annual allocation as red grouper multi-use, **Preferred Alternative 2** and **Alternatives 3-4** would decrease the proportion of red grouper annual allocation issued as red grouper multi-use available to harvest red grouper or gag (Table 2.1.1). Proportions of red grouper shares issued as red grouper multi-use would range from 0.8% (**Alternative 4**) to 2.1% (**Preferred Alternative 2**). These decreases are expected to lessen the catch-quota flexibility of IFQ shareholders. Relative to **Alternative 1**, which would annually issue 16% of the gag annual allocation as gag multi-use, **Preferred Alternative 2** and **Alternatives 3-4** would all increase the proportion of gag annual allocation issued as gag multi-use available to harvest gag or red grouper (Table 2.1.1). Proportions of gag shares issued as gag multi-use would range from 75% (**Preferred Alternative 2**) to 100% (**Alternatives 3-4**). These increases are expected to improve IFQ shareholders' flexibility in balancing their catch relative to their quota ownership.

Expected reductions in commercial gag landings, which would result from decreases in commercial gag quota considered in **Preferred Alternative 2** and **Alternatives 3-4,** would lead

to decreased gag availability in the markets. This diminished availability of commercially-caught gag to consumers, which would be associated with an increase in market prices, is expected to result in consumer surplus (CS) losses relative to **Alternative 1** (No Action). Expected landings reductions are estimated by subtracting 2017-2021 average commercial gag landings from the commercial quotas considered in **Preferred Alternative 2** and **Alternatives 3-4**. Average commercial gag landings between 2017 and 2021 are estimated at 492,401 lb gw (NMFS, 2022). Expected price increases were derived based on a price flexibility estimate provided by Keithly and Tabarestani (2018) and an average ex-vessel price for gag. Keithly and Tabarestani (2018) estimated an own price flexibility of -0.396 for groupers, including gag. Between 2017 and 2021, ex-vessel prices for gag averaged $6.10 per lb gw ($2021) (Table 3.3.1.19). Estimated changes in commercial gag landings, in average ex-vessel prices and associated changes in CS are provided in Table 4.1.3.2.

Table 4.1.3.2. Changes in commercial gag landings and in average ex-vessel prices and consumer surplus in $2021.

	Changes in Landings (gw)	Average Price Change	Consumer Surplus (CS) Change
Preferred Alternative 2	-293,401	$1.44	-$497,585
Alternative 3	-396,401	$1.94	-$572,116
Alternative 4	-408,401	$2.00	-$577,414

Relative to **Alternative 1**, changes in CS ($2021) expected to result from the decreased availability of gag to consumers are estimated to range from -$497,585 (**Preferred Alternative 2**) to -$577,414 (**Alternative 4**). The expected change in CS is estimated at -$572,116 for **Alternative 3**.

Estimated average price changes expected to result from decreases in commercial gag landings and a 2017-2021 average ex-vessel price of $6.10 per lb gw ($2021) (Table 3.3.1.19) are used to estimate expected changes in commercial revenues. As discussed in Section 3.3.1., changes in producer surplus (PS) were estimated at 50% of the revenues. Changes in commercial gag landings, revenue, and associated changes in PS are provided in Table 4.1.3.3.

Table 4.1.3.3. Expected Changes in commercial gag landings, revenue, and producer surplus.

	Changes in Landings (gw)	Revenue Change ($2021)	Producer Surplus Change ($2021)
Preferred Alternative 2	-293,401	-$1,503,312	-$751,656
Alternative 3	-396,401	-$2,231,358	-$1,115,679
Alternative 4	-408,401	-$2,322,948	-$1,161,474

Relative to **Alternative 1**, changes in commercial revenues and in producer surplus expected to result from **Preferred Alternative 2** are estimated at -$1.50 million and -$0.75 million, respectively. Changes in commercial revenues expected to result from **Alternatives 3** and **4** are estimated at -$2.23 million and -$2.32 million, respectively.

The sizeable decreases in the commercial gag landings expected from **Preferred Alternative 2** and **Alternatives 3-4** would be expected to result in the reduction of gag available for purchase by dealers. Commercial gag landings would approximately decrease by at least 60% (**Preferred Alternative 2**) and at most by 83% (**Alternative 4**). However, gag purchases represent a relatively small proportion of total dealer purchases. Between 2016 and 2020, gag purchases accounted for 3.74% of total dealer purchases. Therefore, adverse economic effects to dealers due to the reduced availability of gag for purchase are expected to be limited.

For the recreational sector, the economic effects expected to result from the **Preferred Alternative 2** and **Alternatives 3-4** were measured in changes in economic value, i.e., changes in consumer surplus (CS) for anglers and changes in producer surplus (PS) to for-hire operators. Changes in CS provided in this section are evaluated based on differences between ACLs considered in **Preferred Alternative 2** and **Alternatives 3-4** and 2017-2021 average recreational gag landings. Changes in PS are evaluated based on expected changes in the number of for-hire trips targeting gag.

CS per additional fish kept during a trip is defined as the amount of money an angler would be willing to pay for a fish in excess of the cost to harvest the fish. Changes in CS expected to result from ACL decreases considered in **Preferred Alternative 2** and **Alternatives 3-4** were based on an estimated CS per gag and on the expected decreases in recreational gag landings relative to the status quo alternative (**Alternative 1**). Expected decreases in recreational gag landings were determined by subtracting 2017-2021 average recreational gag landings from recreational ACLs proposed in in **Preferred Alternative 2** and **Alternatives 3-4.** As provided in Table 1.1., recreational gag landings averaged 2,538,280 lb gw between 2017 and 2021. Based on information provided in Section 3.3.2, a CS of $92.80 ($2021) per two gag is used. Expected changes in recreational gag landings were converted into numbers of fish based on a 2017-2021 average weight of 8.88 lb whole weight (ww) per gag (M. Larkin, pers. comm., 2022). For **Preferred Alternative 2** and **Alternatives 3-4**, expected changes in recreational gag

landings expressed in lb gw and in number of fish, and associated expected changes in economic value are provided in Table 4.1.3.4.

Table 4.1.3.4. Gag recreational ACLs, changes in recreational landings, number of fish, and in economic value (CS) ($2021).

	ACL (gw)	Changes relative to Alternative 1		
		Pounds (gw)	Number of fish	Economic Value ($2021)
Alternative 1	2,538,280			
Preferred Alternative 2	403,759	-2,134,521	-240,374	-$11,153,353
Alternative 3	486,204	-2,052,076	-231,090	-$10,722,559
Alternative 4	496,235	-2,042,045	-229,960	-$10,670,145

Preferred Alternative 2 is expected to decrease the recreational gag landings by 2.13 million lb gw or 240,374 fish. In terms of economic value to the recreational sector, **Preferred Alternative 2** is expected to result in a loss of $11.15 million.

PS per angler trip is defined as the amount of money that a vessel owner earns in excess of the cost of providing the trip. As indicated in Section 3.3.2, PS per angler trip is estimated at $149 ($2021). Expected changes in charter trips targeting gag were derived from projected closure dates for **Preferred Alternative 2** and **Alternatives 3** and **4** provided in Table 2.1.2. and from the average distribution of gag target trips by wave and mode between 2017 and 2021 provided in Table 3.3.2.4. For each alternative, starting and anticipated closure dates for the recreational gag fishing season, estimated number of gag target trips, and estimated changes in number of trips and in economic value (PS) relative to **Alternative 1** are provided in Table 4.1.3.5. It is noted that due to the uncertainty in the estimated season lengths, the projected closure dates could change when NMFS reviews the most recent data in 2023.

Table 4.1.3.5. Recreational fishing seasons start and closure dates, estimated number of trips, and changes in trips and in economic value ($2021) to the for-hire sector.

Alternatives	Recreational Fishing season		Number of Trips	Change relative to Alternative 1	
	Start Date	Closure date		Trips	Economic Value
Alternative 1	June 1	None	29,328		
Preferred Alternative 2	June 1	June 16	2,786	-26,542	-$3,954,704
Alternative 3	June 1	June 19	3,309	-26,019	-$3,876,860
Alternative 4	June 1	June 19	3,309	-26,019	-$3,876,860

Relative to **Alternative 1**, **Preferred Alternative 2** is expected to reduce the number of for-hire trips by 26,542 trips and result in a change in economic value estimated at -$3.95 million ($2021). **Alternatives 3** and **4** are expected to each reduce the number of trips by 26,019 and result in a change in economic value estimated at -$3.88 million ($2021).

Net benefits expected to result from **Action 1** were computed by combining changes in CS to consumers purchasing commercially-harvested gag, changes in PS to the commercial fishermen, changes in CS to recreational anglers, and changes in PS to for-hire operators. Changes in recreational and commercial economic values and total changes in net benefits are provided in Table 4.1.3.6.

Table 4.1.3.6. Changes in commercial and recreational economic values, and changes in net benefits ($2021).

Alternative	Commercial Economic Value		Recreational Economic Value		Net Benefits
	CS Change	PS Change	CS Change	PS Change	
Preferred Alternative 2	-$497,585	-$751,656	-$11,153,353	-$3,954,704	-$16,357,298
Alternative 3	-$572,116	-$1,115,679	-$10,722,559	-$3,876,860	-$16,287,215
Alternative 4	-$577,414	-$1,161,474	-$10,670,145	-$3,876,860	-$16,285,893

As expected, due to the sizeable decreases in commercial and recreational gag ACLs considered in this action, all alternatives would result in reductions in net benefits. **Preferred Alternative 2** is expected to result in a reduction in net benefits estimated at $16.36 million.

4.1.4 Effects on the Social Environment

The intent of this action is to reduce overfishing of gag in 2023, based on the results of the recent stock assessment and updated MRIP-FES estimate. This action would reduce gag catch limits and consider changes in gag allocations between sectors. In general, lower catch limits would be associated with negative effects to fishermen and communities in the short term as they allow less fish to be landed. While the negative effects are usually short-term, they may at times induce other indirect effects through changes in fishing behavior or business operations that could have long-term social effects, such as increased pressure on another species. However, restrictions on harvest contribute to sustainable management goals, and effects of this action are expected to be positive in the long term. A sector allocation is a policy designation of the rights to access that also carries socio-cultural significance and consequences.

Alternative 1 (No Action) would retain current catch limits and allocations and would allow for the continued overfishing of the stock, which could result in long term negative social effects. However, this is contrary to the intent of these interim measures.

Under **Preferred Alternative 2** through **Alternative 4**, the ACL for gag would be updated based current information and in order to reduce overfishing in 2023. Related to the catch limit reduction, the SEFSC has determined the MRIP-FES data used in the stock assessment represent the best scientific information available for recreational landings and should replace MRIP-CHTS data. **Preferred Alternative 2** maintains the current ACL allocation for gag of 61% recreational and 39% commercial and reflects historical engagement with the gag stock by the recreational sector compared to the commercial sector; but is based on recreational landings using MRIP-CHTS, the method used in recent management years. However, because MRIP-FES replaced MRIP-CHTS for monitoring recreational landings and the estimate for MRIP-FES is up to three times greater than the recreational effort and catch when compared to MRIP-CHTS, the recreational catch is expected to be harvested more quickly. Therefore, the reduction for the recreational sector under **Preferred Alternative 2** is expected to be proportionally higher than for Alternatives 3 and 4 because the historical allocations are based on MRIP-CHTS. **Alternative 3** and **Alternative 4** would increase the recreational sector allocation (79.5% and 82%, respectively) and reduce the commercial sector allocation (20.5% and 18%, respectively), resulting in positive effects for the recreational sector and negative effects for the commercial sector, when compared to **Preferred Alternative 2**. The allocation percentages in **Alternative 3** are based on recalibrated MRIP-FES landings being applied to the historical landing formula, using landings from 1986–2005, and would set the allocation at historical catch percentages as recalibrated by MRIP-FES. Whereas, the allocation percentages in **Alternative 4** are based on commercial and recreational landings (in MRIP-FES) percentages from 2017–2019. The effects on each sector and under each alternative differ based on the ACL reduction and the effect on the sector allocation from the MRIP-FES and landings years used to determine allocation.

Preferred Alternative 2 through **Alternative 4** would result in a large reduction the commercial ACL and quota. The greatest reduction of commercial gag quota is expected under **Alternative 4** (91%), followed by **Alternative 3** (90%), and **Preferred Alternative 2** (79%). The resulting annual IFQ allocation value and IFQ share value for gag would include the greatest losses under **Alternative 4**, followed by **Alternative 3**, and **Preferred Alternative 2** (Table 4.1.3.1); however as the quota decreases, gag IFQ shares and allocation prices are also expected to increase due to reduced availability. A reduction of commercial gag quota and ensuing losses in IFQ allocation and share values would result in negative social effects to gag IFQ fishermen such as shareholders, allocation holders, captains, and crewmembers and their corresponding communities. A reduction in landed product could also affect gag dealers; however as described in Section 4.1.3, gag purchases represent a relatively small proportion of total dealer purchases overall. However, some dealers and their associated communities are more dependent on gag, with gag comprising a larger proportion of total landings for the community or the community showing a high engagement overall and these places could experience negative effects (see the below description on communities).

Preferred Alternative 2 through **Alternative 4** would also modify the portion of gag and red grouper multi-use allocation available in 2023. Multi-use allocation is a portion of the gag or red grouper IFQ allocation that can be used to land either gag or red grouper, and is intended for incidental catch to allow flexibility for fishermen. Gag IFQ shareholders receive gag multi-use allocation and red grouper IFQ shareholders receive red grouper multi-use allocation. **Alternative 1** (No Action) would retain the red grouper multi-use allocation at 9.9%. Red

grouper multi-use would be reduced under **Alternatives 2** through **4** with the greatest reduction of red grouper multi-use allocation available and least flexibility for fishermen provided under **Alternative 4** (0.8%), followed by **Alternative 3** (1%), and **Alternative 2** (2.1%). For gag multi-use, **Alternative 1** would maintain gag multi-use at 16% and the proportion of gag multi-use allocation available would increase under **Alternatives 2** through **4**. The greatest increase in gag multi-use allocation and most flexibility for fishermen would be provided under **Alternatives 3** and **4** (each 100%), followed by **Alternative 2** (75%).

Preferred Alternative 2 through **Alternative 4** would result in a large reduction to the recreational ACL and a severely shortened recreational season. The greatest reduction in the recreational ACL, shortest recreational season, and greatest negative social effects to the for-hire sector and private anglers are expected under **Preferred Alternative 2** (78.8% reduction in the recreational ACL and a 16 day recreational season), followed by **Alternative 3** (74.5% reduction in ACL and 19 day season), and **Alternative 4** (73.9% reduction in ACL and 19 day season).

The communities that would be most affected by a revision to the gag ACL or a revision to sector allocations are discussed in Section 3.4. Fishing communities along the west coast of Florida consistently experience the highest commercial and recreational landings of Gulf gag. In particular, the communities of Madeira Beach, Apalachicola, and Panama City, Florida represent a substantial amount of the commercial harvest. Panama City also demonstrates high engagement in commercial gag fishing according to the gag-specific commercial engagement index and through all types of gag IFQ participation (largest number of IFQ accounts with gag shares, greatest proportion of gag shares, largest number of IFQ accounts with gag allocation but without gag shares, and largest number of dealer facilities with gag landings). As a result, the fishing community of Panama City is likely to see negative social effects related to decreases in income and employment under a lower ACL. In addition to consistently high landings of gag, Madeira Beach (IFQ accounts with gag allocation but without shares, dealer facilities with gag landings, and moderate overall engagement in commercial gag fishing) and Apalachicola (number of reef fish permits, number of IFQ account with gag shares, and percentage of gag shares) include other measures of gag engagement and would likely see negative social effects. Destin, Tarpon Springs, and Cortez, Florida (moderate to high engagement in commercial gag fishing) and Redington Shores and Tallahassee, Florida (highest LQs by pounds and value of gag landings) had comparatively lower landings, but were moderate to highly engaged in commercial gag fishing and may also experience negative social effects from a lower ACL. Similarly, there are a substantial number of for-hire permit holders and high overall recreational engagement in Florida in Panama City, Destin, and the Florida Keys. These fishing communities are likely to experience negative effects of a lower ACL and reduced access to gag, especially if anglers desire to specifically target gag. The Keys communities of Islamorada, Marathon, and Tavernier are also highly reliant upon the recreational fishing industry.

4.1.5 Effects on the Administrative Environment

This action would affect the administrative environment by lowering the Gulf gag ACL, which reduces the likelihood of overfishing of the gag stock. Because the intent of this interim rule is to reduce overfishing while a rebuilding plan for gag is developed, it is only in effect for a short period of time. Any substantial overage from the implemented catch limit would affect the pace of rebuilding and the accuracy of the projections. However, given that the rebuilding plan must be implemented in 2024 before gag landings for 2023 under these interim measure are finalized, there would likely be inadequate time to address that issue in the rebuilding plan. Therefore, the biggest risk of increased burden on the administrative environment would be in exceeding the stock ACL set in this action to such a degree that it requires a future modification of the gag rebuilding plan currently under development.

In the commercial sector, there is little risk of exceeding the ACL. The IFQ program in place for regulating commercial landings of gag is designed to prevent ACL overages by allocating quota to individual entities, and holding them accountable to stay under that catch limit. However, the recreational fishery does have potential to exceed both the recreational ACL and cause the fishery as a whole to exceed the stock ACL. This may result in an increased administrative burden, because NMFS would likely need to implement measures to further reduce catch in the rebuilding plan, which is likely to require additional Council action and potential rulemaking. However, the seasons set in Action 2 of this document are based on patterns of catch in previous years and are intended close the recreational gag season prior to exceeding the ACL, no matter the alternative chosen. Therefore, effects on the administrative environment associated with exceeding the stock ACL in this interim rule are expected to be minimal.

Alternative 1 in Action 1 proposes catch limits that would not reduce overfishing, resulting in continued negative impacts to the stock that are contrary to the intent of these interim measures. **Preferred Alternative 2**, **Alternative 3**, and **Alternative 4** would all greatly reduce the ACL. Although there are differences among these alternatives in the overall ACL, as well as differences in the portion of the stock allocated to the recreational sector as compared to the commercial sector, the difference in administrative burden between the three action alternatives is expected to be negligible. The differences in the catch limits in these alternatives are very small relative to the current catch limits (**Alternative 1**), and thus the likelihood of an overage of the ACL for each of the alternatives is expected to be similar.

Further, the effects of any of the action alternatives would be expected to be minor. NMFS routinely assesses the effects of management decisions on stock status and works with the Council to modify actions to control harvest.

4.2 Action 2 – Modification of Gulf Gag Recreational Fishing Season Start Date

4.2.1 Direct and Indirect Effects on the Physical Environment

Modifying the gag recreational fishing season start date is not expected to significantly impact the physical environment. As explained in Section 4.1.1 above, effects on the physical environment from fishing are generally caused by gear coming into contact with the bottom. Because changing the season dates is intended, in concert with the reduced catch limits in Action 1, to reduce fishing effort for gag, it may have a slight positive impact on the physical environment. However, because the reef fish fishery is a multi-species fishery where several species are often targeted on a single trip (especially for the recreational sector), the effects of Action 2, no matter the alternative chosen in Action 1, are expected to be minor. This is because modifications to the gag recreational fishing season would not change the fishing methods used or alter the execution of the reef fish fishery as a whole.

Action 2 proposes opening recreational season dates that would result in fishing seasons that would last from just over two weeks (**Alternative 1**) up to 70 days (**Preferred Alternative 2**), with **Alternative 3** and **Alternative 4** falling between the other two alternatives in duration. Despite the time of year that the fishery would be prosecuted and the duration of the recreational fishing season, the alternatives in Action 2 are expected to have similar and negligible effects on the physical environment. This is because changing the recreational season opening date and duration are not expected to alter the execution of the reef fish fishery as a whole.

4.2.2 Direct and Indirect Effects on the Biological Environment

Modifying the gag recreational fishing season start date and shortening the fishing seasonis expected to have a positive impact on the biological environment. Management actions that affect the biological environment mostly relate to the impacts of fishing on a species' population size, life history, and the role of the species within its habitat. Removal of fish from the population through fishing can reduce the overall population size if harvest is not maintained at sustainable levels. Indirect impacts of these alternatives on the biological environment would depend on the resulting reduction in fishing effort as a result of each alternative. Modifications to the gag recreational season opening date and season duration could result in changes to the biological/ecological effects. Reducing the duration of the recreational season reduces the amount of time that gag can be harvested. This is expected to result in reduced gag harvest. However, a decrease in the duration that gag may be harvested may also result in an increase in gag discards while targeting other reef fish species. This potential negative effect may be more pronounced when other fish are being targeted extensively (e.g., red snapper in June and July), and may result in increased gag discards. SEDAR 72 (2021) suggests that recreational gag discards are high, especially in the recreational sector, where the ratio of discards to kept fish in recent years had been at about 0.9. Discard mortality rates for gag were low overall with a suggested rate for recreational fishing of 12% and 25% for commercial fishing. However, given that the gag recreational season is normally timed coincident with the Gulf state-managed red

snapper recreational seasons, and that would change under all of the alternatives (note that there would still be some overlap under **Alternative 1**), it is likely that an increase in discards of gag associated with the change in fishing season dates would occur. However, the magnitude of the increase in discards is expected to be minor relative to the reduction in allowable catch, and thus the impacts on the gag population expected from Action 2 are expected to be positive. Since no other substantial impacts are expected to the biological environment, Action 2 is expected to have a positive impact overall on the biological environment.

Because each of the alternatives in Action 2 are expected to implement season durations that would constrain catch to the recreational ACL, the recreational harvest of gag is expected to be similar for each alternative, no matter the catch limit chosen in Action 1. Because analysis of the impacts of the alternatives in Action 2 depends on the alternative chosen in Action 1, this section uses Action 1 Preferred Alternative 2 as the baseline for comparison. However, there are caveats associated with incapability of closing recreational fishing seasons when the catch limit has been harvested regardless of the Action 1 alternative, so this analysis could be equally applied to any Action 1 alternative (except Alternative 1). These caveats include uncertainty with catch rates with the newly proposed seasons that could result in overharvest of the new ACL, and that the season duration for all alternatives would be set based on projections of catch that occurs prior to the season. Thus, no in season data are expected to be available for use in projecting a season end date under any alternative, so the choice of season in Action 2 may have a greater impact on the actual gag harvest than the harvest catch limit chosen in Action 1.

Alternative 1 would maintain the current season open date of June 1. Because the gag recreational season has historically started on June 1, season duration projections for **Alternative 1** are likely to provide the most certainty in terms of fishing effort and expected catch (16-19 day season expected, minimum season length of 15 days). However, the short recreational season may result in increased fishing relative to previous seasons because the limited number of days to target gag may encourage greater fishing effort (e.g., derby fishing). Because **Alternative 1** would implement the shortest season, it may result in higher discards. Gag fishing effort has historically been highest in June and **Alternative 1** would maintain the June 1 open date, so there are expected to be lower discards (relative to the other Alternatives) during the time with greatest effort. However, the season would be shortest under **Alternative 1**, and the season would likely close when fishing effort is still high. Importantly, the red snapper recreational fishing season for most Gulf states generally starts between the last week of May and June 1, lasting for variable periods of time that generally extend into or beyond July. Because the gag recreational season would only be open for the first 16-19 days (estimated) of June and gag are frequently bycaught by those targeting red snapper, **Alternative 1** could still result in substantial gag discards **Alternative 1** would limit discards during the busiest historical gag fishing season and also has the lowest associated uncertainty in constraining catch to the ACL relative to the other Action 2 alternatives, However, because the season would be short and would still result in substantial discards during the remainder of the red snapper season (after the gag recreational closure), it is expected to have a similar impact on gag stocks as the other Action 2 alternatives.

Preferred Alternative 2 would move the recreational gag season opening to September 1, and would provide the longest season (70 days) of any of the alternatives. **Preferred Alternative 2** would also have the most uncertainty in whether landings could be constrained to the

recreational ACL. This is because **Preferred Alternative 2** provides not only the longest season, but also includes months where landing have varied substantially in recent years. Although September and October recreational harvest of gag has historically been low, projections based on landings between 2017 and 2021 indicate that the recreational ACL could be harvested in as little as 27 days. Because recreational landings data would not be available prior to the season closure on November 10, NMFS would have little indication of harvest levels until after the recreational season had closed. Thus, if high levels of catch seen in recent years were to occur under **Preferred Alternative 2**, the ACL could be exceeded by a substantial margin. Regardless of the Council's chosen recreational season closure date of November 10, NMFS would still be required to close the season earlier if projections indicate that the ACL would be harvested prior to that date. Under **Preferred Alternative 2**, harvest would be prohibited prior to September, which may result in increased fishing effort when the season opens on September 1.

Alternative 3 would move the recreational gag season opening to October 1, and is expected to provide a 55-62 day fishing season. **Alternative 3** would have substantial uncertainty in whether landings could be constrained to the recreational ACL, although less uncertainty than **Preferred Alternative 2**. This is because like **Preferred Alternative 2**, the season includes months where landings have varied substantially in recent years. Although October harvest of gag has been historically low, projections based on landings between 2017 and 2021 indicate that the gag recreational catch limit could be landed in as little as 27 days. Because recreational landings data would not be available prior to the season closure (which would be based on a pre-season projection of catch), NMFS would have little indication of harvest levels until after the season had closed. Thus, if high levels of catch seen in recent years were to occur under **Alternative 3**, the ACL could be exceeded by a substantial margin. However, NMFS would need to update its projections prior to the start of the season and close when earlier if NMFS determines that is necessary to constrain landings to the ACL. Under **Alternative 3**, harvest would be prohibited prior to October, which may result in increased fishing effort (e.g., derby fishing) once the season opens on October 1.

Alternative 4 would move the recreational gag season opening to November 1, and is expected to provide a 29-36 day fishing season, with a minimum season duration of 19 days. **Alternative 4** would have less uncertainty in whether landings could be constrained to the recreational ACL than for **Preferred Alternative 2** and **Alternative 3**. This is because effort in November is generally much higher than in September and October, so landings projection are likely to be more similar to actual harvest. In addition, the projected season duration is shorter, allowing fishermen less time to fish and decreasing the probability of recreational landings exceeding the ACL. Like other Action 2 alternatives, little information on recreational landings would be available prior to the season closure (which would be based on a pre-season projection of catch), and NMFS would not have little indication of harvest levels until after the season had closed. Thus, if higher levels of catch than normal were to occur under **Alternative 4** (which is possible due to the shortened gag season), the ACL could be exceeded. However, NMFS would need to update its projections prior to the start of the season and close when earlier if NMFS determines that is necessary to constrain landings to the ACL. **Alternative 4** would prohibit gag harvest prior to November, which may result in increased fishing once the season opens on November 1

if fishermen who normally target gag at the beginning of the historical gag season (June 1) shift that effort to the new season starting November 1.

4.2.3 Effects on the Economic Environment

Alternative 1 (No Action) would maintain the current federal recreational fishing season opening date of June 1 for Gulf gag. In ***Action 1***, ***Preferred Alternative 2*** would establish a recreational gag ACL of 403,759 lb ww. The analysis provided in this section uses the preferred recreational gag ACL as a baseline. Based on this recreational ACL, **Alternative 1** is expected to result in a 16-day recreational gag fishing season.

In an effort to mitigate the adverse economic effects expected to result from the sizeable reductions in recreational gag ACL considered in Action 1, **Preferred Alternative 2** and **Alternatives 3** and **4** would consider alternative start dates for the recreational gag fishing season. Because losses of consumer surplus to recreational anglers were accounted for in the analysis provided in Action 1, this section exclusively addresses the changes in economic value to for-hire operators. Furthermore, detailed information on targeting behavior is not available for headboats. Therefore, the analysis presented here is based on changes in expected target trips for charter operators.

Expected changes in charter trips targeting gag were derived from Table 3.3.2.4., which provides the average distribution of gag target trips by wave and mode between 2017 and 2021, and from the starting and closing dates considered in **Preferred Alternative 2** and **Alternatives 3** and **4**. For each alternative, starting and anticipated closure dates for the recreational gag fishing season, season length number of days), estimated number of gag target trips, and changes relative to **Alternative 1** in numbers of trips and in economic value are provided in Table 4.2.3.1. It is noted that due to the uncertainty in the estimated season lengths, the projected closure dates could change when NMFS reviews the most recent data in 2023.

Table 4.2.3.1. Recreational gag fishing seasons dates, length, number of gag target trips, and estimated changes in trips and economic value relative to **Alternative 1**.

	Dates	Season Length (Days)	Number of Target Trips	Difference relative to Alternative 1	
				Number of Target Trips	Economic Value (PS) ($2021)
Alternative 1	June 1 to June16	16	2,786	--	--
Preferred Alternative 2	Sept 1 to Nov 10	70	4,945	2,159	$321,733
Alternative 3	Oct 1 to Nov 24	55	5,698	2,912	$433,829
Alternative 4	Nov 1 to Nov 29	29	4,882	2,096	$312,231

Relative to **Alternative 1**, **Preferred Alternative 2** is estimated to result in 2,159 additional charter gag target trips. **Preferred Alternative 2** is expected to result in an increase in producer surplus to for-hire operators estimated at $321,733 ($2021). **Alternative 3**, which would result in the largest increase in the number of target trips relative to **Alternative 1**, is expected to add 2,912 target trips and increase producer surplus to charter operators by $433,829 ($2021).

Combined economic effects expected to result from decreases in ACLs (Action 1) and modifications to the recreational gag fishing season (Action 2) are evaluated by summing expected changes in economic values across the actions. Estimated changes in economic values expected to result from Actions 1 and 2 are provided in Table 4.2.3.2.

Table 4.2.3.2. Expected changes in economic value for Actions 1 and 2.

	Changes in economic value		
	Action 1 ($2021)	Action 2 ($2021)	Total ($2021)
Preferred Alternative 2	**-$16,357,298**	**$321,733**	**-$16,035,566**
Alternative 3	-$16,287,215	$433,829	-$15,853,385
Alternative 4	-$16,285,893	$312,231	-$15,973,663

Relative to status quo, **Preferred Alternative 2-Action 1** and **Preferred Alternative 2-Action 2** would be expected to result in a total change in economic value estimated at -$16.04 million ($2021). **Preferred Alternative 2-Action 1** and **Preferred Alternative 2-Action 2** would be expected to result in long term economic benefits as the gag stock rebuilds. Changes in

economic value that would be expected to result from **Alternatives 3** and **4** were estimated at -$15.85 million and -$15.97 million, respectively.

4.2.4 Effects on the Social Environment

This action would modify the gag recreational season start date to allow for more fishing days for the recreational sector. ***Action 1***, ***Preferred Alternative 2*** would establish a recreational gag ACL of 403,759 lb ww and the following analysis uses this ACL as a baseline. Using this baseline, **Alternative 1 (No Action)** would retain the current federal season opening date of June 1 and is expected to result in a 16 day recreational season for gag.

Preferred Alternative 2 through **Alternative 4** would modify the recreational gag season start date, to allow a longer season to mitigate some of the adverse effects from the decrease in the recreational ACL and shortened recreational season in Action 1. The longest recreational season for gag and greatest opportunity and flexibility for recreational for-hire operators and private anglers targeting gag would be under **Preferred Alternative 2** (70 days), followed by **Alternative 3** (55 days), and **Alternative 4** (29 days). A longer season and greater flexibility to plan trips is particularly important during poor weather, such as hurricane season and can result in positive social effects to recreational for-hire operators and private anglers.

Fishing communities along the west coast of Florida consistently experience the highest recreational landings of Gulf gag. The communities that would be most affected by a modification to the Gulf gag recreational fishing season start date are discussed in Section 3.4. Communities that are engaged in and reliant on recreational fishing would be the most affected by a longer season length (i.e. **Preferred Alternative 2**) for Gulf gag. There are a substantial number of for-hire permit holders and high overall recreational engagement in Florida in Panama City, Destin, and the Florida Keys. These fishing communities, as well as others with high engagement and reliance are likely to experience positive effects under **Preferred Alternative 2** relative to the other Action 2 alternatives of lesser access to gag, through fishing days and increased angler satisfaction, especially if for-hire operators and anglers desire to specifically target gag. In addition to being highly engaged, the Keys communities of Islamorada, Marathon, and Tavernier are also highly reliant upon the recreational fishing industry.

4.2.5 Effects on the Administrative Environment

Modifying season opening dates does not typically result in significant effects on the administrative environment. **Alternative 1** is not expected to affect the administrative environment because it would not change season opening date. **Preferred Alternative 2** and **Alternatives 3** and **4** would result in a short-term increased burden on the administrative environment due to the establishment of a new recreational season opening dates. No seasonal closure dates were chosen with **Alternatives 3** and **4**, but rather they would be associated with the catch limit chosen in Action 1. Thus, these Action 2 alternatives would have no further effect on the administrative environment other than implementation of a new recreational season opening date. Changing the season opening date from **Alternative 1** would increase the burden for NMFS, which would have to engage in rulemaking to implement this change in management. The administrative burden for law enforcement would go largely unchanged, as

law enforcement officers would continue to monitor compliance with any established closed season. Some administrative burden is anticipated with respect to outreach as it relates to notifying stakeholders of the changes to the season.

4.3 Cumulative Effects

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

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

2. *The impacts that are expected in that area from the proposed action* - The proposed actions would modify Gulf gag catch limits and the recreational season opening date. The environmental consequences of the proposed actions are analyzed in Sections 4.1.1, 4.1.2, 4.2.1, and 4.2.2, and are not expected to be significant. Reducing the gag catch limits in combination with moving the recreational season open date and reducing the season duration are not expected to have significant effects on the physical environment, as they are not expected to alter the manner in which the gag portion of the reef fish fishery is prosecuted (Sections 4.1.1 and 4.2.1). These measures are expected to have non-significant but positive effects on the biological environment because the actions would reduce harvest, which would reduce overfishing and allow the spawning stock biomass to increase (Section 4.1.2). Since gag is part of a multi-species fishery and fishermen can specifically target them, bycatch mortality is expected to be reduced due to reduced directed targeting of gag. However, regulatory discards are expected to increase during the new recreational closed season for gag because harvest would not be allowed when gag are caught while fishing for other species. In particular, red snapper fishing previously overlapped with the gag recreational fishing season, allowing for some harvest of gag caught while targeting red snapper. This would no longer be allowed, so legal-sized gag would be required to be released. Despite this change, overall gag mortality is expected to decrease. Further, changing fishing practices on one stock does not generally change overall fishing effort or fishing practices. Although it is likely that a short-term negative effect on the social and economic environments will occur due to decreased harvest limits and season duration, addressing the overfishing status of the stock is expected to have positive long-term effects (Sections 4.1.3, 4.1.4, 4.2.3, and 4.2.4). Decreasing gag harvest and changing/reducing the season duration is not expected to lead to decreased costs in terms of vessel trips, as these trips will most likely be occurring for other fish species. Similar to the economic environment, negative social effects are anticipated in the short term. However, as more harvest is allowed as the stock rebuilds, benefits to the economic (Sections 4.1.3 and 4.2.3) and social environments

(Sections 4.1.4 and 4.2.4) are expected. The actions are not expected to significantly affect the administrative environment (Sections 4.1.5 and 4.2.5), adversely or beneficially.

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

Other fishery related actions - *Other Fishery related actions* - The cumulative effects associated with modifying gag ACLs, ACTs, and quotas were analyzed in the environmental impact statement (EIS) for Amendment 32 (GMFMC 2011b). In addition, cumulative effects relative to reef fish management have been analyzed in the EISs for Amendment 22 (GMFMC 2004b), Amendment 26 (GMFMC 2006), and Amendment 27/14 (GMFMC 2007), Amendment 29 (GMFMC 2008b), Amendment 30A (GMFMC 2008c), Amendment 30B (GMFMC 2008a), Amendment 31 (GMFMC 2010a), Amendment 40 (GMFMC 2014), Amendment 28 (GMFMC 2015a), and Amendment 53 (GMFMC 2021). These cumulative effects analyses are incorporated here by reference. Other pertinent actions are summarized in the history of management (Section 1.3). Currently, there are several present and reasonably foreseeable future actions (RFFAs) that are being considered by the Council for the Reef Fish FMP or implemented by NMFS, which could affect reef fish stocks. These include: Amendment 48 to the Reef Fish FMP, which established status determination criteria for many reef fish stocks, including gag; Amendment 54, which would revise greater amberjack catch limits and sector allocations; and Amendment 36B, which would revise the red snapper and grouper-tilefish commercial IFQ programs. In addition, Amendment 56 will implement management measures to stop overfishing of gag, as well as implement a rebuilding plan for the Gulf gag stock. Several framework actions also are being developed to address red snapper, greater amberjack, vermilion snapper, and yellowtail snapper. Descriptions of these actions can be found on the Council's Web page.[36]

Non-fishery related actions - Actions affecting the Reef Fish fishery have been described in previous cumulative effect analyses. Three important events include impacts of the *Deepwater Horizon* MC252 oil spill, the Northern Gulf Hypoxic Zone, and climate change (See Sections 3.1 and 3.2). Impacts from the *Deepwater Horizon* MC252 oil spill are still being examined; however, as indicated in Section 3.2, the oil spill had some adverse effects on fish species. Further, the impacts on the food web from phytoplankton, to zooplankton, to mollusks, to top predators may be significant in the future. Impacts to gag from the oil spill may similarly affect other species that may be preyed upon by gag. However, since the majority of the spawning biomass for gag occurs outside the main areas affected by the *Deepwater Horizon* MC252 oil spill plume, it is less likely that a direct effect on this species will be detected. Gag is a mobile species and is able to avoid hypoxic conditions, so any effects from the Northern Gulf Hypoxic Zone on gag are likely to be minimal.

[36] http://gulfcouncil.org/

There is a large and growing body of literature on past, present, and future impacts of global climate change induced by human activities. Some of the likely effects commonly mentioned are sea level rise, increased frequency of severe weather events, and change in air and water temperatures. The Environmental Protection Agency's climate change web page provides basic background information on these and other measured or anticipated effects. In addition, the Intergovernmental Panel on Climate Change has numerous reports addressing their assessments of climate change.[37] Global climate changes could affect the Gulf fisheries as discussed in Sections 3.1 and 3.2. In addition, the distribution of native and exotic species may change with increased water temperature, as may the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms. Climate change may significantly impact Gulf Reef Fish species in the future, but the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts would occur. The proposed actions are not expected to significantly contribute to climate change through the increase or decrease in the carbon footprint from fishing, as these actions should not change how the fishery is prosecuted. As described in Section 3.1, the contribution to greenhouse gas emissions from fishing is minor compared to other emission sources (e.g., oil platforms).

4. The impacts or expected impacts from these other actions - The cumulative effects from managing the Reef Fish fishery have been analyzed in multiple other actions.[38] They include a detailed analysis of the Reef Fish fishery, cumulative effects on non-target species, protected species, and habitats in the Gulf. Overall, bycatch of protected species in the gag portion of the Reef Fish fishery is negligible and effects to habitat are minimized due to the gear types used for harvest (Section 3.2). The effects of this action are positive, as they ultimately reduce overfishing with increased fishing opportunities expected in the future. Short-term negative impacts on the social and economic environments are expected due shortened seasons and limited harvest for gag. However, as more harvest is allowed as the stock rebuilds, benefits to the economic and social environments are expected. Furthermore, it is assumed that recreational fishing trips would occur regardless of whether gag is open for recreational harvest, as recreational fishing for gag is generally part of a multi-species fishing strategy and fishermen typically switch to targeting other species when gag harvest is closed.

5. *The overall impact that can be expected if the individual impacts are allowed to accumulate:* These actions, combined with other past actions, present actions, and RFFAs, are not expected to have significant beneficial or adverse effects on the physical and biological environments. Any effects are expected to be positive, but are not expected to substantially change the manner in which the reef fish fishery is prosecuted (Sections 4.1.1, 4.1.2, 4.2.1, and 4.2.2). For the social and economic environments, some negative short-term but positive long-term effects are expected to result for fishing communities from reducing harvest and shortening/moving the fishing season (Sections 4.1.3, 4.1.4, 4.2.3, and 4.2.4). These effects are likely minimal, as the proposed action, along with other past actions, present actions, and RFFAs, are not expected to alter the manner in which the fishery is prosecuted. Because it is unlikely there would be any changes in how the fishery is prosecuted, these actions, combined with past actions, present

[37] http://www.ipcc.ch/publications_and_data/publications_and_data.shtml
[38] https://gulfcouncil.org/reef-fish/

actions, and RFFAs, are not expected to have significant adverse effects on public health or safety.

6. Summary: The proposed actions are not expected to have individual significant effects to the physical, biological, economic, or social environments. Any effects of the proposed action, when combined with other past actions, present actions, and RFFAs are not expected to be significant. The effects of the proposed actions are, and will continue to be, monitored through collection of landings data by NMFS, individual state programs, stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations. Landings data for the recreational sector in the Gulf are collected through MRIP, Louisiana Creel Survey, Southeast Regional Headboat Survey, the Southeast For-Hire Integrated Electronic Reporting Program, Florida's State Reef Fish Survey, and Texas Parks and Wildlife Department. The cumulative social and economic effects of past, present, and future amendments may be described as increasing fishing opportunities, resulting in positive social and economic impacts. The proposed actions in this environmental assessment are expected to result in important long-term benefits to the for-hire fishing fleets, fishing communities and associated businesses, and private recreational anglers. This analysis found positive effects on the biophysical and socioeconomic environments because it would maintain the Gulf gag stock at a level that allows the maximum benefits in yield while reducing overfishing while an amendment and plan to rebuild the Gulf gag stock is under development.

CHAPTER 5. REGULATORY IMPACT REVIEW

5.1 Introduction

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

5.2 Problems and Objectives

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

5.3 Description of Fisheries

A description of the Gulf of Mexico reef fish fishery is provided in Section 3.1.

5.4 Impacts of Management Measures

5.4.1 Action 1: Modification of Gulf Gag Catch Limits and Sector Allocations

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

Relative to **Alternative 1** (No Action), **Preferred Alternative 2** would decrease the commercial gag quota by 740,000 pounds (lb) gutted weight (gw), resulting in associated losses in annual allocation value estimated at $0.76 million ($2021). Longer term economic effects expected to result from **Preferred Alternative 2**, as measured by changes in lost individual fishing quota (IFQ) share value, are estimated at $8.20 million ($2021).

Relative to **Alternative 1**, **Preferred Alternative 2** would change the commercial gag landings by 293,401 lb gw, resulting in associated changes in commercial revenues and in producer surplus estimated at -$1.50 million and -$0.75 million ($2021), respectively. In addition, the decreased availability of gag to consumers is expected to result in changes in consumer surplus estimated at -$0.50 million ($2021) under **Preferred Alternative 2**.

Preferred Alternative 2 is expected to decrease the recreational gag landings by 2.13 million lb gw or 240,374 fish. Associated changes in consumer surplus to recreational anglers are estimated at -$11.15 million ($2021). **Preferred Alternative 2** is also expected to decrease the number of charter trips targeting gag by 26,542 trips; resulting in a change in producer surplus to for-hire operators estimated at -$3.95 million ($2021).

Net benefits expected to result from **Preferred Alternative 2** combine changes in consumer surplus to consumers purchasing commercially-harvested gag, changes in producer surplus to commercial fishermen, changes in consumer surplus to recreational anglers, and changes in producer surplus to for-hire operators. Due to the sizeable decreases in commercial and recreational gag annual catch limits and landings, **Preferred Alternative 2** is expected to result in a change in net benefits estimated at -$16.36 million ($2021).

5.4.2 Action 2: Modification of Gulf Gag Recreational Fishing Season Start Date

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.2.3. The following discussion summarizes the expected economic effects of the preferred alternatives.

Relative to **Alternative 1**, **Preferred Alternative 2** is estimated to result in 2,159 additional charter gag target trips. **Preferred Alternative 2** is expected to result in an increase in producer surplus to for-hire operators estimated at $321,733 ($2021). Table 5.4.2.1 provides combined changes in economic value as measured by recreational and commercial changes in consumer and producer surpluses. Relative to status quo (**Alternative 1** in Actions 1 and 2), **Preferred Alternative 2-Action 1** and **Preferred Alternative 2-Action 2** would be expected to result in a total change in economic value estimated at -$16.04 million ($2021).

Table 5.4.2.1. Combined changes in commercial and recreational economic values for preferred alternatives in Actions 1 and 2 ($2021).

	Commercial Sector	Recreational Sector	**Total**
Action 1			
Producer Surplus	-$751,656	-$3,954,704	-$4,706,360
Consumer Surplus	-$497,585	-$11,153,353	-$11,650,938
Action 2			
Producer Surplus		$321,733	$321,733
Total	-$1,249,241	-$14,786,324	**-$16,035,565**

5.5 Public and Private Costs of Regulations

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

Council costs of document preparation, meetings, public hearings, and information dissemination……$10,500

NMFS administrative costs of document preparation, meetings and review ….....$34,500

TOTAL ….....$45,000

5.6 Determination of Significant Regulatory Action

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

CHAPTER 6. INITIAL REGULATORY FLEXIBILITY ACT ANALYSIS

6.1 Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure such proposals are given serious consideration. The RFA does not contain any decision criteria; instead the purpose of the RFA is to inform the agency, as well as the public, of the expected economic effects of various alternatives contained in the regulatory action and to ensure the agency considers alternatives that minimize the expected economic effects on small entities while meeting the goals and objectives of the applicable statutes (e.g., the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)).

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

In addition to the information provided in this section, additional information on the expected economic effects of the proposed action is included in the RIR.

6.2 Statement of the need for, objectives of, and legal basis for the rule

A discussion of the reasons why action by the agency is being considered is provided in Section 1.1. The purpose of this proposed regulatory action is to reduce overfishing of Gulf of Mexico (Gulf) gag. The objective of this proposed regulatory action is to use the best scientific information available to reduce overfishing of Gulf gag while a rebuilding plan is developed, consistent with the authority under the Magnuson-Stevens Act. The Magnuson-Stevens Act serves as the legal basis for the proposed regulatory action. All monetary estimates in the following analysis are in 2021 dollars.

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

This proposed regulatory action would revise the stock annual catch limit (ACL), sector ACLs, and sector annual catch targets (ACT) for Gulf gag based on based on the "T_{Min}*2" (twice the minimum time for the stock to rebuild with zero fishing mortality) rebuilding scenario under consideration in Amendment 56. Given the current allocation of the stock ACL of 61% to the recreational sector and 39% to the commercial sector, the current stock ACL, commercial ACL, recreational ACL, commercial quota, and recreational ACT are 3.12 million pounds (mp) gutted weight (gw), 1.217 mp gw, 1.903 mp gw, 0.939 mp gw, and 1.708 mp gw, respectively. The recreational portion of the current stock ACL, the recreational ACL, and the recreational ACT are based on Marine Recreational Information Program (MRIP) Coastal Household Telephone Survey (CHTS) data. This proposed regulatory action would retain the current sector allocations, but reduce the stock ACL, commercial ACL, recreational ACL, commercial quota and recreational ACT to 661,901 lb gw, 258,000 lb gw, 403,759 lb gw, 199,000 lb gw, and 362,374 lb gw, respectively. The recreational portion of the revised stock ACL, the recreational ACL, and the recreational ACT are based on MRIP Fishing Effort Survey (FES) data. This proposed regulatory action would also change the recreational season start date from June 1 to September 1, and close the season on November 10 or when the recreational ACL is projected to be met, whichever occurs first. As a result, this proposed regulatory action is expected to regulate commercial fishing businesses that possess Gulf gag shares in the Grouper-Tilefish Individual Fishing Quota (IFQ) program and for-hire fishing businesses that target gag.

The commercial gag quota is allocated annually based on the percentage of gag shares in each IFQ account (e.g., if an account possesses 1% of the gag shares and the commercial quota is 1 mp, then that account would receive 10,000 pounds of commercial gag quota). Although it is common for a single IFQ account with gag shares to be held by a single business, some businesses have multiple IFQ accounts with gag shares. As of July 8, 2021, 506 IFQ accounts held gag shares. These accounts and gag shares were owned by 455 businesses. Thus, it is assumed this proposed regulatory action would regulate 455 commercial fishing businesses.

A valid charter-headboat (for-hire) Gulf reef fish vessel permit is required to legally harvest gag in the Gulf. The National Marine Fisheries Service (NMFS) does not possess complete ownership data regarding businesses that hold charter-headboat (for-hire) Gulf reef fish vessel

permits, and thus potentially harvest gag. Therefore, it is not currently feasible to accurately determine affiliations between vessels and the businesses that own them. As a result, for purposes of this analysis, it is assumed each for-hire vessel is independently owned by a single business, which is expected to result in an overestimate of the actual number of for-hire fishing businesses regulated by this proposed regulatory action.

NMFS also does not have data indicating how many for-hire vessels actually harvest Gulf gag in a given year. However, in 2020, there were 1,289 vessels with valid charter-headboat Gulf reef fish vessel permits. Further, Gulf gag is only targeted and almost entirely harvested in waters off the west coast of Florida. Of the 1,289 vessels with valid charter-headboat Gulf reef fish vessel permits, 803 were homeported in Florida. Of these permitted vessels, 62 are primarily used for commercial fishing rather than for-hire fishing purposes and thus are not considered for-hire fishing businesses. In addition, 46 of these permitted vessels are considered headboats, which are considered for-hire fishing businesses. However, headboats take a relatively large, diverse set of anglers to harvest a diverse range of species on a trip, and therefore do not typically target a particular species. Therefore, it is assumed that no headboat trips would be canceled, and thus no headboats would be directly affected as a result of this proposed regulatory action. However, charter vessels often target gag. Of the 803 vessels with valid charter-headboat Gulf reef fish vessel permits that are homeported in Florida, 695 vessels are charter vessels. Souza and Liese (2019) reported that 76% of charter vessels with valid charter-headboat permits in the Gulf were active in 2017 (i.e., 24% were not fishing). A charter vessel would only be directly affected by this proposed regulatory action if it is fishing. Given this information, our best estimate of the number of charter vessels that are likely to harvest Gulf gag in a given year is 528, and thus this proposed regulatory action is estimated to regulate 528 for-hire fishing businesses.

On December 29, 2015, NMFS issued a final rule establishing a small business size standard of $11 million in annual gross receipts (revenue) for all businesses primarily engaged in the commercial fishing industry (NAICS code 11411) for RFA compliance purposes only (80 FR 81194, December 29, 2015). In addition to this gross revenue standard, a business primarily involved in commercial fishing is classified as a small business if it is independently owned and operated, and is not dominant in its field of operations (including its affiliates). NMFS does not collect revenue data specific to commercial fishing businesses that have IFQ accounts; rather, revenue data are collected for commercial fishing vessels. It is not possible to assign revenues earned by commercial fishing vessels back to specific IFQ accounts and the businesses that possess them because quota is often transferred across many IFQ accounts before it is used by a vessel for harvesting purposes, and specific units of quota cannot be tracked. However, from 2016 through 2020, the maximum annual gross revenue earned by a single vessel during this time was about $1.73 million in 2016. The average gross revenue per vessel was about $108,000 in that year. By 2020, the maximum and average gross revenue per vessel had decreased to about $730,000 and $79,700, respectively. Based on this information, all commercial fishing businesses regulated by this proposed regulatory action are determined to be small entities for the purpose of this analysis.

For other industries, the Small Business Administration (SBA) has established size standards for all major industry sectors in the U.S., including for-hire businesses (NAICS code 487210). A business primarily involved in for-hire fishing is classified as a small business if it is

independently owned and operated, is not dominant in its field of operation (including its affiliates), and has annual receipts (revenue) not in excess of $12.5 million for all its affiliated operations worldwide. The maximum annual gross revenue for a single headboat in the Gulf was about $1.45 million in 2017 (D. Carter, pers. comm.). According to Savolainen, et al. (2012), on average, annual gross revenue for headboats in the Gulf is about three times greater than annual gross revenue for charter vessels, reflecting the fact that businesses that own charter vessels are typically smaller than businesses that own headboats. Based on this information, all for-hire fishing businesses regulated by this proposed regulatory action are determined to be small businesses for the purpose of this analysis.

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

This proposed regulatory action would not establish any new reporting or record-keeping requirements.

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

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

6.6 Significance of economic effects on small entities

Substantial number criterion

If implemented, this proposed regulatory action is expected to directly regulate 455 of the 536 businesses with IFQ accounts, or approximately 85% of those commercial fishing businesses. Further, this proposed regulatory action is expected to directly regulate 528 of the 1,227 for-hire fishing businesses with valid charter/headboat permits in the Gulf reef fish fishery, or approximately 43% of those for-hire fishing businesses. All directly regulated commercial and for-hire fishing businesses have been determined, for the purpose of this analysis, to be small entities. Based on this information, the proposed regulatory action is expected to affect a substantial number of small businesses.

Significant economic effects

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

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

All entities directly regulated by this regulatory action have been determined to be small entities. Thus, the issue of disproportionality does not arise in the present case.

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

Because revenue and cost data are not collected for the commercial fishing businesses that are expected to be regulated by this proposed regulatory action, direct estimates of their economic profits are not available. However, economic theory suggests that annual allocation (quota) prices should reflect expected annual economic profits, which allows expected economic profits to be estimated indirectly. Further, the 455 businesses with gag shares also own shares in the other IFQ share categories and thus are expected to earn profits from their ownership of these shares as well, i.e., red snapper, red grouper, shallow water grouper, deep-water grouper, and tilefish.

However, economic profits will only be realized if the allocated quota is used for harvesting purposes. For example, practically all of the commercial red snapper quota has been used for harvesting in recent years, and so it is assumed that all of that quota will be harvested in the foreseeable future. Important management changes have occurred for red grouper, which partly resulted in 96% of the commercial quota being harvested in 2021. Thus, this analysis also assumes that all of the red grouper quota will be harvested in the future as well. However, based on 2017-2021 data, only 82% of the deep-water grouper quota, 38% of the shallow water grouper quota, and 73% of the tilefish quota have been harvested, and that is expected to continue in the foreseeable future. For gag, the quota utilization rate from 2017-2021 was approximately 52%. Given these quota utilization rates in combination with average annual allocation prices from 2017-2021 (see Table 3.4.1.15) and annual commercial quotas in 2021, the total expected economic profits for businesses with gag shares are estimated to be at least $29.4 million at the present time. This estimate does not account for any economic profits that may accrue to businesses with gag shares that also own commercial fishing vessels that harvest non-IFQ species. Such profits are likely to be small because harvest of IFQ species accounts for around 84% of commercial IFQ vessels' annual revenue and economic profits from the harvest of non-IFQ species tend to be smaller than those from IFQ species (C. Liese, pers. communication, April 9, 2019). Given that there are 455 businesses with gag shares, the average annual expected economic profit per commercial fishing business is at least $64,620.

However, most of these expected economic profits (84%) are the result of owning red snapper shares. Only approximately $502,930 (or 1.7%) of their expected economic profits is due to the ownership of gag shares. This proposed regulatory action is only expected to affect economic profits from the ownership of gag shares, specifically because of the proposed action to reduce the gag commercial ACL from 1.217 mp gw to 258,000 lb gw and the commercial gag quota (quota) from 939,000 lb gw to 199,000 lb gw. Average annual commercial landings of gag from 2017-2021 were 492,401 lb gw. Because average annual landings exceed the proposed commercial quota, it is assumed all of the proposed commercial quota will be harvested in the future. Further, the expected reduction in annual commercial landings is 293,401 lb gw. The reduction in commercial landings is expected to increase the average ex-vessel price of gag from

$6.10/lb gw to $7.54/lb gw, thereby partially offsetting the adverse effects of the expected landings reduction. Thus, the expected reduction in annual ex-vessel revenue for gag is approximately $1.5 million. Given an average annual allocation price of $1.03/lb gw for gag from 2017-2021, the expected reduction in commercial landings of gag is expected to reduce economic profits to these commercial fishing businesses by about $302,200, or by approximately $660 per commercial fishing business. Thus, economic profits are expected to be reduced by around 1% on average per commercial fishing business.

According to Savolainen, et al. (2012), which contains the most recent estimates of economic returns, including economic profits, in the for-hire sector, average annual economic profits are $27,948 per charter vessel. The action that revises the stock ACL changes the gag recreational ACL from 1.903 mp gw in MRIP-CHTS units to 403,759 lb gw in MRIP-FES units. However, average recreational landings from 2017-2021 were approximately 2.538 mp gw in MRIP-FES units. Given that average recreational landings have been considerably greater than the proposed recreational ACL, all of the proposed recreational ACL is expected to be harvested in the future. The recreational ACL reduction is expected to reduce the recreational season length from 214 days to 16 days, which in turn is expected to reduce the number of trips targeting gag on charter vessels by 26,542 angler trips. Net Cash Flow per Angler Trip (CFpA) is the best available estimate of profit per angler trip by charter vessels. According to Souza and Liese (2019), CFpA on charter vessels is estimated to be $149 per angler trip. Thus, the estimated reduction in charter vessel profits from this action is expected to be $3.955 million. The reduction in charter vessels profits is estimated to be $7,490 per vessel, or almost 27 percent on average per for-hire fishing business.

The proposed action that changes the recreational season start date from June 1 to September 1, and closes the season on November 10 or when the recreational ACL is projected to be met, would increase the number of target trips for gag by charter vessels by 2,159 trips, thereby partially mitigating the reduction in target trips due to the proposed recreational ACL reduction. Assuming the CFpA on charter vessels is estimated to be $149 per angler trip, this proposed action is expected to increase economic profits for charter vessels by $321,733, or by $609 per charter vessel. Thus, economic profits are expected to be increased by around 2.2% on average per for-hire fishing business.

Based on the above, the total reduction in economic profits for charter vessels from this proposed regulatory action is expected to be about $3.634 million, or approximately $6,882 per charter vessel. Thus, economic profits are expected to be reduced by approximately 24.6% on average per for-hire fishing business.

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

Three alternatives, including the status quo, were considered for the proposed action to revise the stock ACL, commercial ACL, recreational ACL, commercial quota and recreational ACT from

3.12 mp gw, 1.217 mp gw, 1.903 mp gw, 0.939 mp gw, and 1.708 mp gw based on MRIP-CHTS data to 661,901 lb gw, 258,000 lb gw, 403,759 lb gw, 199,000 lb gw, and 362,374 lb gw, respectively, based on the TMin*2 rebuilding scenario and MRIP- FES data. Similar to the proposed action, the status quo alternative would have retained the current allocation of the stock ACL of 61% to the recreational sector and 39% to the commercial sector. But it also would have maintained current the stock ACL, commercial ACL, recreational ACL, commercial quota and recreational ACT at 3.12 mp gw, 1.217 mp gw, 1.903 mp gw, 0.939 mp gw, and 1.708 mp gw based on MRIP-CHTS data. The status quo alternative was not selected because it would not reduce overfishing of gag while a rebuilding plan is being developed, contrary to the purpose of this proposed regulatory action.

A second alternative would have increased the allocation of the stock ACL to the recreational sector from 61% to 79.5% and decreased the allocation to the commercial sector from 39% to 20.5%. Further, based on the TMin*2 rebuilding scenario and MRIP-FES data, this alternative would have revised the stock ACL, commercial ACL, recreational ACL, commercial quota and recreational ACT from 3.12 mp gw, 1.217 mp gw, 1.903 mp gw, .939 mp gw, and 1.708 mp gw based on MRIP-CHTS data to 611,578 lb gw, 125,000 lb gw, 486,204 lb gw, 96,000 lb gw, and 436,368 lb gw. Like the proposed action, this alternative would have reduced overfishing while a rebuilding plan is being developed. However, since an interim rule cannot be in effect for more than 366 days, this alternative was not selected because the Gulf of Mexico Fishery Management Council (Council) advised NMFS they would prefer to address sector allocations on a longer-term basis through a plan amendment to the reef fish fishery management plan (FMP).

A third alternative would have increased the allocation of the stock ACL to the recreational sector from 61% to 82% and decreased the allocation to the commercial sector from 39% to 18%. Further, based on the TMin*2 rebuilding scenario and MRIP- FES data, this alternative would have revised the stock ACL, commercial ACL, recreational ACL, commercial quota and recreational ACT from 3.12 mp gw, 1.217 mp gw, 1.903 mp gw, .939 mp gw, and 1.708 mp gw based on MRIP-CHTS data to 605,165 lb gw, 109,000 lb gw, 496,235 lb gw, 84,000 lb gw, and 445,370 lb gw. Similar to the second alternative, this alternative would have reduced overfishing while a rebuilding plan is being developed. However, since an interim rule cannot be in effect for more than 366 days, this alternative was not selected because the Council advised NMFS they would prefer to address sector allocations on a longer-term basis through a plan amendment to the reef fish FMP.

Three alternatives, including the status quo, were considered for the proposed action to change the recreational start date from June 1 to September 1, and close the season on November 10 or when the recreational ACL is projected to be met, whichever occurs first. The status quo alternative would have maintained the recreational season start date of June 1, which was expected to result in a recreational season length of only 16 days compared to 70 days under the proposed action. This alternative was not selected as it would not mitigate the adverse effects from the proposed recreational ACL reduction and thereby would have resulted in greater adverse effects on small for-hire fishing businesses.

The second alternative would have changed the recreational season start date from June 1 to October 1, which would have resulted in a recreational season length of 55 days compared to 70 days under the proposed action. Although the second alternative would have mitigated some of the adverse effects from the proposed recreational ACL reduction, this alternative was not selected because, given the shorter season length compared to the proposed action, it would not allow for-hire fishing businesses and recreational fishermen as much flexibility in planning target trips for gag grouper, which is particularly desirable during hurricane season. Further, unlike the proposed action, this alternative does not have a fixed closure date, which would increase the probability of exceeding the recreational ACL relative to the proposed action.

The third alternative would have changed the recreational season start date from June 1 to November 1, which would have resulted in a recreational season length of 29 days compared to 70 days under the proposed action. Although the third alternative would have mitigated some of the adverse effects from the proposed recreational ACL reduction, this alternative was not selected because it would not have mitigated those adverse effects as much as the proposed action, thereby causing relatively greater adverse effects on small for-hire fishing businesses. Further, given the shorter season length compared to the proposed action, it would not allow for-hire fishing businesses and recreational fishermen as much flexibility in planning target trips for gag grouper, which is particularly desirable during hurricane season. Also, similar to the second alternative, this alternative does not have a fixed closure date, which would increase the probability of exceeding the recreational ACL relative to the proposed action.

CHAPTER 7. LIST OF AGENCIES CONSULTED

National Marine Fisheries Service
- Southeast Fisheries Science Center
- Southeast Regional Office
- Office for Law Enforcement

National Oceanic Atmospheric Administration General Counsel

Environmental Protection Agency
United States Coast Guard
United States Fish and Wildlife Services
Texas Parks and Wildlife Department
Alabama Department of Conservation and Natural Resources/Marine Resources Division
Louisiana Department of Wildlife and Fisheries
Mississippi Department of Marine Resources
Florida Fish and Wildlife Conservation Commission

CHAPTER 8. LIST OF PREPARERS

Name	Expertise	Responsibility
Ryan Rindone, GMFMC	Fishery Biologist	Co-Team Lead – amendment development, introduction, physical, biological, and ecological effects
Daniel Luers, NMFS/SF	Fishery Biologist	Co-Team Lead – amendment development, introduction, and administrative effects
Assane Diagne, GMFMC	Economist	Economic effects, Regulatory Impact Review
Adam Stemle, NMFS/SF	Economist	Economic Environment
Mike Travis, NMFS/SF	Economist	Regulatory Flexibility Act analysis
Christina Package-Ward, NMFS/SF	Anthropologist	Social effects, Social environment, Environmental Justice
Alisha Gray, NMFS/SF	Fishery Biologist, Data Analyst	Data analysis

Name	Discipline/Expertise	Role in EA Preparation
Mara Levy, NOAA GC	Attorney	Legal review
Noah Silverman, NMFS	Natural Resource Management Specialist	NEPA review
David Dale, NMFS/HC	EFH Specialist	Habitat review
Patrick Opay, NMFS/PR	Protected Resources Specialist	Protected resources review
Adam Bailey, NMFS/SF	Regulatory Writer	Regulatory preparation and review
Larry Peruso, NMFS SEFSC	Economist	Economic review
Lisa Ailloud, NMFS SEFSC	Research Fishery Biologist	Physical, biological, and ecological review
Katie Seigfried, NMFS SEFSC	Research Fishery Biologist	Physical, biological, and ecological review
Carrie Simmons, GMFMC	Fishery Biologist	Physical, biological, and ecological review
John Froeschke, GMFMC	Fishery Biologist	Physical, biological, and ecological review
Peter Hood, NMFS/SF	Fishery Biologist	Physical, biological, and ecological review

GMFMC = Gulf of Mexico Fishery Management Council, SAFMC = South Atlantic Fishery Management Council, NMFS = National Marine Fisheries Service, SF = Sustainable Fisheries Division, PR = Protected Resources Division, HC = Habitat Conservation Division, GC = General Counsel

CHAPTER 9. CHAPTER 9. REFERENCES

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APPENDIX A. LETTER REGARDING GULF GAG GROUPER INTERIM RULE MEASURES

Gulf of Mexico Fishery Management Council
Managing Fishery Resources in the U.S. Federal Waters of the Gulf of Mexico

4107 W. Spruce Street, Suite 200, Tampa, Florida 33607 USA
Phone: 813.348.1630 • Toll free: 888.833.1844 • Fax: 813.348.1711
www.gulfcouncil.org

July 18, 2022

Mr. Andrew Strelcheck, Regional Administrator
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, Florida 33701

007050JUL2022

Dear Mr. Strelcheck:

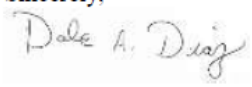
At its June 2022 meeting, the Gulf of Mexico (Gulf) Fishery Management Council (Council) discussed a proposed interim rule and corresponding proposed management measures for Gulf gag grouper. The stock assessment (SEDAR 72 2021) found gag grouper to be overfished and undergoing overfishing, and the National Marine Fisheries Service (NMFS) notified the Council of this stock status on January 26, 2022. Per the rebuilding guidelines defined in the Magnuson-Stevens Fishery Conservation and Management Act, the Council must develop and implement a rebuilding plan that ends overfishing within two years, or by January 26, 2024. However, the commercial sector is managed under the Grouper-Tilefish Individual Fishing Quota (IFQ) Program and the rebuilding plan will include reduced catch levels from status quo that will need to take effect prior to January 1, 2024, when the commercial quota for the 2024 fishing year is scheduled to be released. Likewise, for the 2023 fishing year which occurs in the interim between the present day and the deadline for implementing a rebuilding plan for gag, any interim rule to reduce or end overfishing will need to be implemented by January 1, 2023.

During the June 2022 meeting, the Council reviewed proposed management alternatives for the interim rule. The Council decided to recommend that NMFS adopt catch limits consistent with the current sector allocation of 61% recreational, 39% commercial, based on the rebuilding timeline of T_{MIN}*2, or twice the minimum time to rebuild the stock if fishing mortality were reduced to zero. This results in a stock ACL of 661,901 pounds gutted weight (lbs gw) in MRIP-FES currency, with a commercial annual catch limit of 258,142 lbs gw and a commercial quota of 199,147 lbs gw, and a recreational ACL of 403,759 lbs gw. The Council elected not to make any modifications to the commercial sector's IFQ multi-use provision for red and gag grouper. Further, the Council recommended that NMFS implement a revision to the fishing season closure for gag grouper, such that the recreational fishing season opens on September 1 and closes by November 10 for the 2023 fishing year.

The Council requests that NMFS implement these interim measures to reduce overfishing of gag as soon as practicable, with an effective date of January 1, 2023. These measures were expected to reduce or end overfishing of gag grouper for the 2023 fishing year, and are expected to aid in the pace of recovery of the stock while the Council works to develop the rebuilding plan via Reef Fish Amendment 56. During its August 2022 in Corpus Christi, Texas, the Council will be considering the SSC-approved catch limit recommendations based on

the requested SEDAR 72 alternative base model run using the State of Florida's State Reef Fish Survey for informing private angling landings and discards. If you have questions, please do not hesitate to contact Council staff.

Sincerely,



Dale Diaz
Council Chair

RR

cc: Council Members / Council Staff / John F. Walter, Ph.D. / Clay Porch, Ph.D. / Jack McGovern, Ph.D. / Peter Hood / Mara Levy / Dan Luers / Jim Nance, Ph.D. / Luiz Barbieri, Ph.D.

APPENDIX B. RECREATIONAL SEASON PROJECTION

Gulf of Mexico Recreational Season Projection Analyses for Gulf of Mexico Gag
Southeast Regional Office LAPP/DM Branch
May 2022

Gulf of Mexico 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, regulatory measures are being explored to determine the best action to end overfishing. This analysis predicts recreational season closures based on the management options being considered, including sector allocation options and changes in the seasonal closure. Finally, commercial data are provided to show monthly landings and how multi-use allocation may be impacted.

Recreational seasonal closure analysis
Recreational landings were obtained from the Southeast Fisheries Science Center (SEFSC) recreational ACL files (3/17/22; **Figure 1**). This dataset includes landings from the Texas Parks and Wildlife recreational creel survey (TPWD), Louisiana Department of Wildlife and Fisheries creel survey (LA Creel), Southeast Region Headboat Survey (SRHS) and Marine Recreational Information Program Fishing Effort Survey (MRIP FES). TPWD and SRHS data provide monthly landings estimates whereas MRIP and LACreel data are provided in two month waves (e.g., January and February = wave 1, March and April = wave 2, etc.). Monthly 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 the SRHS survey, while June landings were estimated by adding SRHS landings for that month to all of the landings reported for wave 3 for the MRIP survey. To estimate monthly landings July through December, MRIP waves were used to estimate to monthly landings by assuming equal daily catch rates for months within a wave, and then SRHS landings were added back in. Future landings were predicted by taking an average of 2017 through 2019 landings for each month. More recent years (e.g., 2020 and 2021) were not used in predicting future landings due to a decrease in landings seen those years in response to the pandemic. Based on the cumulatively summed projected recreational landings of gag, the recreational sector can expect a fishing season between 16 and 98 days depending on the management options selected (**Table 1**). These results assume no effort shifting and that no landings are made during the spawning season closure.

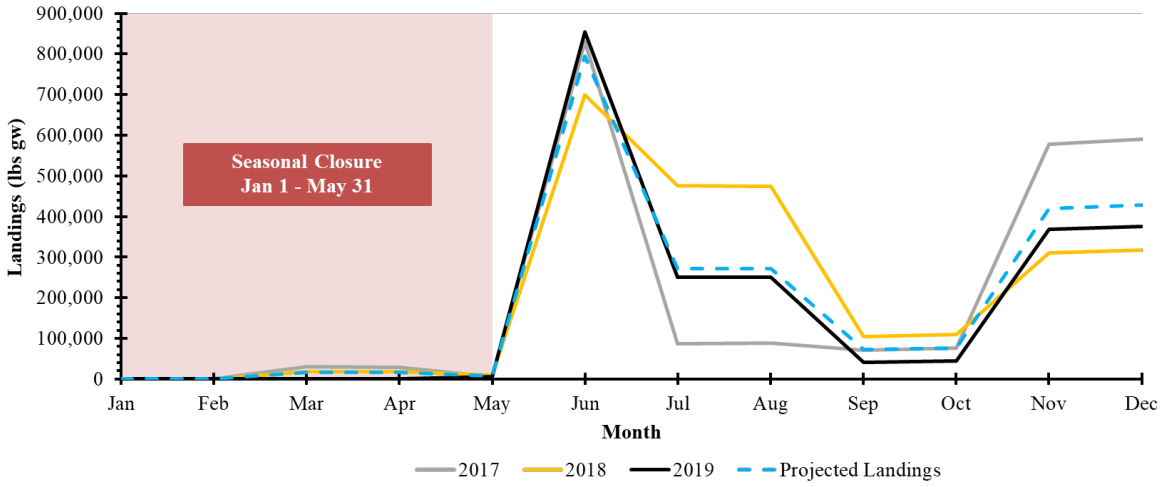


Figure B1. Gulf gag monthly recreational landings (lb gw) for 2017-2019, and average landings from 2017-2019. Source: SEFSC Recreational MRIP FES ACL Dataset (March 17, 2022)

Table B1. The projected Gulf of Mexico gag recreational landings (lb gw) and closure dates expected with each proposed management option. Upper and lower projected landings with 95% confidence intervals were also projected to provide predicted closure dates associated with those landings. Projected commercial landings (lb gw) and commercial annual catch limits are included for reference. Source: SEFSC Recreational ACL Dataset (March 17, 2022); Southeast Regional Office's (SERO) Catch Share Program database (3/25/2022)

Action 1, Alternative 1: No Action (1,903,000 R*reflects MRIP CHTS | 939,000 C)						
Rec. ACL*	Projected Rec. Landings (Upper – Lower 95%)	Fishing Season	Rec. Closure Date (Upper – Lower 95%)	Days Open in Rec. Season (Upper – Lower 95%)	Comm. ACL	Projected Comm. Landings
1,903,000	890,244 (1,032,980 – 716,156)	Jun 1 – Dec 31	None	214	939,000	505,681
Action 1, Alternative 2: Tmin*2 with 61% R*incorporates MRIP FES | 39% C						
Rec. ACL*	Projected Rec. Landings (Upper – Lower 95%)	Fishing Season	Rec. Closure Date (Upper – Lower 95%)	Days Open in Rec. Season (Upper – Lower 95%)	Comm. ACL	
403,759	2,332,048 (3,262,782 – 1,401,315)	Jun 1 – Dec 31 Jul 1 – Dec 31 Aug 1 – Dec 31 Sep 1 – Dec 31 Oct 1 – Dec 31 Nov 1 – Dec 31	**Jun 16 (Jun 14 – Jun 18)** **Aug 16 (Jul 26 – Nov 27)** **Oct 25 (Aug 26 – Dec 3)** **Nov 19 (Nov 10 – Dec 9)** **Nov 24 (Nov 16 – Dec 13)** **Nov 29 (Nov 21 – Dec 17)**	16 (14 - 18) 47 (26 - 150) 86 (26 - 125) 80 (71 - 100) 55 (47 - 74) 29 (21 - 47)	258,142	
Action 1, Alternative 3: Tmin*2 with 79.5% R*incorporates MRIP FES | 20.5% C						
Rec. ACL*	Projected Rec. Landings (Upper – Lower 95%)	Fishing Season	Rec. Closure Date (Upper – Lower 95%)	Days Open in Rec. Season (Upper – Lower 95%)	Comm. ACL	

486,204	2,332,048 (3,262,782 – 1,401,315)	Jun 1 – Dec 31 Jul 1 – Dec 31 Aug 1 – Dec 31 Sep 1 – Dec 31 Oct 1 – Dec 31 Nov 1 – Dec 31	**Jun 19** **(Jun 17 – Jun 21)** **Aug 25** **(Jul 31 – Dec 6)** **Nov 5** **(Aug 31 – Dec 12)** **Nov 25** **(Nov 16 – Dec 18)** **Nov 30** **(Nov 20 – Dec 22)** **Dec 5** **(Nov 26 – Dec 27)**	19 (17 - 21) 56 (31 - 159) 97 (31 - 134) 86 (77 - 109) 61 (51 - 83) 35 (26 - 57)	125,374
Action 1, Alternative 4: Tmin*2 with 82% R*incorporates MRIP FES | 18% C					
Rec. ACL*	Projected Rec. Landings (Upper – Lower 95%)	Fishing Season	Rec. Closure Date (Upper – Lower 95%)	Days Open in Rec. Season (Upper – Lower 95%)	Comm. ACL
496,235	2,332,048 (3,262,782 – 1,401,315)	Jun 1 – Dec 31 Jul 1 – Dec 31 Aug 1 – Dec 31 Sep 1 – Dec 31 Oct 1 – Dec 31 Nov 1 – Dec 31	**Jun 19** **(Jun 17 – Jun 22)** **Aug 26** **(Aug 1 – Dec 7)** **Nov 6** **(Sep 2 – Dec 13)** **Nov 25** **(Nov 15 – Dec 19)** **Dec 1** **(Nov 20 – Dec 24)** **Dec 6** **(Nov 26 – Dec 28)**	19 (17 - 22) 57 (32 - 160) 98 (33 - 135) 86 (76 - 110) 62 (51 - 85) 36 (26 - 58)	108,930

Table B2. The projected Gulf of Mexico gag recreational landings (lb gw) and closure dates expected with each proposed management option. Highest observed annual landings between 2017 and 2021 were also used to provide predicted closure dates

associated with those landings. Projected commercial landings (lb gw) and commercial annual catch limits are included for reference. Source: SEFSC Recreational ACL Dataset (March 17, 2022); Southeast Regional Office's (SERO) Catch Share Program database (3/25/2022)

Action 1, Alternative 1: No Action (1,903,000 R*reflects MRIP CHTS | 939,000 C)						
Rec. ACL*	Projected Rec. Landings (Highest observed – Lower 95%)	Fishing Season	Rec. Closure Date (Highest observed)	Days Open in Rec. Season (Highest observed)	Comm. ACL	Projected Comm. Landings
1,903,000	890,244 (1,201,211 – 716,156)	Jun 1 – Dec 31	None	214	939,000	505,681
Action 1, Alternative 2: Tmin*2 with 61% R*incorporates MRIP FES | 39% C						
Rec. ACL*	Projected Rec. Landings (Highest observed – Lower 95%)	Fishing Season	Rec. Closure Date (Highest observed – Lower 95%)	Days Open in Rec. Season (Highest observed – Lower 95%)	Comm. ACL	
403,759	2,332,048 (2,878,806 – 1,401,315)	Jun 1 – Dec 31 Jul 1 – Dec 31 Aug 1 – Dec 31 Sep 1 – Dec 31 Oct 1 – Dec 31 Nov 1 – Dec 31	**Jun 16 (Jul 4 – Jun 18)** **Aug 16 (Sep 4 – Nov 27)** **Oct 25 (Sep 15 – Dec 3)** **Nov 19 (Sep 27 – Dec 9)** **Nov 24 (Oct 27 – Dec 13)** **Nov 29 (Nov 21 – Dec 17)**	16 (34 - 18) 47 (66 - 150) 86 (46 - 125) 80 (27 - 100) 55 (27 - 74) 29 (21 - 47)	258,142	
Action 1, Alternative 3: Tmin*2 with 79.5% R*incorporates MRIP FES | 20.5% C						
Rec. ACL*	Projected Rec. Landings (Highest observed – Lower 95%)	Fishing Season	Rec. Closure Date (Highest observed – Lower 95%)	Days Open in Rec. Season (Highest observed – Lower 95%)	Comm. ACL	
486,204	2,332,048 (2,878,806 – 1,401,315)	Jun 1 – Dec 31 Jul 1 – Dec 31	**Jun 19 (Jul 18 – Jun 21)** **Aug 25 (Sep 9 – Dec 6)**	19 (48 - 21) 56 (71 - 159)	125,374	

		Aug 1 – Dec 31	**Nov 5 (Sep 21 – Dec 12)**	97 (52 - 134)	
		Sep 1 – Dec 31	**Nov 25 (Oct 3 – Dec 18)**	86 (33 - 109)	
		Oct 1 – Dec 31	**Nov 30 (Nov 1 – Dec 22)**	61 (32 - 83)	
		Nov 1 – Dec 31	**Dec 5 (Nov 25 – Dec 27)**	35 (25 - 57)	
Action 1, Alternative 4: Tmin*2 with 82% R*incorporates MRIP FES | 18% C					
Rec. ACL*	Projected Rec. Landings (Highest observed – Lower 95%)	Fishing Season	Rec. Closure Date (Highest observed – Lower 95%)	Days Open in Rec. Season (Highest observed – Lower 95%)	Comm. ACL
496,235	2,332,048 (2,878,806 – 1,401,315)	Jun 1 – Dec 31	**Jun 19 (Jul 20 – Jun 22)**	19 (51 - 22)	108,930
		Jul 1 – Dec 31	**Aug 26 (Sep 10 – Dec 7)**	57 (72 - 160)	
		Aug 1 – Dec 31	**Nov 6 (Sep 22 – Dec 13)**	98 (53 - 135)	
		Sep 1 – Dec 31	**Nov 25 (Oct 3 – Dec 19)**	86 (33 - 110)	
		Oct 1 – Dec 31	**Dec 1 (Nov 2 – Dec 24)**	62 (33 - 85)	
		Nov 1 – Dec 31	**Dec 6 (Nov 25 – Dec 28)**	36 (25 - 58)	

Table B3. The projected Gulf of Mexico gag recreational landings (lb gw) and closure dates expected with each proposed management option. Highest observed monthly landings between 2017 and 2021 were also used to provide predicted closure dates associated with those landings. Projected commercial landings (lb gw) and commercial annual catch limits are included for reference. Source: SEFSC Recreational ACL Dataset (March 17, 2022); Southeast Regional Office's (SERO) Catch Share Program database (3/25/2022)

Action 1, Alternative 1: No Action (1,903,000 R*reflects MRIP CHTS | 939,000 C)

Rec. ACL*	Projected Rec. Landings (Highest observed – Lower 95%)	Fishing Season	Rec. Closure Date (Highest observed)	Days Open in Rec. Season (Highest observed)	Comm. ACL	Projected Comm. Landings
1,903,000	890,244 (1,201,211 – 716,156)	Jun 1 – Dec 31	None	214	939,000	505,681
Action 1, Alternative 2: Tmin*2 with 61% R*incorporates MRIP FES | 39% C						
Rec. ACL*	Projected Rec. Landings (Highest observed – Lower 95%)	Fishing Season	Rec. Closure Date (Highest observed – Lower 95%)	Days Open in Rec. Season (Highest observed – Lower 95%)	Comm. ACL	
403,759	2,332,048 (4,045,842 – 1,401,315)	Jun 1 – Dec 31	**Jun 16 (Jun 15 – Jun 18)**	16 (15 - 18)	16 (14 - 18)	
		Jul 1 – Dec 31	**Aug 16 (Jul 27 – Nov 27)**	47 (27 - 150)	47 (26 - 150)	
		Aug 1 – Dec 31	**Oct 25 (Aug 27 – Dec 3)**	86 (27 - 125)	86 (26 - 125)	
		Sep 1 – Dec 31	**Nov 19 (Sep 27 – Dec 9)**	80 (27 - 100)	80 (71 - 100)	
		Oct 1 – Dec 31	**Nov 24 (Oct 27 – Dec 13)**	55 (27 - 74)	55 (47 - 74)	
		Nov 1 – Dec 31	**Nov 29 (Nov 19 – Dec 17)**	29 (19 - 47)	29 (21 - 47)	
Action 1, Alternative 3: Tmin*2 with 79.5% R*incorporates MRIP FES | 20.5% C						
Rec. ACL*	Projected Rec. Landings (Highest observed – Lower 95%)	Fishing Season	Rec. Closure Date (Highest observed – Lower 95%)	Days Open in Rec. Season (Highest observed – Lower 95%)	Days Open in Rec. Season (Upper – Lower 95%)	
486,204	2,332,048 (4,045,842 – 1,401,315)	Jun 1 – Dec 31	**Jun 19 (Jun 18 – Jun 21)**	19 (18 - 21)	19 (17 - 21)	
		Jul 1 – Dec 31	**Aug 25 (Aug 1 – Dec 6)**	56 (32 - 159)	56 (31 - 159)	
		Aug 1 – Dec 31	**Nov 5 (Sep 1 – Dec 12)**	97 (32 - 134)	97 (31 - 134)	
		Sep 1 – Dec 31	**Nov 25 (Oct 3 – Dec 18)**	86 (33 - 109)	86 (77 - 109)	

		Oct 1 – Dec 31	**Nov 30 (Nov 1 – Dec 22)**	61 (32 - 83)	61 (51 - 83)
		Nov 1 – Dec 31	**Dec 5 (Nov 23 – Dec 27)**	35 (23 - 57)	35 (26 - 57)
Action 1, Alternative 4: Tmin*2 with 82% R*incorporates MRIP FES | 18% C					
Rec. ACL*	Projected Rec. Landings (Highest observed – Lower 95%)	Fishing Season	Rec. Closure Date (Highest observed – Lower 95%)	Days Open in Rec. Season (Highest observed – Lower 95%)	Days Open in Rec. Season (Upper – Lower 95%)
496,235	2,332,048 (4,045,842 – 1,401,315)	Jun 1 – Dec 31	**Jun 19 (Jun 18 – Jun 22)**	19 (18 - 22)	19 (17 - 22)
		Jul 1 – Dec 31	**Aug 26 (Aug 2 – Dec 7)**	57 (33 - 160)	
		Aug 1 – Dec 31	**Nov 6 (Sep 2 – Dec 13)**	98 (33 - 135)	
		Sep 1 – Dec 31	**Nov 25 (Oct 3 – Dec 19)**	86 (33 - 110)	
		Oct 1 – Dec 31	**Dec 1 (Nov 2 – Dec 24)**	62 (33 - 85)	
		Nov 1 – Dec 31	**Dec 6 (Nov 23 – Dec 28)**	36 (23 - 58)	

Commercial landings

Commercial landings for Gulf gag were obtained the Southeast Regional Office's (SERO) Catch Share Program database (3/25/2022; **Figure 2**).

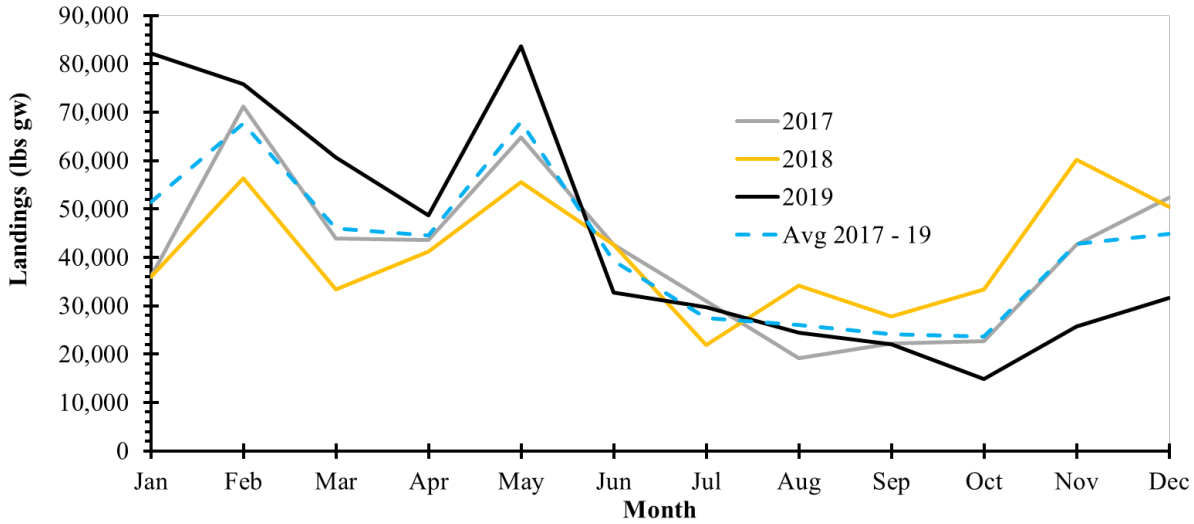


Figure 2. Gulf gag monthly commercial landings (lb gw) for 2017-2019, and average landings from 2017-2019. Source: SERO Catch Share Database (March 25, 2022)

Commercial multi-use allocation

Gulf gag is part of the Grouper-Tilefish individual fishing quota (GT-IFQ) program, which is a multi-species program that requires participants to possess a valid Gulf commercial reef fish permit and allocation to harvest IFQ species. Gag is a species in the program that has additional flexibilities that allow for the harvest of the species using allocation known as multi-use allocation. A portion of the gag or red grouper allocation may be reserved each year for multi-use allocation, which may be used to land either gag or red grouper. The multi-use provision is to ensure that there may be allocation to use if either gag or red grouper are landed as incidental catch. The percentage of multi-use may change each year and may even be zero (**Table 2**). Since 2013, the red grouper multi-use (RGM) and gag multi-use (GGM) allocation was based on formulas (see below) using the commercial quota and the annual catch limits for gag and red grouper. If either stock is under a rebuilding plan, the percentage of the other species multi-use allocation will equal zero. Multi-use allocation cannot be used until all the species-specific allocation has been landed or transferred, including allocation in shareholder and all associated vessel(s) accounts. For example, gag may not be landed under GGM or RGM until there is no GG allocation remaining in the shareholder and associated vessel(s) accounts. Similarly, multi-use allocation may only be transferred after landing or transferring all the corresponding species-specific allocation in the shareholder and associated vessel(s) accounts.

$$RGM\ allocation = 100 * \frac{(Gag\ ACL - Gag\ Commercial\ Quota)}{Red\ Grouper\ Commercial\ Quota}$$

$$GGM\ allocation = 100 * \frac{(Red\ Grouper\ ACL - Red\ Grouper\ Commercial\ Quota)}{Gag\ Commercial\ Quota}$$

There was no RGM allocation from 2011-2014 because gag was under a rebuilding plan. Between 2017 and 2021, multi-use has been set at 43.6% GGM and 3.5% RGM, as the buffers between the ACL and quota for both species remained constant during that time. The majority of RGM and GGM multi-use allocation were used typically to harvest gag (**Table 3**), particularly when the gag stock was under a rebuilding plan. **Table 4** provides multi-use allocation estimates that can be expected depending on the management measures selected to address the notification that gag is overfished and experiencing overfishing. It is possible that multi-use allocation will be used predominantly to land gag during any resulting rebuilding plan, just as was the case in 2011-2014.

Table B4. The percentage of allocation reserved and distributed each year for gag multi-use (GGM) and red grouper multi-use (RGM) allocation.

Year	GGM	RGM
2010	8%	4%
2011	8%	NA
2012	8%	NA
2013	70%	NA
2014	47%	NA
2015	33%	4.8%
2016	33%	4.8%
2017	43.6%	3.5%
2018	43.6%	3.5%
2019	43.6%	3.5%
2020	43.6%	3.5%
2021	43.6%	3.5%
2022	13.8%	11.5%

Table B5. The percentage of allocation used each year to land either red grouper or gag using gag multi-use (GGM) and red grouper multi-use (RGM) allocation. Landings in lb gw are also provided.

Year	RGM		GGM	
	Red Grouper	Gag	Red Grouper	Gag
2010	73% (13,833 lb)	27% (5,091 lb)	28% (2,203 lb)	72% (5,654 lb)
2011	NA	NA	14% (1,474 lb)	86% (8,700 lb)
2012	NA	NA	6% (1,928 lb)	94% (32,230 lb)
2013	NA	NA	1% (4,329 lb)	99% (376,528 lb)
2014	NA	NA	35% (103,151 lb)	65% (188,950 lb)
2015	82% (98,466 lb)	18% (20,998 lb)	26% (33,165 lb)	74% (92,661 lb)

2016	8% (11,441 lb)	92% (135,471 lb)	1% (1,665 lb)	99% (220,088 lb)
2017	11% (6,145 lb)	89% (51,137 lb)	2% (2,198 lb)	98% (116,163 lb)
2018	4% (1,656 lb)	96% (41,364 lb)	0.3% (344 lb)	99.7% (114,984 lb)
2019	38% (43,610 lb)	62% (71,349 lb)	19% (9,209 lb)	81% (39,266 lb)
2020	74% (85,218lb)	27% (30,677 lb)	46% (23,525 lb)	54% (27,701 lb)
2021	96% (235,454 lb)	4% (9,272 lb)	77% (74,919 lb)	23% (22,200 lb)

Table B6. Calculating the percentage of allocation and equivalent pounds that will be reserved and distributed for each Action 1 Alternative for gag multi-use (GGM) and red grouper multi-use (RGM) allocation.

Action 1 Alternatives	Gag ACL	Gag Quota	Red Grouper ACL	Red Grouper Quota	GGM %	RGM %	GGM Pounds	RGM Pounds
Alt 1: (No Action)	1,217,000	939,000	2,530,000	2,400,000	13.8%	11.5%	129,582	257,400
Alt 2: (61% R | 39% C)	257,400	198,584	2,530,000	2,400,000	65%	NA	130,000	NA
Alt 3: (79.5% R | 20.5% C)	135,300	104,384	2,530,000	2,400,000	124.5%	NA	130,000	NA
Alt 4: (82% R | 18% C)	118,800	91,654	2,530,000	2,400,000	142%	NA	130,000	NA

APPENDIX C. OTHER APPLICABLE LAWS

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.) provides the authority for management of stocks included in fishery management plans (FMP) in federal waters of the exclusive economic zone. However, management decision-making is also affected by a number of other federal statutes designed to protect the biological and human components of U.S. fisheries, as well as the ecosystems that support those fisheries. Major laws affecting federal fishery management decision-making include the Endangered Species Act (Section 3.3.3), E.O. 12866 (Regulatory Planning and Review, Chapter 5) and E.O. 12898 (Environmental Justice, Section 3.5). Other applicable laws are summarized below.

Administrative Procedure Act

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

Coastal Zone Management Act

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

Regulations at 15 CFR 930.32(b) state: "A federal agency may deviate from full consistency with an approved management program when such deviation is justified because of an emergency or other similar unforeseen circumstance ("exigent circumstance"), which presents the federal agency with a substantial obstacle that prevents complete adherence to the approved program." The dynamic circumstances supporting the request for the emergency rule, and the associated need to implement this emergency rule qualify as exigent circumstances.

Upon submission to the Secretary of Commerce, NMFS will determine if this plan amendment is consistent with the Coastal Zone Management programs of the states of Alabama, Florida, Louisiana, Mississippi, and Texas to the maximum extent possible. Their determination will

then be submitted to the responsible state agencies under Section 307 of the CZMA administering approved Coastal Zone Management programs for these states.

Data Quality Act

The Data Quality Act (Public Law 106-443) effective October 1, 2002, requires the government to set standards for the quality of scientific information and statistics used and disseminated by federal agencies. Information includes any communication or representation of knowledge such as facts or data, in any medium or form, including textual, numerical, cartographic, narrative, or audiovisual forms (includes web dissemination, but not hyperlinks to information that others disseminate; does not include clearly stated opinions).

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

Scientific information and data are key components of FMPs, amendments, and regulations, consistent with National Standard 2 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), which requires the use of best scientific information available. They should also properly reference all supporting materials and data, and be reviewed by technically competent individuals. With respect to original data generated for FMPs and amendments, it is important to ensure that the data are collected according to documented procedures or in a manner that reflects standard practices accepted by the relevant scientific and technical communities. Data will also undergo quality control prior to being used by the agency and a pre-dissemination review.

National Historic Preservation Act

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

Historical research indicates that over 2,000 ships have sunk on the Federal Outer Continental Shelf between 1625 and 1951; thousands more have sunk closer to shore in state waters during the same period. Only a handful of these have been scientifically excavated by archaeologists for the benefit of generations to come. Further information can be found at: http://www.boem.gov/Environmental-Stewardship/Archaeology/Shipwrecks.aspx

The proposed action does not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places nor is it expected to cause loss or destruction of significant scientific, cultural, or historical resources. In the Gulf of Mexico (Gulf), the *U.S.S. Hatteras*, located in federal waters off Texas, is listed in the National Register of Historic Places. Fishing activity already occurs in the vicinity of this site, but the proposed action would have no additional adverse impacts on listed historic resources, nor would they alter any regulations intended to protect them.

Executive Orders (E.O.)

E.O. 12630: Takings

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

E.O. 12962: Recreational Fisheries

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

E.O. 13089: Coral Reef Protection

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

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

Regulations are already in place to limit or reduce habitat impacts within the Flower Garden Banks National Marine Sanctuary. Additionally, NMFS approved and implemented Generic Amendment 3 for Essential Fish Habitat (GMFMC 2005) and Coral Amendment 9 (GMFMC 2018), which established additional habitat areas of particular concern (HAPCs) and gear restrictions to protect corals throughout the Gulf. There are no implications to coral reefs by the actions proposed in this amendment.

E.O. 13132: Federalism

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

No Federalism issues were identified relative to the action to modify the management of the Gulf gag. Therefore, consultation with state officials under Executive Order 12612 was not necessary. Consequently, consultation with state officials under Executive Order 12612 remains unnecessary.

E.O. 13158: Marine Protected Areas

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