01/15/2025

Modifications to Deep-water Grouper Management Measures

Draft Amendment 58B
to the Fishery Management Plan for
Reef Fish Resources of the Gulf of Mexico

January 2025

This is a publication of the Gulf of Mexico Fishery Management Council Pursuant to National Oceanic and Atmospheric Administration Award No. NA20NMF4410007.

This page intentionally blank

ABBREVIATIONS USED IN THIS DOCUMENT

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

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

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1. INTRODUCTION

1.1 Background

Several species of Gulf of Mexico (Gulf) groupers are currently managed within two distinct complexes: the Other Shallow-water Grouper (SWG) complex and the Deep-water Grouper (DWG) complex. Scamp (*Mycteroperca phenax*), yellowmouth grouper (*Mycteroperca interstitialis*), black grouper (*Mycteroperca bonaci*), and yellowfin grouper (*Mycteroperca venenosa*) are managed under the Other SWG complex. Yellowedge grouper (*Hyporthodus flavolimbatus*), snowy grouper (*Hyporthodus niveatus*), warsaw grouper (*Hyporthodus nigritus*), and speckled hind (*Epinephelus drummondhayi)* are managed under the DWG complex. These species were originally assigned to these complexes under the Generic Annual Catch Limits (ACLs) and Accountability Measures (AMs) Amendment to the Fishery Management Plans (FMPs) of the Gulf of Mexico Region (ACL/AM Amendment; GMFMC 2011). Assignment of these species was, at the time, made with respect to where these species occurred in the Gulf environment, and whether it was common for these species to be caught on the same fishing trips. Until recently, none of these eight species had approved peer-reviewed stock assessments available to inform their stock status[1]. In 2022, a stock assessment of scamp and yellowmouth grouper was completed (SEDAR 68 2022), which assessed both species together as a complex, and passed a peer-review by the Gulf of Mexico Fishery Management Council's (Council) Scientific and Statistical Committee (SSC). The SSC recommended updated status determination criteria (SDC) and catch advice for these two species. To act on these recommendations, the Council initiated work on Amendment 58 to the FMP for the Reef Fish Resources of the Gulf of Mexico (Reef Fish FMP). Following, in 2024, a stock assessment of yellowedge grouper also passed a peer-review by the SSC (SEDAR 85 2023). Likewise, the SSC recommended updated SDC and catch advice for yellowedge grouper. Due to the way in which the SWG and DWG complexes are managed, modifications to the management of these species were originally examined concurrently in draft Amendment 58. In August 2024, to efficiently address necessary management modifications, the Council decided to split draft Amendment 58 into Amendment 58A, which focuses on the SWG species, and Amendment 58B (this document), which focuses on DWG species. As such, discussion of the SWG complex will be limited from this point forward herein.

The DWG complex is managed under a total complex ACL. The commercial sector is apportioned 96.47% of the total complex ACL as specified in the Generic ACL/AM Amendment, and that apportionment and the associated catch limits are shown in Table 1.1.1. The commercial apportionment was implemented to allow the commercial sector to operate under the Grouper-Tilefish Individual Fishing Quota (IFQ) program (Amendment 29 to the Reef Fish FMP; GMFMC 2008b). Landings (2000 – 2023) by species for DWG are shown in Table 1.1.2. The recreational landings data used to develop the current catch limits were derived from

[1] Black grouper had last been assessed in 2010 (SEDAR 19), but an assessment attempted in 2017 (SEDAR 48) had to be terminated due to irreconcilable data issues. Thus, no assessment for informing the stock status of black grouper relative to its SDC exists.

the Marine Recreational Fisheries Statistics Survey (MRFSS). Landings including those using MRFSS data are shown in Table 1.1.3, which is provided only for illustrative and comparative purposes. Recreational landings are now estimated using Marine Recreational Information Program (MRIP), which includes the Access Point Angler Intercept Survey (APAIS) and the Fishing Effort Survey (FES), collectively referred to as MRIP-FES. MRFSS and MRIP-FES both generate estimates in pounds of fish, but those estimates are not directly comparable because they use different methods for estimating fishing effort. Therefore, the total landings shown in Table 1.1.2 cannot be directly compared to the complex ACL shown in Table 1.1.1. A depiction of the percentage of commercial landings attributable to each species within the DWG complex is shown in Figure 1.1.1.

Table 1.1.1. Catch limits and buffers by sector for DWG, as established in the Generic ACL/AM Amendment. Values are in millions of pounds (mp) gutted weight (gw). OFL = overfishing limit; ABC = acceptable biological catch.

Complex	Year	OFL	ABC (Complex ACL)	Comm ACL	Comm Quota	Comm Buffer	Rec ACL
DWG	2016+	1.113	1.105	1.066	1.024	4%	undefined

Table 1.1.2. Landings for DWG by sector from 2000 – 2023. Landings are in lb gw.

	Commercial						Recreational (MRIP-FES)					
Year		**Snowy Grouper**	**Speckled Hind**	**Warsaw Grouper**	**Yellowedge Grouper**	**Total Comm Landings**	**Snowy Grouper**	**Speckled Hind**	**Warsaw Grouper**	**Yellowedge Grouper**	**Total Rec Landings**	**Total Landings**
2000	Pre-IFQ Years, SEFSC Commercial ACL Files (February 2024)	184,381	64,242	161,543	1,349,383	1,759,549	Confidential				13,917	1,773,466
2001		175,591	62,366	145,278	873,682	1,256,917	2,804	3,076	90,316	1,370	97,567	1,354,484
2002		134,999	48,220	217,031	925,582	1,325,832	5,763	1,413	61,520	2,159	70,855	1,396,687
2003		218,137	82,000	265,480	1,291,967	1,857,584	695	13,222	48,588	329	62,834	1,920,418
2004		180,487	101,745	176,895	1,020,564	1,479,691	3,273	25,546	89,214	1,162	119,194	1,598,885
2005		182,647	88,636	164,292	918,521	1,354,096	1,771	158	29,522	105,090	136,541	1,490,637
2006		171,616	64,620	140,662	824,952	1,201,850	1,610	42,667	84,972	2,546	131,796	1,333,646
2007		175,531	79,784	86,376	1,002,080	1,343,771	1,035	5,316	9,498	2,822	18,672	1,362,443
2008		199,782	41,187	88,622	946,423	1,276,014	2,426	958	17,434	1,252	22,069	1,298,083
2009		183,998	68,292	117,695	972,112	1,342,097	1,727	697	42,449	3,209	48,081	1,390,178
2010	Gulf IFQ Program	90,180	15,359	56,496	443,887	605,922	11,177	14,006	5,507	28,403	59,094	665,016
2011		132,971	24,925	61,661	558,908	778,465	8,108	2,419	6,621	9,461	26,609	805,074
2012		168,759	43,344	86,212	667,785	966,100	69,469	4,115	35,329	1,212	110,125	1,076,225
2013		108,689	34,922	103,074	673,349	920,034	50,297	205	18,774	6,198	75,474	995,508
2014		159,857	72,241	75,426	773,621	1,081,145	61,282	508	72,897	18,982	153,669	1,234,814
2015		108,980	55,550	55,502	735,218	955,250	12,174	778	3,636	15,669	32,258	987,508
2016		94,830	41,151	44,635	709,349	889,965	3,365	14,666	8,773	22,637	49,441	939,406
2017		87,587	51,061	44,362	677,926	860,936	2,167	345	8,969	4,139	15,619	876,555
2018		89,416	60,618	35,976	677,310	863,320	6,335	363	55,304	39,221	101,224	964,544
2019		91,430	67,082	33,590	804,558	996,660	5,401	5,665	3,225	74,516	88,807	1,085,467
2020		99,072	36,187	22,707	665,406	823,372	4,883	222	18,865	33,522	57,491	880,863
2021		91,362	41,451	17,419	681,679	831,911	11,873	288	2,216	15,286	29,663	861,574
2022		76,075	27,776	15,012	461,661	580,524	15,335	838	2,850	19,826	38,848	619,372
2023		64,877	34,297	12,056	514,547	625,777	10,362	2,856	2,906	52,314	68,438	694,215

Sources: Commercial data from SEFSC Commercial ACL Data (March 2024); SERO Catch Share Database (February 2024). Recreational data from SEFSC Recreational MRIP-FES ACL File (MRIP_FES_rec81_24wv3_23Aug24).

Table 1.1.3. Landings for DWG by sector from 2000 – 2023, using MRFSS data for the recreational sector. Landings are in lb gw.

Year	Total Comm Landings	Comm Quota (96% of Comm ACL)	Total Rec Landings (MRFSS)	Total Landings	DWG Complex ACL	% DWG ACL Landed
2013	920,034	1,024,000	60,773	980,807	1,105,000	88.8%
2014	1,081,145	1,024,000	81,938	1,163,083	1,105,000	105.3%
2015	955,250	1,024,000	28,065	983,315	1,105,000	89.0%
2016	889,965	1,024,000	28,589	918,554	1,105,000	83.1%
2017	860,936	1,024,000	13,765	874,701	1,105,000	79.2%
2018	863,320	1,024,000	67,123	930,443	1,105,000	84.2%
2019	996,660	1,024,000	75,513	1,072,173	1,105,000	97.0%
2020	823,372	1,024,000	32,977	856,349	1,105,000	77.5%
2021	831,911	1,024,000	30,771	862,682	1,105,000	78.1%
2022	580,524	1,024,000	44,869	625,393	1,105,000	56.6%
2023	625,777	1,024,000	33,801	659,578	1,105,000	59.7%

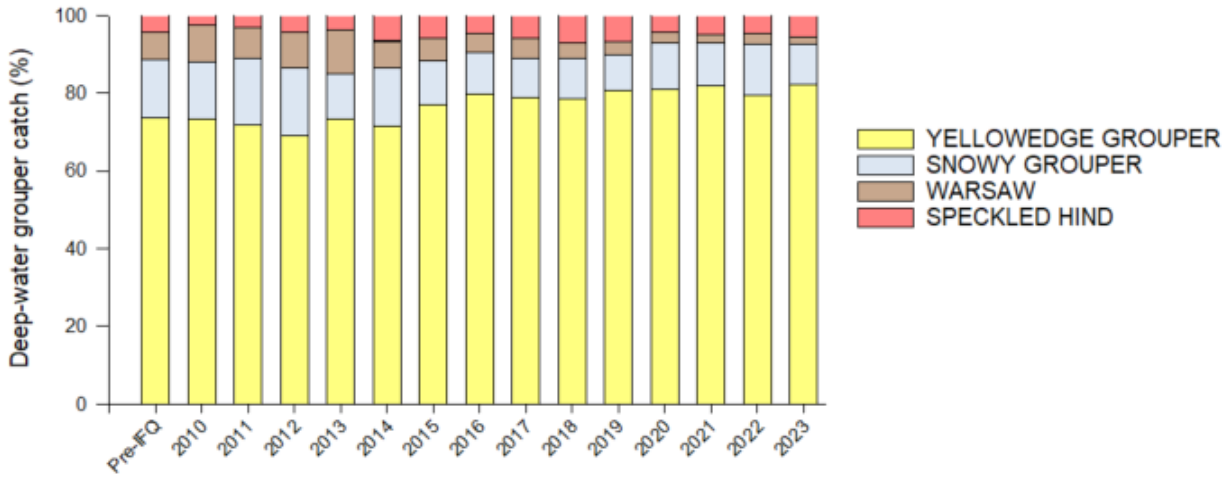

Figure 1.1.1. Percentages of commercial landings by species for the DWG complex from the 2023 Grouper-Tilefish IFQ Program Report[2]. Data for the years prior to the start of the IFQ program are summarized as "Pre-IFQ".

Commercial Sector

Commercial harvest of DWG has been managed under the Grouper-Tilefish IFQ program since 2010 (GMFMC 2008b). Anyone commercially fishing for DWG must possess a federal commercial reef fish permit and DWG allocation under the IFQ program. IFQ allocation is

[2] https://noaa-sero.s3.amazonaws.com/drop-files/cs/2023_GT_AnnualReport_FINAL.pdf

determined and distributed at the beginning of each calendar year by multiplying a shareholder's IFQ DWG shares, represented as a fraction of the total commercial quota, times the commercial quota for that year and complex. The current commercial quota is set 4% below the commercial ACL (GMFMC 2011; Table 1.1.1). The buffer between the commercial quota and the commercial ACL was put in place to account for uncertainty with discards from the implementation of the IFQ program, and it was noted that this buffer could be re-evaluated with time. The IFQ program acts as the AM for the commercial sector for DWG, and the commercial quota has never been exceeded under the IFQ program.

SWG and DWG Flexibility Measures

Amendment 29 to the Reef Fish FMP (GMFMC 2009) established flexibility measures between the SWG and DWG complexes, in order to reduce discards and allow commercial fishermen to better use the allocation they have in a given fishing year. These measures were implemented without regard to a species' stock status. A graphical depiction of these flexibility measures is shown in Figure 1.1.2. Briefly:

- A shareholder may land scamp under their DWG allocation, so long as they have no SWG allocation remaining in their shareholder account or any associated vessel accounts.
- A shareholder may land warsaw grouper or speckled hind under their SWG allocation, so long as they have no DWG allocation remaining in their shareholder account or any associated vessel accounts.

Because of modifications to the SWG complex structure and catch limits for scamp and yellowmouth grouper, these flexibility measures will be evaluated in Amendment 58A.

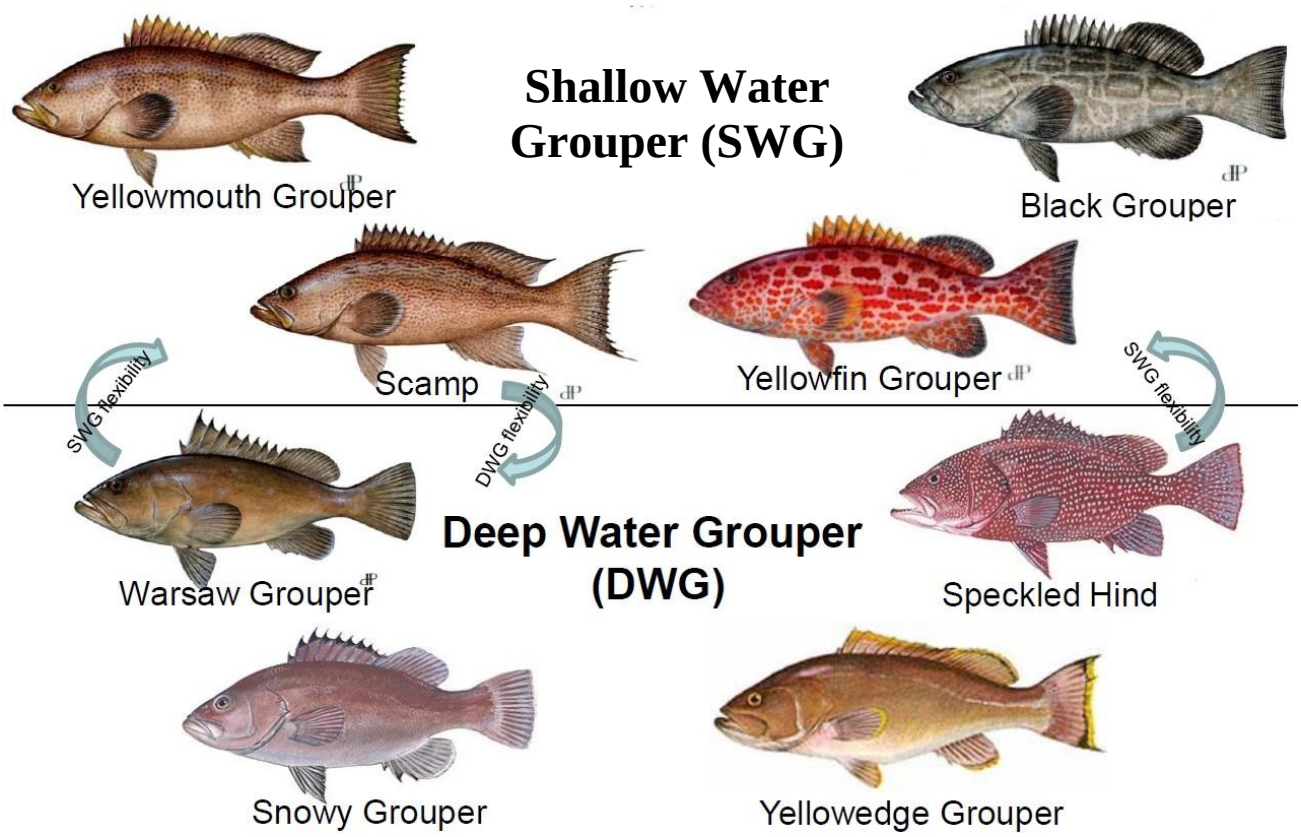

Figure 1.1.2. Depiction of the SWG and DWG flexibility measures as defined in Amendment 29 to the Reef Fish FMP.

Recreational Sector

Recreational fishing for DWG occurs primarily via hook-and-line. All species can be caught throughout the Gulf. Recreational landings comprise an increasing proportion of landings in recent history, yet still comprise a minority fraction of landings for DWG (see Table 1.1.2).

Presently, there is no defined ACL for the recreational sector for DWG. It is assumed that the difference between the sector apportionment for the commercial ACL from the Generic ACL/AM Amendment and the total complex ACL is for the recreational sector to harvest. Because the commercial sector operates under an IFQ program, the pounds available to the commercial sector are released to shareholder accounts on January 1 each year and cannot be recalled. Thus, outside of the use of the IFQ program as the AM for the commercial sector, the only other AM for the DWG complex is a post-season AM for the recreational sector, which states that in the year following an overage, fishing will close for the recreational sector if the complex ACL is projected to be reached. No payback provision for an overage of the complex ACL currently exists. The complex ACL has not been exceeded since implementation of the IFQ program in 2010, and thus the closure and payback provision has not been invoked. However, because the AM is based on reaching the combined (commercial and recreational) ACL, it would allow for overfishing each year since the recreational (undefined) catch limit could be exceeded prior to the commercial fishery harvesting its IFQ quota. This scenario is

especially more likely to occur given the vast reductions in catch limits being proposed in this document.

Recreational Data

Federal Data Collection Programs

The National Marine Fisheries Service (NMFS) created the MRFSS in 1979. In the Gulf, MRFSS collected recreational catch and effort data, including DWG species, beginning in 1981. MRFSS included both offsite telephone surveys and onsite interviews at marinas and other points where recreational anglers fish. In 2008, the 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 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, by extending the time period dockside samplers stayed at an assigned location (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 (NMFS 2019).

MRIP transitioned from the legacy Coastal Household Telephone Survey (CHTS) to a new mail survey (FES) 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 (NMFS 2019). This is because the FES is designed to measure fishing activity more accurately than the CHTS, albeit while recognizing a greater degree of uncertainty in those landings estimates. 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 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.

2023 MRIP-FES Pilot Study and 2024 Comprehensive Study

At the August 2023 Council meeting, the National Oceanic and Atmospheric Administration (NOAA) Office of Science and Technology (OST) discussed the release of a pilot study (NOAA 2023[3]), which evaluated potential respondents' bias (e.g., recall error) in the mail portion of the recreational FES survey used to estimate effort. The 2023 pilot study evaluated this bias for a portion of the year across several states, and preliminary results suggest the order of the questions in the survey led to overestimation of fishing effort by MRIP-FES. As a result of this, NOAA OST is conducting a more comprehensive pilot study which began in 2024, will be independently peer-reviewed in early 2025, and will then be available for evaluation by data users (e.g., the Southeast Fisheries Science Center [SEFSC], Southeast Regional Office [SERO], and the Council) thereafter.

Recent Stock Assessments and Catch Projections

SEDAR 85 (2023)

A stock assessment for yellowedge grouper (SEDAR 85) was completed in 2023 using data through 2021. This assessment used updated recreational landings information informed by MRIP-FES. However, because recreational landings make up such a small fraction of total yellowedge grouper removals (Table 1.1.3), they were combined with the commercial vertical line fleet for the assessment. These fleets were combined due to similarities in their estimated selectivity and retention functions (i.e., ages and lengths of fish caught by this gear type and kept). In reviewing SEDAR 85, the Council's SSC determined that the proxy value for maximum sustainable yield (MSY), set at the yield when fishing at $F_{30\%SPR}$, was not biologically appropriate for protogynous hermaphrodites like yellowedge grouper. Thus, the SSC recommended changing the MSY proxy to a more conservative yield when fishing at $F_{40\%SPR}$. Based on this proxy, yellowedge grouper was not overfished, but was experiencing overfishing, as of 2021 (Table 1.1.4.). During its review of SEDAR 85, the SSC recommended revised catch limits for yellowedge grouper, which are expected to end overfishing and are shown in Table 1.1.5.

[3] https://www.fisheries.noaa.gov/recreational-fishing-data/fishing-effort-survey-research-and-improvements

Table 1.1.4. Summary of Magnuson-Stevens Act benchmarks and reference points for the SEDAR 85 assessment. Spawning stock biomass (SSB) is in metric tons (male and female combined SSB), whereas F is a harvest rate (total biomass killed all ages / total biomass age 1+). An SPR proxy of 40% is presented.

Criteria	Definition	Value
SSB_0	Virgin SSB	13,197
$F_{MSYProxy}$	Equilibrium F to achieve 40% SPR	0.044
MFMT	$F_{MSYProxy}$	0.044
$F_{Current}$	Geometric mean of $F_{2019-2021}$	0.047
$F_{Current}$/MFMT	Current overfishing status	**1.08**
$SSB_{MSYProxy}$	Equilibrium SSB at $F_{40\%SPR}$	4,842
MSST	0.75 * $SSB_{40\%SPR}$	3,632
$SSB_{Current}$	SSB in 2021	6,017
$SSB_{Current}/SSB_{MSYProxy}$	Stock status based on $SSB_{40\%SPR}$	1.24
$SSB_{Current}$/MSST	Stock status based on MSST	**1.66**
$SSB_{Current}/SSB_0$	SSB in 2021 compared to virgin SSB	0.46

Table 1.1.5. SSC recommended OFL and ABC values for yellowedge grouper, based on the results of SEDAR 85 (2023) and using an MSY proxy of the yield when fishing at $F_{40\%SPR}$. Catch limits are in lb gw.

Year	OFL	ABC
2025 – 2029+	487,000	372,000

The SSC also recommended updated catch limits for snowy grouper, warsaw grouper, and speckled hind, using landings calibrated to MRIP-FES to inform recreational landings (Table 1.1.6). The SSC used Tier 3b of the Council's ABC Control Rule[4], which is reserved for unassessed and data-poor species, since none of these three species have a peer-reviewed stock assessment to use to inform management decisions.

Table 1.1.6. SSC recommended OFL and ABC values for snowy grouper, warsaw grouper, and speckled hind in lb gw.

Year	OFL	ABC
2025+	244,035	183,026

The SSC thought it appropriate, in the case of DWG, to continue managing all four species together as a complex (Table 1.1.7) by adding the OFL and ABC values for yellowedge grouper

[4] Tier 3b of the Council's ABC Control Rule is used when there is no stock assessment available (as is the case for three of the four DWG species), but landings data exist. Based on SSC judgement, recent landings may be unsustainable. The OFL is then set equal to the mean of the landings from a representative time series, typically the most recent 10 years. The ABC is then set representative of an acceptable level of risk relative to scientific uncertainty. The default choice is to set the ABC at 75% of the OFL, but the SSC can use another percentage with justification (GMFMC 2012).

to the values for snowy grouper, warsaw grouper, and speckled hind. Since several DWG species inhabit similar environments, the SSC acknowledged the difficulty for fishermen attempting to avoid catching yellowedge grouper when targeting other DWG species. Managing all four DWG species together under combined catch limits is expected to reduce overall discard mortality.

Table 1.1.7. SSC combined DWG OFL and ABC recommendations in lb gw.

Year	OFL	ABC
2025 – 2029+	731,035	555,026

Expected Management Considerations

The Council is considering revising the MSY proxy for yellowedge grouper given the SSC's recommendation to modify that proxy to the yield when fishing at $F_{40\%SPR}$ for that species. Due in large part to the magnitude of the reduction of the DWG ABC compared to the current landings for the DWG complex, it is possible that the number of DWG discards could increase. Thus, the establishment of the separate yellowedge grouper catch limits likely requires further evaluation of expected discards. The SSC recommended keeping the four DWG species in the same complex for management to reduce discards, which would be expected to be vulnerable to considerable discard mortality due to the deeper depths from which those species are harvested (greater than 100 meters or 330 feet). Because the portion of the DWG stock ACL available to the recreational sector for harvest is less than that sector's recent landings (see Table 1.1.2), the Council is considering establishing a recreational ACL, and reconsidering sector allocations. Further, due to the changes proposed to DWG, the Council is considering changes to the current AMs to prevent overfishing.

1.2 Purpose and Need

The purpose of this amendment is to modify the status determination criteria, sector allocations, catch limits, and accountability measures of the DWG complex species in response to recent stock assessment results.

The need for these actions is to use the best scientific information available, based on the recent stock assessment, to implement measures to end overfishing of yellowedge grouper, and to achieve optimum yield for the species considered herein, consistent with the authority under the Magnuson-Stevens Fishery Conservation and Management Act.

1.3 History of Management

This section focuses specifically on management modifications affecting the DWG complex.

Amendment 1 to the Reef Fish FMP, including an environmental assessment (EA), regulatory impact review (RIR), and regulatory flexibility analysis (RFA), implemented in 1990, set objectives to stabilize long-term population levels of all reef fish species by establishing a survival rate of biomass into the stock of spawning age fish to achieve at least 20% spawning stock biomass per recruit by January 1, 2000. It set a five-grouper recreational daily bag limit;

allowed a 2-day possession limit for charter vessels and head boats on trips that extend beyond 24 hours, provided the vessel has two licensed operators aboard as required by the U.S. Coast Guard, and each passenger can provide a receipt to verify the length of the trip; set an 11.0 mp commercial quota for grouper, with the commercial quota divided into a 9.2 mp SWG (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 DWG (misty grouper, snowy grouper, yellowedge grouper, and warsaw grouper, and scamp once the SWG quota was filled) quota; established a longline and buoy gear boundary at the 50-fathom depth contour west of Cape San Blas, Florida, and the 20-fathom depth contour east of Cape San Blas, inshore of which the directed harvest of reef fish with longline gear and buoy gear was prohibited, and the retention of reef fish captured incidentally in other longline operations (e.g., sharks) was limited to the recreational daily bag limit; limited trawl vessels to the recreational size and daily bag limits of reef fish; established fish trap permits (up to 100 fish traps per permit holder); and established a commercial reef fish vessel permit.

Amendment 3 to the Reef Fish FMP, including an EA, RIR, and RFA and implemented in July 1991, transferred speckled hind from the SWG quota category to the DWG quota category.

Amendment 5 to the Reef Fish FMP, including an EA, RIR, and RFA and implemented in February 1994, established restrictions on the use of fish traps in the Gulf exclusive economic zone (EEZ); implemented a three-year moratorium on the use of fish traps by creating a fish trap endorsement for fishermen with historical landings; created a special management zone (SMZ) with gear restrictions off the Alabama coast; created a framework procedure for establishing future SMZ's; required that all finfish except for oceanic migratory species be landed with head and fins attached; and closed the region of Riley's Hump (near Dry Tortugas, Florida) to all fishing during May and June to protect mutton snapper spawning aggregations.

A **Framework Action**, including an EA, RIR, and RFA implemented in June 2000 established two marine reserves (Steamboat Lumps and Madison-Swanson) that are closed year-round to fishing for all species under the Council's jurisdiction.

Secretarial Amendment 1 to the Reef Fish FMP, including EIS, RIR, IRFA, and effective July 2004, reduced the DWG quota from 1.6 mp ww (equal to 1.35 mp landed weight) to 1.02 mp gw.

An **October 2005 Regulatory Amendment**, including EA, RIR, IRFA and implemented in January 2006, established an aggregate DWG and SWG commercial trip limit of 6,000 lb gw.

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

Amendment 30B to the Reef Fish FMP, including a final Supplemental Environmental Impact Statement (SEIS), RIR and IRFA, implemented May 2009, repealed the commercial closed season of February 15 to March 15 on gag, black and red grouper, and replaced it with a January through April seasonal area closure to all fishing at the Edges 40-fathom contour, a 390-nautical square mile gag spawning region northwest of Steamboat Lumps. In addition, the Steamboat Lumps and Madison-Swanson fishing area restrictions were continued indefinitely. For the

recreational sector, the amendment reduced the aggregate grouper bag limit from five fish to four. Finally, the amendment required that all 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 to the Reef Fish FMP, 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, of which only 750 may be rigged for fishing.

Amendment 44 to the Reef Fish FMP standardized the MSST for certain reef fish species. The MSST is used to determine whether a stock is overfished; if the biomass of the stock falls below the threshold, then the stock is overfished. The MSST for several reef fish species was set equal to 50% of the biomass at MSY. This amendment was approved on December 21, 2017.

Amendment 36A to the Reef Fish FMP, including EIS, RIR and IRFA and implemented in January 2019, requires all reef fish permitted vessels landing federally managed reef-fish to land at approved locations and hail-in at least 3 hours, but no more than 24 hours before landing. The Amendment returns red snapper and grouper-tilefish shares from non-activated individual fishing quota (IFQ) accounts to the NMFS for redistribution and allows NMFS to withhold a portion of IFQ allocation at the start of the year equal to an anticipated quota reduction.

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action 1: Modification of Deep-Water Grouper Maximum Sustainable Yield (MSY) Proxy, Overfishing Limit (OFL), Acceptable Biological Catch (ABC), and Complex Annual Catch Limit (ACL)

Alternative 1: No Action. Maintain the current MSY proxy, OFL, ABC, and complex ACL. The MSY proxy is the yield when fishing at 30% spawning potential ratio ($F_{30\%SPR}$), the OFL is 1.113 mp gw, the ABC and complex ACL are 1.105 mp gw.

Alternative 2: Revise the MSY proxy and catch limits for the DWG complex based on the Gulf of Mexico (Gulf) Fishery Management Council's (Council) Scientific and Statistical Committee's (SSC) recommendations. The OFL and ABC for yellowedge grouper would be set based on an MSY proxy of the yield when fishing at $F_{40\%SPR}$, and the yield when fishing at 75% of the F_{MSY} proxy, respectively. The OFL and ABC for the three remaining species would be based on Tier 3b of the Council's ABC Control Rule. The DWG MSY proxy would be the yield when fishing at $F_{40\%SPR}$. The OFL and ABC for yellowedge grouper and the three remaining species would be combined, and all four species would be managed as a single complex with a complex OFL of 731,035 lb gw, and an ABC of 555,026 lb gw. The complex ACL would be set equal to the ABC.

Note: *Alternative 1 is not a viable alternative because the stock assessment used to determine the catch limits in Alternative 1 included recreational data from the Marine Recreational Fisheries Statistics Survey (MRFSS) which is no longer in operation. Subsequent catch limit recommendations have used more contemporary data that are recognized as consistent with the best scientific information available.*

Discussion:

Yellowedge grouper were assessed in the Gulf through SEDAR 85 (2023), which estimated that while the stock was not overfished as of 2021, it was experiencing overfishing. The Council's SSC evaluated SEDAR 85 and found the analyses to be consistent with the best scientific information available at its February 2024 meeting. The SSC recommended that the OFL and ABC for yellowedge grouper be 487,000 lb gw and 372,000 lb gw, respectively. The SSC then evaluated updated catch limits for the other three DWG complex species: snowy grouper, warsaw grouper, and speckled hind. These updated landings were informed by the Marine Recreational Information Program (MRIP) Fishing Effort Survey (FES) for the recreational private vessel landings. The SSC recommended that the OFL and ABC for the remaining three DWG complex species for 2025 and subsequent years be 244,035 lb gw and 183,026 lb gw, respectively. Since DWG species inhabit similar environments, the SSC acknowledged the difficulty fishermen would have of attempting to avoid catching yellowedge grouper when targeting other DWG species. Therefore, the SSC also recommended maintaining yellowedge grouper as part of the DWG complex. Catch advice for yellowedge grouper informed by

SEDAR 85 is added to the OFL and ABC (calculated using Tier 3b of the ABC Control Rule) for the rest of the DWG complex to obtain the complex catch limits. This determination maintains the current management structure for this complex.

Alternative 1 would maintain the current MSY proxy, OFL and ABC for the DWG complex, at the yield when fishing at $F_{30\%SPR}$, 1.113 mp gw and 1.105 mp gw, respectively. The MSY proxy in **Alternative 1** was established in Amendment 48 to the Fishery Management Plan (FMP) for the Reef Fish Resources of the Gulf of Mexico (Reef Fish FMP). At that time, there was no defined MSY proxy for any of the species in the DWG complex. The catch limits in **Alternative 1** were based on the results of SEDAR 22 for yellowedge grouper and Tier 3b of the ABC Control Rule for the other three species, which used recreational landings data from MRFSS. MRFSS has not been in use since 2013. The catch limits in **Alternative 1** are no longer consistent with the best scientific information available. Thus, **Alternative 1** is not a viable alternative.

Alternative 2 would revise the catch limits for the DWG complex based on the SEDAR 85 stock assessment for yellowedge grouper, Tier 3b of the Council's ABC Control Rule for the other three DWG species, and the SSC's recommendations from its February 2024 meeting, which incorporated MRIP-FES data for recreational private vessel landings. The DWG complex OFL would be 731,035 lb gw, and the ABC would be 555,026 lb gw. **Alternative 2** would also modify the MSY proxy for the DWG complex to be the yield when fishing at $F_{40\%SPR}$, based on the SSC's recommendations for yellowedge grouper and the similarities between the species in the DWG complex with respect to their life histories. The SSC recommended changing the yellowedge grouper MSY proxy because yellowedge grouper reaches sexual maturity at older ages relative to other Gulf groupers (half of females are sexually mature by age-9, compared to age-3 in red grouper) and is longer lived (maximum age is estimated at 85 years, SEDAR 85 2023). The other species in the complex are not as long-lived as yellowedge grouper but share other similar characteristics such as later maturity at age (Stevens et al. 2019). Amendment 48 to the Reef Fish FMP provides that for future assessments of reef fish stocks, the MSY proxy equals the yield produced by the F_{Proxy} recommended by the SSC and subject to approval by the Council through a plan amendment. This amendment recognizes the SSC's recommendation for yellowedge grouper and because yellowedge is managed as part of the DWG complex, and the other species in the complex have similar life histories, adopts this new MSY proxy for the complex.

To reduce the likelihood of dead discards, all four DWG complex species would continue to be managed as a single complex under **Alternative 2**. Despite combining the yellowedge grouper OFL and ABC with the three other DWG species, the recommended catch limits are expected to end and prevent overfishing of yellowedge grouper. This is due in part to the historical composition of landings from the DWG complex, in that the other three species are expected to account for some fraction of landings for that complex (approximately 20% for 2019 – 2023; see Table 1.1.2).

Compared to **Alternative 1**, **Alternative 2** is a reduction in allowable catch of approximately 50%. This is due to three main factors. First, the use of the more conservative MSY proxy ($F_{40\%SPR}$) for yellowedge grouper results in a reduction in allowable yield compared to

Alternative 1, as more of the spawning stock biomass is conserved. Second, when evaluating the projections for yellowedge grouper, the SSC used the average recruitment to the population from 1998 – 2012 to inform future recruitment from the yellowedge grouper stock. This decision recognized lower recruitment during the time period in which recruitment was estimable, and results in a lower yield projection to account for that. Third, the yield projections informing **Alternative 2** are designed to end overfishing, as it is currently occurring under **Alternative 1**.

2.2 Action 2: Modification of Deep-Water Grouper Sector ACLs and Sector Allocations

Note: This Action assumes that Alternative 2 in Action 1 is selected as the Preferred Alternative. Therefore, Alternative 1 reflects the status quo method of specifying the catch limits but uses the ABC from Alternative 2 in Action 1 used to specify the complex ACL.

Alternative 1: No Action. Based on the Generic ACL/AM Amendment, the DWG ACL provides 96.50% of the complex ACL for the commercial sector based on landings during 2001-2004. The recreational sector's ACL is unspecified.

The complex ACL is set equal to the ABC. Based on the DWG complex OFL of 731,035 lb gw, and the ABC of 555,026 lb gw, the commercial ACL is 535,600 lb gw. The commercial quota is reduced from the commercial ACL by 4%[5] and is set at 514,176 lb gw[6]. As described in the Generic ACL/AM Amendment, the recreational harvest is managed through the current recreational accountability measures. These values are shown in the table below in lb gw.

Complex	Year	OFL	ABC (Complex ACL)	Comm ACL	Comm Quota	Rec ACL
DWG	2025-2029+	731,035	555,026	535,600	514,176	Undefined

Alternative 2: The complex ACL is set equal to the complex ABC. Establish a recreational ACL and sector allocation based on the average recreational landings as used in the Generic ACL/AM Amendment (2001 – 2004). This results in a recreational ACL of 19,426 lb gw, or 3.50% of the complex ACL. The commercial sector is allocated 96.50% of the complex ACL, or 535,600 lb gw. The commercial quota is reduced from the commercial ACL by 4% and is set at 514,176 lb gw. The recreational and commercial ACLs sum to equal the DWG complex ACL. These values are shown in the table below in lb gw.

[5] The 4% reduction in the commercial quota from the commercial ACL was implemented with the Grouper-Tilefish Individual Fishing Quota (IFQ) program. The buffer accounts for flexibility measures which allow for a system of cross-use of allocation between the DWG and Other Shallow-water Grouper share categories, and for any other variability in landings associated with the institution of the program or new participation.

[6] The commercial ACL and commercial quota are presently codified in the federal regulations as 1.067 million pounds gutted weight (mp gw) and 1.024 mp gw, respectively; while, the recreational ACL is not, as of January 15, 2025.

Complex	Year	OFL	ABC (Complex ACL)	Comm ACL	Comm Quota	Rec ACL
DWG	2025-2029+	731,035	555,026	535,600	514,176	19,426

Alternative 3: The complex ACL is set equal to the complex ABC. Establish a recreational ACL and sector allocation based on the average recreational landings from the most recent 5 years (2019 – 2023; see Table 1.1.2.). This results in a recreational ACL of 56,649 lb gw, or approximately 10.21% of the complex ACL. The commercial sector is allocated approximately 89.79% of the complex ACL, or 498,377 lb gw. The commercial quota is reduced from the commercial ACL by 4% and is set at 478,441 lb gw. The recreational and commercial ACLs sum to equal the DWG complex ACL. These values are shown in the table below in lb gw.

Complex	Year	OFL	ABC (Complex ACL)	Comm ACL	Comm Quota	Rec ACL
DWG	2025-2029+	731,035	555,026	498,377	478,441	56,649

Alternative 4: The complex ACL is set equal to the complex ABC. Establish a recreational ACL and sector allocation based on an equal reduction in the landings from the recreational and commercial sectors from the most recent 5 years (2019 – 2023; see Table 1.1.2), such that the resulting sector ACLs do not exceed the complex ACL proposed in Action 1. This results in a recreational ACL of 37,964 lb gw, or approximately 6.84% of the complex ACL. The commercial sector is allocated approximately 93.16% of the complex ACL, or 517,062 lb gw. The commercial quota is reduced from the commercial ACL by 4% and is set at 496,380 lb gw. The recreational and commercial ACLs sum to equal the DWG complex ACL. These values are shown in the table below in lb gw.

Complex	Year	OFL	ABC (Complex ACL)	Comm ACL	Comm Quota	Rec ACL
DWG	2025-2029+	731,035	555,026	517,062	496,380	37,964

Alternative 5: The complex ACL is set equal to the complex ABC. Establish a recreational ACL and sector allocation based on the average landings from the recreational and commercial sectors from 2001 – 2004 (see Table 1.1.2). This results in a recreational ACL of 31,026 lb gw, or 5.59% of the complex ACL. The commercial sector is allocated 94.41% of the complex ACL, or 524,000 lb gw. The commercial quota is reduced from the commercial ACL by 4% and is set at 503,040 lb gw. The recreational and commercial ACLs sum to equal the DWG complex ACL. These values are shown in the table below in lb gw.

Complex	Year	OFL	ABC (Complex ACL)	Comm ACL	Comm Quota	Rec ACL
DWG	2025-2029+	731,035	555,026	524,000	503,040	31,026

Alternative 6: The complex ACL is set equal to the complex ABC. Establish a recreational ACL and sector allocation based on the average landings from the recreational and commercial sectors from 2000 – 2023 (see Table 1.1.2). This results in a recreational ACL of 32,747 lb gw, or approximately 5.90% of the complex ACL. The commercial sector is allocated approximately 94.10% of the complex ACL, or 522,279 lb gw. The commercial quota is reduced from the commercial ACL by 4% and is set at 501,388 lb gw. The recreational and commercial ACLs sum to equal the DWG complex ACL. These values are shown in the table below in lb gw.

Complex	Year	OFL	ABC (Complex ACL)	Comm ACL	Comm Quota	Rec ACL
DWG	2025-2029+	731,035	555,026	522,279	501,388	32,747

Discussion:

Currently, there is no specified DWG ACL for the recreational sector. However, the commercial ACL was specified as 96.5% of the complex ACL (**Alternative 1**) so there would be a portion of the total ACL unallocated which would be sufficient to allow the historical recreational fishery to continue (GMFMC 2011). However, there are no in-season measures that limit recreational harvest. The post-season AM only limits recreational harvest (in the year following an overage of the complex ACL) after the complex ACL has been reached. And, that AM could still allow for overfishing since recreational landings could exceed the 3.5% of the total ACL prior to closure of the recreational fishery, while still allowing harvest of the entire commercial quota. This is because the AM allows NMFS to close the recreational sector only if the sum of commercial and recreational landings reaches or is projected to reach the total ACL, and the commercial sector operates under the Grouper-Tilefish IFQ program, which allows commercial fishing year-round. Therefore, total commercial landings cannot be determined until the fishing year is over. The current commercial allocation is based on that sector's average landings from 2001 – 2004. The recreational landings used to establish the allocation scenario in **Alternative 1** was based on recreational data from MRFSS. Because of the transition to MRIP-FES data for the recreational sector (which estimates greater historical recreational landings than MRFSS), and the increase in recreational landings estimated in the SEDAR 85 stock assessment, additional recreational removals are not accounted for in **Alternative 1**. This means that despite the reduction in the catch limits recommended by the Council's SSC, the increased proportion of landings attributable to the recreational sector as estimated by MRIP-FES do not also increase that sector's portion of the DWG complex ACL. Thus, the commercial sector is inherently benefitting from a sector allocation standpoint if the sector allocation does not explicitly account for the change from MRFSS to MRIP-FES. **Alternative 2** would establish a recreational ACL

and sector allocation using the same percentages used in **Alternative 1**. Thus, **Alternative 2** would also benefit the commercial sector by retaining the same allocation scenario as represented in **Alternative 1**. However, having a recreational ACL would allow for the establishment of a more effective recreational AM (see Action 3).

Alternative 3 would establish a recreational ACL and sector allocation based on the average recreational landings from the most recent 5 years (2019 – 2023; see Table 1.1.2.). This time period includes 2020, during which the COVID-19 pandemic resulted in various spatiotemporal effects on fishing effort and landings. However, the DWG landings do not demonstrate any obvious effect from this during 2020. Overall commercial fishing effort, and landing per trip, are similar to surrounding years (e.g., 2018-2019, 2021-2022). Thus, 2020 data are included here. The recreational ACL would equal 56,649 lb gw, or approximately 10.21% of the complex ACL. The commercial ACL would equal 498,377 lb gw, or approximately 89.79% of the complex ACL. The commercial quota is reduced from the commercial ACL by 4% and is set at 478,441 lb gw. **Alternative 3** would give more weight to recent recreational landings, which have ranged from as low as 29,663 lb gw to as high as 88,807 lb gw. Under **Alternative 3**, the recreational ACL would have been exceeded in 3 of the last 5 years (2019, 2020, and 2023).

Alternative 4 would establish a recreational ACL and sector allocation based on an equal reduction in the landings from the recreational and commercial sectors from 2019 – 2023, based on the landings in Table 1.1.2, such that the resulting sector ACLs do not exceed the complex ACL proposed in Action 1. This results in a recreational ACL of 37,964 lb gw, or approximately 6.84% of the complex ACL. The commercial sector is allocated approximately 93.16% of the complex ACL, or 517,062 lb gw. The commercial quota is reduced from the commercial ACL by 4% and is set at 496,380 lb gw. **Alternative 4** applies proportionally the same degree of reduction in recent landings to each fishing sector, based on those sectors' respective landings from 2019 - 2023. Under **Alternative 4**, the recreational ACL would have been exceeded in 4 of the last 5 years (2019, 2020, 2022, and 2023).

Alternative 5 would establish a recreational ACL and sector allocation based on the average recreational and commercial landings from 2001 – 2004 (see Table 1.1.2.), the same years originally used to determine the commercial allotment in **Alternative 1**. **Alternative 5** uses current landings data calibrated to MRIP-FES units. The recreational ACL would equal 31,026 lb gw, or approximately 5.59% of the complex ACL. The commercial ACL would equal 524,000 lb gw, or approximately 94.41% of the complex ACL. The commercial quota is reduced from the commercial ACL by 4% and is set at 503,040 lb gw. Under **Alternative 5**, the recreational ACL would have been exceeded in 4 of the last 5 years (2019, 2020, 2022, and 2023).

Alternative 6 would establish a recreational ACL and sector allocation based on the average recreational and commercial landings from 2000 – 2023, or the entirety of the landings history presented in Table 1.1.2. **Alternative 6** uses current landings data calibrated to MRIP-FES units. The recreational ACL would equal 32,747 lb gw, or approximately 5.90% of the complex ACL. The commercial ACL would equal 522,279 lb gw, or approximately 94.10% of the complex ACL. The commercial quota is reduced from the commercial ACL by 4% and is set at 501,388

lb gw. Under **Alternative 6**, the recreational ACL would have been exceeded in 4 of the last 5 years (2019, 2020, 2022, and 2023).

The alternatives in Action 2 differ in how they determine the sector allocation. **Alternative 2** uses the existing allocation to create a recreational ACL, thereby using the historical proportion of landings attributable to each fishing sector from the Generic ACL/AM Amendment. **Alternative 3** uses the average landings from the recreational sector, in MRIP-FES units, from 2019 – 2023, and then deducts that value from the complex ACL; the remainder is then allocated to the commercial sector. **Alternative 4** equally reduces the average landings for both sectors from 2019 – 2023 such that the resulting sector ACLs do not exceed the complex ACL proposed in Action 1. Like **Alternative 2**, **Alternative 5**, and **Alternative 6** use the average landings from *both sectors* from their respective time periods to establish the sector allocation, as opposed to only the recreational landings in **Alternative 3**, or an equal reduction in **Alternative 4**. In contrast to Alternative 2 though, **Alternative 5** and **Alternative 6** use recreational data in MRIP-FES units.

Under **Alternative 2**, **Alternative 3**, **Alternative 4**, **Alternative 5**, and **Alternative 6**, the recreational and commercial ACLs equal the DWG complex ACL, which is set equal to the DWG complex ABC. **Alternative 3**, **Alternative 4**, **Alternative 5**, and **Alternative 6** increase the recreational sector's allocation of the total DWG complex ACL relative to both **Alternative 1** and **Alternative 2**. Under **Alternative 3**, **Alternative 4**, **Alternative 5**, and **Alternative 6**, and based on the estimated recreational landings from the most recent 5 years, it is possible that recreational landings would exceed the recreational ACL. Though season duration projections will still be necessary, the larger ACL presented in **Alternative 3** may improve the ability of NMFS to monitor recreational harvest against the recreational ACL and apply any AMs compared to **Alternative 2** (there is no recreational ACL under **Alternative 1**), and **Alternative 4**, **Alternative 5**, and **Alternative 6**, all of which have comparatively lower proposed recreational ACLs. This is because a larger ACL may result in landings being spread over a longer time period and allow for landings to be estimated before an ACL closure is implemented. Table 2.2.1 shows the sector allocations and corresponding ACLs in this action. Figure 2.2.1 demonstrates how the alternatives in Action 2 compared to recent recreational landings in lb gw from 2014 – 2023. Over the last 10 years, recreational landings would have exceeded the recreational ACL 9 times under **Alternative 1** and **Alternative 2**, 5 times under **Alternative 3**, 7 times under **Alternative 4**, 8 times under **Alternative 5**, and 7 times under **Alternative 6**. Similar data for the commercial sector are not presented, because recent commercial landings exceed the proposed commercial ACLs in all alternatives in Action 2 for the last 10 years.

Table 2.2.1. Sector allocations and corresponding ACLs for alternatives presented in Action 2. All ACLs are in lb gw.

Alternative	Complex ACL	Rec Sector Allocation	Rec ACL	Comm Sector Allocation	Comm ACL	Comm Quota
1	555,026	*none*	*undefined*	96.50%	535,600	514,176
2	555,026	3.50%	19,426	96.50%	535,600	514,176
3	555,026	10.21%	56,649	89.79%	498,377	478,441
4	555,026	6.84%	37,964	93.16%	517,062	496,380
5	555,026	5.59%	31,026	94.41%	524,000	503,040
6	555,026	5.90%	32,747	94.10%	522,279	501,388

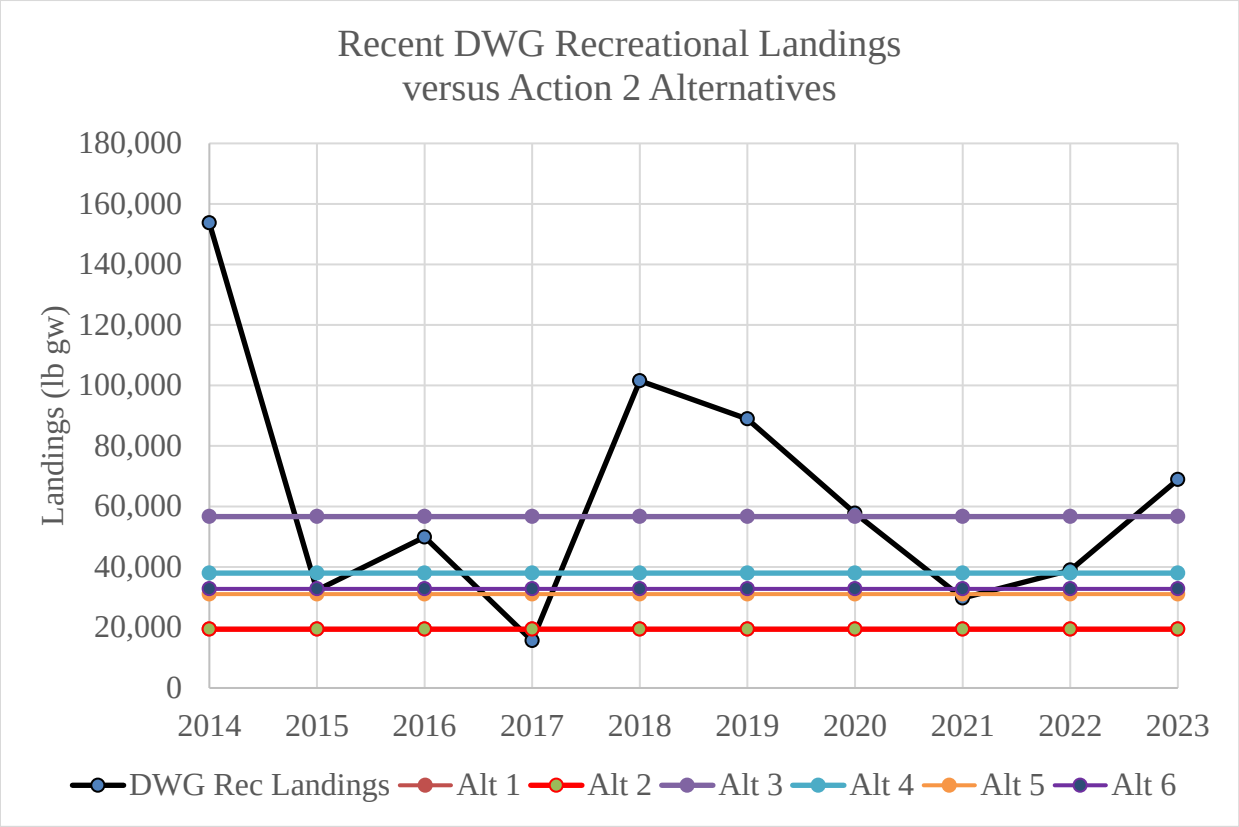

Figure 2.2.1. Comparison of recent landings of DWG species by the recreational sector in lb gw to the alternatives in Action 2 in MRIP-FES units. Recreational landings data are the same as those presented in Table 1.1.2. The data for Alternative 1 and Alternative 2 overlap, showing only the data for Alternative 2.

It is important to note that the representativeness of the MRIP-FES recreational landings estimates is highly uncertain, and these data should be used to inform management advice with caution. This is due to two main reasons. First, the proportional standard error about the annual recreational landings estimates for the species in the DWG complex regularly exceeds 50%, even when aggregated to the greatest possible degree (i.e., all recreational fleets combined, all areas in

the Gulf combined, and all MRIP waves combined).[7] Second, the portion of the MRIP-FES survey which records catch, known as the Access Point Angler Intercept Survey (APAIS), is constrained to sampling at public locations and marinas which grant surveyors access. Excluded from APAIS are all private docks, marinas, and other private access points. Given the distances necessary to travel to access the depths in which DWG species are typically harvested (again, greater than 100 meters or 330 feet, with the distance from shore to these depths varying across the Gulf), larger vessels with greater fuel capacity and large and/or multiple engines are often used by private anglers to fish these species. This means that the recreational landings for private vessels are likely underestimated, and this potential bias should be considered in setting catch limits.

[7] https://www.fisheries.noaa.gov/data-tools/recreational-fisheries-statistics-queries

2.3 Action 3: Modification of Deep-Water Grouper Recreational Accountability Measures

Alternative 1: No Action. Maintain the recreational accountability measures (AMs) for the DWG complex. If the total complex ACL is exceeded in a fishing year, then in the following fishing year, the Regional Administrator will close the recreational sector for the remainder of the fishing year if the sum of commercial and recreational landings reaches or is projected to reach the total complex ACL.

This AM directs NMFS to close the recreational sector only if the sum of commercial and recreational landings reaches or is projected the total complex ACL. Because the IFQ system allows commercial landings year-round, it is unlikely that this AM will effectively constrain recreational landings unless NMFS assumes at the beginning of the fishing year that all of the commercial quota will be landed. However, this assumption is not clearly stated in the current AM

***A*lternative 2**: Revise the post-season recreational AMs for the DWG complex. For the recreational sector, if the recreational ACL is exceeded in a fishing year, then in the following fishing year, the Regional Administrator would close the recreational sector for the DWG complex for the remainder of that fishing year when the recreational ACL is projected to be met.

Alternative 3: Establish in-season recreational AMs for the DWG complex. For the recreational sector, if the recreational ACL is projected to be met in a fishing year, then the Regional Administrator would close the recreational sector for the DWG complex for the remainder of that fishing year.

Alternative 4: Revise the post-season recreational AMs for the DWG complex. For the recreational sector, if the recreational ACL is exceeded in a fishing year and the total ACL for DWG is exceeded, then in the following fishing year, the Regional Administrator would close the recreational sector for the DWG complex for the remainder of that fishing year when the recreational ACL is projected to be met.

Alternative 5: Revise the post-season recreational AMs for the DWG complex. For the recreational sector, if recreational landings exceed the recreational ACL in two consecutive years out of the previous three fishing years, then in the following fishing year the Regional Administrator would close the recreational sector for the DWG complex for the remainder of that fishing year when the recreational ACL is projected to be met.

Discussion:

The current AMs for the DWG complex were established in the Generic ACL/AM Amendment (GMFMC 2011). These AMs are reflected in **Alternative 1**. The rationale offered in the Generic ACL/AM Amendment for applying the AM to the recreational sector in this manner was if the complex ACL was exceeded, the reason for the overage would be due to high harvests from the recreational sector. So, it was this sector that would be managed under this AM, with

the commercial sector using the IFQ Program as its AM. Stock complexes like the DWG complex did not have AMs other than IFQs applied to commercial harvest at the time of the Generic ACL/AM Amendment. The DWG complex also had not had catch apportioned between sectors and so the ACL is specific to the complex as a whole. At the time, the need for season duration projections was only required for those stocks exceeding their ACL and those stocks could be targeted in monitoring activities. None of the DWG complex stocks were overfished, in a rebuilding plan, or undergoing overfishing as of 2008; therefore, the likelihood the DWG ACL would be exceeded was reduced. For this reason, a post-season AM was thought to be appropriate for the DWG complex, and no overage adjustment (payback provision) was applied. However, because the IFQ system allows commercial landings year-round, it is unlikely that this AM will effectively constrain recreational landings unless NMFS assumes at the beginning of the fishing year that all of the commercial quota will be landed.

Alternative 2 is proposed in recognition of the overfishing status of yellowedge grouper from SEDAR 85 (2023). Because yellowedge grouper is undergoing overfishing as of 2021, the Council must take steps to end overfishing. This is expected to be accomplished through the reduction of catch limits, as specified in Alternative 2 of Action 1. However, AMs are necessary to help ensure that those reduced catch limits are not exceeded. In this action, **Alternative 2** would modify the post-season AMs for the recreational sector such that if the recreational ACL, as established in Action 2, is exceeded in a fishing year, then in the following fishing year, the Regional Administrator would close the recreational sector for the DWG complex for the remainder of that fishing year (post-season AM) when the recreational ACL is projected to be met. Alternative 1 and Alternative 2 of Action 2 would both present the same concerns about the ability to accurately monitor the recreational harvest against the recreational ACL under **Alternative 2** in Action 3. The high interannual variability of these landings (see Table 1.1.2) would be expected to make accurately forecasting recreational fishing season durations difficult, and overages (or underages) of the recreational ACL would be expected. Alternative 3, and more so Alternative 4 in Action 2, both increase the recreational ACL relative to Alternative 2 in Action 2 and would increase the likelihood of avoiding a closure of the recreational fishing season due to imprecise recreational landings data under **Alternative 2** in Action 3.

Alternative 3 is also proposed in an effort to end overfishing of yellowedge grouper. In conjunction with catch limit reductions in Alternative 2 of Action 1, **Alternative 3** in Action 3 would establish an in-season AMs for the recreational sector such that if the recreational ACL, as established in Action 2, is projected to be met in a fishing year, then the Regional Administrator would close fishing for the recreational sector for the remainder of that fishing year (in-season AM). The same concerns about the ability to accurately monitor the recreational harvest against the recreational ACL exist for **Alternative 3** as under **Alternative 2** in Action 3. **Alternative 3** differs from **Alternative 2** in that if the recreational ACL is estimated to be met under **Alternative 3**, the recreational sector closes in that fishing year, as opposed to the fishing season being monitored during the following fishing year and closed then in the event the recreational ACL is estimated to be met again as is the case in **Alternative 2**.

Alternative 4 would revise the post-season recreational AMs for the DWG complex such that the Regional Administrator would close the recreational sector for the DWG complex when the recreational ACL is projected to be met only if both the recreational ACL and the complex ACL

had been exceeded in the previous fishing year. For the commercial sector, the Grouper-Tilefish IFQ program would continue to serve as the AM. **Alternative 4** is similar to **Alternative 2** in that it is applied post-season; however, the threshold for a closure in the following fishing year is higher under **Alternative 4**. Based on the landings history in Table 1.1.2, it would be unlikely that the commercial sector would not land its quota, regardless of the commercial ACL resulting from the selection of a preferred alternative in Action 2. While it was not the original purpose of the buffer between the commercial ACL and commercial quota, the 4% difference there, combined with any other underharvest by the commercial sector in a fishing year, may insulate the recreational sector from triggering this AM under **Alternative 4**.

Alternative 5 would revise the post-season recreational AMs for the DWG complex such that the Regional Administrator would close the recreational sector for the DWG complex when the recreational ACL is projected to be met only if the recreational ACL had been exceeded in two consecutive years out of the preceding three-year period. For the commercial sector, the Grouper-Tilefish IFQ program would continue to serve as the AM. **Alternative 5** was developed to recognize the lack of precision in the recreational landings data for the DWG complex, as all four species in the complex are considered "rare event" reef fish species compared to other snappers and groupers that are commonly targeted in shallower depths (e.g., gag grouper, red grouper, red snapper, gray snapper). **Alternative 5** would allow for an overage of the recreational ACL to occur in a single fishing year without then triggering the recreational AM, but not if any recreational ACL overage occurs in the following fishing year also. In that case, the AM would then be in effect for the next two consecutive fishing seasons. Figures 2.3.1 and 2.3.2 demonstrate how **Alternative 5** would function using Alternative 3 and Alternative 2 in Action 2, respectively. These Action 2 alternatives represent the highest and lowest options, respectively, for the recreational ACL and sector allocation being considered in this document.

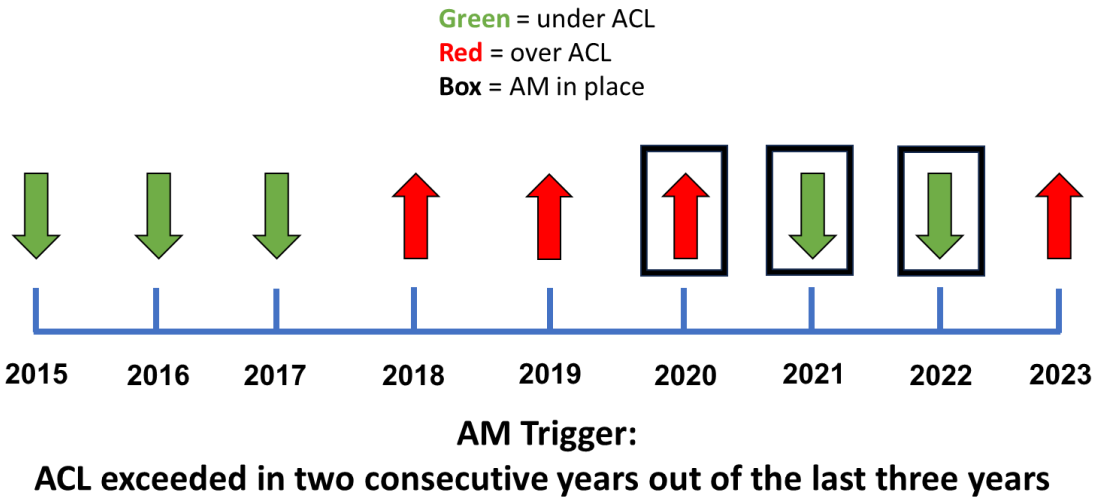

Figure 2.3.1. Demonstration of how Alternative 5 in Action 3 would function, based on the observed landings in Table 1.1.2 for 2015 – 2023 against the proposed ACL and sector allocation under Alternative 3 in Action 2.

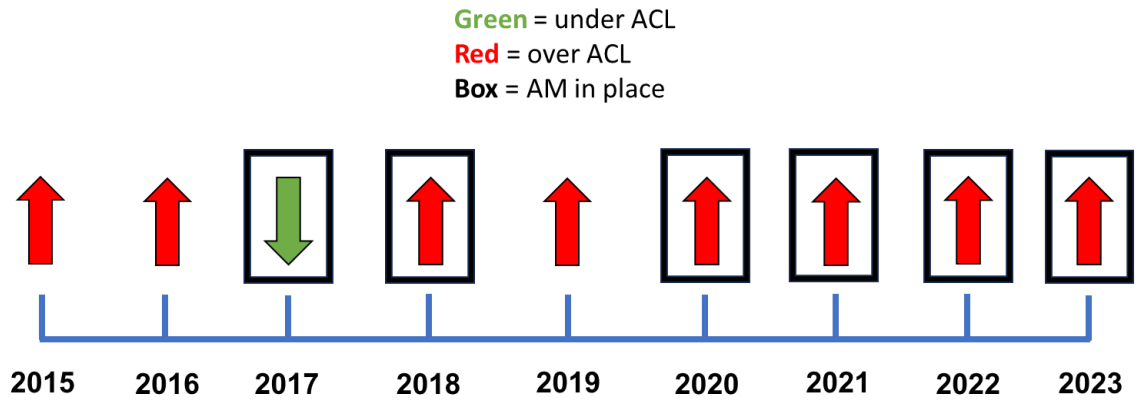

Figure 2.3.2. Demonstration of how Alternative 5 in Action 3 would function, based on the observed landings in Table 1.1.2 for 2015 – 2023 against the proposed ACL and sector allocation under Alternative 2 in Action 2.

Alternative 5 is a post-season AM like **Alternative 2** and **Alternative 4**. However, it is less likely to be triggered than **Alternative 2**, which requires only one overage of the recreational ACL to take effect. It is also less likely to be triggered than **Alternative 4** which, despite requiring both the recreational ACL and complex ACL to be exceeded to be triggered, also only requires an overage in the previous year. Based on the landings in Table 1.1.2, the proposed catch limits specified in Alternative 2 of Action 1, and on Alternatives 1-6 in Action 2, it is expected that the fishing season for the recreational sector under **Alternative 2** or **Alternative 3** in Action 3 would not continue for the full year as it has in previous years. **Alternative 4** and **Alternative 5** would have a higher probability of resulting in a complete fishing season for the recreational sector, with a closure being least likely under **Alternative 5**. Because the recreational sector's ACLs under Action 2 would be monitored using MRIP-FES data, the available harvest under the alternatives in Action 2 would be expected to be landed more quickly than under Alternative 1 of Action 2. Without proper consideration of ACLs and AMs for the recreational sector, overages of the recreational ACL may occur. It is common in these circumstances for overages of the complex ACL to occur due to the imprecision of the data available for fishing season projections (and particularly for recreational fishing seasons), and when the closure of the fishing season is scheduled. These fishing season projections are only as reliable as the data upon which they are based. These MRIP-FES data are presently only representative of Mississippi, Alabama, and Florida; Texas and Louisiana have separate recreational data collection programs for estimating recreational landings. The precision of the Texas and Louisiana programs with respect to DWG species has not yet been reviewed by the Council's SSC.

CHAPTER 3. REFERENCES

Abbott, J., D. Willard. 2017. Rights-based management for recreational for-hire fisheries: Evidence from a policy trial. Fisheries Research 196: 106-116.

Barnette, M. C. 2001. A review of the fishing gear utilized within the Southeast Region and their potential impacts on essential fish habitat. NOAA Technical. Memorandum. NMFS-SEFSC-449. National Marine Fisheries Service. St. Petersburg, Florida. 68 pp. https://repository.library.noaa.gov/view/noaa/8527

Bohaboy, E.C., T.L. Guttridge, N. Hammerschlag, M.P.M. Van Zinnicq Bergmann, and W.F. Patterson III. 2020. Application of three-dimensional acoustic telemetry to assess the effects of rapid recompression on reef fish discard mortality. ICES Journal of Marine Science77(1): 83-96.

Breitburg, D., L.A. Levin, A. Oschiles, M. Gregoire, F.P. Chavez, D.J. Conley, V. Garcon, D. Gilbert, D. Gutierrez, K. Isensee, G.S. Jacinto, K.E. Limburg, I. Montes, S.W.A. Naqvi, G.C. Pitcher, N.N. Rabalais, M.R. Roman, K.A. Rose, B.A. Seibel, M. Telszewski, M. Yasuhara, J. Zhang. 2018. Declining oxygen in the global ocean and coastal waters. Science 359(6371). https://doi.org/10.1126/science.aam7240

Carter, D., C. Liese, S. Lovell. 2022. The option price of recreational bag limits and the value of harvest. Marine Resource Economics 37(1): 35-52.

Carter, D., Lovell, S., Liese, C. 2020. Does angler willingness-to-pay for changes in harvest regulations vary by state? Results from a choice experiment in the Gulf of Mexico. Marine Policy 121:104-196.

Chagaris, D., S. Sagarese, N. Farmer, B. Mahmoudi, K. de Mutsert, S. VanderKooy, W. F. Patterson III, M. Kilgour, A. Schueller, R. Ahrens, and M. Lauretta. 2019. Management challenges are opportunities for fisheries ecosystem models in the Gulf of Mexico. Marine Policy 101:1-7.

Coleman, F. C., C.C. Koenig, and L.A. Collins. 1996. Reproductive styles of shallow-water groupers (*Pisces: Serranidae*) in the eastern Gulf of Mexico and the consequences of fishing on spawning aggregations. Environmental Biology of Fishes 47:129-141.

Fodrie, F. J., K. L. Heck, Jr., S. P. Powers, W. M. Graham, and K. L. Robinson. 2010. Climate-related, decadal-scale assemblage changes of seagrass-associated fishes in the northern Gulf of Mexico. Global Change Biology 16(1):48-59.

Gilmore, R.G., and R.J. Jones. 1992. Color variation and associated behavior in the epinepheline groupers, *Mycteroperca microlepis* (Goode and Bean) and *M. phenax* (Jordan and Swain). Bulletin of Marine Science 51(1):83-103.

GMFMC. 1981. Environmental impact statement and fishery management plan for the reef fish resources of the Gulf of Mexico and environmental impact statement. Gulf of Mexico Fishery

Management Council, Tampa, Florida. 328 pp.
https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/REEF%20FISH/RF%20FMP%20and%20EIS%201981-08.pdf

GMFMC. 1989. Amendment number 1 to the reef fish fishery management plan, includes environmental assessment, regulatory impact review, and regulatory flexibility analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida. 357 pp.
https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/REEF%20FISH/RF%20Amend-01%20Final%201989-08-rescan.pdf

GMFMC. 1999 Generic sustainable fisheries act amendment, to the following FMPs: Gulf coral and coral reef resources, coastal migratory pelagics, red drum, reef fish, shrimp, spiny lobster, stone crab. Includes regulatory impact review, initial regulatory flexibility analysis and environmental assessment. Gulf of Mexico Fishery Management Council, Tampa, Florida. 318 pp. https://gulfcouncil.org/wp-content/uploads/Generic-SFA-amendment-1999.pdf

GMFMC. 2003. Amendment 21 to the reef fish fishery management plan. Includes regulatory impact review, initial regulatory flexibility analyses, and environmental assessment. Gulf of Mexico Fishery Management Council, Tampa, Florida. 215 pp.
https://gulfcouncil.org/wp-content/uploads/RF-Amend-21-Final-2003-09.pdf

GMFMC. 2004a. Final environmental impact statement for the generic essential fish habitat amendment to the following fishery management plans of the Gulf of Mexico: Shrimp fishery of the Gulf of Mexico, red drum fishery of the Gulf of Mexico, reef fish fishery of the Gulf of Mexico, stone crab fishery of the Gulf of Mexico, coral and coral reef fishery of the Gulf of Mexico, spiny lobster fishery of the Gulf of Mexico and South Atlantic, coastal migratory pelagic resources of the Gulf of Mexico of Mexico and South Atlantic. Gulf of Mexico Fishery Management Council. Tampa, Florida.682 pp.

GMFMC. 2004b. Final amendment 22 to the reef fish fishery management plan to set red snapper sustainable fisheries act targets and thresholds, set a rebuilding plan, and establish bycatch reporting methodologies for the reef fish fishery. Includes final supplemental environmental impact statement and regulatory impact review. Gulf of Mexico Fishery Management Council. Tampa, Florida. 291 pp.
https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/REEF%20FISH/Amend%2022%20Final%2070204.pdf

GMFMC. 2005. Final generic amendment number 3 for addressing essential fish habitat requirements, habitat areas of particular concern, and adverse effects of fishing in the following fishery management plans of the Gulf of Mexico: Shrimp fishery of the Gulf of Mexico, United States waters, red drum fishery of the Gulf of Mexico, reef fish fishery of the Gulf of Mexico, coastal migratory pelagic resources (mackerels) in the Gulf of Mexico and South Atlantic, stone crab fishery of the Gulf of Mexico, spiny lobster fishery of the Gulf of Mexico and South

Atlantic, coral and coral reefs of the Gulf of Mexico. Gulf of Mexico Fishery Management Council, Tampa, Florida. 106 pp.
https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/GENERIC/FINAL3_EFH_Amendment.pdf

GMFMC. 2008a. Final reef fish amendment 30B: Gag – end overfishing and set management thresholds and targets, Red grouper – set optimum yield, TAC, and management measures, time/area closures, and federal regulatory compliance including environmental impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida. 462 pp.
https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/REEF%20FISH/Final%20Amendment%2030B%2010_10_08.pdf

GMFMC. 2008b. Amendment 29 to the reef fish fishery management plan – effort management in the commercial grouper and tilefish fisheries, including final environmental impact statement and regulatory impact review. Gulf of Mexico Fishery Management Council. Tampa, Florida. 302 pp. https://gulfcouncil.org/wp-content/uploads/Reef-Fish-Amdt-29-Dec-08_508Compliant.pdf

GMFMC. 2008c. Final reef fish amendment 30A: Greater amberjack – revise rebuilding plan, accountability measures; gray triggerfish – establish rebuilding plan, end overfishing, accountability measures, regional management, management thresholds and benchmarks, including supplemental environmental impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida. 346 pp.
Final Reef Fish Amendment 30A (gulfcouncil.org)

GMFMC. 2010. Final amendment 31 to the fishery management plan for reef fish resources in the Gulf of Mexico (revised). Addresses bycatch of sea turtles in the bottom longline component of the Gulf of Mexico reef fish fishery, includes revised final environmental impact statement and regulatory impact review. Gulf of Mexico Fishery Management Council. Tampa, Florida. 305 pp. https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/REEF%20FISH/Final%20Amendment%2031%20-%20revised%20-%2002-2010.pdf

GMFMC. 2011a. Final generic annual catch limits/accountability measures amendment for the Gulf of Mexico Fishery Management Council's red drum, reef fish, shrimp, coral and coral reefs fishery management plans, including environmental impact statement, regulatory impact review, regulatory flexibility analysis, and fishery impact statement. Gulf of Mexico Fishery Management Council, Tampa, Florida. 378 pp.
http://www.gulfcouncil.org/docs/amendments/Final%20Generic%20ACL_AM_Amendment-September%209%202011%20v.pdf

GMFMC. 2011b. Final reef fish amendment 32 – gag grouper – rebuilding plan, annual catch limits, management measures. Red grouper – annual catch limits, management measures, and

grouper accountability measures, including final environmental impact statement, regulatory impact review, regulatory flexibility analysis, and fishery impact statement. Gulf of Mexico Fishery Management Council, Tampa, Florida. 406 pp.
http://www.gulfcouncil.org/docs/amendments/Final%20RF32_EIS_October_21_2011[2].pdf

GMFMC. 2012a. Final amendment 35 to the fishery management plan for the reef fish resources of the Gulf of Mexico: Modifications to the greater amberjack rebuilding plan and adjustments to the recreational and commercial management measures, including an environmental assessment, fishery impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida. 226 pp.
https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/REEF%20FISH/Final_Amendment_35_Greater_Amberjack_Rebuilding_8_May_2012.pdf

GMFMC. 2012b. Final amendment 38 to the fishery management plan for the reef fish resources of the Gulf of Mexico: Modifications to the shallow-water grouper accountability measures, including an environmental assessment, fishery impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida. 94 pp.
http://www.gulfcouncil.org/docs/amendments/Final%20Amendment%2038%2009-12-2012.pdf

GMFMC. 2015. Final amendment 28 to the fishery management plan for the reef fish resources of the Gulf of Mexico: Red snapper allocation, including final environmental impact statement, fishery impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida. 328 pp.
http://gulfcouncil.org/docs/amendments/Final%20Red%20Snapper%20Allocation%20-RF%20Amendment%2028.pdf

GMFMC. 2016. Framework action to the fishery management plan for the reef fish resources of the Gulf of Mexico: Modifications to gag minimum size limits, recreational season and black grouper minimum size limits. Including environmental assessment, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. 117 pp.
Modifications to Gag Minimum Size Limits, Recreational Season and Black Grouper Minimum Size Limits (gulfcouncil.org)

GMFMC. 2017a. Final amendment 44(revised) to the fishery management plan for the reef fish resources of the Gulf of Mexico: Minimum stock size threshold (MSST) revision for reef fish stocks with existing status determination criteria, including environmental assessment and fishery impact statement. Gulf of Mexico Fishery Management Council. Tampa, Florida. 124 pp.
https://gulfcouncil.org/wp-content/uploads/RF-Final-Amendment-44-revised-MSST-GOM-Reef-Fish-update-2_508Compliant.pdf

GMFMC. 2017b. Final framework action to the fishery management plan for reef fish resources of the Gulf of Mexico: Modifications to mutton snapper and gag management measures,

including environmental assessment, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida. 151pp. http://gulfcouncil.org/wp-content/uploads/Mutton-Snapper-Framework-Action-070717-Final-1.pdf

GMFMC. 2021a. Final amendment 48 to the fishery management plans for reef fish resources in the Gulf of Mexico: Status determination criteria and optimum yield for reef fish and red drum, including environmental assessment and fishery impact statement. Gulf of Mexico Fishery Management Council. Tampa, Florida. 169 pp. https://gulfcouncil.org/wp-content/uploads/Amendment-RF48-RD5_04262021_Final_Transmittal_revised.pdf

GMFMC. 2021b. Final amendment 53 to the fishery management plans for the reef fish resources in the Gulf of Mexico: Red grouper allocations and annual catch levels and targets, including final environmental impact statement, fishery impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. 323 pp. https://gulfcouncil.org/wp-content/uploads/RF-AM-53-Red-Grouper_9_24_2021_Final.pdf

GMFMC and NOAA. 2022. Interim action to reduce overfishing of gag in the Gulf of Mexico. Gulf of Mexico Fishery Management Council, Tampa, Florida and NMFS Southeast Regional Office, St. Petersburg, Florida. 156 pp. https://media.fisheries.noaa.gov/2023-01/Gag%20Interim%20Rule_EA%20_final508_01182023.pdf

GMFMC and NOAA. 2021. Red snapper and grouper-tilefish individual fishing quota programs review. Gulf of Mexico Fishery Management Council, Tampa, Florida and NMFS Southeast Regional Office, St. Petersburg, Florida. 245 pp. https://gulfcouncil.org/wp-content/uploads/Joint-RS-GT-IFQ-Review-w.appendix-10-27-21-Final_508.pdf

Hamilton, A. N., Jr. 2000. Gear impacts on essential fish habitat in the Southeastern Region. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Pascagoula, Mississippi. 41 pp.

Harford, W.J., S.R. Sagarese, and M. Karnauskas. 2019. Coping with information gaps in stock productivity for rebuilding and achieving maximum sustainable yield for grouper–snapper fisheries. Fish and Fisheries 20(2):303-321.

Jacob, S., P. Weeks, B. Blount, and M. Jepson. 2013. Development and evaluation of social indicators of vulnerability and resiliency for fishing communities in the Gulf of Mexico. Marine Policy 37:86-95.

Jepson, M. and L.L. Colburn. 2013. Development of social indicators of fishing community vulnerability and resilience in the U.S. Southeast and Northeast Regions. NOAA Technical Memorandum NMFS-F/SPO-129. NMFS, St. Petersburg, Florida. 72 pp.

Keithly W.R., Jr. and M. Tabarestani. 2018. The Gulf of Mexico grouper/tilefish fishery after introduction of an individual fishing quota program: The impact on ex-vessel prices. 17 pp. Demand-Analysis.pdf (gulfcouncil.org)

Keithly, W. R., Jr. and H. Wang. 2018. Results from the National Marine Fisheries Service 2016 Gulf of Mexico grouper/tilefish IFQ survey. NMFS, Miami, Florida. 50 pp. Dealer-Survey.pdf (gulfcouncil.org)

Kennedy, V.S., R.R. Twilley, J.A. Kleypas, J.H. Cowan, and S.R. Hare. 2002. Coastal and marine ecosystems & global climate change: Potential effects on U.S. resources. Pew Center on Global Climate Change, Arlington, Virginia. 52 pp. https://www.c2es.org/site/assets/uploads/2002/08/marine_ecosystems.pdf

McEachran, J.D. and J.D. Fechhelm. 2005. Fishes of the Gulf of Mexico, Vol. 2. *Scorpaeniformes* to *Tetraodontiformes*. University of Texas Press, Austin, Texas.

NMFS. 2011a. Biological opinion on the continued authorization of reef fish fishing under the Gulf of Mexico reef fish fishery management plan. National Marine Fisheries Service, Southeast Regional Office, St. Petersburg, Florida. 216 pp.

NMFS. 2011b. A user's guide to the National I/O Model. NMFS Office of Science and Technology. Silver Spring MD, 39 pp.

NMFS. 2022a. Fisheries economics of the United States, 2019. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-229A, 236 pp.

NMFS. 2022b. Gulf of Mexico grouper-tilefish individual fishing quota report (2021 Update). National Marine Fisheries Service, Southeast Regional Office. St. Petersburg, Florida. 84pp. SERO-LAPP-2022-2. https://noaa-sero.s3.amazonaws.com/drop-files/cs/2021_GT_AnnualReport_SEROFinal.pdf

Overstreet, E., L. Perruso, and C. Liese. 2017. Economics of the Gulf of Mexico reef fish fishery - 2014. NOAA Technical Memorandum NMFS-SEFSC-716. 84 pp.

Overstreet, E. and C. Liese. 2018a. Economics of the Gulf of Mexico reef fish fishery - 2015. NOAA Technical Memorandum NMFS-SEFSC-724. SEFSC, Miami. 78 pp.

Overstreet, E. and C. Liese. 2018b. Economics of the Gulf of Mexico reef fish fishery-2016. NOAA Technical Memorandum NMFS-SEFSC-725. SEFSC, Miami. 116 pp. https://repository.library.noaa.gov/view/noaa/19805

Pulver, J. 2017. Sink or swim? Factors affecting immediate discard mortality for the Gulf of Mexico commercial reef fish fishery. Fisheries Research 188: 166-172. https://www.sciencedirect.com/science/article/abs/pii/S0165783616304374?via%3Dihub

Savolainen, M.A., R.H. Caffey, and R.F. Kazmierczak, Jr. 2012. Economic and attitudinal perspectives of the recreational for-hire fishing industry in the U.S. Gulf of Mexico. Center for Natural Resource Economics and Policy, LSU AgCenter and Louisiana Sea Grant College Program, Department of Agricultural Economics and Agribusiness, Louisiana State University, Baton Rouge, LA. 171 pp. www.laseagrant.org/wp-content/uploads/Gulf-RFH-Survey-Final-Report-2012.pdf

SEDAR 19. 2010. SEDAR 19 Stock Assessment of Gulf of Mexico and South Atlantic Black Grouper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. 661 pp. https://sedarweb.org/documents/sedar-19-final-stock-assessment-report-south-atlantic-and-gulf-of-mexico-black-grouper/

SEDAR 68. 2021. SEDAR 68 Operational Assessment of Gulf of Mexico Scamp and Yellowmouth Grouper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. 231 pp. https://sedarweb.org/documents/sedar-68oa-gulf-of-mexico-scamp-operational-assessment-final-stock-assessment-report/

SEDAR 85. 2023. SEDAR 85 Operational Assessment of Gulf of Mexico Yellowedge Grouper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. 293 pp. https://sedarweb.org/documents/sedar-85-gulf-of-mexico-yellowedge-grouper-final-stock-assessment-report/

Siebenaler, J.B. and W. Brady. 1952. A high speed manual commercial fishing reel. Technical Series 4. Florida Board of Conservation, Tallahassee, Florida. 11 pp.

Souza, Philip M., Jr. and Christopher Liese. 2019. Economics of the federal for-hire fleet in the Southeast - 2017. NOAA Technical Memorandum NMFS-SEFSC-740. SEFSC, Miami. 42 pp.

Swedmark, M., A. Granmo, and S. Kollberg. 1973. Effects of oil dispersants and oil emulsions on marine animals. Water Research 7(11): 1649-1672.

Wells, M.L., V.L. Trainer, T.J. Smayda, B.S.O. Karlson, C.G. Trick, R.M. Kudela, A. Ishikawa, S. Bernard, A. Wulff, D.M. Anderson, W.P. Cochlan. 2015. Harmful algal blooms and climate change: Learning from the past and present to forecast the future. Harmful Algae 49: 68-93

Whitehead, A., B. Dubansky, C. Bodinier, T. Garcia, S. Miles, C. Pilley, V. Raghunathan, J. L. Roach, N. Walker, R.B. Walter, C. D. Rice, F. Galvez. 2012. Genomic and physiological footprint of the *Deepwater Horizon* oil spill on resident marsh fishes. Proceedings of the National Academy of Sciences 109 (50): 20298-20302

APPENDIX A: CONSIDERED BUT REJECTED

Action 2: Modification of Deep-Water Grouper Sector ACLs and Sector Allocations

Alternative 4: The complex ACL is set equal to the complex ABC. Establish a recreational ACL and sector allocation based on the average of the highest (2014) and lowest (2000) annual recorded recreational landings from 2000 – 2023 (see Table 1.1.2.). This results in a recreational ACL of 83,809 lb gw, or 15.10% of the complex ACL. The commercial sector is allocated 84.90% of the complex ACL, or 471,217 lb gw. The commercial quota is reduced from the commercial ACL by 4% and is set at 452,368 lb gw. The recreational and commercial ACLs sum to equal the DWG complex ACL. These values are shown in the table below in lb gw.

Complex	Year	OFL	ABC (Complex ACL)	Comm ACL	Comm Quota	Rec ACL
DWG	2025-2029+	731,035	555,026	471,217	452,368	83,809

Council Rationale:

The Council evaluated Alternative 4 in Action 2 and expressed concern with using a data point as old as one from 2000 and providing such considerable weight to it (50%) in determining a sector allocation strategy for deep-water grouper (DWG). Given this concern, and the availability of other alternatives for consideration, the Council decided to remove Alternative 4 of Action 2 to the Considered but Rejected Appendix.