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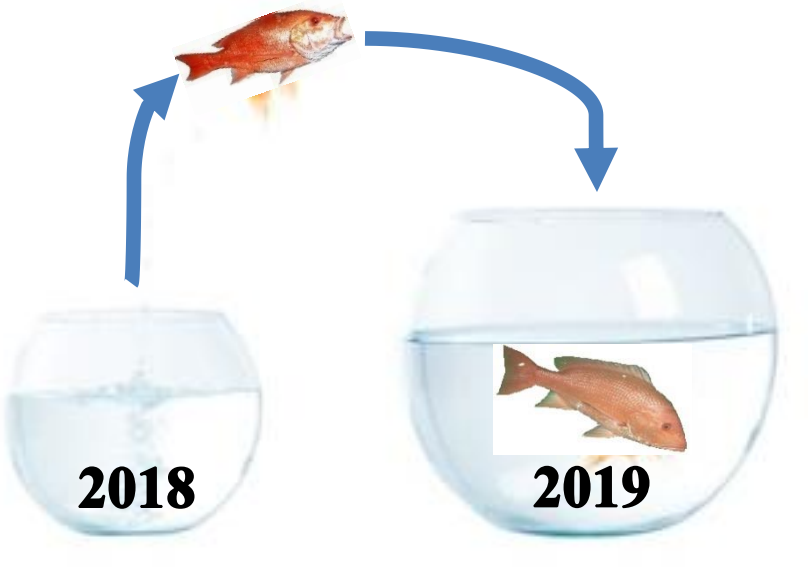
Carryover Provisions and Framework Modifications



Draft Generic Amendment to the Fishery Management Plans for Reef Fish, Coastal Migratory Pelagics, Coral and Coral Reefs, and Spiny Lobster in the Gulf of Mexico

June 2019

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ENVIRONMENTAL ASSESSMENT COVER SHEET

Name of Action

Draft Generic Amendment to:
Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico;
Fishery Management Plan for Coastal Migratory Pelagic Resources of the Gulf of Mexico and South Atlantic;
Fishery Management Plan for the Coral Resources of the Gulf of Mexico; and
Fishery Management Plan for the Spiny Lobster Resources of the Gulf of Mexico and South Atlantic.

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Type of Action

( ) Administrative ( ) Legislative
( ) Draft (X) Final

Summary/Abstract

ABBREVIATIONS USED IN THIS DOCUMENT

AA	Assistant Administrator of Fisheries
ABC	acceptable biological catch
ACCSP	Atlantic Coastal Cooperatives Statistics Program
ACL	annual catch limit
ACT	annual catch target
ALS	Accumulated Landings System
AM	accountability measure
APAIS	Access Point Angler Intercept Survey
BEA	United States Bureau of Economic Analysis
BiOp	biological opinion
CFR	Code of Federal Regulations
CHTS	Coastal Household Telephone Survey
CMP	coastal migratory pelagics
CN	bully net permit
Council	Gulf of Mexico Fishery Management Council
CS	consumer surplus
CV	coefficient of variation
CZMA	Coastal Zone Management Act of 1972
DPS	distinct population segment
DWH	Deepwater Horizon
EA	environmental assessment
EEZ	exclusive economic zone
EFH	essential fish habitat
EJ	environmental justice
EO	Executive Order
ESA	Endangered Species Act
FAC	Florida Administrative Code
FES	Fishing Effort Survey
FGBNMS	Flower Garden Banks National Marine Sanctuary
FL	fork length
FMP	fishery management plan
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Florida Wildlife Research Institute
GDP	Gross Domestic Product
GMFMC	Gulf of Mexico Fishery Management Council
Gulf	Gulf of Mexico
gw	gutted weight
HAB	harmful algal bloom
HAPC	Habitat Area of Particular Concern
IFQ	individual fishing quota
IPCC	Intergovernmental Panel on Climate Change
IRFA	initial regulatory flexibility analysis
MFMT	maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act

mp	million pounds
MRFSS	Marine Recreational Fisheries Statistics Survey
MRIP	Marine Recreational Information Program
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NMFS	National Marine Fisheries Service
NOR	net operating revenue
NS1	National Standard 1 guidelines
OFL	overfishing limit
OY	optimum yield
P*	probability of overfishing
PAH	polycyclic aromatic hydrocarbons
PDARP	Programmatic Damage Assessment and Restoration Plan
PDF	probability density function
PPT	parts per thousand
PS	producer surplus
Q*	qualitative measure of relative risk
RA	Regional Administrator
RIR	regulatory impact review
RFA	regulatory flexibility analysis
RQ	regional quotient
RS	restricted species
SAFMC	South Atlantic Fishery Management Council
Secretary	United States Secretary of Commerce
SEFSC	Southeast Fisheries Science Center
SPL	saltwater products license
SPR	spawning potential ratio
SRHS	Southeast Regional Headboat Survey
SSB	spawning stock biomass
SSBR	spawning stock biomass per recruit
SSC	Science and Statistical Committee
SSRG	Science Research Group
SWG	Shallow-water Grouper
TAC	total allowable catch
TL	total length
USFWS	United States Fish and Wildlife Service
ww	whole weight

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FISHERY IMPACT STATEMENT

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires that a fishery impact statement (FIS) be prepared for all amendments to fishery management plans. The FIS contains: 1) an assessment of the likely biological/conservation, economic, and social effects of the conservation and management measures on fishery participants and their communities; 2) an assessment of any effects on participants in the fisheries conducted in adjacent areas under the authority of another Fishery Management Council; and 3) the safety of human life at sea. Detailed discussion of the expected effects for all alternatives considered is provided in Chapter 4. The FIS provides a summary of these effects.

CHAPTER 1. INTRODUCTION

1.1 Background

The acceptable biological catch (ABC) is a level of annual catch that accounts for the scientific uncertainty in the estimate of the overfishing limit (OFL). To maintain landings of a stock at or below the ABC, an annual catch limit (ACL) is established that must be less than or equal to the ABC. Typically, fishing is prohibited when harvest reaches, or is projected to reach, the ACL (or the annual catch target (ACT), a level below the ACL), depending on the species. Since these closures are implemented based on preliminary landings data and effort estimates, some amount of the ACT or ACL may ultimately not be harvested in a given fishing year (Table 1.1.1).

OFL

Overfishing Limit is the amount of fish that can be harvested, above which the stock cannot be sustained. Exceeding the overfishing limit in a year means overfishing occurred in that year.

ABC

Acceptable Biological Catch is a catch level recommended by the Science and Statistical Committee and set at or below the overfishing limit to account for scientific uncertainty. This is the highest yield to which annual catch limits can be set.

ACL

Annual Catch Limit is the amount of fish allowed to be harvested in a year. Exceeding the annual catch limit triggers accountability measures to reduce the likelihood of the annual catch limit being exceeded in future years. For some stocks, particularly those in a rebuilding plan, exceeding the ACL may trigger a payback provision in the following year.

National Standard 1 (NS1) of the Magnuson-Stevens Fishery Conservation and Management Act states: Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry. The revised NS1guidelines published in October 2016 include guidance on carrying over unused quota (i.e., harvest below the ACL) from one year to the next. Quota carried over should account for annual natural mortality of the subject species or species complex, and for other affecting factors as appropriate, including episodic mortality and management uncertainty. By creating a carryover provision in the Gulf of Mexico Fishery Management Council's (Gulf Council) ABC Control Rule, the foregone yield resulting from a year in which harvest does not reach the ACL may be carried over to the following fishing year.

Currently, only species included in the fishery management unit for the Reef Fish and Coastal Migratory Pelagic (CMP) fishery management plans (FMPs) are being included in the carryover provision considered in this amendment. The CMP FMP is co-managed by the Gulf Council and South Atlantic Fishery Management Council (South Atlantic Council) with separate ABCs for each stock; only the Gulf of Mexico (Gulf) stock is being considered herein.

The Gulf Council is not considering a carryover for stocks in the Coral and Coral Resources, Shrimp, Spiny Lobster, and Red Drum FMPs. Corals are not being considered since the only harvest is from permitted aquacultured live rock sites. The ACL for federally managed coral stocks is zero. White, brown, and pink shrimp do not have ACLs because they are annual stocks and not subject to an ACL. Royal red shrimp has an ACL; however, harvest levels are low. Spiny lobster are managed cooperatively with the South Atlantic Council under a combined ABC with no apportionment between the Council jurisdictions. Any carryover measure for spiny lobster would require review and approval by the South Atlantic Council, which may slow the application of the carryover provision such that it is not feasible for the following fishing year. Red drum are not being considered because harvest is currently prohibited in federal waters of the Gulf. If red drum harvest is re-opened in the future, a carryover provision for red drum can be considered at that time. For these reasons, the Gulf Council has chosen to only have carryover apply to finfish stocks in this amendment

Gulf of Mexico Fishery Management Council

- Responsible for conservation and management of fish stocks
- Consist of 17 voting members: 11 appointed by the Secretary of Commerce, 1 representative from each of the 5 Gulf states, the Southeast Regional Director of NOAA Fisheries Service, and 4 non-voting members
- Develops fishery management plans and amendments and recommends actions to NOAA Fisheries Service for implementation

South Atlantic Fishery Management Council

- Responsible for conservation and management of fish stocks
- Consists of 13 voting members: 8 appointed by the Secretary of Commerce, 1 representative from each of the 4 South Atlantic states, the Southeast Regional Director of NOAA Fisheries Service, and 4 non-voting members
- Develops fishery management plans and amendments and recommends actions to NOAA Fisheries Service for implementation

National Marine Fisheries Service

- Responsible for preventing overfishing while achieving optimum yield
- Approves, disapproves, or partially approves Council recommendations
- Implements regulations

The Gulf Council intends that any carryover provision function as autonomously as possible (see minutes from January and April 2017 Gulf Council meetings). As such, the framework procedures for the applicable FMPs will need to be modified to allow the National Marine Fisheries Service (NMFS) to adjust the appropriate catch levels in accordance with any new ABC derived from the application of the carryover provision. Therefore, this amendment proposes to modify the closed framework procedures for the Reef Fish and CMP FMPs to allow

the NMFS Regional Administrator (RA) to adjust the ABC, ACL, ACT, and quota for a stock or stock component to account for carryover of the unused portion of the ACL (as derived from the ABC set by the ABC Control Rule). The amendment also proposes the following two minor modifications to the framework procedures: 1) modify the abbreviated framework procedures for the Reef Fish, CMP, Coral and Coral Reefs, Spiny Lobster, and Shrimp FMPs to allow specification of an ABC recommended by the SSC based on results of a new stock assessment and using the ABC Control Rule; and 2) revise the framework procedures for the Reef Fish, CMP, Coral and Coral Reefs, Spiny Lobster, and Shrimp FMPs to have consistent terminology and format, and to include changes to the standard framework procedure for the Coral and Coral Reefs and Spiny Lobster FMPs regarding accountability measures (AMs).

Table 1.1.1. Examples of stocks with sectors with some portion of the ACL having gone unharvested in 2017. All landings are in pounds whole weight with the exception of red grouper and gag which are in pounds gutted weight, and king mackerel, which is in reported weight.

Species	Sector	2017 ACL	2017 Landings	% ACL Landed
Red Snapper	**All Sectors**	**13,610,000**	**15,841,432**	**116.4%**
	Commercial*	7,007,000	6,978,662	99.6%
	Private Angling	3,755,094	6,590,221	175.5%
	For-hire	2,848,000	2,272,549	79.8%
	Recreational Total	6,603,094	8,862,770	134.2%
Red Grouper	**All Sectors**	**10,360,000**	**4,160,586**	**40.2%**
	Commercial*	7,780,000	3,328,271	42.8%
	Recreational	2,580,000	832,315	32.3%
Gag	**All Sectors**	**2,842,000**	**1,357,325**	**47.8%**
	Commercial*	939,000	492,095	52.4%
	Recreational	1,903,000	865,230	45.5%
Greater Amberjack	**All Sectors**	**1,013,041**	**1,257,328**	**124.1%**
	Commercial	464,400	454,439	97.9%
	Recreational	548,641	802,889	146.3%
Gray Triggerfish	**All Sectors**	**113,859**	**125,619**	**110.3%**
	Commercial	64,100	62,888	98.1%
	Recreational	49,759	62,731	126.1%
King Mackerel	**All Sectors**	**8,880,000**	**4,432,959**	**49.9%**
	Comm- Western HL	1,136,000	1,114,825	98.1%
	Comm- Northern HL	511,200	544,516	106.5%
	Comm- Southern HL	596,400	861,899	144.5%
	Gillnet	596,400	552,775	92.7%
	Commercial Total	2,840,000	2,754,337	97.0%
	Recreational**	6,040,000	1,678,622	27.8%

* Sector for this stock is managed under an individual fishing quota program.
** Landings for king mackerel are tracked from July 1 – June 30.
Source: NMFS ACL Monitoring webpage

Simulations of Carryover

During its January 2018 meeting, the Council's Scientific and Statistical Committee (SSC) reviewed simulations developed by the Southeast Fisheries Science Center (SEFSC) which demonstrated the effects of a carryover provision on king mackerel and red snapper. The simulations showed that fish not caught in the previous fishing year could be harvested, pound for pound, without causing harm to the subject fish stock. For red snapper, the simulations demonstrated that carrying over fish not caught in the previous fishing year to the following fishing year would not jeopardize the red snapper rebuilding plan. Conceptually, in a year in which the allowable harvest is not caught, "under-fishing" will have occurred; under the proposed carryover provision, this "under-fishing" will be balanced out in the following fishing year by increasing the ABC. Because the ABC cannot exceed the OFL, and so long as the OFL is not exceeded, overfishing will not occur in a carryover year. Further, the catch limits in a fishing year (ACL, ABC, OFL) are calculated under the assumption that all of the fish which were allowed to be caught in the previous fishing year were caught. If some of those fish were not caught, then the catch limits for the following fishing year would by default be more conservative than necessary to prevent overfishing. Therefore, by maintaining the previous fishing year's OFL, and only changing the ABC (and ACLs and ACTs, if applicable), an additional degree of protection against overfishing is afforded to the subject fish stock.

At its March 2019 meeting, the Gulf SSC requested that the previous carryover simulations performed by the SEFSC be updated to include multiple instances of both carryover and quota overages. Variations showing the effect of applying a pound-for-pound payback provision were also requested. The updated simulations were presented to the SSC during its May 2019 webinar. Generally, so long as unharvested quota is carried over and overharvested fish are paid back pound for pound in the following fishing year, there are unlikely to be long-term negative effects on a species' rebuilding plan. However, if carryover is permitted for a species which also experiences quota overages, and those overages are not paid back, the spawning stock biomass (SSB) will deplete, regardless of whether the stock is in a rebuilding plan.

The SSC noted that even a small difference between the ABC, which is equal to the ACL for most Gulf stocks, and OFL will result in some underharvest. This underharvest, when combined with positive population growth and high recruitment, can allow for more rapid stock rebuilding than projected. The SEFSC cautioned the SSC that not all changes to spawning stock biomass may be due to fishing effort (or a lack thereof). Episodic mortality events, such as oil spills or red tide, could cause a stock's SSB to decline despite how the species is managed. Conversely, strong weather events like hurricanes, or economic forces like a recession or high fuel costs, could suppress fishing effort. Limiting carryover only to when a fishing season for a species was closed early because the ACL was projected to be met would prevent carryover due to insufficient effort or a lower than expected catch rate. Also, in the event a stock may have experienced negative effects from an episodic mortality event, the Council can request an emergency action from the National Marine Fisheries Service to modify the ACL until an interim analysis or other assessment can reveal more about the condition of the stock.

The SSC agreed that, all else being equal, the results of the updated simulations indicate if a payback, in the case of a quota overage, or a carryover, in the case of a quota underage, is handled in a one to one (pound for pound) fashion in the short term, there is little effect on

rebuilding trajectories. Further, the SSC recommended consideration of paybacks for overages for stocks on a rebuilding schedule, in light of the analyses provided by SEFSC regarding overages with no payback provision.

1.2 Objectives of the Reef Fish Fishery Management Plan

At the October 2018 Gulf Council meeting, the Reef Fish Committee reviewed the overall goal and the objectives of the Reef Fish Fishery Management Plan (FMP). The overall goal and objectives, as reviewed, are located in Appendix H. The Reef Fish Committee's motions, which included both modifications to and removal of certain objectives, were then approved by the full Council. At the January 2019 Gulf Council meeting, the Gulf Council reviewed the objectives from the previous meeting. The Council then modified Objective 2 by changing "achieve" to "maintain" and adding "…across all sectors…" and "which minimizes management uncertainty" and also added Objective 12 Through this generic amendment to the Reef Fish FMP, the Gulf Council is adopting the updated objectives as shown below.

The overall goal of the Reef Fish FMP is:

To manage the reef fish fishery of the United States within the waters of the Gulf of Mexico Fishery Management Council jurisdiction to attain the greatest overall benefit to the nation with particular reference to food production and recreational opportunities on the basis of the maximum sustainable yield as reduced by relevant ecological, economic, or social factors.

The new Reef Fish FMP objectives are as follows:

1. To prevent overfishing and rebuild overfished stocks.
2. To achieve robust fishery reporting and data collection systems across all sectors for monitoring the reef fish fishery which minimizes management uncertainty.
3. To conserve and protect reef fish habitat.
4. To minimize conflicts between user groups.
5. To minimize and reduce dead discards.
6. To manage Gulf stocks at OY as defined in MSA.
7. To revise the definitions of the fishery management unit and fishery to reflect the current species composition of the reef fish fishery.
8. To encourage and periodically review research on the efficacy of artificial reefs for management purposes.
9. To promote stability in the fishery by allowing for enhanced fisher flexibility and increasing fishing opportunities to the extent practicable.
10. To avoid to the extent practicable the "derby" type fishing season.
11. To provide for cost-effective and enforceable management of the fishery.
12. To promote and maintain accountability in the reef fish fishery.

1.3 Purpose and Need

The purpose of this action is to incorporate provisions to allow carryover of portions of ACLs that were uncaught due to landings uncertainty and management limitations, and to modify the framework procedure to allow carryover and other changes to operate in a timely manner.

The need is to increase flexibility in quota management to promote achievement of the optimum yield for reef fish and CMP stocks, as allowed under the October 2016 revisions to the NS1 guidelines, and to streamline the framework procedures.

1.4 History of Management

For Reef Fish, CMP, Corals and Coral Reefs, and Spiny Lobster FMPs, the following is a history of management as it relates to quota overharvest and underharvest considerations, and actions that divide a stock ACL into sectors, zones, or components.

Reef Fish Fishery Management Plan

Prior to 2008, there were no established policies to address quota overharvests or underharvests in the reef fish fishery. Annual catches were incorporated into stock assessments, and the resulting catch limits reflected the effect of past landings.

Amendment 30A, implemented in August 2008, established a season length adjustment for recreational gray triggerfish, and a payback provision for commercial gray triggerfish harvest under the gray triggerfish rebuilding plan. Under the season length adjustment, if recreational gray triggerfish landings exceeded the ACL, then the Assistant Administrator for Fisheries (AA) would reduce the fishing season in the following year to return recreational landings to the target total allowable catch level. If commercial landings exceeded the ACL, the AA would reduce the quota for the following year by the amount of the overage.

Amendment 30B, implemented in May 2009, established overage adjustments for red grouper, gag, and the shallow-water grouper (SWG) complex. If commercial landings for red grouper, gag, or SWG landings exceeded the respective ACL, then the AA would file a notification maintaining the prior year red grouper, gag, or SWG commercial quota in the following fishing year. If recreational landings exceed the recreational red grouper or gag ACLs, the AA would file a notification maintaining the prior year red grouper or gag target catch level. In addition, the AA would reduce the length of the recreational SWG fishing season in the following year by the amount necessary to ensure recreational gag and red grouper landings do not exceed the recreational target catch level for that fishing year.

In April 2010, the *Deepwater Horizon* MC252 deep-sea drilling rig exploded and sank off the coast of Louisiana. Because of the resulting oil spill, approximately one-third of the Gulf was closed to fishing for much of the summer months. The direct loss of fishing opportunities due to the closure, plus the reduction in tourism throughout the Gulf coast, resulted in a much lower catch than projected. An estimated 2.3 million pounds of the 3.4 million pound recreational red snapper quota remained unharvested (NMFS 2010b). The Council responded with a request for an emergency rule to re-open the recreational red snapper season during weekends in October and November 2010. In May 2011, the SSC recommended new ABCs for 2011-2014 based on

updated stock assessment projections that incorporated the 2010 underharvest. The Council used those new ABC projections in a **March 2012 Regulatory Amendment** that increased the red snapper commercial and recreational quotas for 2012 and 2013.

An **August 2011 Red Grouper Regulatory Amendment** increased the 2011 TAC to 6.88 million pounds and allowed the TAC to increase each year from 2012 to 2015. However, the increases in TAC were contingent on not exceeding the TAC in previous years. If the TAC was exceeded in a given year, it would remain at that year's level until the effects of the overage could be evaluated by the Scientific and Statistical Committee (SSC).

The Generic ACL/AMs Amendment, implemented in January 2012, established an AMs for the stocks and sectors that did not have AMs. For most of the stocks included in the amendment, if the ACL is exceeded in a given year, then landings are monitored the following year and fishing is prohibited when the landings reach or are projected to reach the ACL. For vermilion snapper, the AM requires in-season monitoring every year with a closure when the ACL is reached or projected to be reached.

Amendment 32, implemented in March 2012, modified the AMs for the commercial sector of species under the individual fishing quota (IFQ) program and revised the recreational AMs by adding both an overage adjustment to be applied when gag or red grouper are considered overfished and an in-season AM to close the gag or red grouper season early if the ACL is reached or projected to be reached.

Amendment 38, implemented in March 2013, revised the post-season recreational AM that reduces the length of the recreational season for all shallow-water grouper in the year following a year in which the ACL for gag or red grouper is exceeded. The modified AM reduces the recreational season of only the species for which the ACL was exceeded.

Amendment 37, implemented in May 2013 for changes to ACLs and ACTs, and June 2013 for management measures, modified the recreational gray triggerfish AMs by establishing an in-season closure authority based on the recreational ACT, and an overage adjustment to reduce the gray triggerfish ACL and ACT by the amount of the overage. This overage adjustment applies only while gray triggerfish is overfished (the population is too low).

An **October 2014 Framework Action**, implemented in April 2015, permanently established an overage adjustment for recreationally harvested red snapper that is only applied when the red snapper population is classified as overfished. In the event the recreational quota is exceeded, the recreational quota will be reduced in the year following the overage by the amount of the overage. The framework action also set the recreational ACT at 20% below the adjusted quota.

The Council established federal for-hire and a private angling components within the Gulf recreational sector fishing for red snapper through **Amendment 40,** implemented in May 2015. The federal for-hire component is comprised of all for-hire vessels with a valid or renewable federal charter vessel/headboat permit for reef fish and the private angling component is comprised of other for-hire vessels and anglers fishing from privately owned vessels. Amendment 40 allocated the red snapper recreational quota and ACT between the federal for-

hire (42.3%) and private angling (57.7%) components, and required the AM to apply by component. Amendment 40 included a sunset provision to end the separate components in 2017; **Amendment 45**, implemented in January of 2016, extended the sunset until 2022.

Amendment 50 is expected to receive the Council's approval in April 2019. The 2018 and 2019 recreational private angling component fishing seasons are set by each Gulf state through exempted fishing permits (EFPs), while the federal for-hire component season continues to be set by the National Marine Fisheries Service (NMFS). **Amendment 50** is separated into a program document and separate state-specific documents. Under state management, if a state's ACL is exceeded, the following year's state ACL would be reduced by the amount of the overage. In the event that a state's ACL is not reached, the remaining quota could be added to the state's ACL for the following year, according to the procedure that would be implemented through this Generic Carryover Amendment.

Coastal Migratory Pelagic Resources Fishery Management Plan

The **CMP FMP** was approved in 1982 and implemented in February 1983. The management unit includes king mackerel, Spanish mackerel, and cobia. The FMP treated king and Spanish mackerel as unit stocks in the Atlantic and Gulf.

Amendment 18, implemented in January 2012, separated cobia into Atlantic and Gulf migratory groups and established ACLs, ACTs, and accountability measures for Gulf cobia.

Amendment 20B, implemented in March 2015, created a Florida east coast subzone for Gulf cobia with a separate ACL, which would be managed by SAFMC.

Framework Amendment 3, implemented in January 2016, implemented changes to commercial regulations on king mackerel harvested by gillnets in the Gulf. The rule implemented an increase in the daily trip limit from 25,000 lbs to 45,000 lbs and added an AM to reduce the ACL in the year following an overage.

Amendment 31, implemented in March 2019, removed the Atlantic migratory group of cobia from the CMP FMP.

Coral and Coral Reefs Fishery Management Plan

The **Coral and Coral Reefs FMP** was implemented in July of 1984. The rule was prepared jointly by the Gulf and South Atlantic Councils due to the susceptibility of coral and coral reefs to physical and biological degradation, and the need to optimize the benefits from these resources while conserving the coral and coral reefs. In later amendments, the FMP was split into two FMPs (one for the South Atlantic and one for the Gulf), and octocorals were removed. The harvest of federally managed live corals is prohibited in the Gulf and South Atlantic.

In 1989, NMFS published revised guidelines for FMPs that addressed the Magnuson-Stevens

Act national standards. These guidelines require each FMP to include a scientifically measurable definition of overfishing and an action plan to prevent or stop overfishing should it occur. The Gulf and South Atlantic Councils reviewed these requirements and concluded that because harvest of prohibited corals was limited to scientific and educational purposes, overfishing of corals could not occur. NMFS review determined that an amendment to the plan was necessary because it did not include a measurable definition of overfishing, which was addressed in Amendment 1.

Amendment 1, implemented in 1990, defined the management unit to include octocorals. Specifically the management unit was defined as consisting of coral reefs, stony corals, and octocorals including the two sea fans *Gorgonia ventalina* (Venus sea fan) and *Gorgonia flabellum* (common [purple] sea fan) in the Gulf and South Atlantic exclusive economic zone (EEZ). The amendment defined coral reefs as including hard bottom, deep-water banks, patch reefs, and other outer bank reefs; stony corals included species belonging to Class Hydrozoa (fire corals and other hydrocorals) and Class Anthozoa, Subclass Zoantharia (stony corals and black corals); and octocorals included in Class Anthozoa, Subclass Octocorallia (GMFMC and SAFMC 1990).

This amendment also established permit and reporting requirements for the harvest of octocorals for scientific or educational purposes and limited the recreational and commercial harvest of allowable octocorals not to exceed 50,000 colonies per year. Recreational harvest permits were implemented that limited the harvest of octocorals other than sea fans to a bag limit of six colonies per person per day, and commercial harvest permits were implemented that had no bag limit. Amendment 1 also defined the optimum yield (OY) as zero for coral reefs, stony corals, sea fans, and octocorals in the EEZ except as authorized for scientific or educational purposes, with harvest expected to be approximately 308 lbs (140 kg) per year; overfishing was defined as an annual level of harvest that exceeded the OY (GMFMC and SAFMC 1990).

The incidental take of corals in other fisheries was addressed by implementing the requirement that those colonies be returned to the water in the general area of capture as soon as possible. An exception was provided for groundfish, scallop, and other similar fisheries where the entire unsorted catch is landed. In such instances, the corals could be landed but not sold, and allowable octocorals taken as bycatch without a state or federal permit were to be treated as prohibited species (GMFMC and SAFMC 1990).

Because the harvest of corals was here forth prohibited, subsequent management actions will not be included herein.

Spiny Lobster Fishery Management Plan

The **Spiny Lobster FMP** was implemented in July of 1982, and largely extended Florida's rules regulating the fishery to the EEZ throughout the range of the fishery, i.e., North Carolina to Texas. Spiny lobster are measured jointly between the Gulf and South Atlantic Councils.

Amendment 2, implemented in 1989, modified the issues and objectives of the Spiny Lobster FMP, modified the optimum yield, established a regulatory amendment procedure for instituting future compatible state and federal rules, and added vessel safety and habitat standards to the Spiny Lobster FMP.

Amendment 3, implemented in 1991, added a scientifically measurable definition of overfishing, outlined an action plan to prevent overfishing, and added the requirement for collection of fees for the administrative cost of issuing permits.

Amendment 6, implemented in 1998, determined that the overfishing level for spiny lobster was a fishing mortality rate (F) in excess of F at 20% of the spawning potential ratio (developed by the South Atlantic Council).

Amendment 10, implemented in 2012, established the ABC, ACL, ACT and AMs for Caribbean spiny lobster; removed smoothtail spiny lobster, spotted spiny lobster, Spanish slipper lobster and ridged slipper lobster from the fishery management unit; defined maximum sustainable yield (MSY), overfished, and overfishing thresholds; updated the protocol for enhanced cooperative management and the framework procedure; modified the regulations regarding the use of undersized lobster as bait and tailing permit requirements; and addressed the removal of abandoned traps in Florida waters.

Regulatory Amendment 4, implemented in 2018, updated the OFL, ABC/ACL, and ACT to incorporate a longer time series of landings.

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action 1 - Eligibility for a Carryover Provision for Managed Reef Fish and Coastal Migratory Pelagic (CMP) Stocks in the Gulf of Mexico (Gulf)

Alternative 1: No Action – Do not establish a carryover provision to harvest the unused portion of the annual catch limit (ACL) for any managed reef fish or CMP stock in the Gulf. Any unused portion of the ACL remaining at the end of a fishing year will not be carried over to a successive fishing year.

Preferred Alternative 2: Establish a carryover provision for managed reef fish and CMP stocks. Carryover provisions apply to stocks and stock complexes with sector allocations. Unused portions of the sector ACLs for species managed under a catch share program are excluded from carryover provisions. Carryover provisions would not apply to the unused portion of the ACL for managed reef fish or CMP stocks/stock complexes:

Option 2a: which are currently under a rebuilding plan.

Preferred Option 2b: which are currently overfished.

Preferred Option 2c: which did not have their fishing year closed as a result of the ACL or quota being met or projected to be met.

Option 2d: whose catch limits (e.g., acceptable biological catch [ABC], ACLs) were not determined using projections from a peer-reviewed quantitative stock assessment (i.e., catch limits were set using the ABC control rule tier 3 or a data-limited method).

Option 2e: which are managed by apportionment with an adjacent fishery management council.

Discussion:

The concept of crediting unharvested catch from a fishing year when it was not harvested to a subsequent fishing year has been used in fisheries management (see historical management of Pacific groundfish, North Atlantic swordfish, and Atlantic herring[1]). National Standard 1 guidelines refer to this as "carryover" and allow an ABC control rule to include provisions to carry over some unused portion of an ACL from one year to increase the ABC and, by default, the ACL and ACT, the following fishing year. A carryover provision developed through this amendment would be added to the Gulf of Mexico Fishery Management Council's (Council) ABC Control Rule.

[1] https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-hms-fishery-management-plans-and-amendments

For the carryover method to function while also constraining harvest to prevent overfishing, certain controls would be applied:

1. The unused portion of the ACL considered for carryover would apply to the smallest divisible managed portion (individual fishing sector, component(s), zone(s) or gear) from which the remaining ACL or quota went unharvested.

2. If the combined sector landings ***exceed*** the sector ACL or the stock ACL, there will be no carryover, even if one sector component did not harvest its quota for that fishing year.

3. The amount to be carried over to the following year, when added to the ABC, cannot result in an ABC which is greater than the OFL.

4. Carryover will only be an underage of the original ACL, not the adjusted ACL.

To the first point mentioned above, applying the carryover only to the smallest divisible managed portion of a sector would ensure that any fish that are allowed to be caught in a successive fishing year are caught under the same assumptions about size and age selectivity by gear and sector component. For instance, 100 lbs of fish carried over to the next fishing year may be equivalent to only eight fish for one sector (or component), which typically harvests larger fish, but may be equivalent to 12 fish for another sector, which typically harvests smaller fish. The effect on the stock of removing larger and, typically, more reproductively influential fish from the population may disproportionately affect the overall health of the stock if the carryover is disproportionately applied. Applying the underage adjustment equally to both components may be perceived as inequitable; one component could exceed its quota, yet have its quota increased in the following year due to an underage by another component, which forfeits part of its adjustment to the component that actually exceeded its quota.

To the second point mentioned above, the carryover provision would not be applied in the event the total stock ACL was exceeded in a given fishing year. For example, if the recreational sector did not harvest its ACL, but the commercial harvest exceeded the commercial ACL such that landings for the stock exceeded 100% of the stock ACL, then the recreational ACL for that stock would not be eligible for a carryover in the following fishing year, even though that sector had foregone yield in the previous fishing year. This is because the total amount of fish that could be harvested by all sectors had already been removed, and additional fishing mortality beyond that prescribed in the approved catch limits would exceed the amount of fishing mortality recommended by the Council's Scientific and Statistical Committee (SSC). This second rule preserves the protections intended by the catch limits which, if exceeded, only trigger payback accountability measures for overfished species in the Gulf (exceptions are the commercial gillnet component for Gulf king mackerel and commercial gray triggerfish).

Some stocks have only a single stock ACL, while others divide the stock ACL into commercial and recreational sector ACLs. Additionally, some stocks have one sector further divided into components or zones. The red snapper recreational sector is currently divided into for-hire and private angling components (see Amendment 40; GMFMC 2014a), each with its own quota and ACT; only if landings are below the total recreational ACL (and combined commercial and

recreational ACLs) would a carryover be allowed, and it would only be applied to the component that remained under its quota. A reasonably foreseeable future modification to the management of the private angling component for red snapper is Reef Fish Amendment 50[2], which would further subdivide the private angling component's ACL amongst the five Gulf states, thereby creating a smaller divisible fishing unit than what exists presently. The king mackerel commercial sector is currently divided into several zones for hook-and-line fishermen, each with its own quota; only if landings are below the total commercial hook-and-line ACL (and combined commercial and recreational ACLs) would a carryover be allowed, and it would only be applied to the zone or zones that remained under their quota. For example, if the Western Zone for commercial king mackerel did not harvest its quota but had its fishing year closed early because the quota was projected to be met, then that unharvested quota (however adjusted) could be carried over to the Western Zone's quota in the subsequent fishing year. The gillnet component has its own ACL and would have a separate carryover. This action would adjust the stock ABC to account for this (and all other) adjustment, with the carryover harvest applied only to the smallest divisible managed portion of the fishery from whence it came.

The carryover provision would only be applied to the original ACL for the following fishing year. Assume that the hypothetical ACL for the recreational sector for gag of 1,000,000 lbs was projected to be met in 2021, and the season was closed prematurely on November 30 of that year, leaving 30,000 lbs unharvested from the 2021 recreational ACL. In 2022, the 30,000 lbs that went unharvested is added to the 2022 recreational ACL of 950,000 lbs, bringing the 2022 recreational ACL for gag to 980,000 lbs. In 2022, the carryover provision would only apply to the original recreational ACL of 950,000 lbs. So, if in 2022 the recreational fishing season for gag is closed and 962,000 lbs has been harvested, there would be no carryover in 2023, since the original recreational ACL of 950,000 lbs had been met.

Harvest step-downs (e.g., a reduction in the commercial trip limit) occur after the fishing season has begun, once the harvest reaches a predetermined level. In fisheries with a harvest step-down, the carryover would be added to the ACL for the following year, and then the step-down would occur as it normally would when that percentage of the updated ACL for that fishing year was landed. No Gulf fisheries are currently managed using harvest step-downs.

Table 2.1.1 shows the stocks for which the carryover provision would apply, based on the options in **Alternative 2** of Action 1. Table 2.1.2 demonstrates the smallest degree of division for the stock ACL for all stocks currently managed by the Council in the Reef Fish and CMP fishery management plans (FMPs).

[2] http://gulfcouncil.org/wp-content/uploads/B-5a-State-Management-Program-for-Red-Snapper-PHDDEIS-1-22-2019.pdf

Table 2.1.1. Stocks in the Council's Reef Fish and CMP FMPs for which the carryover provision would apply currently for options under **Preferred Alternative 2**. Stocks without sector allocations have been excluded from all options. A green box with a ✓ means that the species is eligible for a carryover if that option is selected as preferred; a red box with an **X** indicates the opposite.

Alternative 2	**Option 2a**	**Preferred Option 2b**	**Preferred Option 2c**	**Option 2d**	**Option 2e**
Eligible Species	*Under Rebuilding Plan*	*Overfished*	*No ACL Closure*	*No Peer-Reviewed Stock Assessment*	*Managed by Apportionment*
Red Snapper*	**X**	✓	✓	✓	✓
Gray Triggerfish	**X**	✓	✓	✓	✓
Greater Amberjack	**X**	**X**	✓	✓	✓
King Mackerel	✓	✓	Commercial only	✓	✓
Red Grouper*	✓	✓	✓	✓	✓
Gag*	✓	✓	✓	✓	✓

* Recreational only; commercial is under an IFQ program.

Table 2.1.2. The smallest degree to which a stock ACL is divided (e.g., a single stock ACL, sector ACLs, sector component/zone ACLs or quotas) for all species in the Council's Reef Fish and CMP FMPs.

Stock ACL	Sector ACLs	Sector Components
Almaco Jack	Gag	King Mackerel[1]
Banded Rudderfish	Gray Triggerfish	Red Snapper[2]
Black Grouper*	Greater Amberjack	
Blackfin Snapper	Red Grouper	
Blueline Tilefish*		
Cobia		
Cubera Snapper		
Golden Tilefish*		
Goldface Tilefish*		
Goliath Grouper[3]		
Gray Snapper		
Hogfish		
Lane Snapper		
Lesser Amberjack		
Mutton Snapper		
Queen Snapper		
Scamp*		
Silk Snapper		
Snowy Grouper*		
Spanish Mackerel		
Speckled Hind*		
Vermilion Snapper		
Warsaw Grouper*		
Wenchman		
Yellowedge Grouper*		
Yellowfin Grouper*		
Yellowmouth Grouper*		
Yellowtail Snapper		

[1] Commercial sector only
[2] Recreational sector only
[3] Harvest prohibited
* Unofficial sector apportionments based on historical landings are used for these species to facilitate their respective IFQ programs; however, the Council has not established explicit sector allocations for these species.

At its June 2018 meeting, the Council discussed the inclusion of stock components managed under a catch share program, such as an individual fishing quota (IFQ) program. The Council thought that these stocks would be best considered separate from other stocks, and removed their consideration from this generic amendment. As such, Action 1 and the other actions in this generic amendment apply only to the stocks and stock components not managed under a catch share program. For example, under Action 1, red snapper would be considered for the

recreational sector, but would not be considered for the commercial sector (which is managed under an IFQ program).

Alternative 1 would not apply a carryover provision to harvest the unused portion of the ACL for any managed stock in the Gulf. Any unused portion of the ACL remaining at the end of a fishing year would continue to not be carried over to a successive fishing year. **Alternative 1** represents how stocks are currently managed under the Council's Reef Fish and CMP Fishery Management Plans (FMPs).

Preferred Alternative 2 would allow a carryover provision for all stocks except those without sector allocations and those commercial stock components managed under a catch share program. The options under **Preferred Alternative 2** would exclude a carryover provision for stocks which meet certain conditions.

If a carryover provision is established, in accordance with the revised National Standard 1 (NS1) guidelines, the Council should evaluate the appropriateness of applying the carryover provision for stocks that are overfished and/or rebuilding, as the overriding goal for such stocks is to rebuild them in as short a time as possible. **Option 2a** would exclude stocks under a rebuilding plan from consideration for a carryover, regardless of the size of the unused portion of the ACL remaining at the end of a fishing year. Examples of stocks for which the carryover provision would not apply under this option are shown in Table 2.1.1. Once a stock completes its rebuilding plan, it would be eligible for application of the carryover provision contingent on current regulations (e.g., other options in this action). Currently, there are two stocks, gray triggerfish and red snapper, which are no longer classified as overfished but are continuing to rebuild under established rebuilding plans. Stocks that are rebuilding are generally under increased harvest pressure, and increasing the ACL could negatively impact those stocks. As such, not having a carryover provision apply to a stock until such a time as it is determined to be rebuilt could benefit that stock. **Preferred Option 2b** would exclude stocks that are overfished from consideration for a carryover regardless of the size of the unused portion of the ACL remaining at the end of a fishing year. Any unused portion of the ACL remaining at the end of a fishing year for overfished stocks would not be carried over to the next fishing year. Excluding stocks which are overfished increases the likelihood of rebuilding those stocks in the specified timeframe. By allowing any foregone yield to remain in the water, the overfished stock is afforded a *de facto* buffer against recruitment variation, the impact of which is more pronounced when the spawning stock biomass is depressed.

Preferred Option 2c would exclude stocks that did not have a closure because the ACL or quota was met or projected to be met. Any unused portion of the ACL remaining at the end of a fishing year for those stocks would not be carried over to a successive fishing year. This option would prevent the continual accrual of carryover harvest to successive fishing years for stocks which are not currently harvested at their ACL on an annual basis. An example of a carryover provision not being applied under **Preferred Option 2c** is for the recreational harvest of king mackerel, which has not had its fishing season closed because the ACL was met or estimated to be met in many years. For stocks not excluded by **Preferred Option 2c**, if it is determined that a portion of the ACL went unharvested, then that unused portion of the ACL could be carried over contingent on current regulations (e.g., selection of other options in this action).

Option 2d would exclude stocks with catch limits that were not determined using projections from a peer-reviewed quantitative stock assessment. This means that there would be no carryover for stocks where the ABC was set using tier 3a or 3b of the ABC Control Rule, or using methods from the NMFS data-limited methods toolkit. This option addresses potential concerns about carrying over the unused portion of an ACL in the absence of catch advice based on a peer-reviewed and accepted stock assessment, because this may result in additional uncertainty about the impacts of implementing a carryover provision to the stock. Although this option does not currently apply to any candidate species in the reef fish or CMP FMPs, it may in the future. Consideration of **Option 2d** may prove beneficial if a stock which is currently managed under a stock ACL is later managed with sector allocations, and one or both sectors are then eligible for a carryover under the stated provisions.

Option 2e would exclude stocks that are managed by apportionment with an adjacent fishery management council. These are single stocks that cross council management boundaries. Any unused portion of the ACL remaining at the end of a fishing year for those stocks would not be carried over to a successive fishing year. Unless otherwise specified in the framework procedures of the applicable FMP, modifying the ABCs and ACLs for these stocks would require action not only by the Gulf Council (and the Gulf Council's SSC), but by the adjacent fishery management council (and its SSC) which also manages some other apportionment of the subject stock. Requiring consultation and approval for carryover for applicable stocks would delay the implementation of the resultant regulations, and would thereby not be accomplished automatically at the end of each year, as desired by the Council for this management action (see Council meeting minutes; January and April 2017). **Option 2e** does not apply to king mackerel because that species is managed as separate migratory groups (Gulf and South Atlantic), each with separate sector allocations and catch limits.

Currently, the preferred options under **Preferred Alternative 2** (**Preferred Options 2b** and **2c**) would result in carryover provisions for five species. Carryover would be allowed in the recreational and commercial sector for gray triggerfish; the recreational sector only for red snapper, red grouper, and gag (the commercial sector for each of these species is managed under an IFQ program); and the commercial sector only for king mackerel (the recreational sector would not be eligible because the sector has not been closed; exempted under **Preferred Option 2c**). Greater amberjack would not be eligible for either sector at this time because the stock is currently overfished (exempted under **Preferred Option 2b**).

2.2 Action 2 - Adjustment in the Carryover Provision Accounting for Management Uncertainty

Note: Action 2 is only valid if an alternative other than Alternative 1 is chosen in Action 1.

Alternative 1: No Action – Do not limit the carryover provision (as established in Action 1) to account for management uncertainty in the Gulf. The acceptable biological catch (ABC) in a carryover year can be set up to the overfishing limit (OFL) for that year.

Preferred Alternative 2: Adjust the amount of the ACL to be carried over into the following fishing year by limiting how much the difference between the ABC and the OFL can be reduced.

Option 2a: The difference between the ABC and the OFL can be reduced by 25%

Preferred Option 2b: The difference between the ABC and the OFL can be reduced by 50%

Option 2c: The difference between the ABC and the OFL can be reduced by 75%

Discussion:

Alternative 1 would not establish an adjustment in the carryover provision (if established in Action 1) to account for management uncertainty. Currently, the buffer between the ABC and the OFL for a stock is determined using the Council's ABC Control Rule, which uses data from the most recent stock assessment. The buffer between the ABC and the OFL varies by stock, is specific to each individual stock, and is influenced by the type and quality of data used in the assessment and by the degree of uncertainty characterized by that assessment. Most of the stocks considered for carryover are managed with an ACL that equals the ABC. Therefore, if there is no adjustment for management uncertainty as proposed in **Preferred Alternative 2**, it is possible that a carryover could result in a situation where ACL = ABC = OFL. Under this condition, the National Standard 1 guidelines state that the Secretary of Commerce may presume that the proposal would not prevent overfishing, in the absence of sufficient analysis and justification for the approach. Further, the ABC cannot be greater than the OFL, in order to prevent overfishing.

During its January 2018 meeting, the Council's SSC reviewed simulations developed by the Southeast Fisheries Science Center (SEFSC) which demonstrated the effects of a carryover provision on king mackerel and red snapper. The simulations showed that fish not caught in the previous fishing year could be harvested, pound for pound, without causing harm to the subject fish stock. At its May 2019 meeting, the Gulf SSC reviewed expanded simulations showing the effect of multiple carryover instances, and of applying a pound-for-pound payback provision. Generally, so long as unharvested quota is carried over and overharvested fish are paid back pound for pound in the following fishing year, there are unlikely to be long-term negative effects on a species' rebuilding plan. However, if carryover is permitted for a species which also experiences quota overages, and those overages are not paid back, the spawning stock biomass (SSB) will deplete, regardless of whether the stock is in a rebuilding plan. The SSC agreed that, all else being equal, the results of the updated simulations indicate if a payback, in the case of a quota overage, or a carryover, in the case of a quota underage, is handled in a one to one (pound for pound) fashion in the short term, there is little effect on rebuilding trajectories. Further, the

SSC recommended consideration of paybacks for overages for stocks on a rebuilding schedule, in light of the analyses provided by SEFSC regarding overages with no payback provision.

If the unused portion of the ACL is carried over to the following fishing year, it would increase the ABC for that fishing year only. Limiting how much the buffer between the ABC and the OFL can be reduced in years when the unused portion of the ACL is carried over would account for management uncertainty and decrease the probability of overfishing in carryover years. **Preferred Alternative 2** would allow the buffer between the ABC and the OFL to be reduced by 25% (**Option 2a**), 50% (**Preferred Option 2b**), or 75% (**Option 2c**). Table 2.2.1 provides a comparison of the current buffers between the OFL and ABC for stocks affected by this amendment, and excludes those stocks without sector allocations. The buffers shown in Table 2.2.1 are the result of the application of the current ABC Control Rule. These buffers are based on the best scientific information available from the most recent stock assessment or, in the absence of an assessment, on the data available to input into the ABC Control Rule under Tier 3. Because most of the stocks managed under the Reef Fish and CMP FMPs have ACLs that are equal to the ABCs, maintaining some difference between the OFL and ABC is intended to prevent overfishing from occurring. The options presented under **Preferred Alternative 2** would permit some amount of carryover for all applicable managed species (based on Action 1). A buffer which is greater than the buffer set by the ABC Control Rule would result in a decrease in the catch limits, which would be counter to the purpose of this amendment. Ultimately, the decision of a buffer between the ABC and OFL should be set with the intention of preventing overfishing from occurring.

Table 2.2.1. Comparison of the percent difference between the OFL and ABC for stocks which would be affected by this amendment. For each option under **Preferred Alternative 2**, the percentage provides the maximum amount of carryover that could be applied. mp = million pounds; ww = whole weight; gw = gutted weight; lw = landed weight.

Stock	Year	OFL mp	ABC mp	% Difference	Option 2a	Preferred Option 2b	Option 2c
					25%	50%	75%
Red Snapper*	2019+	15.50 ww	15.10 ww	2.58%	1.94%	1.29%	0.65%
Gray Triggerfish	2017+	1.31 ww	0.305 ww	76.72%	57.54%	38.36%	19.18%
Greater Amberjack	2018	1.50 ww	1.182 ww	21.20%	15.90%	10.60%	5.30%
King Mackerel	2018	9.11 lw	8.71 lw	4.21%	3.16%	2.11%	1.05%
Red Grouper	2016+	14.16 gw	13.92 gw	1.69%	1.27%	0.84%	0.42%
Gag	2015+	3.19 gw	3.12 gw	2.19%	1.64%	1.10%	0.55%

* Pending the implementation of the Red Snapper and West Florida Hogfish ACL Modification Framework Action (GMFMC 2018a)

Similarly, Table 2.2.2 shows the difference between the OFL and the ACL for the same stocks as shown in Table 2.2.1. In a carryover year, if the ABC is increased up to (but not to exceed) the OFL, and the ACL is equal to the ABC, then the effective allowable harvest level for the carryover year would be equal to the OFL. As previously mentioned, even if the OFL were

harvested (exactly), due to the previous fishing year's foregone yield, overfishing will not have occurred. However, the Council may want to provide for additional management uncertainty by preserving a buffer between the ABC and OFL during a carryover year to ensure that the fishing year can be closed when the ACL is met or projected to be met without exceeding that year's OFL. Of the species presently eligible for a carryover based on the preferred alternatives in this document, only red grouper and gag have ACLs set lower than their respective ABCs.

Table 2.2.2. Comparison of the percent difference between the OFL and the ACL for stocks which would be affected by this amendment. mp = million pounds; ww = whole weight; gw = gutted weight; lw = landed weight.

Stock	Year	OFL mp	ACL mp	% Difference
Red Snapper*	2019+	15.50 ww	15.10 ww	2.58%
Gray Triggerfish	2017+	1.31 ww	0.305 ww	76.72%
Greater Amberjack	2018	1.50 ww	1.182 ww	21.20%
King Mackerel	2018	9.11 lw	8.71 lw	4.21%
Red Grouper	2018	14.16 gw	10.77 gw	23.94%
Gag	2018	3.19 gw	2.647 gw	17.02%

* Pending the implementation of the Red Snapper and West Florida Hogfish ACL Modification Framework Action (GMFMC 2018a)

An example of how Action 2 would function will be described using red snapper. This example will assume that **Preferred Option 2b** was selected as the preferred alternative, which would limit the reduction in the difference between the OFL and the ABC for red snapper in a carryover year to 50%. Currently, the difference between the OFL and the ABC for red snapper is 2.58%, or equivalent to approximately 400,000 lbs ww. The ACL is equal to the ABC for red snapper. Therefore, under **Preferred Option 2b**, any carryover adjustment to the ABC for red snapper, regardless of how many sectors or sector components qualify for a carryover, would not be allowed to exceed 200,000 lbs ww.

Because the portion of the uncaught ACL must be carried over to the smallest divisible managed portion (individual fishing sector, component(s), zone(s) or gear) from which it went unharvested, the actual amount of carryover to be applied to those components will be done proportional to that component's fraction of the total carryover for a given fishing year. For example, with **Preferred Option 2b** as the preferred alternative for Action 2, assume that the private angling component and federal for-hire component have 350,000 lbs ww and 150,000 lbs ww, respectively, of eligible carryover for a fishing year. The eligible carryover amount sums to 500,000 lbs ww, with 70% of that attributable to the private angling component. However, **Preferred Option 2b** limits the reduction in the difference between the OFL and the ABC in a carryover year to 50%, and the ACL equals the ABC for red snapper. Therefore, the difference

between the OFL and the ABC of 400,000 lbs ww can be reduced to 200,000 lbs ww under **Preferred Option 2b**. Because 70% of the carryover came from the private angling component, and 30% from the federal for-hire component, the amount of carryover to be added to those component's ACLs would be 140,000 lbs ww and 60,000 lbs ww, respectively. This example is demonstrated in Table 2.2.3.

Table 2.2.3. Example of proportional carryover application based on Preferred Alternative 2, Preferred Option 2b in Action 2 for red snapper.

Species	Component	Eligible Carryover	Total Carryover	Percent of Total	Difference between ABC and OFL	Action 2 Adjustment	Actual Carryover
Red Snapper	Private Angling	350,000	500,000	70%	400,000	50%	140,000
	Federal For-hire	150,000		30%			60,000

2.3 Action 3 - Modify the Framework Procedures for the Gulf Council Reef Fish, CMP, Coral and Coral Reefs, and Spiny Lobster FMPs

Alternative 1: No Action – Do not modify the framework procedures.

Preferred Alternative 2: Modify the closed framework procedures for the Reef Fish and CMP FMPs to allow the Regional Administrator (RA) to adjust the ABC, ACL, annual catch target (ACT), and quota for a stock or stock component to account for carryover of the unused portion of the ACL (as derived from the ABC set by the ABC control rule). See highlighted sections below.

Closed Framework:
Consistent with existing requirements in the FMP and implementing regulations, the RA is authorized to conduct the following framework actions through appropriate notification in the Federal Register:

1. Close or adjust harvest of any sector of the fishery for a species, sub-species, or species group that has a quota or sub-quota at such time as projected to be necessary to prevent the sector from exceeding its sector-quota for the remainder of the fishing year or sub-quota season;
2. Reopen any sector of the fishery that had been prematurely closed;
3. Implement an in-season AM for a sector that has reached or is projected to reach, or is approaching or is projected to approach its ACL, or implement a post-season AM for a sector that exceeded its ACL in the current year.
4. Adjust the ABC, ACL, ACT, and quota for a species, sub-species, species group, sector, or component of a sector to allow for carryover of unused ACL, as determined by the ABC control rule.

Preferred Alternative 3: Modify the abbreviated framework procedures for the Reef Fish, CMP, Coral and Coral Reefs, and Spiny Lobster FMPs to allow specification of an ABC recommended by the SSC based on results of a new stock assessment and using the ABC control rule. See highlighted sections below.

Abbreviated documentation process:
Regulatory changes that may be categorized as routine or insignificant may be proposed in the form of a letter or memo from the Council to the Regional Administrator containing the proposed action, and the relevant biological, social and economic information to support the action. If multiple actions are proposed, a finding that the actions are also routine or insignificant must also be included. If the Regional Administrator concurs with the determination and approves the proposed action, the action will be implemented through publication of appropriate notification in the Federal Register. Actions that may be viewed as routine or insignificant include, among others:

- Specification of ABC, MSY, OY, and associated management parameters (such as overfished and overfishing definitions) where new values are calculated based on previously approved specifications,

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Preferred Alternative 4: Revise the framework procedures for the Reef Fish, CMP, Coral and Coral Reefs, and Spiny Lobster FMPs to have consistent terminology and format, and to include changes to the standard framework procedure for the Coral and Coral Reefs and Spiny Lobster FMPs regarding accountability measures. See highlighted sections below for additions to the Coral and Coral Reefs and Spiny Lobster FMPs.

Standard documentation process:
Regulatory changes that do not qualify as a routine or insignificant may be proposed in the form of a framework document with supporting analyses. Non-routine or significant actions that may be implemented under a framework action include:

vi. Implementation or changes to in-season accountability measures

1. Closure and closure procedures
2. Trip limit implementation or change
3. Designation of an existing limited access privilege program as the accountability measure for species in the IFQ program
4. Implementation of gear restrictions

vii. Implementation or changes to post-season accountability measures

1. Adjustment of season length
2. Implementation of closed seasons/time periods
3. Adjustment or implementation of bag, trip, or possession limit
4. Reduction of the ACL/ACT to account for the previous year overage
5. Revoking a scheduled increase in the ACL/ACT if the ACL was exceeded in the previous year
6. Implementation of gear restrictions
7. Reporting and monitoring requirements

Note: The Council may choose Alternatives 2, 3, and/or 4 as preferred alternatives.

Discussion:

The framework procedures provide standardized procedures for implementing management changes pursuant to the provisions of the FMP. There are two basic processes, the closed framework process and the open framework process. Closed frameworks address specific factual circumstances, where the FMP and implementing regulations identify specific action to be taken in the event of specific facts occurring, such as closing a sector of a fishery after its quota has been harvested. Open frameworks address issues where there is more policy discretion in selecting among various management options developed to address an identified management issue, such as changing a size limit to reduce harvest. Open framework actions may be implemented in either of two ways, abbreviated documentation, or standard documentation

process. The abbreviated documentation process is used for regulatory changes that may be categorized as routine or insignificant; the standard documentation process is used for regulatory changes that do not qualify as routine or insignificant.

Alternative 1 would not adjust the framework procedures. The current framework procedures for all applicable FMPs would remain in effect. **Alternative 1** would not permit the changes necessary to automate parts of the carryover process, the specification of ABC, or more timely adjustments to in-season and post-season accountability measures.

Preferred Alternative 2 would modify the closed framework procedures for the Reef Fish and CMP FMPs to allow the Regional Administrator (RA) to adjust the ABC, ACL, ACT, and quota for a stock or stock component to account for carryover of the unused portion of the ACL (as derived from the ABC set by the ABC control rule). This modification would permit NMFS to make the necessary changes to harvest limits for stocks eligible for a carryover as soon as the necessary data are available. This differs from the current framework procedure, which would require a standard framework action under the open framework procedures to modify harvest limits prior to their implementation. **Preferred Alternative 2** increases the timeliness of the application of the carryover provision proposed in Actions 1 and 2, but limits the authority of the RA to make such rapid changes only to the carryover provision. The open framework procedure would still be used for other harvest limit adjustments.

Preferred Alternative 3 would modify the abbreviated framework procedures for the Reef Fish, CMP, Coral and Coral Reefs, and Spiny Lobster FMPs to allow specification of an ABC recommended by the SSC based on results of a new stock assessment and using the ABC control rule. This differs from the current framework procedures, which require a standard framework action to modify the ABC and other harvest limits prior to their implementation. Under **Preferred Alternative 3**, the Council would send a letter to the RA containing the proposed action (a change to the ABC), and the relevant biological, social and economic information to support the action. If the RA concurs with the Council's determination that the action is routine or insignificant, the RA can then approve the proposed action, which will be implemented through publication of appropriate notification in the *Federal Register*.

Preferred Alternative 4 would revise the framework procedures for the Reef Fish, CMP, Coral and Coral Reefs, and Spiny Lobster FMPs to have consistent terminology and format, and to include changes to the standard framework procedure for the Coral and Coral Reefs and Spiny Lobster FMPs regarding accountability measures (AMs). Specifically for the Coral and Coral Reefs and Spiny Lobster FMPs, **Preferred Alternative 4** would permit the implementation of or changes to in-season and post-season AMs through an open framework action, as opposed to a plan amendment. This change would permit the Council to implement or change AMs in a timelier manner than is currently permitted under the existing framework procedures. The modifications in **Preferred Alternative 4** have already been completed for the Shrimp FMP.

CHAPTER 3. AFFECTED ENVIRONMENT

This section will focus on the Fishery Management Plans (FMPs) for Reef Fish, Coastal Migratory Pelagics (CMP) Resources, Spiny Lobster, and Coral and Corals Reefs in the Gulf of Mexico (Gulf). The management alternatives proposed in Actions 1 and 2 of Chapter 2 of this amendment are expected to directly affect these FMPs, and as such, their respective environmental components (physical, biological/ecological, economic, social, and administrative). The management alternatives proposed in Action 3 of Chapter 2 of this amendment are expected to affect the administrative environment for the Reef Fish and CMP FMPs, as well as the Coral and Coral Reefs, and Spiny Lobster FMPs, which will be addressed in Section 3.6.

Carryover would be allowed in the recreational and commercial sector for gray triggerfish; the recreational sector only for red snapper, red grouper, and gag (the commercial sector for each of these species is managed under an IFQ program); and the commercial sector only for king mackerel (the recreational sector would not be eligible because the sector has not been closed; exempted under **Preferred Option 2c**). Greater amberjack would not be eligible for either sector at this time because the stock is currently overfished (exempted under **Preferred Option 2b**). These six species are discussed below in the Description of Fishery since they are the ones eligible for carryover when not being overfished or undergoing overfishing.

3.1 Description of the Fishery

Descriptions of the Fishery are detailed for the six species listed in Table 2.1.1 in Chapter 2.

3.1.1 Coastal Migratory Pelagics

King Mackerel

A federal king mackerel commercial vessel permit is required to retain king mackerel in excess of the bag limit in federal waters of the Gulf of Mexico (Gulf) and Atlantic and to sell king mackerel from federal waters. These permits are limited access. In addition, a limited-access gillnet permit is required to use gillnets in the Gulf Southern Zone. For-hire vessels must have either a Gulf or South Atlantic charter/headboat CMP vessel permit, depending on where they fish. The Gulf for-hire permit is limited access, but the South Atlantic for-hire permit is open access. The commercial king mackerel permits do not have an income requirement (Amendment 20A: GMFMC and SAFMC 2013a).

For the commercial sector, the area occupied by Gulf migratory group king mackerel is divided into zones. The Western Zone extends from the southern border of Texas to the Alabama/Florida state line. The fishing year for this zone is July 1 through June 30. The Northern Zone extends from the Alabama/Florida state line in the west to the Lee/Collier county line in southwest Florida, with a fishing year of October 1 through September 30. The Southern Zone extends south of the Lee/Collier county line to the Monroe/Dade-Miami county line in

southeast Florida, with a fishing year from July 1 through June 30. In the Southern Zone, the gillnet season opens on the day after the Martin Luther King, Jr. holiday. Gillnet fishing is allowed during the first weekend thereafter, but not on subsequent weekends. King mackerel north of the Monroe/Dade county line are considered part of the Atlantic migratory group (Figure 3.1.1.1).

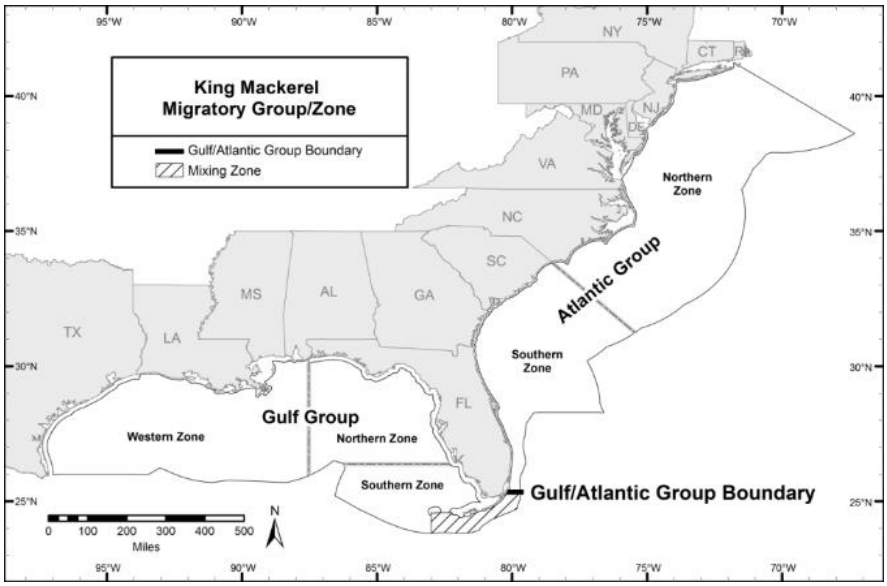

Figure 3.1.1.1. Gulf and Atlantic migratory group king mackerel zones.

Commercial landings of Gulf migratory group king mackerel increased as the total commercial quota for the Gulf increased until 1997/1998 when the quota was set at 3.39 million pounds (mp). After that, landings have been relatively steady near the annual catch limit (ACL). King mackerel have long been a popular target for recreational fishermen. The recreational sector is allocated 68% of the Gulf ACL. Gulf recreational landings averaged about 2.8 mp per year over the last five years (Table 3.1.1.1).

Table 3.1.1.1. Commercial landings of king mackerel in the Gulf by fishing year.

Fishing Year	Landings (lbs)	
	Commercial	Recreational
2000/2001	3,056,222	3,121,584
2001/2002	2,902,632	3,668,540
2002/2003	3,184,478	2,817,537
2003/2004	3,095,673	3,211,497
2004/2005	3,215,676	2,528,457
2005/2006	2,984,694	2,995,716
2006/2007	3,231,734	3,305,567
2007/2008	3,459,064	2,626,527
2008/2009	3,834,026	2,352,510
2009/2010	3,672,628	3,523,777
2010/2011	3,521,125	2,182,980
2011/2012	3,427,891	2,806,173
2012/2013	3,538,228	4,102,846
2013/2014	3,055,018	2,807,447
2014/2015	3,591,000	4,615,150
2015/2016	3,205,712	2,353,611
2016/2017	2,817,308	2,778,688
2017/2018	3,074,196	1,678,622

Source: SEFSC, ALS database; NEFSC, CFDBS database.
* Does not include 2018 MRIP Wave 3 Landings

3.1.2 Reef Fish

General Information Applicable to All Gulf Reef Fish

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 reef fish trips by intent.

Savolainen et al. (2012) surveyed the charter vessel and headboat fleets in the Gulf. For charter vessels, they found that most trips occurred in Gulf federal waters (68%), and targeted "rig-reef" species (64%; snappers and groupers). Pelagic (mackerel and cobia) trips accounted for 19% of trips. If examined by state, more trips targeted rig-reef species with the exception of Louisiana, where rig-reef species and pelagic species had almost the same proportion of trips. In a similar survey conducted in 1998, Holland et al. (1999) found species targeted by Florida charter vessel operators were king mackerel (approximately 41%), grouper (approximately 37%), snapper (approximately 34%), cobia (approximately 25%), and Spanish mackerel (approximately 20%). For the rest of the Gulf and using the same survey, Sutton et al. (1999) reported that the majority of charter vessels targeted snapper (91%), king mackerel (89%), cobia (76%), and tuna (55%).

For headboats, Savolainen et al. (2012) found most headboats target offshore species and fish in federal waters (81% of trips), largely due to vessel size and consumer demand. On average, 84% of trips targeted rig-reef species, while only 10% targeted inshore species and 6% pelagic species. Holland et al. (1999) reported approximately 40% of headboats did not target any particular species. The species targeted by the largest proportion of west Florida headboats were snapper (60%), grouper (60%) and sharks (20%), with species receiving the largest percentage of effort being red grouper (46%), gag (33%), black grouper (20%), and red snapper (7%). For the other Gulf states, Sutton et al. (1999) reported that the majority of headboats targeted snapper (100%), king mackerel (85%), shark (65%), tuna (55%), and amberjack (50%). The species receiving the largest percentage of total effort by headboats in the four-state area were snapper (70%), king mackerel (12%), amberjack (5%), and shark (5%).

Angler fishing effort refers to the estimated number of angler fishing trips taken, and an angler trip is an individual fishing trip taken by a single angler for any amount of time, whether it is half an hour or an entire day. Currently, private angler fishing effort is estimated by mail survey and on-site survey methods (Marine Recreational Information Program [MRIP] Access Point Angler Intercept Survey [APAIS]). From these surveys, NMFS estimates how many people are fishing, where people are fishing, and how often people go fishing. The MRIP APAIS (survey of anglers by the private boat, charter vessel and shore modes as they complete a trip), estimates how many trips target a particular species, how many trips catch what quantity of a particular species, how many of a particular species are kept, how many are discarded, condition of discarded fish, and size and weight of fish caught.

Target effort refers to the number of individual angler trips, regardless of duration, where the intercepted angler indicated that a particular species was targeted as either the first or second primary target for the trip. A given species does not have to be caught on a trip for it to be a trip targeting that species. Catch effort refers to the number of individual angler trips, regardless of duration and target intent, where the target species was caught; those fish caught did not have to be kept. Those trips can result in double counting of trips, such as when a species was both targeted and caught during a specific angler trip. Data from MRIP, LA Creel (Louisiana), Tales and Scales (Mississippi), Snapper Check (Alabama), and the Gulf Reef Fish Survey (Florida) are used to estimate effort of the private angling component for each Gulf state, except Texas.

In some cases, state regulations are different from federal regulations. In those circumstances (e.g., red snapper recreational seasons), private anglers in state waters must obey the regulations for the waters in which they are fishing. Anglers fishing from federally permitted charter vessels and headboats must abide by the more restrictive of state or federal regulations when fishing in state waters.

Red Snapper

Commercial Sector

Since 2007, the commercial sector's harvest of red snapper has operated under an individual fishing quota (IFQ) program. The application of a carryover provision is not being considered in this amendment for stocks managed under IFQ programs.

Recreational Sector

Red snapper is an important component of the recreational sector's harvest of reef fish in the Gulf. Recreational red snapper fishing includes anglers fishing from charter vessels, headboats, and privately owned boats including rental boats.

In 2015, Amendment 40 (GMFMC 2014d), the recreational sector was divided into a private angling component and a federal for-hire component. Separate fishing seasons are established for each component based on the component annual catch targets (ACT), which are reduced from the component ACLs by the established buffer. The private angling component consists of anglers fishing from privately owned and rented vessels, and for-hire vessels without a federal permit (i.e., state-licensed for-hire vessels). These state-licensed for-hire vessels may not harvest red snapper from federal waters, including under any state management plan. The federal for-hire component consists of anglers fishing from vessels with a federal charter/headboat permit for Gulf reef fish. The amendment defined the two components and allocated the red snapper ACL and ACT between the private angling (57.7%) and federal for-hire (42.3%) components.

Currently, the recreational harvest of red snapper in federal waters of the Gulf is constrained by a two-fish bag limit, 16-inch total length (TL) minimum size limit, and a fishing season that begins on June 1 and closes when the ACT of each recreational component is projected to be caught. For the 2018 and 2019 red snapper fishing seasons, the private angling component seasons are set by each of the five Gulf states through exempted fishing permits (EFP), while the federal for-hire component season continues to be set by the National Marine Fisheries Service (NMFS). The purpose of the EFPs is to allow states to demonstrate the effectiveness of state management of recreationally caught red snapper and data collection methods through 2-year pilot programs.

Table 3.1.2.1 provides recent federal for-hire and private angling component landings by state for red snapper. In general, recent trends indicate that Florida and Alabama consistently land the most red snapper.

Table 3.1.2.1. For-hire and private angling component landings for red snapper by component and state from 2013-2017.

State	2013 Landings (lbs whole weight)			% by State
	For-Hire Charter/Headboat	Private Angling	All Components	
FL (west)	671,642	3,105,730	3,777,372	38.9%
AL	546,564	3,877,683	4,424,247	45.6%
MS	3,792	418,737	422,529	4.4%
LA	100,438	489,204	589,642	6.1%
TX	234,549	254,563	489,112	5.0%
Total	**1,556,985**	**8,145,917**	**9,702,902**	-
% by Mode	**16%**	**84%**	-	-

State	2014 Landings (lbs whole weight)			% by State
	For-Hire Charter/Headboat	Private Angling	All Components	
FL (west)	184,957	1,459,885	1,644,841	42.9%
AL	152,614	1,006,166	1,158,780	30.2%
MS	1,693	43,425	45,118	1.2%
LA	33,909	557,189	591,098	15.4%
TX	193,705	201,894	395,599	10.3%
Total	**566,878**	**3,268,558**	**3,835,436**	-
% by Mode	**15%**	**85%**	-	-

State	2015 Landings (lbs whole weight)			% by State
	For-Hire Charter/Headboat	Private Angling	All Components	
FL (west)	865,058	766,237	1,631,295	27.4%
AL	757,388	1,711,421	2,468,809	41.4%
MS	10,485	34,209	44,694	0.7%
LA	155,669	1,059,302	1,214,971	20.4%
TX	365,077	235,305	600,382	10.1%
Total	**2,153,677**	**3,806,474**	**5,960,151**	-
% by Mode	**36%**	**64%**	-	-

Table 3.1.2.1 *continued*. Recent for-hire and private angling landings for red snapper by component and state from 2013-2017.

State	2016 Landings (lbs whole weight)			% by State
	For-Hire Charter/Headboat	Private Angling	All Components	
FL (west)	822,599	1,713,799	2,536,397	34.1%
AL	763,511	2,047,404	2,810,915	37.8%
MS	18,721	354,645	373,366	5.0%
LA	179,586	1,042,389	1,221,975	16.4%
TX	358,399	135,398	493,797	6.6%
Total	**2,142,815**	**5,293,635**	**7,436,450**	**-**
% by Mode	**29%**	**71%**	**-**	**-**
State	**2017 Landings (lbs whole weight)**			**% by State**
	For-Hire Charter/Headboat	**Private Angling**	**All Components**	
FL (west)	884,321	2,576,730	**3,461,051**	**39.1%**
AL	802,920	2,796,840	**3,599,760**	**40.6%**
MS	40,610	243,670	**284,280**	**3.2%**
LA	179,243	751,476	**930,719**	**10.5%**
TX	362,444	224,517	**586,961**	**6.6%**
Total	2,269,538	6,593,233	8,862,771	**-**
% by Mode	**25.60%**	**74.40%**	**-**	**-**

Sources: Southeast Fishery Science Center (SEFSC) MRIP-Based Recreational ACL Data (July 2017; June 2018); SEFSC SEDAR-31 Update (2014) APAIS-adjusted red snapper data.

Red Grouper

Commercial Sector

Since 2010, the commercial sector's harvest of red grouper has operated under an IFQ program. The application of a carryover provision to stocks managed under IFQ programs are not considered in this amendment.

Recreational Sector

Red grouper is an important component of the recreational sector's harvest of reef fish in the Gulf. Recreational red grouper fishing includes anglers fishing from charter vessels, headboats, and privately owned boats including rental boats.

The recreational sector is currently managed through ACLs, ACTs, AMs, a minimum size limit of 20 inches total length (TL), a two-fish per person bag limit, time-area closures (recreational fishing is closed beyond the 20 fathom [120 foot] break from February 1 through March 31), area/gear restrictions, and gear requirements (see Section 1.3.1).

NMFS manages the federal fishing season length based on when the ACT is projected to be met. If the total recreational ACL is projected to be reached, then the federal recreational fishing season is closed. The Gulf states have traditionally followed suit when the federal fishing season closes, but not on all occasions. The primary gear type in the harvest of red grouper is vertical line (rod-and-reel).

Table 3.1.2.2 provides recent combined recreational landings for red grouper. In general, recent trends indicate that Florida consistently lands the preponderance of red grouper.

Table 3.1.2.2. Red grouper landings for the recreational sector in pounds gutted weight (gw) for the years 2001 through 2017.

Year	Recreational Sector
2001	1,562,768
2002	1,856,389
2003	1,337,719
2004	3,529,966
2005	1,469,278
2006	1,151,934
2007	1,036,830
2008	862,303
2009	828,737
2010	793,096
2011	601,651
2012	1,612,444
2013	2,569,518
2014	1,662,920
2015	1,924,626
2016	1,403,236
2017	826,275

Source: SERO ACL database.

Gag

Commercial Sector

Since 2010, the commercial sector's harvest of gag has operated under an IFQ program. The application of a carryover provision is not being considered for stocks managed under IFQ programs in this amendment.

Recreational Sector

Gag is an important component of the recreational sector's harvest of reef fish in the Gulf. Recreational gag fishing includes anglers fishing from charter vessels, headboats, and privately owned boats including rental boats.

The recreational sector is currently managed through ACLs, ACTs, AMs, a minimum size limit of 24 inches total length (TL), a two-fish per person bag limit, seasonal closures (recreational fishing is closed from January 1 through June 30 in federal waters annually), area/gear restrictions, and gear requirements (see Section 1.3).

NMFS manages the federal fishing season length based on when the ACT is projected to be met. If the total recreational ACL is projected to be reached, then the federal recreational fishing season is closed. The primary gear type in the harvest of gag is vertical line (rod-and-reel).

Table 3.1.2.3 provides recent combined recreational landings for gag. In general, recent trends indicate that Florida consistently lands the preponderance of gag.

Table 3.1.2.3. Gag landings for the recreational sector in pounds gutted weight (gw) for the years 2001 through 2017.

Year	Recreational Sector
2001	1,562,768
2002	1,856,389
2003	1,337,719
2004	3,529,966
2005	1,469,278
2006	1,151,934
2007	1,036,830
2008	862,303
2009	828,737
2010	1,664,257
2011	660,287
2012	938,547
2013	1,435,421
2014	862,101
2015	823,940
2016	796,430
2017	865,230

Source: SERO ACL database.

Greater Amberjack

Commercial Sector

The commercial sector has a seasonal closure of March 1 through May 31. Management measures for fish harvested commercially include a 36-inch FL minimum size limit, a trip limit of 1,500 pounds gutted weight, and accountability measures. These accountability measures state that if commercial landings reach or are projected to reach the ACT (quota), the commercial sector will close for the remainder of the fishing year. In addition to these measures, if commercial landings exceed the commercial ACL, the ACT (quota) and the ACL for the commercial sector will be reduced for the following fishing year by the amount of the overage in the prior fishing year. The most common gear type used for the commercial harvest of greater amberjack is hook-and-line.

Recreational Sector

Generally, greater than 60% of the total greater amberjack harvest is landed by recreational anglers. The recreational sector has a current seasonal closure of January 1 – April 30, June 1 – July 31, and November 1 – December 31. Fish harvested recreationally must conform to a 34-inch FL minimum size limit, a bag limit of one fish per person per day, a zero bag limit for

captain and crew of for-hire vessels, and accountability measures. These accountability measures state that if recreational landings reach or are projected to reach the ACT, the recreational sector will close for the remainder of the fishing year. In addition to these measures, if recreational landings exceed the recreational ACL, the ACT and the ACL for the recreational sector will be reduced for the following fishing year by the amount of the overage in the prior fishing year. Recreational landings are primarily from private vessels, and the most common gear type used for harvest is hook-and-line.

Table 3.1.2.4 provides recent commercial and recreational landings for greater amberjack.

Table 3.1.2.4. Greater amberjack landings for the commercial and recreational sectors in pounds whole weight (ww) for the years 2001 through 2017.

Year	Commercial Sector	Recreational Sector
2001	605,285	1,393,307
2002	703,303	2,133,359
2003	857,125	2,901,820
2004	870,953	2,392,230
2005	662,285	1,517,155
2006	566,384	1,700,186
2007	589,235	867,486
2008	440,936	1,318,662
2009	601,446	1,480,315
2010	534,095	1,316,291
2011	508,871	1,032,063
2012	308,334	1,322,788
2013	457,879	1,534,462
2014	482,277	912,254
2015	460,670	1,352,930
2016	437,390	1,962,559
2017	454,561	802,889

Source: SERO ACL database.

Gray Triggerfish

Commercial Sector

Gray triggerfish are harvested by the commercial sector using hook-and-line, bottom longline, and other gears (e.g., dredges, unclassified gear, nets, spear, and traps). The commercial trip limit is set at 16 fish per vessel, per trip. Two closed seasons occur, from January 1 – end of February and also June 1 – July 31. Accountability measures for gray triggerfish include an in-season closure authority based on the commercial ACT, and an overage adjustment to reduce the gray triggerfish ACL and ACT by the amount of the overage.

Recreational Sector

Gray triggerfish is primarily landed by recreational anglers. The recreational bag limit is one fish per person per day, with a minimum size limit of 15 inches FL. Two closed seasons occur, from January 1 – end of February and also June 1 – July 31. Accountability measures for gray triggerfish include an in-season closure authority based on the recreational ACT, and an overage adjustment to reduce the gray triggerfish ACL and ACT by the amount of the overage. This overage adjustment applies only while gray triggerfish is overfished. Anglers on private vessels harvest the greatest amount of gray triggerfish in terms of pounds landed. Landings of gray triggerfish by the recreational sector are harvested primarily by hook-and-line gear, with some harvested by spear.

Table 3.1.2.5 provides recent commercial and recreational landings for gray triggerfish.

Table 3.1.2.5. Gray triggerfish landings for the commercial and recreational sectors in pounds whole weight (ww) for the years 2001 through 2017.

Year	Commercial Sector	Recreational Sector
2001	175,252	594,910
2002	233,232	919,350
2003	251,629	1,072,749
2004	219,879	1,065,495
2005	146,819	658,033
2006	92,503	521,773
2007	95,070	501,428
2008	76,569	419,276
2009	78,117	401,026
2010	55,661	296,360
2011	105,251	461,549
2012	71,948	277,720
2013	63,086	453,251
2014	42,532	217,891
2015	47,480	94,174
2016	58,334	432,641
2017	63,689	62,731

Source: SERO ACL database.

3.1.3 Spiny Lobster

A thorough description of the spiny lobster fishery is discussed in Amendment 13 to the Fishery Management Plan (FMP) for Spiny Lobster in the Gulf of Mexico and South Atlantic (Spiny

Lobster FMP) (GMFMC and SAFMC 2018). That description is summarized in the following and incorporated herein by reference.

The spiny lobster in the U.S. Exclusive Economic Zone (EEZ) of the Atlantic Ocean and Gulf of Mexico (Gulf) is jointly managed by the Gulf and South Atlantic Fishery Management Councils (Councils) through the Spiny Lobster FMP. In the U.S. EEZ off the Caribbean Sea surrounding Puerto Rico and the U.S. Virgin Islands, the resource is managed by the Caribbean Fishery Management Council through a separate FMP. In the Gulf and South Atlantic, the commercial fishery, and most of the recreational fishery, occurs off South Florida, primarily in the Florida Keys.

In the EEZ off Florida, or for spiny lobster harvested in the EEZ other than off Florida and landed from a fishing vessel in Florida, anyone who possesses, sells, trades, or barters or attempts to sell, trade, or barter spiny lobster must have the appropriate licenses, permit, and certificates specified to be a "commercial harvester," as defined in the Florida Administrative Code (FAC). The FAC defines "commercial harvester" as "a person who holds a valid crawfish license (C) or trap number, lobster trap certificates if traps are used to harvest spiny lobster, or a valid commercial dive permit (CD) if harvest is by diving, or a valid bully net permit (CN) if harvest is by bully net, and a valid saltwater products license (SPL) with a restricted species (RS) endorsement issued by the Fish and Wildlife Conservation Commission." The Florida SPL license is open access with an annual cost of $50 for individual Florida residents and $100 for a Florida resident vessel. The Florida RS endorsement is free but income requirements apply to qualify. The C license for fishermen not using traps, divers and bully netters, has an annual cost of $100. A CN permit does not have an additional cost but a C license must be purchased. The CN permit is not under a moratorium or reduction program. A CD permit does not have an additional cost, but a C license must be purchased. The CD permit is currently under a moratorium and can only be acquired by purchasing it from another fisherman.

The Florida crawfish license for fishermen using traps has an annual cost of $125. The Florida crawfish trap certificate has an annual cost of one dollar per trap tag issued or replaced. Florida is currently under a spiny lobster trap reduction program. Therefore, no new trap certificates are being sold. Commercial fishermen in Florida must purchase spiny lobster certificates from other fishermen and then purchase the associated tags for the certificates. Transferred or sold certificates are subject to a 10% trap reduction percentage and a trap certificate surcharge if transferred outside of the immediate family. Failure to pay certificate fees and other charges will also result in a 10% reduction of an individual's trap certificate numbers. This trap reduction program is expected to continue until only 400,000 trap certificates remain, at which time there would be no further reduction in the number of lobster trap certificates issued each year, except those forfeited. For the 2016/2017 fishing year, there were 470,244 trap certificates available of which 466,168 were issued.

A Florida commercial bully netter that possesses, sells, trades, or barters or attempts to sell, trade, or barter spiny lobster must have a Florida SPL license, a RS endorsement, a C license, and a CN permit to harvest spiny lobster, whether in Florida state or federal waters. A Florida commercial diver that possesses, sells, trades, or barters or attempts to sell, trade, or barter spiny lobster must have a Florida SPL license, a RS endorsement, a C license, and a CD

permit whether in Florida state or federal waters. A Florida commercial spiny lobster trap fishermen that possesses, sells, trades, or barters or attempts to sell, trade, or barter spiny lobster must have a Florida SPL license, a RS endorsement, a C license, and a trap certificate and tag for each trap whether in Florida state or federal waters.

Any person who possesses, sells, trades, or barters or attempts to sell, trade, or barter a spiny lobster harvested in the EEZ other than off Florida must have a federal vessel permit (GMFMC and SAFMC 1987). A federal vessel permit does not authorize a commercial vessel to sell, trade, or barter or attempt to sell, trade, or barter a spiny lobster harvested in the EEZ off Florida. Any vessel that harvests spiny lobster in the EEZ under the federal spiny lobster permit or Florida permits must land the species whole (GMFMC and SAFMC 1982) unless they have a federal tailing permit on board in addition to any other permits (GMFMC and SAFMC 1987). Lobster tailing permits are only for commercial vessels that are on trips for 48 hours or more in federal waters and those vessels must land lobsters all whole or all tailed on a trip. Both the federal spiny lobster and spiny lobster tailing permits are open access permits, although the federal spiny lobster permit has an income requirement to obtain. The annual cost of federal permits is $25 for the first permit and $10 for the second.

The commercial and recreational fishing season for spiny lobster in the EEZ off Florida and the Gulf states other than Florida, begins on August 6 and ends March 31 (GMFMC and SAFMC 1987). South Atlantic states, other than Florida, have year-round spiny lobster fishing for both commercial and recreational fishers with a two-lobster per person trip limit (GMFMC and SAFMC 1994). Lobster traps may be worked during daylight hours only, and no spiny lobster can be harvested in excess of the bag limit by diving at night (GMFMC and SAFMC 1993).

Specifications for commercial requirements, traps and buoys, identification requirements, and prohibitions are detailed in sections within the Code of Federal Regulations (CFR), which incorporates by reference the FAC for certain requirements. The Florida recreational spiny lobster fishing season has two parts: a two-day sport season that occurs before commercial spiny lobster fishermen place their traps in the water, and a regular season that coincides with the commercial fishing season. No person can harvest, attempt to harvest, or have in his possession, regardless of where taken, any spiny lobster during the closed season of April 1 through August 5 of each year, except during the two-day sport season. During the two-day sport season, no person can harvest spiny lobster by any means other than by diving or with the use of a bully net or hoop net. Further restrictions are in effect for Monroe County, Florida, during the sport season (GMFMC 1993). Recently implemented regulations that extend the allowable soak time of traps before the 2018/2019 season start of August 6, and extends the retrieval time of traps when the season ends March 31. Amendment 13, if implemented, would update the incorporation by reference date so this increased pre-soak and retrieval time will be applicable in federal waters as well.

In the 2016/2017 fishing season, Florida issued 1,567 commercial crawfish licenses, 276 commercial dive permits and 189 commercial bully net permits; the bully net permit was not available to buy, nor was it required, until nearly the end of the fishing season. In the 2017/2018 fishing season, Florida issued 1,500 commercial crawfish licenses, 265 commercial

dive permits, and 380 commercial bully net permits[3]. As of December 7, 2017, the National Marine Fisheries Service (NMFS) listed 194 valid federal spiny lobster permits for the EEZ other than off Florida and 214 federal tail-separation permits for all EEZ waters. Florida has a variety of licenses that allow recreational fishermen to take spiny lobster. From March 2016 to March 2017, Florida issued 122,674 resident annual or 5-year spiny lobster stamps; in addition, it issued 61,350 other fishing licenses, such as Military Gold Sportsman's or Saltwater Lifetime license, that also allow holders to take spiny lobster. Non-residents were issued 26,668 annual spiny lobster stamps. NMFS does not require a permit for recreational fishing of spiny lobster in the EEZ.

The most recent 5-year overall landings have averaged around seven million pounds (Table 3.1.3.1). Landings began to decrease in the early 2000s, with an increasing trend starting in the late 2000s. Most commercial landings are from trapping; other regularly used gear includes diving and bully nets. There has been a slow increase in bully net harvest since the 1991/1992 season with landings increasing since the 2013/2014 season. Bully net harvest has accounted for approximately 3% of the overall landings since 2013/2014 averaging 172,951 lbs per year. The proportion of landings from recreational fishing has remained fairly constant at around 20-25%.

Table 3.1.3.1. Florida landings of spiny lobster, by sector, gear and recreational license type (million pounds, whole weight (ww).

Fishing Year	Commercial								Recreational					Overall total
	Traps	Diving	Bully net	Other	Mixed	Unknown	Total	% of total	Special	Regular	SRL	% of total	Total	
00/01	4,862,624	634,574	12,193	3,756	318	55,843	5,569,306	74.08	398,618	1,512,348	38,096	25.92	1,949,062	7,518,368
01/02	2,621,748	446,691	8,561	797	1,323	0	3,079,121	71.11	282,861	935,929	32,291	28.89	1,251,081	4,330,201
02/03	3,988,822	560,739	19,854	1,298	602	333	4,572,648	75.86	355,184	1,055,648	44,466	24.14	1,455,298	6,027,946
03/04	3,726,732	406,588	21,743	1,003	2,632	0	4,158,698	74.66	375,119	997,408	38,981	25.34	1,411,509	5,570,206
04/05	5,104,913	310,394	34,111	1,577	395	0	5,451,391	99.38	**	**	34,136	0.62	34,136	5,485,527
05/06	2,686,701	266,115	14,760	1,450	94	0	2,969,121	72.42	331,388	773,199	26,427	27.58	1,131,014	4,100,135
06/07	4,541,462	251,319	29,764	813	754	0	4,824,111	78.71	320,474	957,062	26,974	21.29	1,304,511	6,128,622
07/08	3,467,858	292,531	29,776	2,875	27	0	3,793,068	75.74	354,669	839,471	20,929	24.26	1,215,068	5,008,136
08/09	3,007,289	246,089	29,873	639	67	922	3,284,879	72.22	422,311	824,585	16,612	27.78	1,263,508	4,548,387
09/10	4,181,282	156,154	54,833	517	137	1,047	4,393,970	77.64	419,795	835,054	10,727	22.36	1,265,576	5,659,545
10/11	5,739,252	166,160	58,206	3,607	930	1,797	5,969,950	80.82	437,575	971,920	6,971	19.18	1,416,466	7,386,416
11/12	5,580,904	201,517	67,167	2,983	1,065	538	5,854,173	82.63	324,221	902,523	3,665	17.37	1,230,408	7,084,582
12/13	3,899,828	128,539	47,997	284	0	1,546	4,064,217	72.28	384,466	1,174,529		27.72	1,558,995	5,623,212
13/14	5,938,766	214,810	216,060	1,406	1,728	235	6,373,005	79.91	328,422	1,274,232		20.09	1,602,654	7,975,659
14/15	5,062,422	200,467	187,969	1,655	271	482	5,436,140	77.03	328,136	1,293,046		22.97	1,621,182	7,057,322
15/16	5,730,261	178,599	146,731	2,497	197	2,124	6,060,409	80.25	371,946	1,119,542		19.75	1,491,487	7,551,896
16/17	5,043,775	175,783	141,045	1,928	487	351	5,363,369	78.47	434,532	1,091,642		22.33	1,526,174	6,889,543
5-yr avg	5,135,010	179,640	147,960	1,554	537	948	5,459,428	78	369,500	1,190,598		23	1,560,098	7,019,526

Note: Five year average is for 12/13-16/17. This table updates and replaces Table 3.1.1 in Regulatory Amendment 4. SRL (Special Recreational License) was available from 1994/95 through the 2011/12 season. **Data Unavailable—Recreational Surveys were not conducted due to hurricanes. Sources: Commercial landings, FTT, as of 02Oct17. Recreational landings are estimated using surveys of recreational lobster permit holders and represent landings during the special 2-day sport season ("Special") and from opening day of the regular season (Aug. 6) through Labor Day ("Regular"). Grand total excludes estimated fishing mortality for bait.

3.1.4 Coral and Coral Reefs

A discussion of the fishery for corals is contained in Coral Amendment 9 (GMFMC 2018b) to the Fishery Management Plan for Coral and Coral Reefs of the Gulf of Mexico (Coral FMP) and is incorporated here by reference.

The Council's Coral FMP presently manages over 140 species of coral, which generally fall into the Hydrozoa (stinging and octocorals) or Anthozoa (black and stony corals) families. Black coral and stony coral harvest is prohibited in the EEZ of the Gulf of Mexico (Gulf). Octocorals are harvested in Florida state waters and in the EEZ off Florida, but this harvest is managed by Florida. Live rock harvest is also part of the Coral FMP, though harvest of wild live rock is prohibited in the Gulf.

Currently Florida manages the harvest of octocorals in state and adjacent federal waters through several requirements. Recreational collectors must possess a state saltwater fishing license and are limited to six colonies per day. Commercial collectors must possess a Saltwater Products License with the Restricted Species and Marine Life Tiered endorsements. Collection of octocoral must be by hand and all applicable gear restrictions apply. The quota for octocorals is 70,000 colonies annually. Harvest of attached substrate is limited to within one inch of the base; and harvest of *Gorgonia flabellum* (venus sea fan) and *Gorgonia ventalina* (common [purple] sea fan) and harvest of non-erect or encrusting octocorals is prohibited[13] (Florida Administrative Code (FAC) 68B-42). Florida specifies that harvest is not to occur in habitat areas of particular concern (HAPCs) in the Atlantic (FAC 68B-42.0036). In the years 2011-2016, between 28,000 and 70,000 colonies have been harvested, and the number of dealers has ranged between 41 and 55 (GMFMC 2018, Table 2.1.2). Most octocoral harvest occurs in state waters in the South Atlantic; the Gulf harvest is a mere fraction of the total reported for Florida (GMFMC 2018b, Table 2.1.3).

Live rock is an assemblage of marine organisms attached to a hard substrate. Live rock harvest was first marketed in the 1970s after technical advances in aquarium filtration systems enabled invertebrate dominated aquaria. Live rock harvest is now heavily regulated in the EEZ by a memorandum of understanding between NMFS and the U.S. Army Corps of Engineers, and wild live rock harvest is prohibited. To harvest aquacultured live rock in the Gulf or South Atlantic EEZ, a federal live rock permit must have been issued for a specific site. Any aquacultured live rock material must be deposited and harvested by hand, be distinguishable from surrounding substrates, and if endangered or threatened coral species are present on the substrate, harvest is prohibited. Specific requirements and regulations of aquacultured live rock are contained in 50 CFR Part 622, Subpart F. Additionally, appropriate Florida permits and endorsements are required for landing live rock.

3.1.5 Status of the Stocks

The Reef Fish Fishery Management Plan (FMP) currently encompasses 31 species. Eleven other species were removed from the FMP in 2012 through the Generic ACL/AM Amendment (GMFMC 2011a). The CMP FMP includes three species, and the Spiny Lobster FMP includes one species (Table 3.1.3.1).

The NMFS Office of Sustainable Fisheries updates its Status of U.S. Fisheries Report to Congress[3] on a quarterly basis utilizing the most current stock assessment information. Stock assessments and status determinations have been conducted and designated for 12 stocks and can be found on the Council[4] and SEDAR[5] websites. Of the 12 stocks for which stock assessments have been conducted, the second quarter report of the 2018 Status of U.S. Fisheries classifies only one as overfished (greater amberjack), and two stocks as undergoing overfishing (greater amberjack and gray triggerfish).

The status of both assessed and unassessed stocks, as of the most recent version of the Status of U.S. Fisheries Report, is provided in Table 3.3.2.1. Reef Fish Amendment 44 (GMFMC 2017f) modified the MSST for seven species in the Reef Fish FMP, and was implemented in December 2017. Red snapper and gray triggerfish are now listed as not overfished but rebuilding. The greater amberjack stock remains classified as overfished.

A stock assessment has been conducted for Atlantic goliath grouper (SEDAR 47 2016). The SSC accepted the assessment's general findings that the stock was not overfished nor experiencing overfishing. Although the SSC determined Atlantic goliath grouper to not be experiencing overfishing based on annual harvest remaining below the OFL, the SSC deemed the assessment not suitable for stock status determination and management advice.

Table 3.1.5.1. Status of the applicable species in the Reef Fish, CMP, and Spiny Lobster FMPs, grouped by family. No stock assessments exist for species in the Corals and Coral Reefs FMP.

Common Name	Scientific Name	Stock Status		Most recent assessment
		Overfishing	Overfished	
Family Balistidae – Triggerfishes				
Gray Triggerfish	*Balistes capriscus*	Y	N	SEDAR 43 Update 2018
Family Carangidae – Jacks				
Greater Amberjack	*Seriola dumerili*	Y	Y	SEDAR 33 Update 2016a
Family Serranidae – Groupers				
Gag	*Mycteroperca microlepis*	N	N	SEDAR 33 Update 2016b
Red Grouper	*Epinephelus morio*	N	N	SEDAR 42 2015
Family Lutjanidae – Snappers				
Red Snapper	*Lutjanus campechanus*	N	N	SEDAR 52 2018
Family Scombridae – Mackerels				
King Mackerel	*Scomberomorus cavalla*	N	N	SEDAR 38 2014
Family Palinuridae – Lobsters	-	-	-	-
Caribbean Spiny Lobster	*Panulirus argus*	Unknown	Unknown	SEDAR 8 Update 2010

[3] http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/status_updates.html
[4] www.gulfcouncil.org
[5] www.sedarweb.org

3.2 Description of the Physical Environment

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 3.2.1). 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 73 º F through 83º F (23-28º C) including bays and bayous (Figure 3.2.1) between 1982 and 2009, according to satellite-derived measurements (NODC 2012: http://accession.nodc.noaa.gov/0072888). In general, mean sea surface temperature increases from north to south with large seasonal variations in shallow waters.

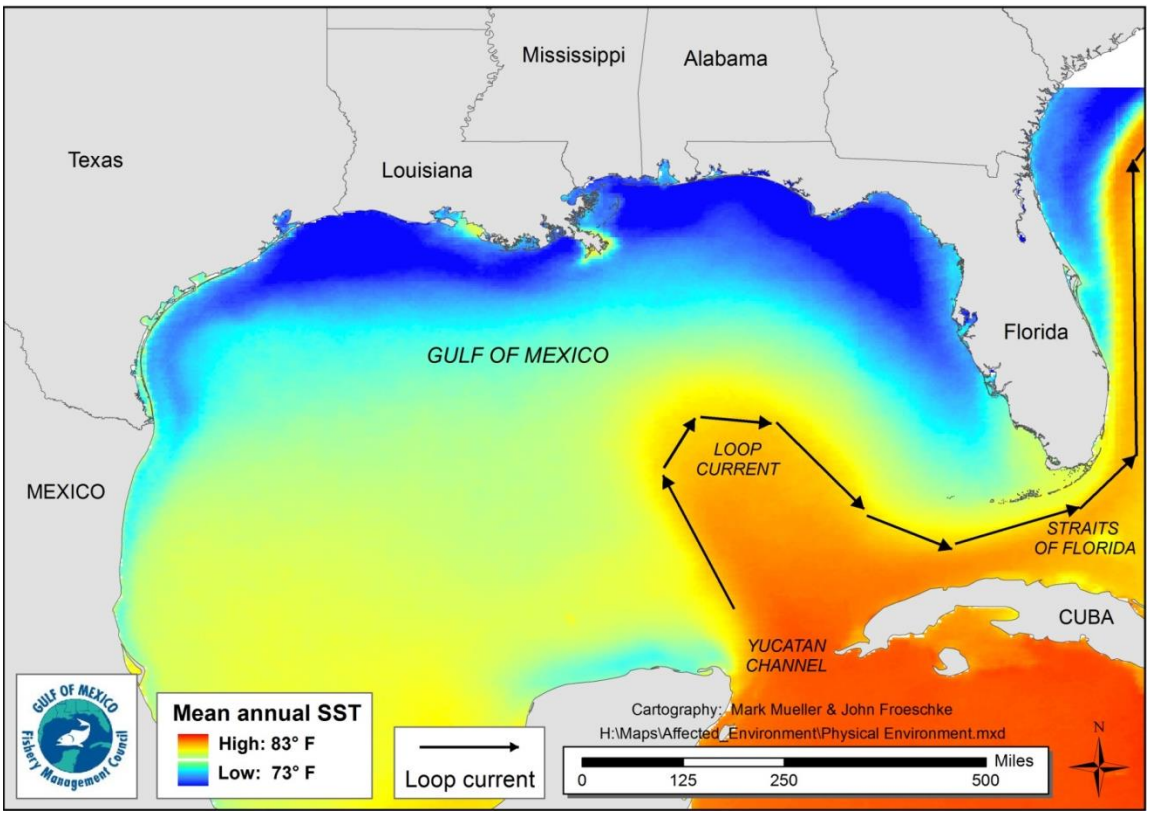

Figure 3.2.1. Physical environment of the Gulf including major feature names and mean annual sea surface temperature as derived from the Advanced Very High Resolution Radiometer Pathfinder Version 5 sea surface temperature data set (http://accession.nodc.noaa.gov/0072888)

The physical environment of the Gulf is also detailed in the EIS for the Generic EFH Amendment, the Generic ACL/AM Amendment, CMP Amendment 26 (GMFMC 2016), and Reef Fish Amendments 40 and 28 (refer to GMFMC 2004a; GMFMC 2011a; GMFMC 2014d; GMFMC 2015a), and are incorporated by reference and further summarized below.

Deepwater Horizon MC252 Oil Spill

The *Deepwater Horizon MC252* oil spill in 2010 affected at least one-third of the Gulf area from western Louisiana east to the Florida Panhandle and south to the Campeche Bank in Mexico. The impacts of the *Deepwater Horizon MC252* oil spill on the physical environment are expected to be significant and may be long-term. Oil was dispersed on the surface, and because of the heavy use of dispersants (both at the surface and at the wellhead), oil was also documented as being suspended within the water column, some even deeper than the location of the broken well head. Floating and suspended oil washed onto shore in several areas of the Gulf, as did non-floating tar balls. Whereas suspended and floating oil degrades over time, tar balls are persistent in the environment and can be transported hundreds of miles. Oil on the surface of the water could restrict the normal process of atmospheric oxygen mixing into and replenishing oxygen concentrations in the water column. In addition, microbes in the water that break down oil and dispersant also consume oxygen; this could lead to further oxygen depletion. It is also possible that zooplankton that feed on algae could be negatively impacted, thus allowing more of the hypoxia-fueling algae to grow.

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 (Intergovernmental Panel on Climate Change [IPCC]).[6] Decreases in surface ocean pH due to absorption of anthropogenic CO^2 emissions may impact a wide range of organisms and ecosystems, particularly organisms that absorb calcium from surface waters, such as corals and crustaceans (IPCC 2007, and references therein). These changes are also likely to affect plankton biomass and invertebrate larvae abundance that could adversely impact fish, marine mammals, seabirds, and ocean biodiversity. Global climate change: affects temperature changes in coastal and marine ecosystems; influences organism metabolism altering ecological processes such as productivity and species interactions; changes precipitation patterns causing a rise in sea level which could change the water balance of coastal ecosystems; alters patterns of wind and water circulation in the ocean environment; and influences the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs (Kennedy et al. 2002; Osgood 2008; Link 2015). The National Oceanic and Atmospheric Administration (NOAA) predicts the average sea surface temperature in the Gulf will increase by 1-3ºC for 2010-2070 compared to the average over the years 1950-2010 (NOAA Climate Change Web Portal[7]). These increases are a little less for the South Atlantic with only a 0.6-2.1ºC change predicted over the same time period.

Global climate change could have significant effects on Gulf and South Atlantic fisheries; however, the extent of these effects cannot be quantified at this time. The distribution of native and exotic species, the prevalence of disease in keystone animals such as corals, and the occurrence and intensity of toxic algae blooms may also change with increased water temperature.

[6] http://www.ipcc.ch/
[7] https://www.esrl.noaa.gov/psd/ipcc/

Greenhouse Gases

Greenhouse gas emissions are one of the most important drivers of recent changes in climate (IPCC).[8] The sources of greenhouse gases in the Gulf have been determined to be associated with oil platforms and those associated with other activities such as fishing (Wilson et al. 2017). A summary of the results from fishing related emissions and total emissions is shown in Table 3.3.1. Commercial and recreational fishing vessels make up a small percentage of the total estimated greenhouse gas emissions from the Gulf (2.04% and 1.67%, respectively).

Table 3.3.1. Total Gulf greenhouse gas 2014 emissions estimates (tons per year [tpy]) 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 Gas CH_4	N_2O	Total CO_{2e}**
Oil platform	5,940,330 tpy	225,667 tpy	98 tpy	11,611,272 tpy
Non-platform	14,017,962 tpy	1,999 tpy	2,646 tpy	14,856,307 tpy
Total	**19,958,292 tpy**	**227,665 tpy**	**2,743 tpy**	**26,467,578 tpy**
Commercial fishing	531,190 tpy	3 tpy	25 tpy	538,842 tpy
Recreational fishing	435,327 tpy	3 tpy	21 tpy	441,559 tpy
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 Wilson et al. 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.

3.2.1 Coastal Migratory Pelagics

A description of the physical environment for CMP species is provided in Amendment 18 (GMFMC and SAFMC 2011), is incorporated herein by reference, and is summarized below.

The mackerels in the CMP FMP are among the most important commercial and sport fishes. The habitat of adults is the coastal waters out to the edge of the continental shelf. Within the area, the occurrence of coastal migratory pelagic species is governed by temperature and salinity. All species are seldom found in water temperatures less than 20°C. Salinity preference varies, but these species generally prefer high salinity, less than 36 parts per thousand (ppt). The larval

[8] http://www.ipcc.ch/

habitat of all species in the coastal pelagic management unit is the water column. Within the spawning area, eggs and larvae are concentrated in the surface waters.

King mackerel is a marine pelagic species that is found throughout the Gulf and Caribbean Sea and along the western Atlantic from the Gulf of Maine to Brazil and from the shore to 200 meter depths. Adults are known to spawn in areas of low turbidity, with salinity and temperatures of approximately 30 ppt and 27°C, respectively. There are major spawning areas off Louisiana and Texas in the Gulf (McEachran and Finucane 1979); and off the Carolinas, Cape Canaveral, and Miami in the western Atlantic (Wollam 1970; Schekter 1971; Mayo 1973).

3.2.2 Reef Fish

In general, reef fish are widely distributed in the Gulf, occupying both pelagic and benthic habitats during their life cycle. A planktonic larval stage lives in the water column and feeds on zooplankton and phytoplankton (GMFMC 2004a). Juvenile and adult reef fish are typically demersal and usually associated with bottom topographies on the continental shelf (<100m) 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, juvenile red snapper are common on mud bottoms in the northern Gulf, particularly off Texas through Alabama. Also, some juvenile snapper (e.g. mutton, gray, red, dog, lane, and yellowtail snappers) and grouper (e.g. Goliath grouper, red, gag, and yellowfin groupers) have been documented in inshore seagrass beds, mangrove estuaries, lagoons, and larger bay systems.

There are several marine reserves, habitat areas of particular concern, and restricted fishing gear areas in the Gulf. These are detailed in GMFMC (2005a and 2018b). The Bureau of Ocean Energy Management lists historic shipwrecks that occur in the Gulf. Most of these sites are in state or deep (>1,000 feet or 328 meters) waters. There is one site located in federal waters in less than 100 feet (30 meters) that could be affected by reef fish fishing. This is the *U.S.S. Hatteras* located approximately 20 miles (12 kilometers) off Galveston, Texas.

There are environmental sites of special interest that are discussed in the Generic EFH Amendment (GMFMC 2004a) that are relevant to reef fish management. These include the longline/buoy area closure, the Edges Marine Reserve, Tortugas North and South Marine Reserves, individual reef areas and bank habitat areas of particular concern (HAPCs) of the northwestern Gulf, the Florida Middle Grounds HAPC, the Pulley Ridge HAPC, and Alabama Special Management Zone. These areas are managed with gear restrictions to protect habitat and specific reef fish species. These restrictions are detailed in the Generic EFH Amendment (GMFMC 2004a).

3.2.3 Spiny Lobster

Detailed descriptions of the physical environments related to the spiny lobster fishery are provided in the Gulf of Mexico Fishery Management Council (Gulf Council)'s Generic Essential Fish Habitat (EFH) Amendment (GMFMC 2004a) and in the South Atlantic Fishery

Management Council's (South Atlantic Council) Fishery Ecosystem Plan (SAFMC 2009a), and are incorporated by reference herein.

Amendment 13 to the Fishery Management Plan for Spiny Lobster in the Gulf of Mexico and the South Atlantic is currently under development to modify spiny lobster gear requirements and cooperative management measures, and describes the spiny lobster physical environment in detail, and is hereby incorporated by reference (GMFMC/SAFMC 2018).

Given the large to near total dependence on larval recruitment from the Caribbean, it is appropriate to include the Caribbean area in the description of the physical environment. A detailed description of the physical environment in the Caribbean related to the spiny lobster fishery is provided in Amendment 8 to the Spiny Lobster FMP (CFMC et al. 2008) and is incorporated herein by reference.

3.2.4 Corals and Coral Reefs

A description of the coral and coral reefs physical environment is discussed in Amendment 9 to the Fishery Management Plan (FMP) for Coral and Corals Reefs of the Gulf of Mexico (GMFMC 2018b).

The Gulf continental shelf varies in width across the Gulf, and is widest in southern Florida (161.6 nm) and narrowest off the Mississippi River Delta (5.2 nm). The shelf also varies in depth of 0-654 ft (0-109 fathoms) and occupies about 35.2% of the surface area of the Gulf. Beyond the shelf, the depth of the Gulf drops off to a maximum of 12,630 ft (2,105 fathoms) in the Sigsbee Deep (Figure 3.2.4.1).

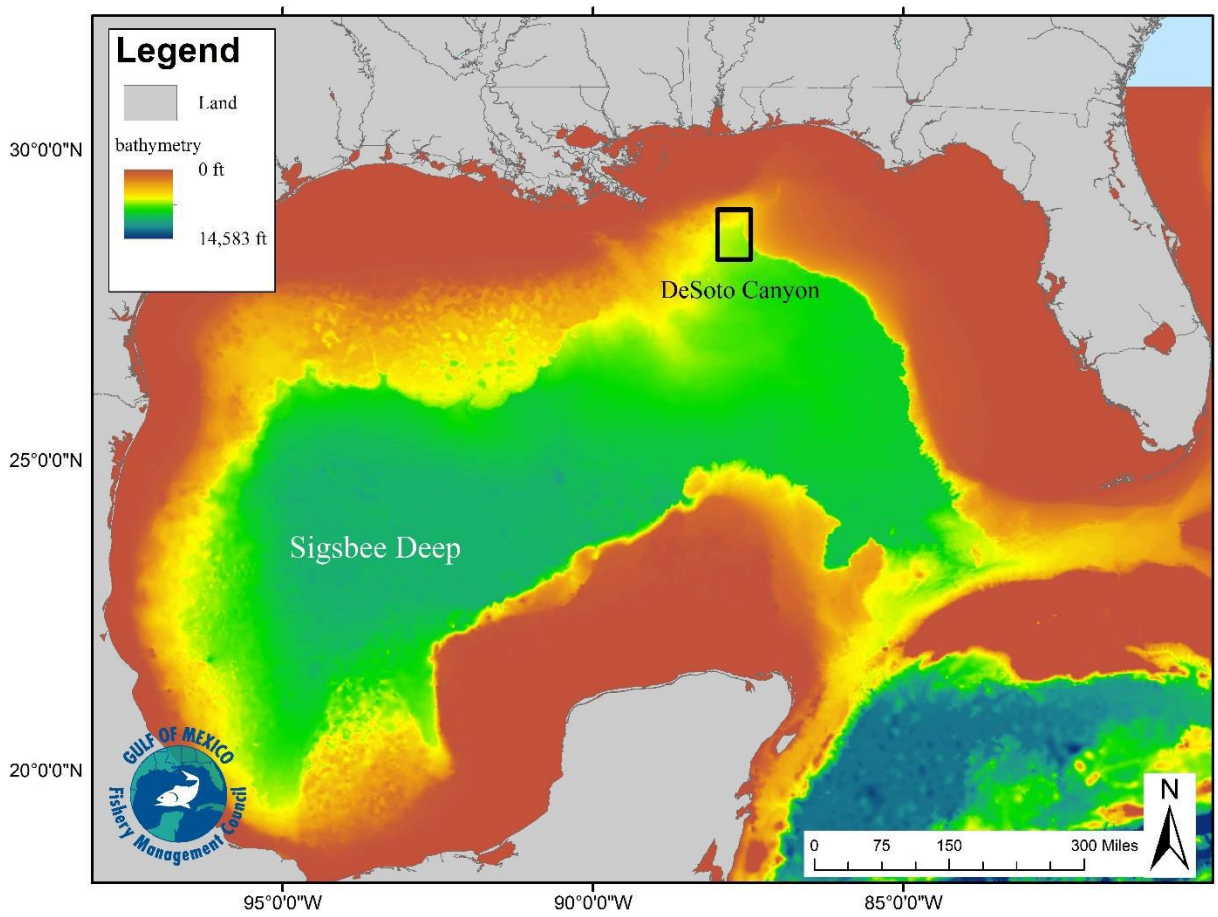

Figure 3.2.4.1. Bathymetry map of the Gulf of Mexico indicating the location of Sigsbee Deep and DeSoto Canyon.

Sediment makeup in the Gulf varies, but can generally be divided into two main zones, carbonate to the east of DeSoto Canyon (Figure 3.2.4.1.) and southward along the Florida coast, and terrigenous (made of material eroded from the land) to the west of DeSoto Canyon, past Louisiana to the Mexican border. Coarse sediments (sand and mixed sand) are present in shallow nearshore bottoms from the Rio Grande River to central Louisiana and are the dominant bottom type from shore to deeper water throughout the central third of the shelf. Coarse sediments are also present in the nearshore environment to a depth of 33 to 66 ft (5.5 to 11 fathoms) from the Everglades northward along the coast of Florida, and cover the entire shelf out to a depth of 396 ft (66 fathoms) from Apalachicola Bay to Mobile Bay.

Fine sediments (silt and clay) are the dominant bottom type along the eastern and southwestern third of the continental shelf), which are areas influenced by the Mississippi and Atchafalaya Rivers and the present or ancestral Rio Grande river. Fine sediments are also strongly represented on the outer shelf beyond the 264 ft (44 fathom) isobaths. These sediments can affect shrimp and fish distributions directly in terms of feeding and burrowing activities or indirectly through food availability, water column turbidity, and related factors. Another swath

of fine sediment runs southwestward from the Everglades, extending the full length of the Florida Keys.

West Florida Shelf

The west Florida shelf bottom consists of a flat limestone table with localized relief due to relic reef or erosional structures. The benthic habitat types include low relief hard bottom, thick sand bottom, coralline algal nodules, coralline algal pavement, and shell rubble. The west Florida slope forms the edge of a sequence of carbonates intercalated with salt deposits more than 2.5 nm thick (Doyle and Holmes 1985). The west Florida shelf provides a large area of scattered hard substrates, some emergent, but most covered by a thin veneer of sand, that allow the establishment of a tropical reef. The only high-relief features are a series of shelf edge prominences that are themselves the remnants of extensive calcareous algal reef development prior to sea level rise.

In water depths of 228 to 294 ft (38 to 49 fathoms) along the southwest Florida shelf, a series of carbonate structures forms a series of steps along the shelf (Holmes 1981). This area corresponds to the partially buried, 3-mile wide reef complex known as Pulley Ridge.

The Florida Middle Grounds is a hard-bottom area approximately 87 nm west-northwest of Tampa, Florida. This region is characterized by steep profile limestone escarpments and knolls rising 32 to 43 feet above the surrounding sand and sand-shell substrate, with overall depths varying from 84 to 156 ft (14 to 26 fathoms) (Smith 1976).

Madison-Swanson is an area south of Panama City, Florida, containing high-relief hard bottom habitat. Depths run between 198 and 330 ft (33 and 55 fathoms), with habitats ranging from low-relief drowned patch reefs (1.6-8.2 ft vertical relief) to high-relief ridges and pinnacles (30- 52 ft vertical relief).

The Dry Tortugas refers to an area of carbonate banks situated in open-ocean, approximately 70 miles west of Key West and 140 miles from mainland Florida. One of the banks is emergent with seven small, sandy islands (GMFMC 2000). The banks are roughly circular in pattern and are considered an atoll (Vaughan 1914). The shallow rim of the atoll is discontinuous and consists of Holocene (less than 10,000 years old) coral and the sandy islands. The Holocene reefs are approximately 46 feet thick, and are situated upon a preexisting high of the Key Largo Limestone, formed approximately 125,000 years ago (Shinn et al. 1977). Two substantial carbonate banks are situated in close proximity to the Dry Tortugas, known as Tortugas Bank and Riley's Hump. Tortugas Bank is directly west of the Dry Tortugas reefs, separated by a northeast-southwest trending channel. The channel is about 120 ft (20 fathoms) deep and 2.6 nm wide. The bank has a 98 ft escarpment on the west, a 49 ft face on the east, and crests at approximately 66 ft. Tortugas Bank is contemporary with the outlier reefs seaward of the Keys reef tract (Lidz et al. 1991; Ludwig et al. 1996).

Riley's Hump is a carbonate bank situated south-southwest of the Tortugas Bank. Based on its position, it is estimated to be equivalent in age to the Florida Middle Grounds (GMFMC 2000).

It crests at about 100 ft, and the southern face exhibits a 66 ft escarpment situated at the shelf/slope break. Thick sedimentary deposits fill a trough separating Riley's Hump from Tortugas Bank.

Mississippi-Alabama Shelf

The Mississippi-Alabama Shelf is a small area extending from the Mississippi River Delta to DeSoto Canyon. The sediments found here are terrigenous to the west, integrating to carbonate sediments near DeSoto Canyon. The outer shelf is dominated by topographic features, which represent the remains of ancient reefs or shorelines. Pinnacles, made of hard, rigidly-cemented, irregularly-shaped aggregates of calcareous organic structures (Continental Shelf Associates, Inc. 1992) are found on the shelf and shelf break off the coasts of Alabama and Mississippi. These calcareous shelf edge and upper slope prominences are present in a wide band (approximately one mile) along the shelf edge from 85° to 88° W longitude (Ludwick and Walton 1957). The average pinnacle height has been measured at 30 ft with some pinnacles exceeding 49 ft in relief and the average water depth to the top of the pinnacles to be 324 ft (54 fathoms). Pinnacles ranged in water depths from 330 to 588 ft (55 to 98 fathoms) and water depths to the top of the pinnacles were found in two zones. In the shallower zone, the depth to the top of the pinnacles ranged from 222 to 276 ft (37 to 46 fathoms and in the deeper zone the depth to the top of the pinnacles ranged from 318 to 330 ft (53 to 55 fathoms). The greatest number of pinnacles were in water depths of 336 to 372 ft (56 to 62 fathoms) (Ludwick and Walton 1957).

Hard bottoms are found in several locations on the inner continental shelf adjacent to Florida and Alabama, in depths of 60 to 132 ft (10 to 22 fathoms) (Schroeder et al. 1988). These hard bottom areas lie south of the mouth of Mobile Bay and south of the Alabama/Florida state line. They have a vertical relief of 2 to 16 ft. Schroeder et al. (1988) identified these areas as either 1) massive to nodular sandstones and mudstones, 2) slabby aragonite-cemented limestone of broken shells and sandstone, 3) sandstone occurring in small irregular outcrops, or 4) calcite-cemented algal reef-like knobs.

Louisiana-Texas Shelf

The Mississippi River has had a profound effect on the landforms of coastal Louisiana (Louisiana Coastal Restoration, no date). The entire area is the product of sediment deposition following the latest rise in sea level about 5,000 years ago. For the last 1,200 years, sediment deposition has occurred primarily at the mouth of the Mississippi River on the edge of the continental shelf, in the area defined as the Mississippi River Delta Basin (Louisiana Coastal Restoration, no date). Its "bird's foot" configuration is characteristic of alluvial deposition, and as the large volumes of sediment required to maintain the delta are lacking, land is being lost rapidly (i.e. wetland loss is occurring). The Louisiana shelf varies in width from less than 10.4 nm off the passes of the "birdfoot" delta to nearly 108 nm off central and western Louisiana with little dramatic changes in topographic relief (Louisiana Coastal Restoration, no date). There is a tremendous fine-grain sediment load from the Mississippi River. The western portion of this shelf receives much less sediment, and instead has Holocene muds up to 30 ft thick. There are carbonate banks present, created during times of low sea level. About 260 nm upstream from its main outlet to the Gulf, the Lower Mississippi River is partly diverted into the Atchafalaya

River.

The Louisiana/Texas Shelf is dominated by muddy or sandy, terrigenous sediments deposited by the Mississippi River. These terrigenous sediments cover over 1.7 nm of rock salt (Louann Salt) that has been deposited since the formation of the Gulf basin. Nearly 9 nm of sediment cover the Louann salt deposit south of the Louisiana/Texas state line. This huge sediment load has caused the deposits of salt to flow and form salt domes that now dot the inner shelf and adjacent coastal plain. Many large isolated salt stacks interconnected by intricate networks of growth faults characterize the middle shelf and lower Mississippi River delta region. More than 130 calcareous banks exist as a result of active salt domes in the northwest Gulf (MMS 1983). Banks of the northwestern Gulf have been grouped into two categories. The first are the mid-shelf banks which have a relief of 13 to 164 ft and have outcrops of relatively bare, bedded Tertiary limestones, sandstones, claystones, and siltstones. The second are also shelf-edge banks, located on salt dome structures, and have well developed carbonate caps with local areas of bare, bedded rocks (Rezak et al. 1985).

The continental shelf south of Matagorda Bay, Texas contains an area of drowned reefs on a relict carbonate shelf (Rezak et al. 1985). The banks vary in relief from 3 to 72 ft, are composed of carbonate substrata overlain by a veneer of fine-grained sediment, and the bottom sides of these reefs are immersed in a nepheloid layer that varies in thickness (up to 66 ft) (Rezak et al.1985). Carbonate rubble is the predominant sediment on the terrace and peaks of the banks. The sediments around the reef consist of three main components: clay, silt, and coarse carbonate detritus. Several shallow water reefs also occur on the south Texas shelf.

3.3 Description of the Biological/Ecological Environment

3.3.1 Coastal Migratory Pelagics

King mackerel is a marine pelagic species that is found throughout the western Atlantic from the Gulf of Maine to Brazil, and from shore to 200 m (656 ft). Within the area, the occurrence of king mackerel is governed by temperature and salinity. They are seldom found in water temperatures less than 20°C, and generally prefer high salinity (< 36 parts per thousand). Adults are migratory, with adult king mackerel found in the southern climates (south Florida and extreme south Texas/Mexico) in the winter and farther north in the summer; however, some king mackerel overwinter in deeper waters off the mouth of the Mississippi River, and off the coast of North Carolina. Food availability and water temperature are likely causes of these migratory patterns. King mackerel have longevities of 24 to 26 years for females and 23 years for males (GMFMC and SAFMC 1985; MSAP 1996; Brooks and Ortiz 2004).

There are major spawning areas off Louisiana and Texas in the Gulf (McEachran and Finucane 1979); and off the Carolinas, Cape Canaveral, and Miami in the western Atlantic (Wollam 1970; Schekter 1971; Mayo 1973). Spawning occurs generally from May through October with peak spawning in September (McEachran and Finucane 1979). Eggs are released and fertilized continuously during these months. Fifty percent of females are sexually mature between 450 to 499 mm (17.7 to 19.6 inches) in length and most are mature by the time they are 800 mm (35.4 inches) in length, or by about age four. Fifty percent of males are sexually mature at age three, at

a length of 718 mm (28.3 inches). Females in U.S. waters, between the sizes of 446-1,489 mm (17.6 to 58.6 inches) release 69,000-12,200,000 eggs. Larvae of king mackerel can grow up to 0.54-1.33 mm (0.02 to 0.05 inches) per day. This shortened larval stage decreases the vulnerability of the larvae, and is related to the increased metabolism of this fast-swimming species. Juveniles are generally found closer to shore than adults and occasionally in estuaries.

3.3.2 Reef Fish

Red Snapper

Red snapper demonstrate the typical reef fish life history pattern. Eggs and larvae are pelagic while juveniles are found associated with bottom features or over mud bottom and oyster shell reef. Spawning occurs over firm sand bottom with little relief away from reefs during the summer and fall. Adult females mature as early as two years and most are mature by four years (Schirripa and Legault 1999). Red snapper have been aged up to 57 years. Until 2013, most red snapper caught by the directed fishery were two to four years old (Wilson and Nieland 2001), but the SEDAR 31 stock assessment suggested that the age and size of red snapper in the directed fishery has increased (SEDAR 31 2013). A more complete description of red snapper life history can be found in the Generic EFH Amendment (GMFMC 2004a).

Red Grouper

In the Gulf, red grouper are commonly caught from Panama City, Florida, to the Florida Keys along the inner to mid-continental shelf in depths ranging from 2 to over 120 m (Moe 1969). Based on reported commercial landings, the Southeast Fishery Science Center's (SEFSC) Headboat Survey, and the Marine Recreational Fisheries Statistics Survey (MRFSS), red grouper are infrequently caught in the western Gulf. The species inhabits flat rock perforated with solution holes, caverns and crevices of limestone reef, and hard bottom areas (Moe 1969; Bullock and Smith 1991). Juveniles live in shallow-water nearshore reefs until reaching approximately 16 inches (40 cm), when they become sexually mature and move offshore (Moe 1969). Red grouper reach a maximum length and weight of 43 inches (110 cm total length) and 50.7 pounds. (23 kg) (Robins et al. 1986). Maximum age of red grouper in the Gulf of Mexico has been estimated at 25 years (SEDAR 12 2007). Clear determinations of size and age of maturity have been difficult for red grouper (Fitzhugh et al. 2006a and references cited therein). Fitzhugh et al. (2006a) determined the size and age at 50% maturity was approximately 11 inches (28 cm total length) at age 2. Although previous estimates indicated that red grouper were 50% mature by 5 years of age and 15-20 inches total length (40-50 cm total length) (Moe 1969; Collins et al. 2002). Red grouper are protogynous hermaphrodites, transitioning from females to males at older ages, and form harems for spawning (Dormeier and Colin 1997). Age and size at sexual transition is approximately 10.5 years and 30 inches total length (76.5 cm total length) (Fitzhugh et al. 2006). Red grouper spawn from February until mid-July with peak spawning occurring in the eastern Gulf of Mexico during March through May (Fitzhugh et al. 2006). Over the last 25-30 years, there has been little change in the sex ratio of red grouper, likely because they do not aggregate (Coleman et al. 1996).

Gag

Gag is primarily caught on the west coast of Florida from Tampa Bay to the northern extent of the state (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, juvenile gag migrate offshore, although some juvenile gag may remain in inshore waters during winter. As gag mature, they move to deeper, offshore waters to spawn. Gag is a protogynous hermaphrodite, transitioning from females to males at older ages. Age and size at 50% sexual transition is approximately 11 years and 42-43 inches (108.5 - 110 cm) total length (SEDAR 10 2006). Maximum age is 31 years (Lombardi-Carlson et al. 2006) and females are mature by 3.7 years of age and 23 inches (58.5 cm) total length (Fitzhugh et al 2006b). They form 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 of 54 inches (138 cm) total length and weight of 68 pounds (31 kg) (Lombardi-Carlson et al. 2006).

Greater Amberjack

Studies conducted in the Gulf have consistently estimated that peak spawning occurs during March and April (Wells and Rooker 2002; Murie and Parkyn 2008). Sexually mature females were significantly larger than males (Harris 2004; Harris et al. 2007). For males, the size at which 50% of individuals were sexually mature was 25 inches fork length (FL) (644 mm FL) and for females was 29 inches FL (733 mm FL). A spawning season of ~73 days was estimated off south Florida, with a spawning period of 5 days, estimating that an individual female could spawn as frequently as 14 times during the season. Female fecundity increased with size, but was essentially constant throughout the spawning season. Greater amberjack are extremely fecund, releasing 18 to 59 million eggs per female in a single spawning season (Harris et al. 2007). No aggregation or indication of spawning aggregations was discussed by the Murie and Parkyn (2008) Gulf study or other earlier Gulf studies. After spawning, eggs and larvae are pelagic. Smaller juveniles less than one-inch standard length (SL) (20 mm SL) were found associated with pelagic *Sargassum* spp. mats (Bortone et al. 1977; Wells and Rooker 2004). Juveniles then shift to demersal habitats, where they congregate around reefs, rocky outcrops, and wrecks (GMFMC 2004a). Since greater amberjack are only seasonally abundant in certain parts of their range, they likely utilize a variety of habitats and/or areas each year. Greater amberjack have been documented on artificial structures and natural reefs (Ingram and Patterson 2001). Greater amberjack in the Gulf have been reported to live as long as 15 years and commonly reach sizes greater than 40 inches FL (1,016 mm FL) (Manooch and Potts 1997).

Gray Triggerfish

Gray triggerfish are estimated to live up to 11 years, with 16 being the maximum age recorded (Wilson et al. 1995; Ingram 2001). Gray triggerfish grow rapidly within the first year, slowing thereafter for both sexes combined (Hood and Johnson 1997; Ingram 2001; Wilson et al. 1995). The maximum length of gray triggerfish recorded was 27-28 inches fork length (697-725 mm

FL). The maximum weight documented from the Panama City NMFS Database, accessed in 2012, was 13.8 lbs gutted weight (6.26 kg gw). Male gray triggerfish reach significantly larger sizes than females (Simmons and Szedlmayer 2012). Gray triggerfish spawn from May to August. Both sexes are reproductively mature by age-2, 10 inches FL (250 mm FL). At this size, some males are age-1 and all females are age-2 (Wilson et al. 1995; Ingram 2001). Male gray triggerfish establish territories, build demersal nests, and form harems (one male and several females) during the spawning season (Simmons and Szedlmayer 2012). After fertilization, females provide parental care of the eggs, while the male defends his territory and courts other female gray triggerfish (Simmons and Szedlmayer 2012). Eggs hatch 24 to 48 hours after fertilization and larvae move up into the water column (Simmons and Szedlmayer 2013). Larval and juveniles are found associated with *Sargassum* spp. mats in late summer and fall (Bortone et al. 1977; Wells and Rooker 2004). After several months in the pelagic zone, juvenile gray triggerfish recruit to benthic substrate (Simmons and Szedlmayer 2011). Adults are closely associated with both natural and artificial reefs (Ingram 2001; Lingo and Szedlmayer 2006; Simmons and Szedlmayer 2011). Adults have high site fidelity (Ingram and Patterson 2001).

3.3.3 Spiny Lobster

A description of the spiny lobster biological environment is discussed in Amendment 13 to the Fishery Management Plan (FMP) for Spiny Lobster in the Gulf of Mexico and South Atlantic (Spiny Lobster FMP) (GMFMC and SAFMC 2018). That description is summarized in the following sections and incorporated herein by reference.

The spiny lobster (*Panulirus argus*) is widely distributed throughout the western Atlantic Ocean as far north as North Carolina to as far south as Brazil including Bermuda, the Bahamas, Caribbean, and Central America (Herrnkind 1980). Analyses of DNA indicate a single stock structure for spiny lobster throughout its range (Lipcius and Cobb 1994; Silberman et al. 1994; Hunt et al. 2009). More recent genetic studies have shown almost all recruits in U.S. waters are from elsewhere in the Caribbean. Spiny lobster is known to have the longest larval duration of any oceanic marine animal. However, other studies have shown that the wind effects or the presence of local gyres or loop currents in certain locations could influence the retention of locally spawned larvae in some years more than others (Johnson 1960; Phillips 1989; Yeung and McGowan 1991; Yeung 1996; Yeung et al. 2001). A more recent study has shown retention of local larvae in Florida ranges between 10 and 40 percent (Kough et al. 2013). While recruitment is considered stable, it is not thought to be linked to production.

This species typically inhabits shallow waters, occasionally as deep as 295 ft (90 m). Spiny lobster can be found among rocks, on reefs, in seagrass beds, or in any habitat, that provides protection. This species is gregarious and migratory. Maximum total body length recorded is 18 in (45 cm), but the average total body length for this species is 8 in (20 cm; FAO Fisheries Synopsis 1991).

Distribution and dispersal of spiny lobster is determined by the long planktonic larval phase, called the puerulus, during which time the larval lobsters are carried by the currents until they become large enough to settle to the bottom (Acosta et al. 1997; Davis and Dodril 1989). As

the lobsters begin metamorphosis from puerulus to the juvenile form, the ability to swim increases and they move into shallow nearshore environments to grow and develop.

Young benthic stages of spiny lobster typically inhabit branched clumps of red algae (*Laurencia* sp.), mangrove roots, seagrass banks, or sponges; they feed on invertebrates found within these habitats. In contrast to the social behavior of their older counterparts, juvenile lobsters are solitary and aggressive to ensure they remain solitary. Two to four year olds are nomadic, emigrating out of the shallows and moving to deeper offshore reef environments. Adult spiny lobsters tend to aggregate in enclosed shelters such as natural holes in a reef or rocky outcrops, or artificially created environments (Lipcius and Cobb 1994).

Mass migrations of 2-60 spiny lobsters occur annually throughout the geographic range of the species and are dependent on latitude and climactic factors. Observed locations for the migration include Bermuda in October, the Bahamas and Florida in late October and early November, and the Yucatan and Belize in December (Herrnkind 1985). The first autumn storm in the tropics usually drops the water temperature by about 5°C and brings large sea swells. The shallow regions that the lobsters exploit during the summer months become turbid and cold, initiating the diurnal migration of thousands of lobsters to evade these conditions. The spiny lobster is highly susceptible to severe winter cooling and will exhibit reduced feeding and locomotion at temperatures 54-57ºF (12-14ºC); molting individuals usually perish under these conditions.

According to Herrnkind (1985), the behavioral changes observed in spiny lobster as well as the known biological information about the species lends credence to the idea that individuals migrate to evade the stresses of the cold and turbidity in the winter. Biologically, the queuing behavior is an important hydrodynamic drag-reduction technique for the migration of individuals over long distances (Bill and Herrnkind 1976). Studies done by tagging individuals found that during the migration, individuals tended to move distances of 19-31 statute miles (30- 50 km; Herrnkind 1985).

For lobsters, including spiny lobster, warming water temperatures have resulted in life history changes such as: movements toward deeper water; changes in growth rates; differences in sizes at maturity; changes in timing of reproductive processes; changes in duration of larval development; and changes in the timing and levels of settlement (Phillips et al. 2017). Integrating the potential effects of climate change into the fisheries assessment for marine fisheries and dependent communities is currently difficult due to the time scale differences (Hollowed et al. 2013). The fisheries stock assessments rarely project through a time span that would include detectable climate change effects.

3.3.4 Coral and Coral Reefs

A description of the coral and coral reefs biological environment is discussed in Amendment 9 to the Fishery Management Plan (FMP) for Coral and Corals Reefs of the Gulf of Mexico (GMFMC 2018b). That description is summarized in the following sections and incorporated herein by reference.

The Gulf contains both coral reef communities and solitary coral colonies. These exist from nearshore environments to continental slopes and canyons, including intermediate shelf zones. Corals may dominate a habitat (coral reefs), be a significant component (hard bottom), or be individuals within a community characterized by other fauna (solitary corals).
A description of the biological/ ecological environments of each of the proposed HAPCs is described in detail in the discussion of each action in Chapter 2 and a more general description of the biological/ecological environments in the Gulf is thoroughly covered in the Final Essential Fish Habitat Environmental Impact Statement (GMFMC 2004a) and summarized here.

Geologically and ecologically, the range of coral assemblages and habitat types in the Gulf are very diverse. The coral reefs of shallow, warm waters are typically built upon coralline rock and support a wide array of hermatypic and ahermatypic corals, finfish, invertebrates, algae, plants, and microorganisms. Hard bottoms and hard banks, found on a wider bathymetric and geographic scale, often possess high species diversity but may lack hermatypic corals, the supporting coralline structure, or some of the associated biota. In deeper waters, large elongate mounds called deep-water banks, hundreds of feet in length, often support a rich fauna compared with adjacent areas. Lastly are communities including solitary corals; this category often lacks a topographic relief as its substrate, but may use a sandy bottom instead. Solitary corals are a minor component of the bottom communities and comprise a minor percentage of the total coral stocks in the Gulf.

3.3.5 General Information

Bycatch

Bycatch is defined as fish harvested in a fishery, but not sold or retained for personal use. This definition includes both economic and regulatory discards, and excludes fish released alive under a recreational catch-and-release fishery management program. Economic discards are generally undesirable from a market perspective because of their species, size, sex, and/or other characteristics. Regulatory discards are fish required by regulation to be discarded, but also include fish that may be retained but not sold. Bycatch practicability analyses of the reef fish and CMP fisheries have been provided in several amendments (GMFMC 2004a, GMFMC 2007b, GMFMC 2014d, GMFMC 2015a, and GMFMC 2016a).

Protected Species

The Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) provide special protections to some species that occur in the Gulf, and more information is available on the NMFS Office of Protected Resources website.[9] All 22 marine mammals in the Gulf are protected under the MMPA (Waring et al. 2016). These 22 species of marine mammals include one sirenian species (a manatee), which is under U.S. Fish and Wildlife Service's (USFWS) jurisdiction, and 21 cetacean species (dolphins and whales), all under NMFS' jurisdiction. Two marine mammals (sperm, blue, sei, and fin whales, and manatees) are also protected under the

[9] http://www.nmfs.noaa.gov/pr/laws/

ESA. On December 8, 2016, NMFS published a proposed rule to list the Bryde's whale as endangered under the ESA (81 FR 88639).

The MMPA requires that each commercial fishery be classified into one of three categories based on the level of incidental mortality or serious injury of marine mammals. NMFS classifies reef fish bottom longline/hook-and-line gear in the MMPA 2018 List of Fisheries as a Category III fishery (83 FR 5349). This classification indicates the fishery has a remote likelihood of or no known incidental mortality or serious injury of marine mammals. There have been three observed takes of bottlenose dolphin from the continental shelf stock by this fishery.

Other species protected under the ESA include sea turtle species (Kemp's ridley, loggerhead (Northwest Atlantic Ocean distinct population segment [DPS]), green (North Atlantic and South Atlantic DPSs), leatherback, and hawksbill), fish species (Gulf sturgeon, smalltooth sawfish, Nassau Grouper, oceanic whitetip shark, giant manta ray), and coral species (elkhorn, staghorn, pillar, lobed star, mountainous star, and boulder star). Critical habitat designated under the ESA for smalltooth sawfish, Gulf sturgeon, and the Northwest Atlantic Ocean DPS of loggerhead sea turtles also occur in the Gulf, though only loggerhead critical habitat occurs in federal waters.

NMFS has conducted consultations under section 7 of the ESA evaluating potential effects from the Gulf reef fish fishery on ESA-listed species and critical habitat. The most recent formal consultation or Biological Opinion (BiOp) was finalized on September 30, 2011. It concluded that the continued authorization of the Gulf reef fish fishery is not likely to adversely affect listed whales or elkhorn or staghorn coral, and is not likely to jeopardize the continued existence of any sea turtles (loggerhead, Kemp's ridley, green, hawksbill, and leatherback) or smalltooth sawfish (NMFS 2011). An incidental take statement was issued specifying the amount and extent of anticipated take, along with reasonable and prudent measures and associated terms and conditions deemed necessary and appropriate to minimize the impact of these takes. Since issuing the 2011 Bi Op, in memoranda dated September 16, 2014, and October 7, 2014, NMFS concluded that the activities associated with the Reef Fish FMP will not adversely affect critical habitat for the Northwest Atlantic Ocean loggerhead sea turtle DPS or the additional four species of coral. On September 29, 2016, NMFS reinitiated formal consultation on the continued authorization of the Gulf reef fish fishery because new species (Nassau grouper and North Atlantic and South Atlantic green sea turtle DPSs) were listed under the ESA that may be affected by the fishery. On March 6, 2018, NMFS revised the request for reinitiation to include the newly listed oceanic whitetip shark and the giant manta ray. NMFS also determined that the continued authorization of the fishery during the reinitiation period would not jeopardize the continued existence of these species.

A biological opinion (BiOp) on the CMP FMP was completed on June 18, 2015 (NMFS 2015). The BiOp determined that the continued authorization of the CMP fishery is not likely to adversely affect any listed whales, or elkhorn and staghorn corals. The BiOp determined that CMP fisheries would have no effect on the Gulf sturgeon. The BiOp also determined that the CMP fishery is not likely to adversely affect designated critical habitats for elkhorn and staghorn corals or loggerhead sea turtles. NMFS determined in a memorandum dated October 7, 2014, and later it confirmed the determination in the 2015 BiOp, that any adverse effects from the CMP fishery's impacts to the five corals listed in 2014 (rough cactus coral, pillar coral, lobed

star, mountainous star, and boulder star corals) are extremely unlikely to occur and therefore are discountable.

According to the 2015 BiOp, the green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles and the smalltooth sawfish are all likely to be adversely affected by the CMP fishery. Green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles area all highly migratory, travel widely throughout the Gulf, and are known to occur in areas subject to CMP fishing. The distribution of smalltooth sawfish within the action area is more limited, but this species has the potential to be incidentally captured in the CMP fishery. The 2015 BiOp concluded that the fishery is not likely to jeopardize the continued existence of loggerhead (the Northwest Atlantic DPS) or green (both the Florida breeding population and non-Florida breeding population, as well as the proposed North Atlantic DPS) sea turtles. The BiOp also stated that the proposed action is not likely to jeopardize the continued existence of Kemp's ridley, hawksbill, or leatherback sea turtles, or smalltooth sawfish (U.S. DPS).

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, effective May 6, 2016. Two of the green sea turtle DPSs, the North Atlantic DPS and the South Atlantic DPS, overlap with the CMP fishery. In addition, on June 29, 2016, NMFS published a final rule (81 FR 42268) listing Nassau grouper as threatened under the ESA.

In a memorandum dated November 18, 2017, NMFS amended the 2015 BiOp to address these new listings. The amendment determined that the proposed action is not likely to jeopardize the continued existence of loggerhead (the NWA DPS) or the green (North Atlantic DPS or South Atlantic DPS), Kemp's ridley, hawksbill, or leatherback sea turtles, or smalltooth sawfish (U.S. DPS). Furthermore, it was determined that Nassau grouper were not likely to be adversely affected by the CMP fishery.

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 June 11, 2018, NMFS reinitiated consultation on the CMP FMP to address the listings of the giant manta ray and oceanic whitetip shark. The consultation memo determined that allowing fishing under the CMP FMP to continue during the re-initiation period is not likely to adversely affect oceanic whitetip sharks and will not appreciably reduce the likelihood of the giant manta ray's survival or recovery within its range.

The coral fishery is not monitored for bycatch purposes. There should be minimal impacts from the harvest of coral colonies conducted by hand. Rather, corals are subject to bycatch in bottom-tending gear fisheries.

Details of bycatch in the spiny lobster fishery can be found in Appendix D, Bycatch Practicability Analysis, of Amendment 10 to the Spiny Lobster FMP (GMFMC and SAFMC 2011), which is hereby incorporated by reference.

In summary, studies have documented low bycatch and bycatch mortality of finfish by the commercial trap fishery for both wooden and plastic traps (Matthews et al. 1994, Matthews and Donahue 1997). Most of the finfish caught in commercial spiny lobster traps are juveniles and all escape within 48 hours (Matthews and Donahue 1997). Stone crabs were the dominant species caught in two studies of lobster traps (Matthews et al. 1994, Matthews and Donahue 1997). Bully net gear is considered highly selective for spiny lobster, and therefore bycatch of non-target species is rare. Because the gear types used by SCUBA divers and snorkelers targeting spiny lobster are also considered highly selective for spiny lobster, there is very little bycatch of non-target species. In the recreational fishery, spiny lobsters are mainly harvested by SCUBA divers and snorkelers, so there is very little bycatch. The total discard rate of finfish and invertebrates for the spiny lobster fisheries is generally between 8-15% and it is unlikely any one species comprises more than 5% of the catch, but this bycatch is primarily in the trap portion of the fishery (Seafood Watch 2015). Mortality of commercially and recreationally important finfish is negligible (Matthews and Donahue 1997). Little is known about the status of many finfish (e.g., grunts, cowfish, porgies) and invertebrate (e.g., spider crabs, urchins) species which are the bycatch in lobster traps in the greatest numbers. None of these species have undergone (or are likely to undergo) formal stock assessments, because most are not targeted in commercial or recreational fisheries. The management measures in this amendment are not expected to affect spiny lobster discard mortality.

The most recent biological opinion (BiOp) on the Spiny Lobster FMP was completed on August 27, 2009 (NMFS 2009b). The BiOp determined the continued authorization of the Gulf and South Atlantic spiny lobster fishery managed under the Spiny Lobster FMP is not likely to adversely affect ESA-listed marine mammals, Gulf sturgeon, North Atlantic right whales, or *Acropora* spp. critical habitat, and is likely to adversely affect sea turtles (loggerhead, Kemp's ridley, green, hawksbill, and leatherback), smalltooth sawfish and *Acropora* spp. corals, but is not likely to jeopardize their continued existence. An incidental take statement was issued. On September 22, 2011, NMFS and the U.S. Fish and Wildlife Service determined the loggerhead sea turtle population consists of nine distinct population segments (DPS) (76 FR 58868). Previously, loggerhead sea turtles were listed as a threatened species throughout their global range. On February 15, 2012, NMFS determined that the 2009 BiOp's findings for loggerhead sea turtles remain valid for the Northwest Atlantic DPS of loggerhead sea turtle.

On July 27, 2012, NMFS published a final rule (77 FR 44168), effective August 27, 2012, that limited spiny lobster trap fishing in certain areas in the EEZ off the Florida Keys to protect threatened species of corals and addresses the requirements of the 2009 BiOp. A correction to coordinates in this rule was published on August 22, 2012 (77 FR 50642). The final rule prohibited spiny lobster trap fishing in 60 closed areas that were chosen because of their high benthic conservation value and areas of high coral density. On August 11, 2014, NMFS published a final rule (79 FR 39856) that designated 38 marine areas within the Atlantic Ocean and Gulf which contained physical or biological features essential for the conservation of the loggerhead sea turtle. On September 16, 2014, NMFS determined that the continued authorization of the Gulf and South Atlantic spiny lobster fishery was not likely to adversely affect the critical habitat for the Northwest Atlantic ocean loggerhead sea turtle DPS.

On September 10, 2014, NMFS published a final rule to list 22 coral species under the ESA (79 FR 53851). Five of the 22 species (*Mycetophyllia ferox*, *Dendrogyra cylindrus, Orbicella annularis*, *O. faveolata*, and *O. franksi*) occur in the Gulf and South Atlantic which results in seven species of coral listed as threatened when added to the already listed species *Acropora cervicornis, A. palmata*. 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 11 DPSs as threatened and three DPSs as endangered, effective May 6, 2016. Two of the green sea turtle DPSs, the North Atlantic DPS and the South Atlantic DPS, occur in the Gulf and South Atlantic 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. The new listings triggered reinitiation of consultation under Section 7 of the ESA. On January 9, 2018, NMFS determined that allowing fishing under the Gulf and South Atlantic spiny lobster fishery to continue during the reinitiation period is not likely to jeopardize the continued existence of the 2014 listed coral species, the North Atlantic and South Atlantic DPSs of green sea turtles, or Nassau grouper.

On April 12, 2018, NMFS determined that the continued authorization of the Gulf and South Atlantic spiny lobster fishery is not likely to adversely affect giant manta rays. On January 30, 2018 (83 FR 4153), NMFS listed the oceanic whitetip shark as threatened under the ESA, effective March 1, 2018. On March 19, 2018, NMFS determined that allowing fishing under the Gulf and South Atlantic spiny lobster fishery would have no effect on oceanic whitetip sharks.

The Florida spiny lobster trap/pot fishery is classified in the 2018 MMPA List of Fisheries as a Category III fishery (83 FR 5349), i.e. there is a remote likelihood of incidental mortality or serious injury to marine mammals. More information can be found on the website for the List of Fisheries and the classification process.[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 affect 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. This 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 will increase by 1-3ºC for 2010-2070 compared to the average over the years 1950-2010. For reef fishes, Burton (2008) speculated climate change could cause shifts in spawning seasons, changes in migration patterns, and changes to basic life history parameters such as

[10] http://www.nmfs.noaa.gov/pr/interactions/fisheries/lof.html
[11] http://www.ipcc.ch/
[12] https://www.esrl.noaa.gov/psd/ipcc/

growth rates. The smooth puffer and common snook are examples of species for which there has been a distributional trend to the north in the Gulf. For other species such as red snapper and the dwarf sand perch, there has been a distributional trend towards deeper waters. For other fish species, such as the dwarf goatfish, there has been a distributional trend both to the north and to deeper waters. These changes in distributions have been hypothesized as a response to environmental factors, such as increases in temperature.

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. Hollowed et al. (2013) provided a review of projected effects of climate change on the marine fisheries and dependent communities. Integrating the potential effects of climate change into the fisheries assessment is currently difficult due to the time scale differences (Hollowed et al. 2013). The fisheries stock assessments rarely project through a time span that would include detectable climate change effects.

Deepwater Horizon MC252 Oil Spill

The *Deepwater Horizon* MC252 oil spill in 2010 affected at least one-third of the Gulf area from western Louisiana east to the Florida Panhandle and south to the Campeche Bank in Mexico. The impacts of the *Deepwater Horizon* MC252 oil spill on the physical environment are expected to be significant and may be long-term. Oil was dispersed on the surface, and because of the heavy use of dispersants (both at the surface and at the wellhead), oil was also documented as being suspended within the water column, some even deeper than the location of the broken well head. Floating and suspended oil washed ashore in several areas of the Gulf as did non-floating tar balls. Whereas suspended and floating oil degrades over time, tar balls are persistent in the environment and can be transported hundreds of miles. A discussion of the additional impacts to the physical, biological, economic, social, and administrative environments affected by the oil spill is contained in the January 2011 Reef Fish Regulatory Amendment (GMFMC 2011c) and is incorporated here by reference. For more information on physical impacts of the *Deepwater Horizon* MC252 oil spill, see http://sero.nmfs.noaa.gov/deepwater_horizon_oil_spill.htm.

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). When exposed to realistic, yet toxic levels of PAHs (1–15 µg/L), greater amberjack larvae develop cardiac abnormalities and physiological defects (Incardona et al. 2014). The future reproductive success of long-lived species, including red drum (*Sciaenops ocellatus*) and many reef 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).

Increases in histopathological lesions were found in red snapper (*Lutjanus campechanus*) in the area affected by the oil, but Murawski et al. (2014) found that the incidence of lesions had declined between 2011 and 2012. The occurrence of such lesions in marine fish is not uncommon (Sindermann 1979; Haensly et al. 1982; Solangi and Overstreet 1982; Khan and Kiceniuk 1984, 1988; Kiceniuk and Khan 1987; Khan 1990). Red snapper diet was also affected after the spill. A decrease in zooplankton consumed, especially by adults (greater than 400 mm total length) over natural and artificial substrates may have contributed to an increase in the consumption of fish and invertebrate prey – more so at artificial reefs than natural reefs (Tarnecki and Patterson 2015).

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. The effect of oil, dispersants, and the combination of oil and dispersants on fishes of the Gulf remains an area of concern.

Red Tide

Red tide is a common name for harmful algal bloom (HABs) caused by species of dinoflagellates and other organisms that causes the water to appear to be red. Red tide blooms occur in the Gulf of Mexico almost every year, generally in late summer or early fall. They are most common off the central and southwestern coasts of Florida between Clearwater and Sanibel Island but may occur anywhere in the Gulf. More than 50 HAB species occur in the Gulf of Mexico, but one of the best-known species is *Karenia brevis*. This organism produces brevetoxins capable of killing fish, birds and other marine animals.[13]

The effects of red tide on fish stocks have been well established. In 2005, a severe red tide event occurred in the Gulf of Mexico along with an associated large decline in multiple abundance indices for red grouper, gag, and other species thought to be susceptible to mortality from red tide events. It is unknown whether mortality occurs via absorption of toxins across gill membranes (Abbott et al. 1975, Baden 1988), ingestion of toxic biota (Landsberg 2002), or from some indirect effect of red tide such as hypoxia (Walter et al. 2013).

As of the time of this writing, a severe red tide event which began in late 2017 has begun to dissipate along the southwest coast of Florida from Monroe County to Pasco County. This red tide event had persisted for more than one year.

3.4 Description of the Economic Environment

The primary purpose of this amendment is to allow for carryover of portions of Reef Fish and Coastal Migratory Pelagics (CMP) ACLs that were uncaught due to landings uncertainty and management limitations. This amendment also considers modifications to the framework

[13] Source: http://myfwc.com/research/redtide/general/about/

procedures to allow carryover and other changes to operate in a timely manner. The Coral and Coral Reefs and Spiny Lobster FMPs would be included in some of the changes to the framework procedures; however, carryover would not apply to them. The following section describes the economic environments of these fisheries.

3.4.1 Reef Fish Fishery

Economic information pertaining to the reef fish fishery can be found in Amendment 49 to the Reef Fish FMP (GMFMC 2018c) and Amendment 9 to the Coral and Coral Reefs FMP (GMFMC 2018b) and is incorporated herein by reference. Select updates to this information, by sector, are included below.

Commercial Sector

Permits

Any fishing vessel that harvests and sells any of the reef fish species managed under the Reef Fish FMP from the Gulf EEZ must have a valid Gulf reef fish permit. As of December 4, 2018, there were 842 valid (non-expired) or renewable[14] commercial reef fish permits. In order to harvest reef fish species managed under an individual fishing quota (IFQ) program in the Gulf, a vessel permit must also be linked to an IFQ account and possess sufficient allocation for each IFQ species landed. Details of Gulf IFQ programs may be found at the National Oceanic and Atmospheric Administration (NOAA) website.[15]

Vessel Activity

The following summaries of landings, revenue, and effort (Tables 3.4.1.1 and 3.4.1.2) are based on logbook information and the National Marine Fisheries (NMFS) Accumulated Landings System (ALS) for prices. Landings for all species in the Southeast Fisheries Science Center Social Science Research Group's (SEFSC-SSRG) Socioeconomic Panel data are expressed in gutted weight (gw) to provide one unit for all species. This is because data summarizations, as presented in Table 3.4.1.1 and Table 3.4.1.2 below, generally involve a multitude of species. It is also important to note that federally-permitted vessels that are required to submit logbooks generally report their harvest of most species regardless of whether the fish were caught in state or federal waters.

The number of federally permitted vessels that harvested reef fish commercially in the Gulf fluctuated from 2013 through 2017 with a peak of 576 in 2014 (Table 3.4.1.1). On average (2013 through 2017), these vessels landed reef fish on approximately 89% of their Gulf trips and reef fish comprised 93% of their annual revenue from all species (Table 3.4.1.1 and Table 3.4.1.2). Average vessel level revenue peaked in 2015, remained mostly stable in 2016, but then dropped to a 5-year low in 2017 (Table 3.4.1.2).

[14] A renewable permit is an expired permit that may not be actively fished, but is renewable for up to one year after expiration.

[15] https://www.fisheries.noaa.gov/southeast/about-us/limited-access-privilege-programs-data-management-branch

Table 3.4.1.1. Number of vessels, trips, and landings (pounds [lbs] gw) by year for reef fish species in the Gulf.

Year	# of vessels that caught reef fish (> 0 lbs gw)	# of trips that caught reef fish	reef fish landings (lbs gw)	Other species' landings jointly caught w/ reef fish (lbs gw)	# of Gulf trips that only caught other species	Other species' landings on Gulf trips w/o reef fish (lbs gw)	All species landings on South Atlantic trips (lbs gw)
2013	531	6,295	13,691,777	768,908	799	789,777	428,690
2014	576	6,986	15,459,573	895,474	1,010	848,153	401,112
2015	548	7,005	15,392,715	739,055	785	800,750	665,643
2016	538	7,125	15,095,974	699,776	828	957,296	540,643
2017	562	6,763	13,691,902	608,976	792	768,405	533,851
Average	551	6,835	14,666,388	742,438	843	832,876	513,988

Source: SEFSC-SSRG Socioeconomic Panel v.8 December 2018.
Note: Gulf trips refer to trips taken in Gulf Council jurisdictional waters and South Atlantic trips refer to trips taken in South Atlantic Council jurisdictional waters.

Table 3.4.1.2. Number of vessels and ex-vessel revenue by year (2017 dollars) for reef fish species in the Gulf.

Year	# of vessels that caught reef fish (> 0 lbs gw)	Dockside revenue from reef fish	Dockside revenue from 'other species' jointly caught w/ reef fish	Dockside revenue from 'other species' caught on Gulf trips w/o reef fish	Dockside revenue from 'all species' caught on South Atlantic trips	Total dockside revenue	Average total dockside revenue per vessel
2013	531	$54,140,421	$1,368,338	$1,657,647	$1,290,202	$58,456,608	$110,088
2014	576	$62,201,714	$1,498,547	$1,934,454	$1,353,766	$66,988,481	$116,299
2015	548	$63,616,618	$1,289,316	$1,493,357	$2,216,015	$68,615,306	$125,210
2016	538	$62,483,076	$1,193,934	$1,944,899	$1,612,875	$67,234,784	$124,972
2017	562	$56,355,421	$1,062,928	$1,623,364	$1,696,339	$60,738,052	$108,075
Average	551	$59,759,450	$1,282,613	$1,730,744	$1,633,839	$64,406,646	$116,929

Source: SEFSC-SSRG Socioeconomic Panel v.8 December 2018.
Note: Gulf trips refer to trips taken in Gulf Council jurisdictional waters and South Atlantic trips refer to trips taken in South Atlantic Council jurisdictional waters.

Business Activity

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 fish purchased at a local seafood 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, such as other finfish or seafood products, and services, such as visits to different food service establishments. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic effects 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.

Estimates of the U.S. average annual business activity associated with the commercial harvest of reef fish in the Gulf were derived using the model developed for and applied in NMFS (2017) and are provided in Table 3.4.1.3.[16] Specifically, these impact estimates reflect the expected economic impacts from average annual gross revenues generated by landings of Gulf reef fish from 2013-2017. This business activity is characterized as jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), output impacts (gross business sales), and value-added impacts, which represent the contribution made to the U.S. Gross Domestic Product (GDP). These impacts should not be added together because this would result in double counting. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species. Separate models to address individual species are not available. It should be noted that the results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. For example, a harvester job, as presented in Table 3.4.1.3 is "generated" for approximately every $32,000 (2017 dollars) in ex-vessel revenue. These results contrast with the number of harvesters (vessels) with recorded landings of reef fish species in Table 3.4.1.1.

Table 3.4.1.3. Average annual business activity (2013 through 2017) associated with the commercial harvest of reef fish in the Gulf. All monetary estimates are in 2017 dollars.*

Species	Average Ex-vessel Value ($ thousands)	Total Jobs	Harvester Jobs	Output (Sales) Impacts ($ thousands)	Income Impacts ($ thousands)	Value Added ($ thousands)
Reef Fish	$59,759	7,839	1,860	$592,623	$217,632	$307,489

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).
*Converted to 2017 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis (BEA).

[16]A detailed description of the input/output model is provided in NMFS (2011).

Recreational Sector

Permits

For-hire vessels in the Gulf are required to have a limited access Gulf Charter/Headboat for Reef Fish permit (Gulf reef fish for-hire permit) to fish for or possess managed reef fish species in or from the Gulf EEZ (a similar, but separate, permit is required for coastal migratory pelagic species). On Dec 4, 2018, there were 1,276 valid (non-expired) or renewable[17] Gulf reef fish for-hire permits and 31 valid or renewable Gulf reef fish historical captain for-hire permits. Although the for-hire permit application collects information on the primary method of operation, 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, only federally permitted headboats are required to submit harvest and effort information to the NMFS Southeast Region Headboat Survey (SRHS). Participation in the SRHS is based on determination by the SEFSC that the vessel primarily operates as a headboat. As of June 11, 2018, 70 Gulf headboats were registered in the SRHS (K. Fitzpatrick, NMFS SEFSC, pers. comm.). The majority of these headboats were located in Florida (41), followed by Texas (16), Alabama (8), and Mississippi/Louisiana (5).

There are no specific federal permitting requirements for recreational anglers to fish for or harvest reef fish. Instead, anglers are required to possess either 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 this proposed amendment.

Angler Effort

Recreational effort derived from the Marine Recreational Information Program (MRIP) database can be characterized in terms of the number of trips as follows:

- Target trips - 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 trips - 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.

A target trip may be considered an angler's revealed preference for a certain species, and thus may carry more relevant information when assessing the economic effects of regulations on the subject species than the other two measures of recreational effort. The following discussion focuses on target trips for reef fish species in the Gulf.

[17] A renewable permit is an expired permit that may not be actively fished, but is renewable for up to one year after expiration.

The majority of estimated target trips for reef fish species in the Gulf, on average (2013 through 2017), were taken in Florida and the predominant mode of fishing on these trips was the private/rental mode (Table 3.4.1.4). The total number of trips targeting reef fish species in the Gulf decreased by 28% from 2013 through 2017 with fluctuations in between (Table 3.4.1.4). It is important to note that in 2018, MRIP transitioned from the old Coastal Household Telephone Survey (CHTS) to a new mail-based fishing effort survey (FES). The estimates presented in Table 3.4.1.4 are based on the CHTS and have not been calibrated to the FES; however, it is expected that such calibration would result in greater estimates.

Table 3.4.1.4. Gulf reef fish recreational target trips, by mode and state, 2013-2017.*

	Alabama	Florida	Louisiana**	Mississippi	Total
	Shore Mode				
2013	1,612	155,702	0	0	157,314
2014	2,064	241,095	N/A	0	243,159
2015	8,665	158,377	N/A	0	167,042
2016	14,331	197,430	N/A	0	211,761
2017	2,758	235,796	N/A	0	238,554
Average	5,886	197,680	0	0	203,566
	Charter Mode				
2013	26,953	133,038	9,793	38	169,822
2014	14,444	94,693	N/A	0	109,137
2015	27,299	158,214	N/A	366	185,879
2016	38,975	158,450	N/A	1,287	198,712
2017	36,258	149,085	N/A	2,990	188,333
Average	28,786	138,696	9,793	936	170,377
	Private/Rental Mode				
2013	232,280	1,456,836	36,961	21,713	1,747,790
2014	68,919	1,086,201	N/A	8,864	1,163,984
2015	140,490	844,223	N/A	4,199	988,912
2016	199,875	915,111	N/A	36,126	1,151,112
2017	219,031	827,766	N/A	20,030	1,066,827
Average	172,119	1,026,027	36,961	18,186	1,223,725
	All Modes				
2013	260,844	1,745,575	46,754	21,752	2,074,925
2014	85,426	1,421,989	N/A	8,864	1,516,279
2015	176,453	1,160,814	N/A	4,565	1,341,832
2016	253,182	1,270,992	N/A	37,413	1,561,587
2017	258,047	1,212,646	N/A	23,020	1,493,713
Average	206,790	1,362,403	46,754	19,123	1,597,667

Source: MRIP database, SERO, NMFS.

* These estimates are based on the MRIP CHTS. Directed effort estimates that are calibrated to the new MRIP mail-based FES may be greater than what are presented here.

** MRIP estimates for Louisiana are not available after 2013. The Louisiana Department of Wildlife and Fisheries did collect target effort data beginning in 2016; however, those data are not currently calibrated with the MRIP data and therefore are not useful for direct comparison.

Note: Texas and headboat information is unavailable.

Similar analysis of recreational effort is not possible for the headboat mode 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 total number of standardized full-day angler trips.[18] Florida experienced a 12% increase overall in the number of headboat angler days from 2013 through 2017 and Alabama experienced a 23% increase (Table 3.4.1.5). The other Gulf states experienced minor decreases during this time period. On average (2013 through 2017), Florida accounted for the majority of headboat angler days reported, followed by Texas and Alabama, whereas Mississippi through Louisiana accounted for only a small percentage (Table 3.4.1.5).

Table 3.4.1.5. Gulf headboat angler days and percent distribution by state (2013 through 2017).

	Angler Days				Percent Distribution			
	FL	**AL**	**MS-LA***	**TX**	**FL**	**AL**	**MS-LA**	**TX**
2013	160,346	14,454	3406	55,749	68.54%	6.18%	1.46%	23.83%
2014	174,599	16,766	3257	51,231	71.02%	6.82%	1.32%	20.84%
2015	176,375	18,008	3587	55,135	69.68%	7.11%	1.42%	21.78%
2016	183,147	16,831	2955	54,083	71.26%	6.55%	1.15%	21.04%
2017	178,816	17,841	3189	51,575	71.12%	7.10%	1.27%	20.51%
Average	174,657	16,780	3,279	53,555	70%	7%	1%	22%

Source: NMFS SRHS.

* Headboat data from Mississippi and Louisiana are combined for confidentiality purposes.

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 (2013 through 2017) (Table 3.4.1.6). The monthly trend in angler days was mostly similar across years, building gradually from January through May, rising sharply to a peak in June and July, dropping rapidly through September, increasing slightly in October, then tapering through December.

[18] Headboat trip categories include half-, three-quarter-, full-, and 2-day trips. A full-day trip equals one angler day, a half-day trip equals .5 angler days, etc. Angler days are not standardized to an hourly measure of effort and actual trip durations may vary within each category.

Table 3.4.1.6. Gulf headboat angler days (in thousands) and percent distribution by month (2013 – 2017).

-	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-	**Headboat Angler Days (in thousands)**											
2013	8.6	9.6	16.8	16.4	17.2	47.8	38.3	27.6	12.7	21.3	8.7	9.1
2014	7.1	12.4	18.6	18.7	21.3	44.3	46.2	30.9	12.1	17.4	7.6	9.2
2015	9.4	10.6	22.8	20.7	21.0	44.7	45.2	26.6	15.1	17.2	9.8	9.9
2016	8.0	13.2	21.8	18.7	21.7	50.3	49.9	21.8	13.6	15.8	11.8	10.4
2017	9.0	14.0	21.0	19.4	19.2	47.7	54.0	23.0	10.3	11.1	11.3	11.5
Avg	8.4	12.0	20.2	18.8	20.1	47.0	46.7	26.0	12.8	16.6	9.8	10.0
-	**Percent Distribution**											
2013	3.7%	4.1%	7.2%	7.0%	7.3%	20.4%	16.4%	11.8%	5.4%	9.1%	3.7%	3.9%
2014	2.9%	5.0%	7.6%	7.6%	8.7%	18.0%	18.8%	12.6%	4.9%	7.1%	3.1%	3.7%
2015	3.7%	4.2%	9.0%	8.2%	8.3%	17.7%	17.9%	10.5%	6.0%	6.8%	3.9%	3.9%
2016	3.1%	5.1%	8.5%	7.3%	8.4%	19.6%	19.4%	8.5%	5.3%	6.2%	4.6%	4.0%
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%
Avg	3.4%	4.8%	8.1%	7.6%	8.1%	18.9%	18.8%	10.5%	5.1%	6.7%	3.9%	4.0%

Source: NMFS SRHS.

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. These variables help determine the value of a fishing trip and influence total demand for recreational fishing trips. For example, the estimated value of the CS for catching and keeping a second red snapper on an angler trip is approximately $82 (values updated to 2017 dollars), and decreases thereafter (approximately $55 for a third red snapper, $40 for a fourth red snapper, and $32 for a fifth red snapper; Carter and Liese 2012). In comparison, the estimated value of the CS for catching and keeping a grouper is approximately $105 for the second fish, $70 for the third fish, $52 for the fourth fish, and $41 for the fifth fish (Carter and Liese 2012).

The foregoing estimates of economic value should not be confused with economic impacts associated with recreational fishing expenditures. Although expenditures for a specific good or service may represent a proxy or lower bound of value (a person would not logically pay more for something than it was worth to them), they do not represent the net value (benefits minus cost), nor the change in value associated with a change in the fishing experience.

With regard to for-hire businesses, economic value can be measured by producer surplus (PS) per passenger trip (the amount of money that a vessel owner earns in excess of the cost of providing the trip). Estimates of the PS per for-hire passenger trip are not available. Instead, net

operating revenue (NOR), which is the return used to pay all labor wages, returns to capital, and owner profits, is used as a proxy for PS. The estimated NOR value for an average Gulf charter angler trip is $158 (2017 dollars) and the estimated NOR value for an average Gulf headboat angler trip is $52 (C. Liese, NMFS SEFSC, pers. comm.). Estimates of NOR for for-hire trips that target specific species are not available.

The most current estimates of average annual gross revenue per vessel are provided in Savolainen, et al. (2012).[19] In 2017 dollars, the average annual gross revenue for a Gulf headboat is $260,731 while the average annual gross revenue for a Gulf charter vessel is $86,021. 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 PS. In general, annual 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 2017 dollars, Savolainen, et al. (2012) estimated the annual PS for Gulf headboats and charter vessels was approximately $182,427 and $56,589, respectively. Their best estimates of economic profit were $76,110 and $25,435 (2017 dollars), respectively.[20]

Business Activity

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 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 reef fish species in the Gulf were calculated using average trip-level impact coefficients derived from the 2015 Fisheries Economics of the U.S. report (NMFS 2017) and underlying data provided by the NOAA Office of Science and Technology. Economic impact estimates in 2015 dollars were adjusted to 2017 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. BEA.

Business activity (economic impacts) for the recreational sector is characterized in the form of jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), output impacts (gross business sales), and value-added impacts (contribution to the GDP in a state or

[19] Research by Abbott and Willard (2017) suggest that Savolainen, et al.'s estimate of average annual gross revenues 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 approximately $461,000 (2017 dollars). 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 those from Savolainen, et al. are based on a random sample of 20 headboats. It is very possible that the headboats that participated in the Collaborative are economic highliners, in which case Abbott and Willard's estimates would not be representative of the fleet.

[20] 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.

region). Estimates of the average annual economic impacts (2013-2017) resulting from Gulf reef fish target trips are provided in Table 3.4.1.7. The average impact coefficients, or multipliers, used in the model are invariant to the "type" of effort and can therefore be directly used to measure the impact of other effort measures such as reef fish catch trips. To calculate the multipliers from Table 3.4.1.7, simply divide the desired impact measure (sales impact, value-added impact, income impact or employment) associated with a given state and mode by the number of target trips for that state and mode.

The estimates provided in Table 3.4.1.7 only apply at the state-level. 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. It is also important to note that these economic impacts estimates are based on trip expenditures only and do not account for durable expenditures. Durable expenditures cannot be reasonably apportioned to individual species or groups of species. As such, the estimates provided in Table 3.4.1.7 may be considered a lower bound on the economic activity associated with those trips that targeted reef fish.

Estimates of the business activity associated with headboat effort are not available. Headboat vessels are not covered in MRIP in the Southeast, so, in addition to the absence of estimates of target effort, estimation of the appropriate business activity coefficients for headboat effort has not been conducted.

Table 3.4.1.7. Estimated annual average economic impacts (2013-2017) from recreational trips that targeted reef fish species in the Gulf, by state and mode, using state-level multipliers. All monetary estimates are in 2017 dollars in thousands.*

	FL	AL	MS	LA**
	Charter Mode			
Target Trips	138,696	28,786	936	9,793
Value Added Impacts	$50,733	$9,277	$214	$3,098
Sales Impacts	$91,953	$17,768	$432	$5,370
Income Impacts	$33,117	$6,335	$149	$2,085
Employment (Jobs)	723	147	3	36
	Private/Rental Mode			
Target Trips	1,026,027	172,119	18,186	36,961
Value Added Impacts	$23,025	$4,862	$261	$1,328
Sales Impacts	$38,855	$9,391	$601	$2,735
Income Impacts	$13,351	$2,823	$156	$717
Employment (Jobs)	349	92	5	19
	Shore			
Target Trips	197,680	5,886	0	0
Value Added Impacts	$3,330	$216	$0	$0
Sales Impacts	$5,482	$390	$0	$0
Income Impacts	$1,905	$128	$0	$0
Employment (Jobs)	52	4	0	0
	All Modes			
Target Trips	1,362,403	206,791	19,123	46,754
Value Added Impacts	$77,087	$14,355	$475	$4,426
Sales Impacts	$136,290	$27,549	$1,033	$8,105
Income Impacts	$48,374	$9,285	$305	$2,802
Employment (Jobs)	1,124	243	8	55

Source: Effort data from MRIP; economic impact results calculated by NMFS SERO using NMFS (2017) and underlying data provided by the NOAA Office of Science and Technology.
* Headboat target information is unavailable, as are target effort estimates from Texas.
** Louisiana estimates are based on 2013 target trips only.

3.4.2 CMP Fishery

Economic information pertaining to king and Spanish mackerel can be found in Framework Amendment 5 (GMFMC/SAFMC 2016) and is incorporated herein by reference. Economic information pertaining to cobia can be found in Vondruska (2010), Amendment 18 (GMFMC/SAFMC 2011), Amendment 20B (GMFMC/SAFMC 2014), and Framework Amendment 7 (GMFMC 2018a) and is incorporated herein by reference. Select updates to this information, by sector, are included below.

Commercial Sector

Permits

Any fishing vessel that sells king mackerel harvested in Atlantic and Gulf federal waters must have a valid limited access commercial king mackerel permit. A separate and additional valid limited access commercial king mackerel gillnet permit is required to harvest the species using a run-around gillnet in the Southern Florida west coast subzone. Any fishing vessel that sells Spanish mackerel harvested in Atlantic and Gulf federal waters must have a valid open access commercial Spanish mackerel permit. The numbers of commercial permits associated with king and Spanish mackerel as of Dec 4, 2018 are provided in Table 3.4.2.1.

Table 3.4.2.1. Number of permits associated with the king and Spanish mackerel fisheries as of December 4, 2018.

	Valid*	Valid or Renewable
King Mackerel	1,330	1,434
King Mackerel Gillnet	16	17
Spanish Mackerel	1,932	Not applicable

Source: NMFS SERO PIMS, 2018.
*Non-expired; expired permits may be renewed within one year of expiration.

There is no federal permit required for the commercial harvest of Gulf cobia. However, vessels with a valid federal commercial vessel permit or a charter vessel/headboat permit that harvest Gulf cobia in the EEZ or in state waters may only sell or transfer those fish to dealers with a federal dealer permit. Similarly, a federal dealer may only purchase or receive cobia that was harvested in the EEZ from a vessel that has a valid federal commercial vessel or charter vessel/headboat permit. As of December 4, 2018, there were 418 entities with a federal Gulf and South Atlantic Dealers permit. Cobia harvested in the Gulf by vessels that do not have a valid federal commercial or charter vessel/headboat permit may be sold or transferred to state authorized seafood dealers. Such sales are subject to the regulations of the state where the cobia is sold.

Vessel Activity

The following summaries of landings, revenue, and effort (Tables 3.4.2.2 and 3.4.2.3) are based on logbook information and the NMFS ALS for prices. Landings for all species in the SEFSC-SSRG Socioeconomic Panel data are expressed in gw to provide one unit for all species. This is because data summarizations, as presented in Table 3.4.2.2 and Table 3.4.2.3 below, generally involve a multitude of species. It is also important to note that federally-permitted vessels that are required to submit logbooks generally report their harvest of most species regardless of whether the fish were caught in state or federal waters.

The number of federally permitted vessels that harvested CMP species (king mackerel, Spanish mackerel, or cobia) commercially in the Gulf fluctuated from 2013 through 2017 with a peak of

492 in 2014 (Table 3.4.2.2). On average (2013 through 2017), these vessels landed CMP species on approximately 46% of their Gulf trips, but CMP species comprised only 10% of their annual revenue from all species (Table 3.4.2.2 and Table 3.4.2.3). Average vessel level revenue increased substantially from 2013 to 2016, but then returned to 2013 levels in 2017 (Table 3.4.2.3).

Table 3.4.2.2. Number of vessels, trips, and landings (lbs gw) by year for CMP species in the Gulf.

Year	# of vessels that caught CMP species (> 0 lbs gw)	# of trips that caught CMP species	CMP species landings (lbs gw)	Other species' landings jointly caught w/ CMP species (lbs gw)	# of Gulf trips that only caught other species	Other species' landings on Gulf trips w/o CMP species (lbs gw)	All species landings on South Atlantic trips (lbs gw)
2013	447	3,044	2,185,064	3,325,527	3,515	8,858,003	821,824
2014	492	3,613	2,826,232	3,834,747	4,142	9,564,342	931,402
2015	476	3,156	2,531,694	3,894,691	4,234	10,089,038	1,121,563
2016	462	3,358	2,698,842	3,875,174	3,966	9,727,534	1,170,832
2017	480	3,689	2,810,742	3,297,808	3,708	8,731,075	1,219,444
Average	471	3,372	2,610,515	3,645,589	3,913	9,393,998	1,053,013

Source: SEFSC-SSRG Socioeconomic Panel v.8 December 2018.
Note: Gulf trips refer to trips taken in Gulf Council jurisdictional waters and South Atlantic trips refer to trips taken in South Atlantic Council jurisdictional waters.

Table 3.4.2.3. Number of vessels and ex-vessel revenue by year (2017 dollars) for CMP species in the Gulf.

Year	# of vessels that caught CMP species (> 0 lbs gw)	Dockside revenue from CMP species	Dockside revenue from 'other species' jointly caught w/ CMP species	Dockside revenue from 'other species' caught on Gulf trips w/o CMP species	Dockside revenue from 'all species' caught on South Atlantic trips	Total dockside revenue	Average total dockside revenue per vessel
2013	447	$5,167,873	$11,992,374	$33,238,896	$2,255,213	$52,654,356	$117,795
2014	492	$6,286,189	$14,406,438	$36,586,735	$2,514,059	$59,793,421	$121,531
2015	476	$5,201,415	$15,173,493	$39,737,437	$2,999,084	$63,111,429	$132,587
2016	462	$5,660,555	$15,407,876	$38,725,969	$2,608,795	$62,403,195	$135,072
2017	480	$6,147,154	$13,219,050	$34,369,810	$2,879,733	$56,615,747	$117,949
Average	471	$5,692,637	$14,039,846	$36,531,769	$2,651,377	$58,915,630	$124,987

Source: SEFSC-SSRG Socioeconomic Panel v.8 December 2018.
Note: Gulf trips refer to trips taken in Gulf Council jurisdictional waters and South Atlantic trips refer to trips taken in South Atlantic Council jurisdictional waters.

Business Activity

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 fish purchased at a local seafood 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, such as other finfish or seafood products, and services, such as visits to different food service establishments. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic effects 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.

Estimates of the U.S. average annual business activity associated with the commercial harvest of CMP species in the Gulf were derived using the model developed for and applied in NMFS (2017) and are provided in Table 3.4.2.4.[21] Specifically, these impact estimates reflect the expected economic impacts from average annual gross revenues generated by landings of Gulf CMP species from 2013-2017. This business activity is characterized as jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), output impacts (gross business sales), and value-added impacts, which represent the contribution made to the U.S. GDP. These impacts should not be added together because this would result in double counting. These results are based on average relationships developed through the analysis of many fishing

[21]A detailed description of the input/output model is provided in NMFS (2011).

operations that harvest many different species. Separate models to address individual species are not available. It should be noted that the results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. For example, a harvester job, as presented in Table 3.4.2.4 is "generated" for approximately every $32,000 (2017 dollars) in ex-vessel revenue. These results contrast with the number of harvesters (vessels) with recorded landings of CMP species in Table 3.4.2.2.

Table 3.4.2.4. Average annual business activity (2013 through 2017) associated with the commercial harvest of CMP species in the Gulf. All monetary estimates are in 2017 dollars.*

Species	Average Ex-vessel Value ($ thousands)	Total Jobs	Harvester Jobs	Output (Sales) Impacts ($ thousands)	Income Impacts ($ thousands)	Value Added ($ thousands)
CMP species	$5,693	747	177	$56,456	$20,727	$29,288

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).
*Converted to 2017 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. BEA.

Recreational Sector

Permits

For-hire vessels in the Gulf are required to have a limited access Gulf Charter/Headboat for Coastal Migratory Pelagics permit (Gulf CMP for-hire permit) to fish for or possess CMP species in or from the Gulf EEZ (a similar, but separate, permit is required for coastal reef fish species). On Dec 4, 2018, there were 1,286 valid (non-expired) or renewable[22] Gulf CMP for-hire permits and 32 valid or renewable Gulf CMP historical captain for-hire permits. Although the for-hire permit application collects information on the primary method of operation, 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, only federally permitted headboats are required to submit harvest and effort information to the NMFS SRHS. Participation in the SRHS is based on determination by the SEFSC that the vessel primarily operates as a headboat. As of June 11, 2018, 70 Gulf headboats were registered in the SRHS (K. Fitzpatrick, NMFS SEFSC, pers. comm.). The majority of these headboats were located in Florida (41), followed by Texas (16), Alabama (8), and Mississippi/Louisiana (5).

There are no specific federal permitting requirements for recreational anglers to fish for or harvest CMP species. Instead, anglers are required to possess either 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 this proposed amendment.

[22] A renewable permit is an expired permit that may not be actively fished, but is renewable for up to one year after expiration.

Angler Effort

Recreational effort derived from the MRIP database can be characterized in terms of the number of trips as follows:

- Target trips - 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 trips - 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.

A target trip may be considered an angler's revealed preference for a certain species, and thus may carry more relevant information when assessing the economic effects of regulations on the subject species than the other two measures of recreational effort. The following discussion focuses on target trips for CMP species (Spanish mackerel, king mackerel, and cobia) in the Gulf.

The majority of estimated target trips for CMP species in the Gulf, on average (2013 through 2017), were taken in Florida and the predominant mode of fishing on these trips was the shore mode (Table 3.4.2.5). The total number of trips targeting CMP species in the Gulf steadily declined from 2013 through 2017; resulting in an overall decrease of 28% (Table 3.4.2.5). It is important to note that in 2018, MRIP transitioned from the CHTS to the FES. The estimates presented in Table 3.4.2.5 are based on the CHTS and have not been calibrated to the FES; however, it is expected that such calibration would result in greater estimates.

Table 3.4.2.5. Gulf CMP recreational target trips, by mode and state, 2013-2017.*

	Alabama	Florida	Louisiana**	Mississippi	Total
	Shore Mode				
2013	329,579	749,202	0	0	1,078,781
2014	224,318	796,550	N/A	0	1,020,868
2015	288,365	586,330	N/A	0	874,695
2016	287,360	488,591	N/A	0	775,951
2017	285,870	466,667	N/A	0	752,537
Average	283,098	617,468	0	0	900,566
	Charter Mode				
2013	3,354	29,721	0	1,831	34,906
2014	9,455	38,066	N/A	269	47,790
2015	6,735	58,028	N/A	1,297	66,060
2016	7,852	42,589	N/A	430	50,871
2017	6,371	61,046	N/A	355	67,772
Average	6,753	45,890	0	836	53,480
	Private/Rental Mode				
2013	67,985	346,909	12,708	24,078	451,680
2014	41,197	401,591	N/A	16,882	459,670
2015	53,053	317,540	N/A	41,839	412,432
2016	46,150	391,919	N/A	8,990	447,059
2017	51,355	240,469	N/A	12,241	304,065
Average	51,948	339,686	12,708	20,806	414,981
	All Modes				
2013	400,918	1,125,832	12,708	25,909	1,565,367
2014	274,970	1,236,207	N/A	17,151	1,528,328
2015	348,153	961,898	N/A	43,136	1,353,187
2016	341,362	923,099	N/A	9,420	1,273,881
2017	343,596	768,182	N/A	12,596	1,124,374
Average	341,800	1,003,044	12,708	21,642	1,369,027

Source: MRIP database, SERO, NMFS.

* These estimates are based on the MRIP CHTS. Directed effort estimates that are calibrated to the new MRIP mail-based FES may be greater than what are presented here.

** MRIP estimates for Louisiana are not available after 2013. The Louisiana Department of Wildlife and Fisheries did collect target effort data beginning in 2016; however, those data are not currently calibrated with the MRIP data and therefore are not useful for direct comparison.

Note: Texas and headboat information is unavailable.

Similar analysis of recreational effort is not possible for the headboat mode because headboat data are not collected at the angler level. Estimates of effort by the headboat mode, in terms of angler days, are provided in Section 3.4.1.

Economic Value

Economic value received by anglers can be measured in the form of CS per additional fish kept on a trip (the amount of money that an angler would be willing to pay for a fish in excess of the cost to harvest the fish). The estimated values of the CS per fish for a second, third, fourth, and fifth king mackerel kept on a trip are approximately $101, $68, $50, and $39, respectively. There is no available estimate of CS for cobia, but dolphin or king mackerel CS estimates may be close proxies. For dolphin, the values for the second, third, fourth, and fifth kept fish are approximately $15, $10, $8, and $6, respectively (Carter and Liese 2012; values updated to 2017 dollars).[23]

Another study estimated the CS for catching and keeping one additional Spanish mackerel in the Southeastern U.S. using four separate econometric modeling techniques (Haab et al. 2012). Of the four models, only the finite mixture model, which takes into account variation in the preferences of anglers, produced a positive value for Spanish mackerel. The CS estimate for Spanish mackerel from the finite mixture model was approximately $18 (2017 dollars) with a 95% CI of $6 to $33. The other logit-based models from the study produced CS estimates that ranged from negative $14 to negative $8, a result of anglers avoiding fishing locations where Spanish mackerel are prevalent.

The foregoing estimates of economic value should not be confused with economic impacts associated with recreational fishing expenditures. Although expenditures for a specific good or service may represent a proxy or lower bound of value (a person would not logically pay more for something than it was worth to them), they do not represent the net value (benefits minus cost), nor the change in value associated with a change in the fishing experience.

For a discussion of the economic value generated by for-hire businesses, see Section 3.4.1.

Business Activity

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 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 CMP species in the Gulf were calculated using average trip-level impact coefficients derived

[23]Converted to 2017 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. BEA.

from the 2015 Fisheries Economics of the U.S. report (NMFS 2017) and underlying data provided by the NOAA Office of Science and Technology. Economic impact estimates in 2015 dollars were adjusted to 2017 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. BEA.

Business activity (economic impacts) for the recreational sector is characterized in the form of jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), output impacts (gross business sales), and value-added impacts (contribution to the GDP in a state or region). Estimates of the average annual economic impacts (2013-2017) resulting from Gulf CMP target trips are provided in Table 3.4.2.6. The average impact coefficients, or multipliers, used in the model are invariant to the "type" of effort and can therefore be directly used to measure the impact of other effort measures such as CMP catch trips. To calculate the multipliers from Table 3.4.2.6, simply divide the desired impact measure (sales impact, value-added impact, income impact or employment) associated with a given state and mode by the number of target trips for that state and mode.

The estimates provided in Table 3.4.2.6 only apply at the state-level. 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. It is also important to note that these economic impacts estimates are based on trip expenditures only and do not account for durable expenditures. Durable expenditures cannot be reasonably apportioned to individual species or groups of species. As such, the estimates provided in Table 3.4.2.6 may be considered a lower bound on the economic activity associated with those trips that targeted CMP species.

Estimates of the business activity associated with headboat effort are not available. Headboat vessels are not covered in MRIP in the Southeast, so, in addition to the absence of estimates of target effort, estimation of the appropriate business activity coefficients for headboat effort has not been conducted.

Table 3.4.2.6. Estimated annual average economic impacts (2013-2017) from recreational trips that targeted CMP species in the Gulf, by state and mode, using state-level multipliers. All monetary estimates are in 2017 dollars in thousands.*

	FL	AL	MS	LA**
	Charter Mode			
Target Trips	45,890	6,753	836	0
Value Added Impacts	$16,786	$2,177	$191	$0
Sales Impacts	$30,424	$4,169	$386	$0
Income Impacts	$10,957	$1,486	$133	$0
Employment (Jobs)	239	35	3	0
	Private/Rental Mode			
Target Trips	339,686	51,948	20,806	12,708
Value Added Impacts	$7,623	$1,467	$298	$456
Sales Impacts	$12,864	$2,834	$687	$940
Income Impacts	$4,420	$852	$179	$246
Employment (Jobs)	115	28	6	7
	Shore			
Target Trips	617,468	283,098	0	0
Value Added Impacts	$10,401	$10,399	$0	$0
Sales Impacts	$17,124	$18,737	$0	$0
Income Impacts	$5,951	$6,138	$0	$0
Employment (Jobs)	163	207	0	0
	All Modes			
Target Trips	1,003,044	341,800	21,642	12,708
Value Added Impacts	$34,810	$14,043	$490	$456
Sales Impacts	$60,411	$25,740	$1,073	$940
Income Impacts	$21,329	$8,476	$312	$246
Employment (Jobs)	518	269	9	7

Source: Effort data from MRIP; economic impact results calculated by NMFS SERO using NMFS (2017) and underlying data provided by the NOAA Office of Science and Technology.
* Headboat target information is unavailable, as are target effort estimates from Texas.
** Louisiana estimates are based on 2013 target trips only.

3.4.3 Spiny Lobster Fishery

Economic information pertaining to spiny lobster can be found in Amendment 13 (GMFMC/SAFMC 2018) and is incorporated herein by reference. Select updates to this information, by sector, are included below.

Commercial Sector

The major source of data summarized in this description is the Atlantic Coastal Cooperatives Statistics Program (ACCSP) data warehouse. Inflation adjusted revenues and prices are reported in 2017 dollars using the annual, non-seasonally adjusted GDP implicit price deflator provided by the U.S. BEA. This section presents calendar year estimates of fishing activity for vessels that harvested spiny lobster, and therefore, may differ from other sections of this document that present fishing year estimates.

Permits

In the EEZ off Florida, anyone who possesses, sells, trades, or barters or attempts to sell, trade, or barter spiny lobster must have the appropriate licenses, permit, and certificates specified to be a "commercial harvester," as defined in the Florida Administrative Code. In the 2017/2018 fishing season, Florida issued 1,539 commercial spiny lobster[24] licenses, 261 commercial dive permits, and 445 commercial bully net permits (T. Matthews, Florida Fish and Wildlife Conservation Commission [FWC], pers. comm.).

Any person who possesses, sells, trades, or barters or attempts to sell, trade, or barter a spiny lobster harvested in the EEZ other than off Florida must have a federal vessel permit (GMFMC and SAFMC 1987). A federal vessel permit does not authorize a commercial vessel to sell, trade, or barter or attempt to sell, trade, or barter a spiny lobster harvested in the EEZ off Florida. Any vessel that harvests spiny lobster in the EEZ under the federal spiny lobster permit or Florida permits must land the species whole (GMFMC and SAFMC 1982) unless they have a federal tailing permit on board in addition to any other permits (GMFMC and SAFMC 1987). Lobster tailing permits are only for vessels that are on trips for 48 hours or more in federal waters and those vessels must land lobsters all whole or all tailed on a trip. Both the federal spiny lobster and spiny lobster tailing permits are open access permits, although the federal spiny lobster permit has an income requirement to obtain it. As of December 4, 2018, NMFS listed 187 valid federal spiny lobster permits for the EEZ other than off Florida and 204 federal tail-separation permits for all EEZ waters.

Landings, Value, and Effort

The vast majority of U.S. spiny lobster landings occur in Monroe County, FL, and traps are the dominant commercial gear used (GMFMC/SAFMC 2018). The number of trips that reported harvest of spiny lobster in Florida increased slightly in 2014 and then steadily decreased to a five-year low in 2017 (Table 3.4.3.1). During this time, spiny lobster landings ranged from approximately 3.8 million pounds (mp) whole weight (ww) to 6.1 mp ww per year. On average (2013 through 2017), vessels earned approximately $2,300 per spiny lobster trip with only a small percentage of that revenue (approximately 4%) attributed to the harvest of other species (Table 3.4.3.1). Average dockside price per pound (lb) (2017 dollars) ranged from $8.31 per lb ww to $10.93 per lb ww. It is important to note that Hurricane Irma struck the Florida Keys on September 10, 2017 and had widespread impacts on lobster fishermen. The majority of lobster fishermen surveyed in a recent fisheries damage assessment conducted by the FWC, with

[24] Also referred to as crawfish.

assistance from NOAA, reported to have lost between 25% and 50% of their traps as a result of Hurricane Irma (NOAA 2018). The depressed effort and landings estimates shown for 2017 (Table 3.4.3.1) are likely attributable to these hurricane-related losses.

Table 3.4.3.1. Landings, ex-vessel revenue, and average price by year (2017 dollars) for spiny lobster trips in Florida.

Year	# of trips that caught spiny lobster	spiny lobster landings (lbs ww)	Other species' landings jointly caught w/ spiny lobster (lbs ww)	Dockside revenue from spiny lobster	Dockside revenue from 'other species' jointly caught w/ spiny lobster	Average dockside price per pound for spiny lobster
2013	22,888	6,130,845	640,166	$53,635,660	$2,464,340	$8.75
2014	24,000	5,582,375	323,703	$61,035,028	$2,013,411	$10.93
2015	22,080	5,931,282	346,989	$49,274,392	$1,716,238	$8.31
2016	20,669	5,407,054	220,258	$45,111,620	$1,580,638	$8.34
2017	16,030	3,841,797	170,106	$33,623,700	$1,272,703	$8.75
Average	21,133	5,378,671	340,244	$48,536,080	$1,809,466	$9.02

Source: 2018 ACCSP data warehouse (J. Myers, ACCSP, pers. comm.)

Because of missing values in available state dealer data, not all Florida spiny lobster landings could be tied to individual vessels. On average (2013-2017), approximately 9% of spiny lobster landings and 14% of spiny lobster trips could not be assigned to individual vessels. Table 3.4.3.2 provides revenue profiles for those vessels which could be identified. From 2013 through 2017, the number of identified commercial vessels with spiny lobster landings peaked at 912 in 2015 and then decreased to a five-year low of 720 in 2017 (Table 3.4.3.2).[25] On average (2013 through 2017), these vessels derived approximately 68% of their total dockside revenue from spiny lobster. Although not shown in the table, these vessels also landed spiny lobster on approximately 62% of their trips, on average.

[25] It is uncertain how many additional vessels may have participated in the fishery during this time.

Table 3.4.3.2. Ex-vessel revenue for identified vessels* that harvested spiny lobster in Florida (2017 dollars).

Year	# of vessels that landed spiny lobster (> 0 lbs gw)	Dockside revenue from spiny lobster	Dockside revenue from 'other species' jointly caught w/ spiny lobster	Dockside revenue from 'other species' caught on trips w/o spiny lobster**	Total dockside revenue	Average total dockside revenue per vessel
2013	759	$46,048,372	$2,071,820	$15,290,018	$63,410,210	$83,544
2014	812	$52,945,448	$1,815,648	$17,714,442	$72,475,538	$89,256
2015	912	$45,770,752	$1,557,867	$20,566,058	$67,894,677	$74,446
2016	835	$42,527,084	$1,406,138	$19,826,656	$63,759,878	$76,359
2017	720	$31,606,024	$1,189,116	$21,007,044	$53,802,184	$74,725
Average	808	$43,779,536	$1,608,118	$18,880,844	$64,268,497	$79,666

Source: 2018 ACCSP data warehouse (J. Myers, ACCSP, pers. comm.).
* Not all spiny lobster dealer reports contain a vessel ID. On average (2013-2017), approximately 9% of spiny lobster landings and 14% of spiny lobster trips could not be assigned to an individual vessel.
** Other species landings values include all reported landings (state and federal) from the South Atlantic and Greater Atlantic regions. Landings data from Gulf states other than FL are not currently available.

Business Activity

The commercial harvest and subsequent sales and consumption of fish and shellfish generates business activity as fishermen expend funds to harvest the fish and shellfish and consumers spend money on downstream goods and services, such as lobster tails purchased at local fish markets or 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, such as other shellfish or seafood products, and services, such as visits to different food service establishments. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic effects 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.

Estimates of the U.S. average annual business activity associated with the commercial harvest of spiny lobster were derived using the model[26] developed for and applied in NMFS (2017a) and are provided in Table 3.4.3.3. This business activity is characterized as jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), output impacts (gross business sales), and value-added impacts, which represent the contribution made to the U.S. GDP. These impacts should not be added together because this would result in double counting. These results are based on average relationships developed through the analysis of many fishing operations

[26] A detailed description of the input/output model is provided in NMFS (2011).

that harvest many different species. Separate models to address individual species are not available. It should be noted that the results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. For example, the results provided here apply to an "all other shellfish" category rather than just spiny lobster, and a harvester job is "generated" for approximately every $31,000 (2017 dollars) in ex-vessel revenue. These results contrast with the number of harvesters (vessels) with recorded landings of spiny lobster presented in Table 3.4.3.2.

Table 3.4.3.3. Average annual business activity (2013 through 2017) associated with the commercial harvest of spiny lobster in Florida, using national multipliers. All monetary estimates are in 2017 dollars.

Species	Average Ex-vessel Value ($ thousands)	Total Jobs	Harvester Jobs	Output (Sales) Impacts ($ thousands)	Income Impacts ($ thousands)	Value Added ($ thousands)
Spiny Lobster	$48,536	6,436	1,581	$481,551	$178,758	$252,188

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017a).

Recreational Sector

In Florida, an angler must possess both a recreational saltwater fishing license and a spiny lobster permit to harvest spiny lobster. For nonresidents in 2018, the cost is $47 for an annual fishing license, $30 for a 7-day fishing license, or $17 for a 3-day fishing license, plus $5 for a spiny lobster permit. For state residents, an annual fishing license is $17; state residents must also purchase either an annual spiny lobster permit for $5 or a 5-year lobster permit for $25. For-hire vessels that take passengers spiny lobster fishing must purchase a charter lobster permit for $5, in addition to their charter boat or charter captain license. For additional recreational license information, see the FWC website.[27] No federal permits are required to fish recreationally for spiny lobster in the EEZ.

MRIP is typically used to estimate national and regional recreational catch and effort, as well as economic impacts, but it focuses exclusively on finfish species. The Florida Wildlife Research Institute (FWRI) does, however, survey recreational spiny lobster permit holders annually. These surveys are used to estimate recreational spiny lobster landings and fishing effort statewide during Florida's special 2-day sport season and from opening day of the regular season (August 6) through Labor Day. Average annual recreational landings of spiny lobster for the 2012/2013 through 2016/2017 fishing years were estimated to be 1.6 million pounds ww and landings were mostly stable during that time period (GMFMC/SAFMC 2018).[28]

[27] http://myfwc.com/license/recreational/saltwater-fishing/

[28] Landings estimates for the 2017/2018 fishing season are not currently available due to a disruption in the angler survey caused by Hurricane Irma (T. Matthews, FWC, pers. comm.).

3.4.4 Corals

Economic information pertaining to corals can be found in Amendment 9 (GMFMC 2018b) and is incorporated herein by reference. Select updates to this information are included below.

Corals in the Gulf are managed under the Coral FMP. This FMP lists over 100 species of corals, but only black coral and stony coral are included in the fishery management unit. Harvests of these two types of corals are currently prohibited, except when authorized as a scientific research activity, exempted fishing permit activity, or exempted educational activity.

Harvests of wild live rocks are currently prohibited in the Gulf. However, aquacultured live rocks may be harvested, subject to certain limitations. Specific requirements and regulations of aquacultured live rock, including permit requirements are contained in 50 CFR Part 622, Subpart K. As of December 4, 2018, there were 19 vessels with valid federal aquacultured live rock permits. Live rock aquaculture is primarily undertaken in waters off of Florida. For the period 2013-2017, an annual average of approximately 57,000 pounds of live rock worth $131,000 (2017 dollars) were landed in Florida (FL FWC Commercial Fisheries Landings Summaries[29], November 8, 2018). Most of these landings were from the west coast of Florida.

The FWC currently manages the allowable octocoral fishery in both Florida state waters and federal waters adjacent to the state. For the period 2013-2017, an annual average of approximately 34,000 colonies worth $136,000 (2017 dollars) were landed in Florida (FL FWC Commercial Fisheries Landings Summaries, November 8, 2018).

3.5 Description of the Social Environment

The description of the social environment associated with the proposed actions include the reef fish, coastal migratory pelagics (CMP), Coral and Coral Reefs, and Spiny Lobster fisheries. The description of the social environment includes information on commercial and recreational fishing engagement and is presented at both the county and community level. A geographical focus on federal commercial and for-hire permits for reef fish and Gulf CMP within Gulf coast counties and communities is also included.

3.5.1 Permitted Participants

Reef Fish and CMP
A measure of potential participation in reef fish and Gulf CMP fisheries by community can be assessed through the number of valid permits on vessels associated with specific areas. Because it is common for vessels to have multiple permits, specifically both reef fish and CMP, Table 3.5.1 provides information on any vessels with at least one federal commercial or for-hire permit for reef fish or Gulf CMP. Although federal commercial permits for king mackerel and Spanish mackerel include harvest of both Atlantic and Gulf stocks, all vessels with these permits are included in the table because these vessels can harvest Gulf king and Spanish mackerel.

[29] https://public.myfwc.com/FWRI/PFDM/ReportCreator.aspx

Table 3.5.1. Number of vessels by state with at least one federal commercial or for-hire permit for reef fish or CMP as of December 31, 2018, based on homeport.

State	Number of Vessels
Texas	**254**
Louisiana	**171**
Mississippi	**40**
Alabama	**186**
Florida West Coast including Keys	**1,674**
Florida East Coast	**762**
Other South Atlantic States	**425**
Other States	**87**
TOTAL	**3,599**

Source: Southeast Regional Office Permits Database

The Florida west coast, including the Florida Keys, has the largest proportion of reef fish and CMP permits. The Florida east coast and other parts of the South Atlantic region also have high numbers of vessels, but these are primarily commercial king and Spanish mackerel permits. There are some vessels with homeports on the Florida east coast that travel to the Gulf to harvest CMP species, but it is likely that substantial travel to the Gulf is minimal and most vessels fish nearby their homeports.

Figure 3.5.1 provides more detail at the county level in the Gulf region for vessels with at least one federal commercial or for-hire permit for reef fish and CMP. The largest proportion of vessels is in the Florida Keys and along the Florida West Coast.

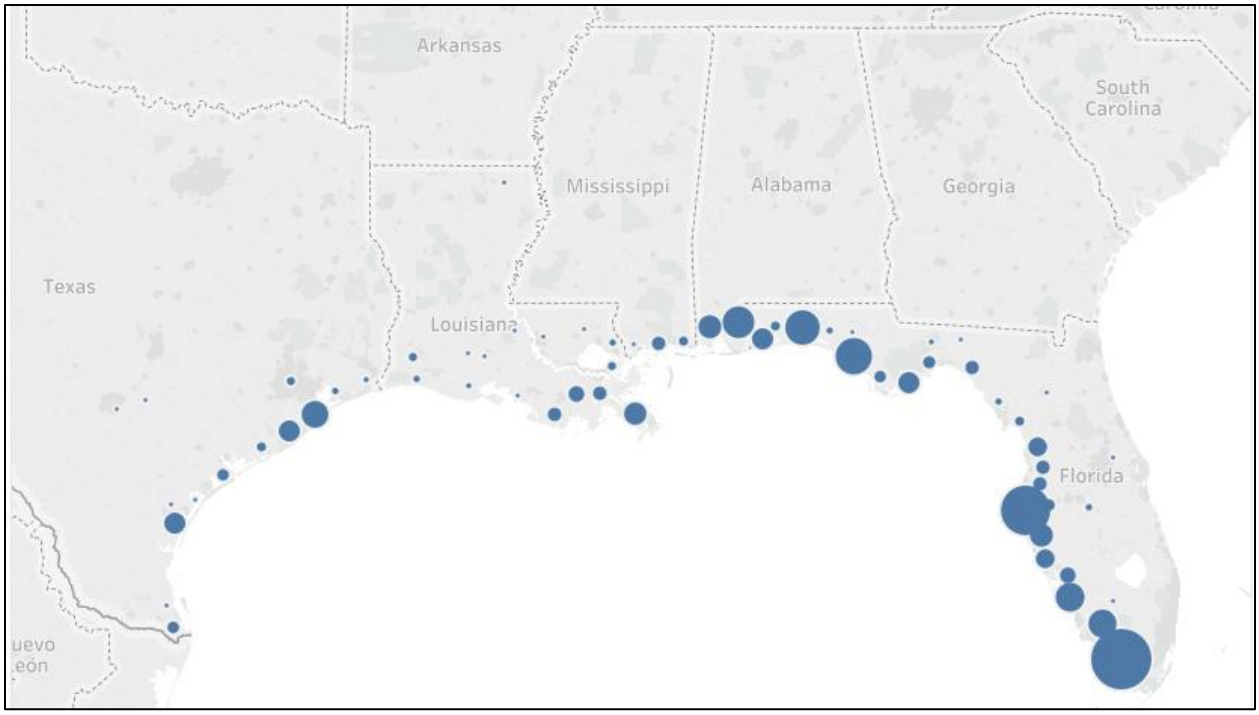

Figure 3.5.1. Number of Gulf vessels with reef fish or CMP permits by county, based on homeport.
Source: Southeast Regional Office Permits Database, 12/30/18.

Spiny Lobster
A thorough description of the spiny lobster fishery is discussed in Amendment 13 to the Fishery Management Plan (FMP) for Spiny Lobster in the Gulf of Mexico and South Atlantic (Spiny Lobster FMP) (GMFMC and SAFMC 2018). That description is summarized in the following and incorporated herein by reference.

The majority of vessels permitted to harvest spiny lobster are in the Florida Keys, which is the location of almost all spiny lobster commercial landings. The primary communities associated with the commercial component of the spiny lobster fishery are Key Largo, Marathon, Stock Island, and Key West. There are spiny lobster commercial vessels also located in Summerland Key along with some vessels in Miami.

Recreational harvest of spiny lobster in Florida state waters and the EEZ off Florida require the Florida recreational license and a spiny lobster stamp (see Section 3.1.3 for detailed information about Florida licenses). Licensed recreational participants are spread throughout Florida, but the majority of the licensed participants reside in Miami (GMFMC and SAFMC 2018).

Coral
Black coral and stony coral are the only species included in the fishery management unit and harvest is prohibited; therefore, no permit information exists. Harvest of aquacultured live rock requires a federal permit, and as of December 2018 there were 19 permits issued to harvesters in Florida (Coral Amendment 9; GMFMC 2018b).

3.5.2 Landings

Another measure of a community's involvement in a particular fishery is its regional quotient (RQ). The RQ is the proportion of the species (or species complex) landed within a community out of the total amount of the species landed within the region. It is an indicator of the percentage contribution in value or pounds landed within that community to the regional fishery. This proportional measure does not provide the number of pounds or value of the catch; data that might be confidential at the community level for many places. The RQ is reported only for those communities that were highly engaged for all years from 2011through 2016.

King and Spanish Mackerel

The top four communities in terms of commercial landings of king mackerel are Destin, Florida; Naples, Florida; Key West, Florida, and Golden Meadow, Louisiana (Figure 3.5.2). Destin consistently makes up the largest proportion of king mackerel pounds and value for all years, while other communities have variability in landings and value. Key West, Florida and Golden Meadow, Louisiana, have decreased in king mackerel landings over the time period.

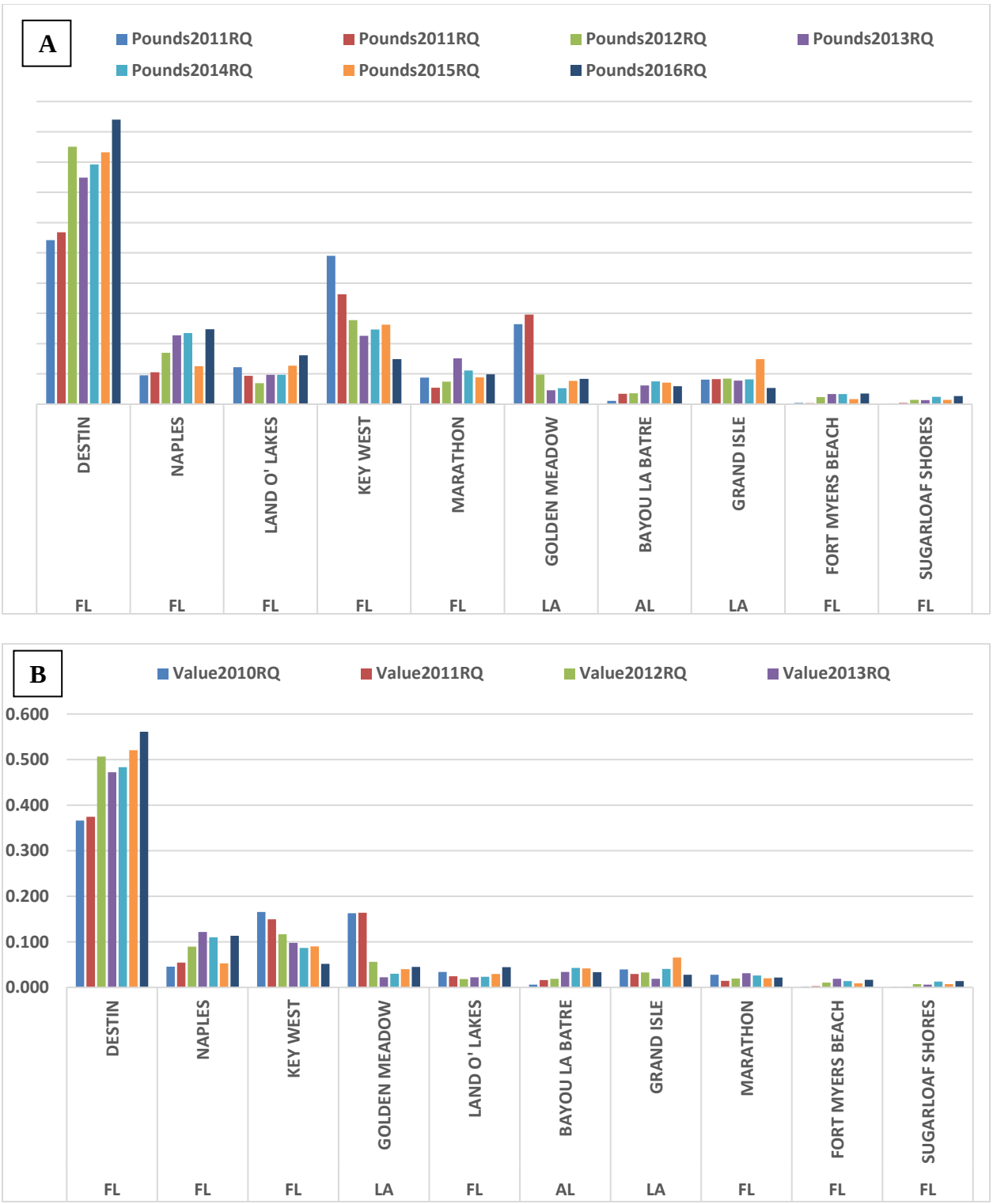

Figure 3.5.2. Regional quotients (RQs) for pounds (A) and value (B) for the top Gulf communities in the commercial sector of the king mackerel fishery from 2011 through 2016.

For Spanish mackerel, the primary communities for commercial Spanish mackerel are Destin, Florida; Bayou La Batre, Alabama; Bon Secour, Alabama; Land O'Lakes, Florida; and Marathon, Florida (Figure 3.5.3). Destin, Bayou La Batre and Bon Secour have some variability but in general make up the largest proportion of Spanish mackerel pounds and value for all years, while other communities have variability in landings and value.

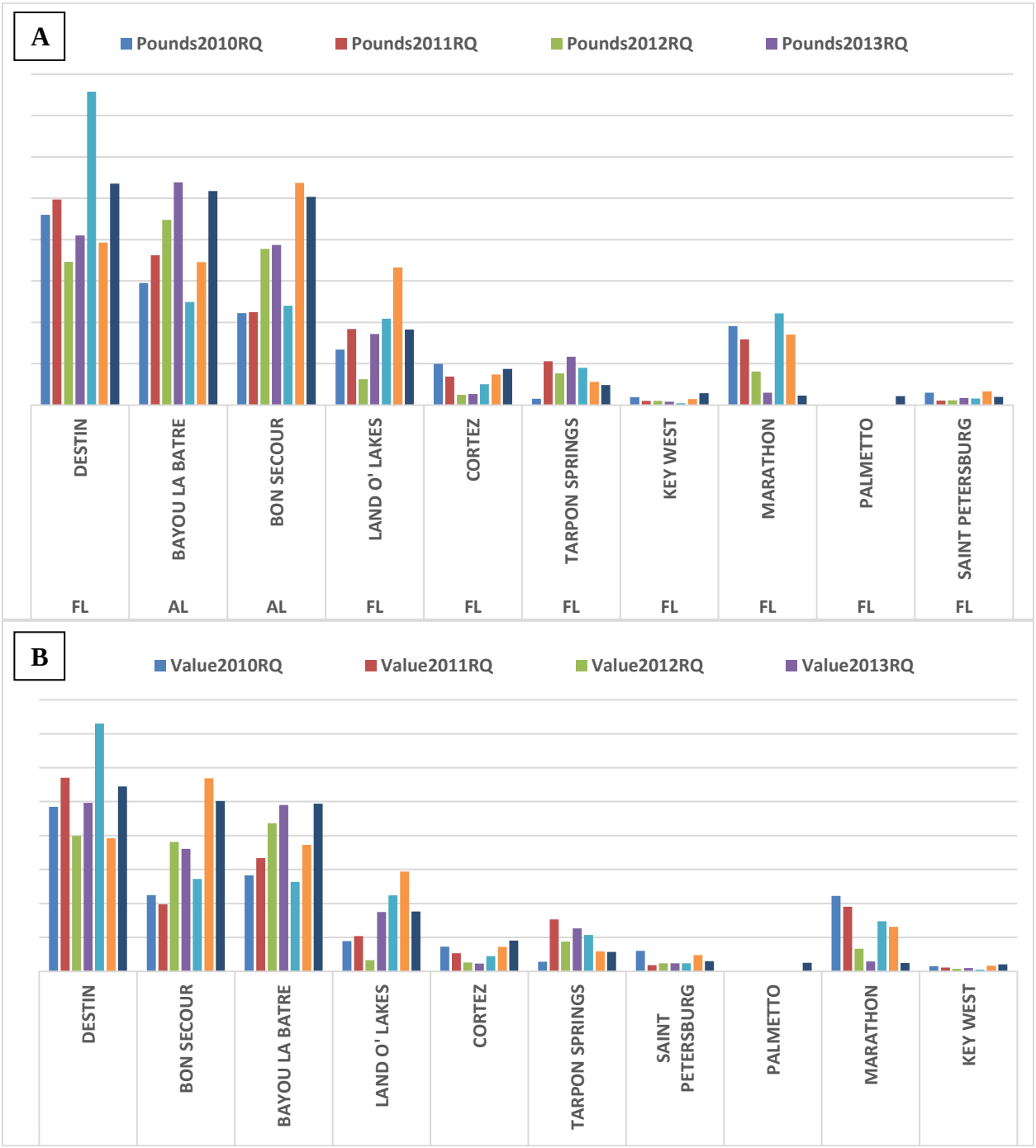

Figure 3.5.3. Regional quotients (RQs) for pounds (A) and value (B) for the top Gulf communities in the commercial sector of the Spanish mackerel fishery from 2011 through 2016.

Reef Fish

Figure 3.5.4 provides RQ values for the combined commercial sector of the reef fish fishery. The primary communities for commercial reef fish are Madeira Beach, Florida; Galveston, Texas; Panama City, Florida; and Destin, Florida. Most of the top communities are located in Florida. While Madeira Beach, Panama City, and Destin have had fairly consistent landings, Galveston has increased in the later years of the time period.

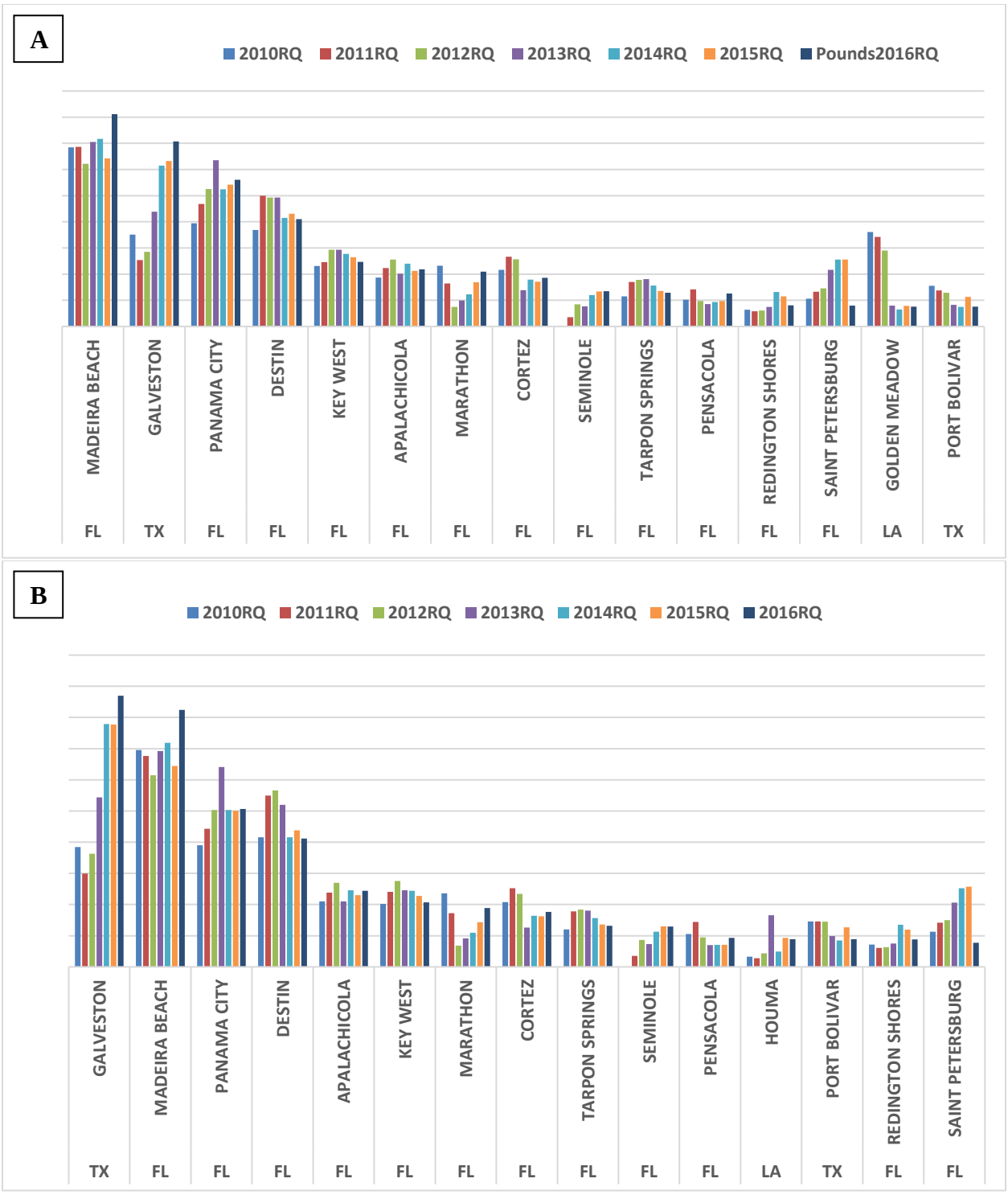

Figure 3.5.4. Regional quotients (RQs) for pounds (A) and value (B) for the top Gulf communities in the commercial sector of the reef fish fishery from 2011 through 2016.

Spiny Lobster

Detailed information on spiny lobster landings is available in Amendment 13 (GMFMC and SAFMC 2018) and summarized in the following. The primary communities with the largest

proportion of commercial landings of spiny lobster are Marathon and Key West. Other communities with spiny lobster landings include Key Largo, Islamorada, Big Pine Key, Tavernier, and Miami. Location information on recreational landings of spiny lobster is not available, as Florida estimates recreational landings through license and survey data.

Coral
Almost all harvest of aquacultured live rock occurs off the west coast of Florida (GMFMC 2018b). There are no landings of black coral and stony coral due to the harvest prohibition.

3.5.3 Fishing Engagement and Reliance

Communities that may be affected by management changes can also be identified by the level of fishing engagement for the community. Commercial and recreational fishing engagement and reliance are measures of sector fishing activity at the county and community level from federal fisheries datasets (Jepson and Colburn 2013). Commercial and recreational fishing engagement are absolute measures of fishing activity as measured by the absolute numbers of that activity. For commercial fishing it is the number of commercial vessels by homeport address, number of commercial vessel by owner's address and number of dealers with landings in each county and value of those landings. For recreational engagement we used the number of recreational vessels by homeport address, number of recreational vessels by owner's address and number of recreational infrastructure (boat ramps associated with community or county). The commercial and recreational reliance indices are relative measures consisting of the same variables related to commercial or recreational fishing activity but divided by the population of the community. These variables are then placed into principal component analysis with a single factor solution. The factor score becomes the engagement or reliance score for the county or community (these are standardized and zero is the mean, they were then categorized by standard deviation: Low = < 0.0 to 0.0; Medium = >0.0 to 0.5; Medium high = >0.5 to 1.0; High = > 1.0, for the county level measure, while community level uses raw factor scores.

Reef Fish and CMP
Figures 3.5.5-3.5.7 provide information about the fishing engagement level for communities involved with the commercial sectors of the king mackerel, Spanish mackerel and reef fish fisheries. The Keys communities of Key West and Marathon are the most prominent in all three fisheries, along with Bayou La Batre, Alabama; Galveston, Texas; and Panama City, Florida.

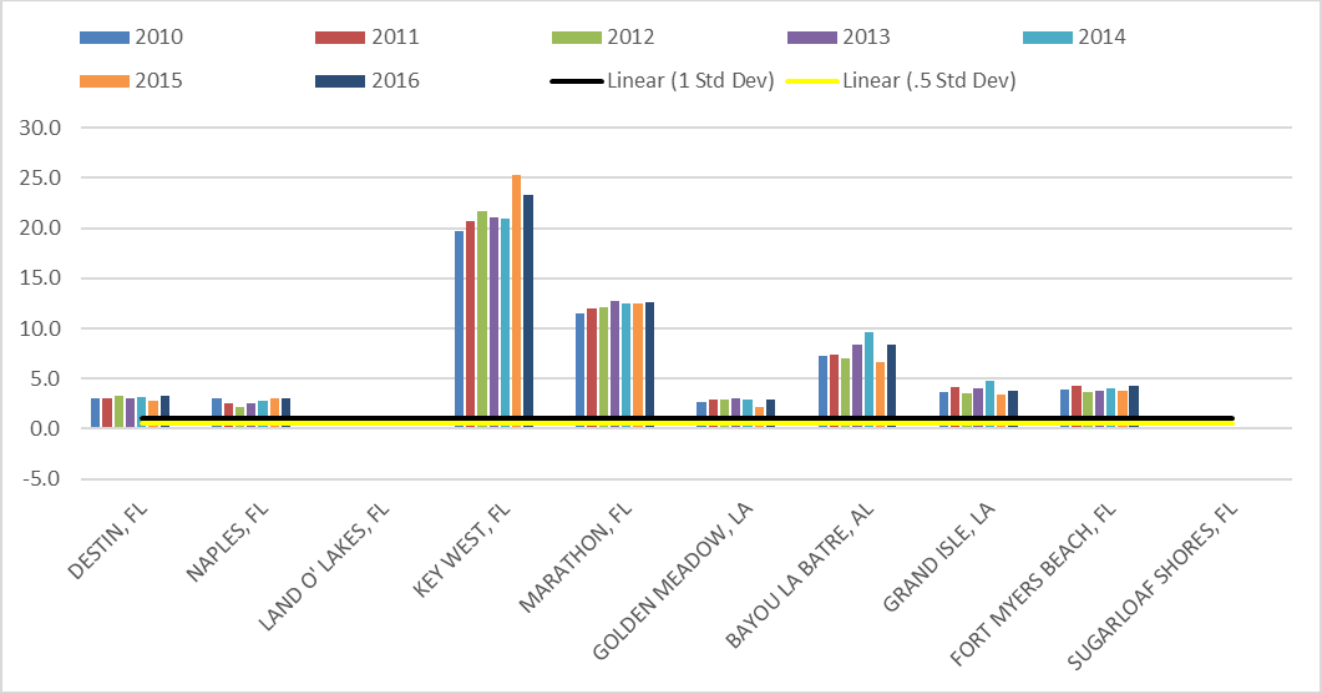

Figure 3.5.5. Top king mackerel commercial fishing communities' engagement, 2010-2016.
Source: SERO, Community Social Vulnerability Indicators Database 2018 (American Community Survey 2012-2016).

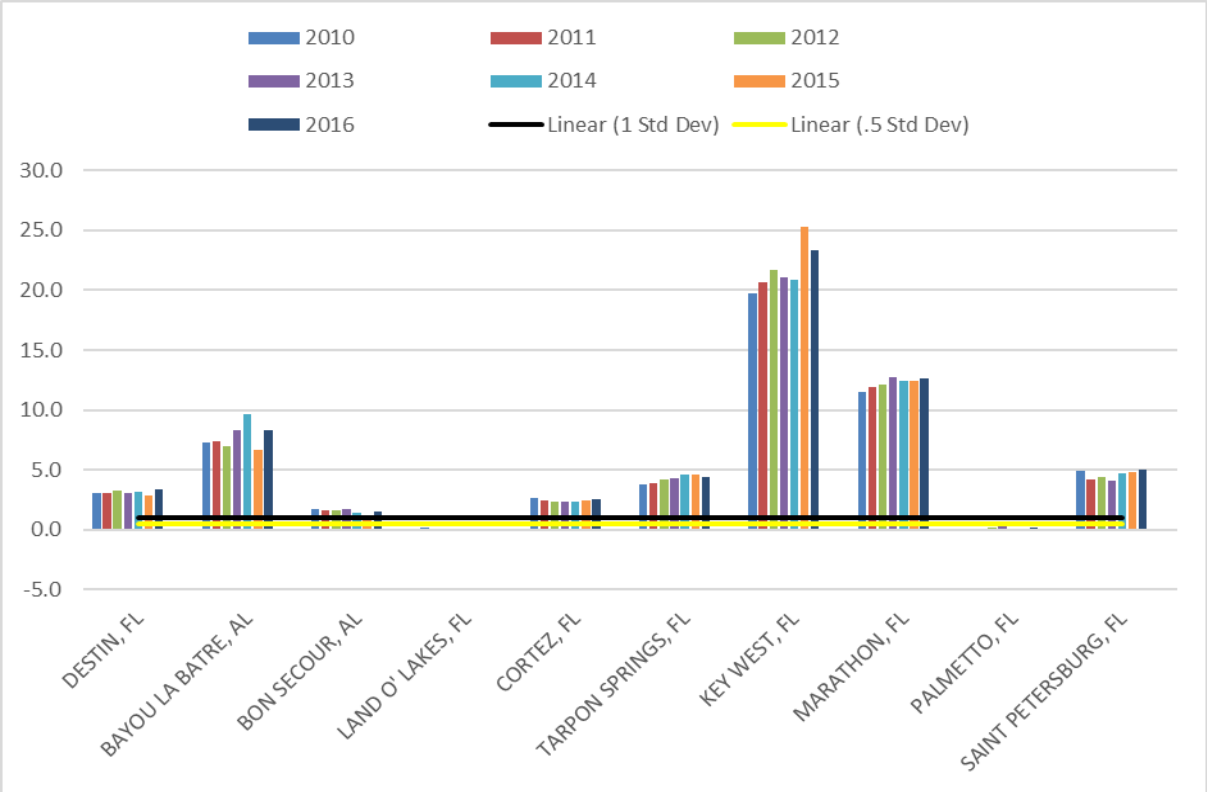

Figure 3.5.6. Top Spanish mackerel commercial fishing communities' engagement, 2010-2016.
Source: SERO, Community Social Vulnerability Indicators Database 2018 (American Community Survey 2012-2016).

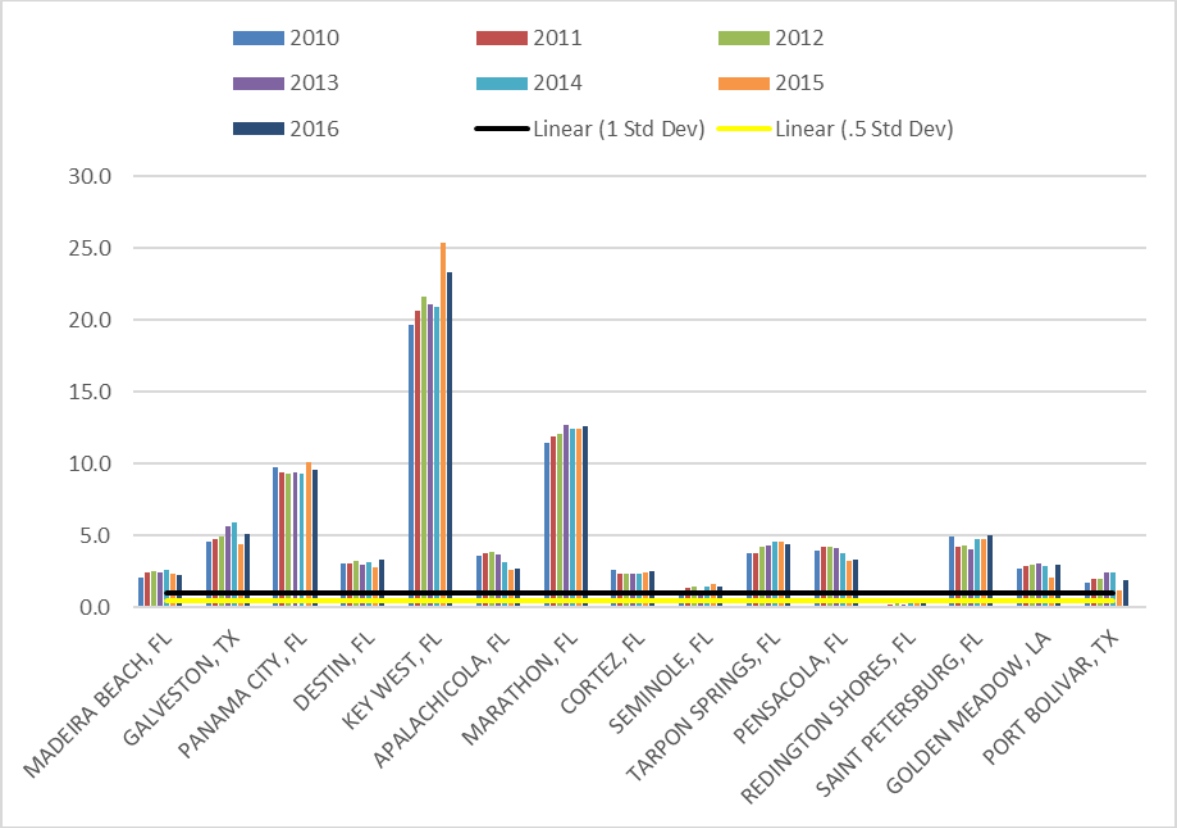

Figure 3.5.7. Top reef fish commercial fishing communities' engagement, 2010-2016.
Source: SERO, Community Social Vulnerability Indicators Database 2018 (American Community Survey 2012-2016).

Figure 3.5.8 provides information about recreational engagement and reliance for the reef fish and CMP fisheries. The top three communities are Key West, Florida; Destin, Florida; and Orange Beach, Alabama, with most of the other primary communities in Florida or Texas. These are areas in which tourism is an important economic driver, and have many businesses associated with recreational fishing.

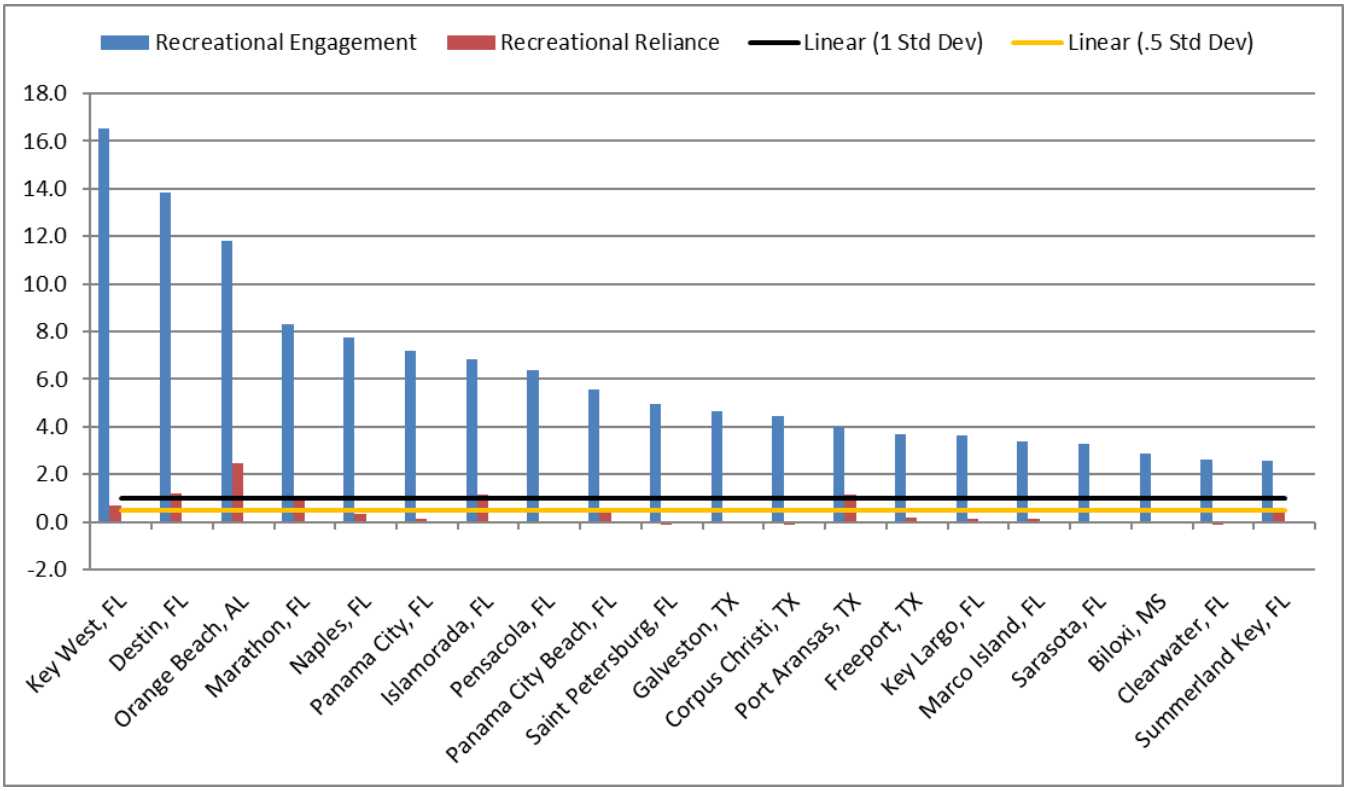

Figure 3.5.8. Top 20 recreational fishing communities' engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators 2018 (American Community Survey 2012-2016).

Spiny Lobster

A more detailed discussion on engagement and reliance for communities associated with the spiny lobster fishery is available in Amendment 13 (GMFMC and SAFMC 2018) and summarized in the following. Of the primary commercial communities, Marathon, Key West and Miami have the highest levels of commercial engagement, but will minimal levels of reliance for those communities. Chokoloskee, which has a small proportion of commercial landings, has a high level of reliance on commercial fishing.

Communities examined for recreational engagement and reliance are based on the number of spiny lobster recreational licenses/stamps associated with the community. Of the top recreational communities, Key West has the highest engagement and reliance on recreational fishing. Other communities associated with the recreational component of the spiny lobster fishery with high levels of fishing engagement include Miami, Key West, Naples, Jacksonville, St. Petersburg, Fort Lauderdale, Key Largo and Sarasota (GMFMC and SAFMC 2018).

Coral

There are no engagement and reliance information available for communities associated with harvest of aquacultured live rock.

3.5.4 Environmental Justice Considerations

Executive Order (E.O.) 12898 requires that 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. This executive order is generally referred to as environmental justice (EJ).

One measure to assess whether a community may be experiencing EJ issues has been developed using other secondary sources, a suite of indices created to examine the social vulnerability (Colburn and Jepson 2012; Jacob et al. 2012) of coastal communities associated with the reef fish and CMP fisheries is presented in Figure 3.5.8. Social vulnerability information for the spiny lobster fishery is provided in Amendment 13 (GMFMC and SAFMC 2018), and summarized below. There are no identified communities associated with the coral fishery, and no information is available.

The three indices used for social vulnerability are poverty, population composition, and personal disruptions. The variables included in each of these indices have been identified as important components that contribute to a community's vulnerability. Indicators such as increased poverty rates for different groups, more single female-headed households and children under the age of 5, disruptions such as higher separation rates, higher crime rates, and unemployment are all signs of vulnerable populations. These indicators are closely aligned to previously used measures of EJ which used thresholds for the number of minorities and those in poverty. For those communities that exceed the threshold, it is expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

Several of the primary reef fish and CMP fishing communities in the Gulf region exceed the threshold (Figure 3.5.8), but the proposed changes are likely to improve fishing opportunities for communities associated with the reef fish and CMP fisheries, and are not expected to contribute to negative social changes in these communities.

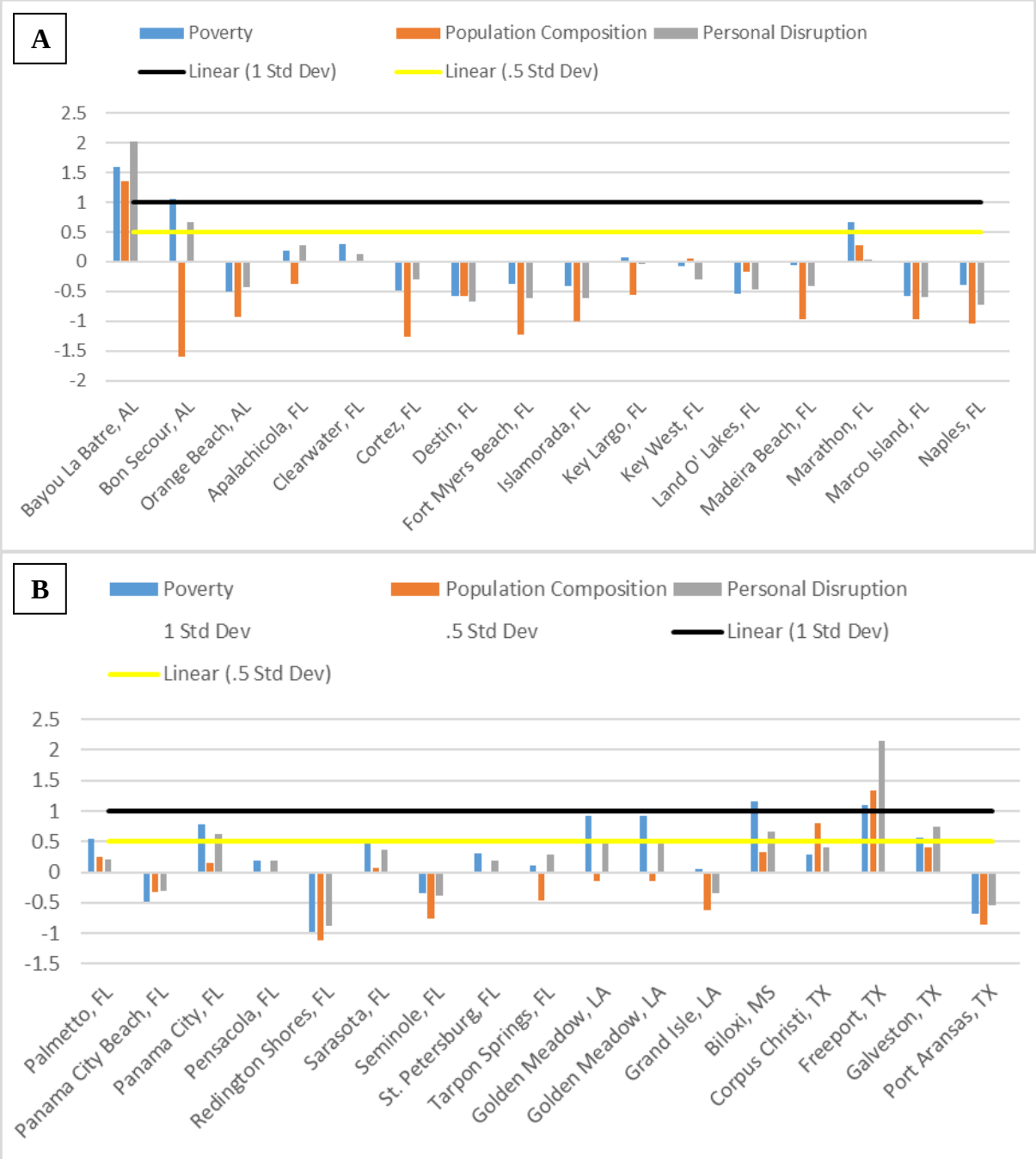

Figure 3.5.8. Social vulnerability indices for top commercial (A) and recreational (B) fishing communities.
Source: SERO, Community Social Vulnerability Indicators Database 2018 (American Community Survey 2012-2016).

For the spiny lobster fishery, there are several communities exceed the threshold for at least one of the social vulnerability indices, all in Florida: Miami, Coral Springs, Homestead, Fort Lauderdale, Lauderhill, Cocoa, Hollywood, Miami Beach, Sunrise, Tampa, Hialeah, West Palm Beach, Fort Myers, Stuart, Sarasota, and Pompano Beach, Florida. The communities of Miami, Homestead, Fort Lauderdale, Lauderhill, Cocoa, Tampa, Hialeah, West Palm Beach, Fort Myers,

and Pompano Beach exceed the threshold for all three social vulnerability indices. These communities have substantial vulnerabilities and may be susceptible to further effects from any regulatory changes depending upon the direction and extent of that change (GMFMC and SAFMC 2018).

3.6 Description of the Administrative Environment

3.6.1 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 Appendix C. 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. For reef fish, these waters extend 9 to 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.

3.6.2 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 Gulf 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 3.6.2.1).

Table 3.6.2.1. Gulf 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: Eligibility for a Carryover Provision for Managed Reef Fish and Coastal Migratory Pelagic (CMP) Stocks in the Gulf of Mexico (Gulf)

4.1.1 Direct and Indirect Effects on the Physical Environment

Modifying catch limits may affect the physical environment by allowing changes in harvest. Effects on the physical environment from fishing are most commonly associated with gear coming into contact with bottom. Different gears have different levels of impact. Recreational fishing for reef fish and CMP species almost exclusively uses vertical line gear, most frequently rod-and-reel that can interact with and affect bottom habitat. Anchor damage is also associated with handline fishing vessels, particularly by the recreational sector where anglers may repeatedly visit well-marked fishing locations. Preferred fishing sites, like reefs, are targeted and revisited multiple times (Bohnsack 2000). In terms of commercial reef fish fishing, most use handlines (mostly bandit rigs and electric reels, occasionally rod-and-reel) with a small percentage caught with bottom longlines. Commercial fishing for CMP species is commonly done using hook-and-line gear and run-around gillnets. 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, including fouled or discarded gear.

Alternative 1 (No Action) would not change the current catch limits through a carryover provision, and therefore would not result in a change in effects to the physical environment. **Preferred Alternative 2** would permit increasing the catch limits through the carryover provision, and therefore may increase the amount of fishing activity, resulting in possible negative effects to the physical environment. **Options 2a** – **2e** of **Preferred Alternative 2** are designed to limit which species would be eligible for a carryover. Limiting the species that would be eligible for a temporary increase in fishing effort will generally reduce the risk of negative effects to the physical environment by capping those effects at the status quo (**Alternative 1**) for the species eliminated by the options in **Preferred Alternative 2**. Therefore, the more options selected as preferred under **Preferred Alternative 2**, the lower the degree of negative effects to the physical environment. However, any negative effects under **Preferred Alternative 2** are expected to be minimal because no significant change in overall fishing effort is expected.

4.1.2 Direct and Indirect Effects on the Biological/Ecological Environment

Alternative 1 (No Action) would not change the current catch limits through a carryover provision, and therefore would not result in a change in effects to species in the CMP and Reef Fish Fishery Management Plans (FMPs). **Preferred Alternative 2** would permit increasing the catch limits through the carryover provision, and therefore may temporarily increase the amount of harvest on species determined to be eligible for a carryover. Increased removals for species determined to be eligible for a carryover will constitute a negative biological effect for those

species, as those additional removals would otherwise not have occurred. However, analyses of the effect of carryover on red snapper and the Gulf migratory group of king mackerel by the Southeast Fisheries Science Center revealed that carrying over uncaught quota from the previous fishing year to the next did not result in any negative biological effects in the long-term for either species. These analyses, reviewed by the Gulf of Mexico Fishery Management Council's (Council) Scientific and Statistical Committee (SSC), suggest that any negative biological effects will be temporary, so long as the overfishing limit (OFL) is not exceeded. However, additional analyses requested by the SSC (reviewed in May 2019) revealed that applying a carryover provision to a species that does not have a payback provision for quota overages could reduce that stock's spawning stock biomass over time. The SSC viewed stocks in rebuilding plans (red snapper, gray triggerfish, and greater amberjack) as most vulnerable to depletion in this manner. Applying a carryover provision to stocks in rebuilding plans without an accompanying payback provision for quota overages could delay rebuilding schedules, ultimately resulting in negative biological effects for those stocks.

Options 2a – **2e** of **Preferred Alternative 2** are designed to limit which species would be eligible for a carryover. Limiting the species that would be eligible for a temporary increase in fishing effort will reduce the risk of negative effects to those species by capping the biological effects at the status quo (**Alternative 1**) for the species eliminated by the options in **Preferred Alternative 2**.

Option 2a would exclude any species in a rebuilding plan which, presently, are red snapper, gray triggerfish, and greater amberjack, from consideration for a carryover. By excluding these species, any uncaught quota would remain in the stock as opposed to being added to the potential harvest for the following fishing year. This would result in positive biological effects for these stocks in the form of previously unaccounted biomass, and could therefore help those stocks rebuild quicker. **Preferred Option 2b** would exclude any species which is designated as overfished which, presently, would only exclude greater amberjack. By doing so, **Preferred Option 2b** would reserve any uncaught quota from fishing effort in the following year, resulting in positive biological effects for the greater amberjack stock in the form of additional biomass which was previously projected to be caught. **Preferred Option 2c** would exclude any species which did not have its fishing season closed due to a projected quota closure, which presently would only include the recreational sector for the Gulf migratory group of king mackerel (Gulf king mackerel). Since the recreational sector has not landed its ACL for Gulf king mackerel in 20 years, carrying over those pounds not previously caught could result in a substantial increase in the recreational ACL (generally upwards of 50%; see Section 3.1). Although there does not presently appear to be enough recreational fishing effort to harvest the current recreational ACL, if that effort were to exist in the future, such a scenario would result in additional removals from the Gulf king mackerel stock beyond that which was previously projected. These additional removals would constitute a negative biological effect on that stock; however, so long as the OFL was not exceeded, overfishing would not occur, and long-term negative effects to the stock would not be anticipated. This evaluation is as applicable to other species as it is Gulf king mackerel. **Option 2d** would exclude any species without a peer-reviewed stock assessment which, presently, does not exclude any species otherwise eligible for a carryover. However, if a species without a peer-reviewed stock assessment were eligible in the future, allowing a carryover on that stock in the absence of a more rigorous evaluation of its stock status could be

detrimental to the long-term health of the stock, as the catch limits would have been determined while acknowledging substantial uncertainty about the condition of the stock. **Option 2e** would exclude any species which is managed via apportionment with an adjacent fishery management council, namely the South Atlantic Fishery Management Council. These species include mutton snapper, black grouper, and yellowtail snapper, all of which are presently excluded from carryover because those species lack sector allocations. If any of these species are managed under sector allocations in the future, and are otherwise eligible for carryover, this provision would allow for the additional harvest in the following year of the uncaught quota from the previous year. Doing so would result in a negative biological effect in the form of additional and unprojected removals; however, so long as the OFL was not exceeded, overfishing would not occur, and long-term negative effects to the stock would not be anticipated.

The relationships among species in marine ecosystems are complex and poorly understood, making the nature and magnitude of ecological effects difficult to predict with any accuracy. It is possible that forage species and competitor species could increase or decrease in abundance in response to a decrease or increase in the abundance of other co-occurring species. However, the relationships between the species considered in this framework action caught on trips where they are directly targeted are not fully understood. Further, substantial changes in the prosecution of the reef fish and CMP fisheries are not expected from this action, so no additional effects to non-target species or protected resources (see Section 3.3.3) are anticipated.

4.1.3 Direct and Indirect Effects on the Economic Environment

Alternative 1 (No Action) would not establish carryover provisions to allow the harvest of the unused portion of the ACL for any managed reef fish or CMP stock in the Gulf. Under **Alternative 1**, unharvested portions of ACLs at the end of a fishing year will continue to remain unused during the next fishing year. Therefore, **Alternative 1** would not modify recreational or commercial fishing practices and harvests and would not be expected to result in direct economic effects. However, because **Alternative 1** may unnecessarily preclude recreational anglers and commercial fishermen from taking advantage of additional fishing opportunities that could result from carryover provisions, **Alternative 1** could result in indirect adverse economic effects. These potential adverse economic effects would be determined by the species in question and by the unused portions of the ACLs that could be available for harvest during the subsequent year.

Preferred Alternative 2 would establish carryover provisions, thereby allowing unused portions of the ACLs of some managed reef fish and CMP stocks to be available for harvest during the next fishing year. Carryover provisions would only apply to stocks and stock complexes with sector allocations. Options considered under **Preferred Alternative 2** further define the range of managed stocks that would be eligible for a carryover. **Option 2a** would exclude stocks under a rebuilding plan, i.e., gray triggerfish, greater amberjack, and red snapper. **Preferred Option 2b** would exclude greater amberjack, the only overfished stock that could be eligible for carryovers under **Preferred Alternative 2**. **Preferred Option 2c** would not allow the carryover of unused portions of the ACLs of stocks for which there was no quota closure in the previous fishing year, e.g., greater amberjack in 2017. **Option 2d** would not allow carryovers for stocks whose catch limits were not based on a peer-reviewed quantitative stock assessment. **Option 2e** would not

allow carryovers for stocks apportioned between the Gulf and the South Atlantic Councils, e.g., black grouper.

For a given stock, the carryover of an unused portion of its ACL into the next fishing year would add to the allowable catch; thereby providing additional fishing opportunities. Therefore, **Preferred Alternative 2** would be expected to result in positive economic effects due to increased fishing opportunities. For recreational anglers, these potential economic benefits would be measured by increases in economic value expected to result from additional recreational fishing opportunities considered in this action. Changes in economic value would be evaluated based on consumer surplus (CS) changes. 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. For example, the CS value per fish for a second red snapper kept is estimated at $82.34 (2017 dollars). Economic value for for-hire vessels can be measured by producer surplus (PS) per passenger trip (the amount of money that a vessel owner earns in excess of the cost of providing the trip). Estimates of the PS per for-hire passenger trip are not available. Instead, net operating revenue (NOR), which is the return used to pay all labor wages, returns to capital, and owner profits, is used as a proxy for PS. For vessels in the Gulf, the estimated NOR value is $158 (2017 dollars) per charter angler trip (Liese and Carter 2011, updated to 2017 dollars). The estimated NOR value per headboat angler trip is $52 (C. Liese, NMFS SEFSC, pers. comm.). For commercial fishermen, the economic benefits could be measured by increases in ex-vessel revenues determined by multiplying the additional commercial harvests by the estimated dockside price per pound. However, the potential recreational and commercial economic benefits that could result from **Preferred Alternative 2** cannot be quantified because they would be determined by the species to carry over, the amounts to be carried over, and the sector(s) that would benefit from the resulting additional fishing opportunities. Similarly, for these reasons, options considered under **Preferred Alternative 2** cannot be ranked at this time. In general, it is expected that carrying over larger amounts of higher value species would be expected to result in greater economic benefits.

4.1.4 Direct and Indirect Effects on the Social Environment

Additional effects would not be expected from **Alternative 1**, and any unused quota would continue to be unavailable for harvest the following year. In general, positive effects would be expected for fishermen from a carryover of uncaught quota if the quota provides additional opportunities to retain a fish that would otherwise be unavailable the following year. However, there would be no effects from providing a quota carryover for a particular stock if the additional quota goes unused. For example, carrying over unused quota for a stock with a large bag limit and no closed season would likely result in the additional quota remaining unharvested the following year as well. In such a case, fishing regulations were not likely a factor in restricting opportunities to retain additional fish, and carrying over additional quota would not provide additional fishing opportunities. Nevertheless, although positive effects may not be realized for a stock under current conditions, broad positive effects would be expected from having a carryover provision in place, in the event it is later determined that a stock's ACL has not been met due to fishing regulations.

The positive effects that may be expected from **Preferred Alternative 2** and its options would relate to the desirability for additional fishing opportunities that would be provided by carrying over quota for a given stock, as described below. Currently, six stocks (red snapper, gray triggerfish, greater amberjack, king mackerel, red grouper, and gag) would be eligible for the carryover provision under **Preferred Alternative 2**, and would apply to the recreational sector only or both the recreational and commercial sectors (see Table 2.1.1 and discussion below). **Preferred Option 2b** would allow carryover for all six stocks except greater amberjack, and **Option 2a** would allow carryover for king mackerel, red grouper, and gag only. **Preferred Option 2c** would allow carryover for the same stocks as **Preferred Alternative 2**, except for the recreational harvest of king mackerel. Because no stocks would be excluded from **Preferred Alternative 2** under **Options 2d** and **2e**, there would be no difference in effects between selecting **Preferred Alternative 2** with or without **Options 2d** and **2e**.

Recreational Sector

For the recreational sector, no effects would be expected from carrying over king mackerel quota. Despite the year-round fishing season and three fish bag limit, annual landings have not reached 70% of the sector's harvest limits in recent years.[30]

It is more difficult to anticipate effects for red grouper, for which there were in-season closures before catch limits were increased in 2016. Positive effects would have been expected from a carryover provision for a stock with in-season closures such as red grouper, if the ACL is later found to not have been met. However, before the red grouper catch limits were increased, fishermen had been reporting that the stock was not healthy and could not sustain the quota increase. In the first year of the increased quota, the recreational sector landed 54.4% of its ACL, [31] decreasing to 32% of the ACL in 2017 (Table 1.1.1). It is unlikely that the 2-month fixed closed season beyond the 20-fathom depth curve and 2-fish bag limit within the 4-grouper aggregate bag limit are overly restrictive, thereby preventing landings from reaching the ACL. The Council took action to decrease the 2019 catch limits and is waiting for the results of a stock assessment later in the year to determine whether additional action is warranted. Nevertheless, carrying over red grouper quota would not be expected to result in effects at this time, as it is unlikely that the carried over quota would result in additional opportunities to retain a red grouper.

Anticipating the effects from a quota carryover for gag is also difficult given the recent changes in management and potential issues with the health of the stock. In 2016, the Council removed the fixed closed recreational closed seasons on gag for the months of June and December, following two years in which the ACL was not met. At the same time, the Council increased the minimum size limit from 22 inches to 24 inches total length. Despite the addition of two months to the season, the recreational sector landed just 42% of its ACL in 2016 and 45% of its ACL in 2017.[32] Although not as commonly heard as concerns for the status of red grouper, some

[30] https://sero.nmfs.noaa.gov/sustainable_fisheries/acl_monitoring/recreational_historical/gulf_recreational_historical/gulf_recreational_historical.pdf

[31] Ibid.

[32] Ibid.

fishermen have reported in public testimony that gag are not as abundant as in years past. Thus, given that the current ACL is not being met, it is unlikely that positive effects would be realized from a carryover of gag quota while the current 5-month fixed closed season and 24-inch minimum size limit remain in effect.

For gray triggerfish and greater amberjack, positive effects would be expected if carried over quota results in additional opportunities to retain fish. Because quota would only be carried over if the respective ACL is not met, it is unlikely that additional opportunities would be available for gray triggerfish and greater amberjack, which have had regular quota overages despite in-season closures.

For red snapper, separate quotas are monitored for the federal for-hire and private angling components of the recreational sector, and positive effects would be expected for both components from adopting a carryover provision. The federal for-hire component has not met its ACL since the component was established in 2015, as the projected season length has overestimated the rate of harvest for the for-hire fleet. Recognizing this, the Council approved an action that would reduce the buffer between the ACL and annual catch target for the federal for-hire component in 2019.[33] For the private angling component currently, the effects would be expected to be the same as for the recreational sector's harvest of gray triggerfish and greater amberjack. However, the Council is considering state management, which includes a quota adjustment provision specifying both a payback and carryover for each state's portion of the ACL under an approved state management program. As discussed in that amendment,[34] positive effects would be expected from the payback and carryover provision as each state is held accountable for any overages, but also receives additional quota in the event its ACL is not met.

Commercial Sector

For the commercial sector, a carryover provision is only being considered for king mackerel, gray triggerfish, and greater amberjack. Some positive effects would be expected from carrying over king mackerel quota. Divided into zones with separate ACLs, the total commercial harvest of king mackerel has come close to its ACL in three of the five most recent years, but had overages in the 2014/2015 and 2015/2016 fishing years.[35]

As with the recreational sector, positive effects would be expected if a carryover of gray triggerfish or greater amberjack quota results in additional opportunities to retain fish. Because quota would only be carried over if the respective ACL is not met, it is unlikely that additional opportunities would be available for gray triggerfish and greater amberjack, which have had regular in-season closures, although smaller overages than the recreational sector. Both stocks are primarily recreational, with the commercial sector assigned 21% of the gray triggerfish ACL and 32% of the greater amberjack ACL. Rather than a directed fishery, most gray triggerfish and

[33] The action reduces the private angling annual catch target as well, but this is not applicable in 2019 as the private angling component is managed by each Gulf state under exempted fishing permits.

[34] http://gulfcouncil.org/wp-content/uploads/V.-State-Management-Program-for-Red-Snapper-PH-draft-11-27-18.pdf

[35] https://sero.nmfs.noaa.gov/sustainable_fisheries/acl_monitoring/commercial_gulf/reef_fish_historical/gulf_commercial_historical.pdf

greater amberjack are caught incidentally by the commercial sector, suggesting that any positive effects of carried over quota would be to reduce discards.

4.1.5 Direct and Indirect Effects on the Administrative Environment

Setting catch levels is an administrative action and would have direct effects on the administrative environment through additional rulemaking. This includes setting fishing seasons, quota monitoring and enforcing fishing regulations. However, applying the carryover provision to the applicable species would require additional quota monitoring effort, depending on the option or combination of options chosen under **Alternative 2** compared to **Alternative 1**. Increased administrative burden for applying the carryover provision, as estimated by the number of species to which the provision would apply, would be greatest under **Options 2d** and **2e** (13 sectors or sector components), followed by **Option 2c** (12 sectors or sector components), then **Option 2b** (11 sectors or sector components), and least of all **Option 2a** (7 sectors or sector components). This evaluation is based on the current smallest divisible fishing unit to which a carryover could apply for the applicable species (Table 4.1.5.1). Indirect effects of modifying the ABCs, and setting ACLs and ACTs include actions required if a sector ACL is exceeded. Further action adjusting fishing season duration or ACTs could result if the ACLs were regularly exceeded.

Table 4.1.5.1. The smallest divisible fishing unit to which harvest is allocated for the species presently eligible for carryover in this amendment. The commercial sectors managed under IFQ programs are excluded from consideration in this amendment.

Eligible Species	*Smallest Divisible Fishing Unit*
Red Snapper	Recreational For-hire Component Recreational Private Angling Component
Gray Triggerfish	Recreational Sector Commercial Sector
Greater Amberjack	Recreational Sector Commercial Sector
King Mackerel	Recreational Sector Commercial Sector: Gulf Western Zone Handline Commercial Sector: Gulf Northern Zone Handline Commercial Sector: Gulf Southern Zone Handline Commercial Sector: Gulf Southern Zone Gillnet
Red Grouper	Recreational Sector
Gag	Recreational Sector

4.2 Action 2: Adjustment in the Carryover Provision Accounting for Management Uncertainty

4.2.1 Direct and Indirect Effects on the Physical Environment

The impacts on the physical environment from reef fish and CMP fishing are detailed in Section 4.1.1. Changes in catch limits may change effort levels, either increasing or decreasing the impact on the physical environment.

4.2.2 Direct and Indirect Effects on the Biological/Ecological Environment

Alternative 1 would not limit the carryover provision (as established in Action 1) to account for management uncertainty in the Gulf. The ABC in a carryover year can be set up to the OFL for that year. Setting the ABC equal to the OFL negates any buffer determined to prevent overfishing through the probability analysis in the Council's ABC Control Rule. Removing this protective buffer, which is based on characterized and uncharacterized uncertainty in the yield projections, may put the respective stock at additional risk of overfishing beyond that originally prescribed by the ABC Control Rule. Further, if the ABC is increased in a carryover year to equal the OFL, and harvest exceeds the OFL the stock will be classified as undergoing overfishing, which may require the Council to take immediate steps to end overfishing of that species.

Preferred Alternative 2 adjusts the amount of the ACL to be carried over into the following fishing year by limiting how much the difference between the ABC and the OFL can be reduced. For most species, the Council has set the ACL equal to the ABC, which makes the difference between the ABC and the OFL important to preventing overfishing. Under **Preferred Alternative 2**, the difference between the ABC and the OFL can be reduced by 25% (**Option 2a**), 50% (**Preferred Option 2b**), or 75% (**Option 2c**). Maintaining some form of buffer between the ABC and the OFL decreases the probability of a stock undergoing overfishing at a given harvest level. The greater the difference between the OFL and the amount of fish allowed to be harvested, the less likely harvest will exceed the OFL and lead to a determination that the stock is undergoing overfishing. Therefore, **Option 2a** would have the greatest benefits to the biological environment, followed by **Preferred Option 2b** and then **Option 2c**. This action limits the amount of carryover permitted under the preferred alternative in Action 1. Therefore, substantial changes in the prosecution of the reef fish and CMP fisheries are not expected from this action, and no additional effects to non-target species or protected resources (see Section 3.3.3) are anticipated.

The relationships between the species being considered in this amendment and the ecological environment are detailed in Sections 3.3.3 and 4.1.2.

4.2.3 Direct and Indirect Effects on the Economic Environment

Alternative 1 (No Action) would not limit the amount to carry over to account for management uncertainty. **Alternative 1** would therefore allow unused portions of the ACLs to be carried over

as long as the resulting ACLs do not exceed the corresponding overfishing limit (OFL) for that year. In and of itself, **Alternative 1** would not be expected to affect the potential additional fishing opportunities that carryover provisions could provide. Therefore, **Alternative 1** would not be expected to result in direct economic effects. However, because it may fail to account for management uncertainty and potentially increase the likelihood of recording landings exceeding the OFL, **Alternative 1** could result in the implementation of unduly restrictive management measures to end overfishing. Under that scenario, **Alternative 1** would be expected to result in indirect economic adverse effects stemming from the failure to keep landings below allowable catch levels. These adverse economic effects cannot be quantified but would be determined by the likelihood of implementing restrictive measures, the stock considered, and the extent to which these measures would curtail future fishing opportunities.

Preferred Alternative 2 would set a minimum threshold (in percentage points) for the buffer between the ABC that would result following a carryover and the OFL for that stock. **Option 2a** would at most allow a 25% reduction in the buffer between the ACL and OFL. **Preferred Options 2b** and **2c** would be less conservative than **Option 2a** and would allow to reduce the buffer by 50% and 75%, respectively.

Relative to **Alternative 1**, which does not account for management uncertainty, **Preferred Alternative 2** would be more precautionary and would be expected to result in a lower likelihood to record landings in excess of the OFL. Therefore, other things equal, **Preferred Alternative 2** would be less likely to result in landings that would require the establishment of restrictive management measures in the future. Therefore, the expected value of potential adverse economic effects that may result from landings above allowable catch levels would be expected to be lessened under **Preferred Alternative 2.** As indicated above, these potential adverse effects cannot be quantified at this time. However, it can be noted that a more conservative buffer between the ACL and OFL, i.e., a smaller allowable reduction in the existing buffer would be expected to result in a lower expected value of the potential adverse effects. **Option 2a** would therefore correspond to the lowest potential adverse effects, followed by **Preferred Option 2b** and **Option 2c**, respectively. Because it would reduce the magnitude of expected carryovers, **Preferred Alternative 2** would also be expected to decrease potential fishing opportunities relative to **Alternative 1**; thereby resulting in adverse economic effects. Although unquantifiable at this time because the amounts to be carried over are unknown, it can be stated that options that would allow smaller reductions in the buffer between the OFL and ACL would result in fewer fishing opportunities. Therefore, relative to **Preferred Option 2b**, **Option 2a** would be expected to result in greater economic losses due to forgone fishing opportunities. **Option 2c**, which is associated with the greatest allowable reduction in the buffer, would be expected to result in the smallest adverse economic effects.

4.2.4 Direct and Indirect Effects on the Social Environment

The effects of the proposed alternatives in this action will depend on any changes in fishing opportunities for participants in the reef fish and CMP fisheries if the ACL for a species is revised. Section 3.5 describes communities that could be affected by changes to reef fish or CMP management, particularly in the Florida Keys.

The ACL for any stock does not directly affect resource users unless the ACL is met or exceeded, in which case accountability measures that restrict or close harvest could negatively impact the commercial fleet, for-hire fleet, and private anglers. Accountability measures can have significant direct and indirect social effects because, when triggered, they can restrict harvest in the current season or subsequent seasons. 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, or fishermen having to stop fishing altogether due to regulatory closures. However, restrictions on harvest contribute to sustainable management goals, and are expected to be beneficial to fishermen and communities in the long-term.

In general, the higher the ACL, the greater the short-term social benefits that would be expected to accrue, assuming long-term recovery and rebuilding goals are met. Adhering to stock recovery and rebuilding goals is assumed to result in net long-term positive social benefits. Additionally, adjustments in an ACL based on updated information from a stock assessment would be the most beneficial in the long term to fishermen and coastal communities because ACLs would be based on the current conditions, even if the updated information indicates that a lower ACL is appropriate to sustain the stock.

The highest potential ACL would be expected to result in the most benefits to participants in the reef fish and CMP fisheries as long as there are no negative long-term negative effects on the stock associated with harvest exceeding the overfishing limit (OFL), which could result in reduced fishing opportunities in the future. A higher ACL would be expected to accommodate growth in some fisheries, which would improve recreational opportunities along with potential revenue and jobs for the commercial sector. Under the proposed alternatives and options, the greatest benefits to fishery participants, communities, and associated fishing businesses would be expected under **Preferred Alternative 2, Option 2c**, followed by **Preferred Option 2b**, **Option 2a**, and **Alternative 1**.

4.2.5 Direct and Indirect Effects on the Administrative Environment

The impacts on the administrative environment from modifying catch limits for reef fish and CMP fishing are largely detailed in Section 4.1.5. Further, reducing the difference between the ABC and the OFL from the status quo (**Alternative 1**) for a stock increases the probability of the OFL being exceeded, especially if the ACL is equal to the ABC, and the ACL is used to determine fishing season duration. If the OFL is ultimately exceeded, then overfishing will have occurred, and administrative action to end overfishing for that stock will need to occur as soon as possible. This risk of overfishing and substantial subsequent negative administrative impact increases as the difference between the ABC and the OFL is allowed to be decreased when the carryover provision is applied. This potential negative administrative effect is greatest under **Option 2c** of **Alternative 2**, followed by **Preferred Option 2b**, and least of all **Option 2a**.

4.3 Action 3: Modify the Framework Procedures for the Gulf Council Reef Fish, CMP, Coral and Coral Reefs, and Spiny Lobster FMPs

4.3.1 Direct and Indirect Effects on the Physical Environment

Generally, impacts on the physical environment from reef fish and CMP fishing are detailed in Section 4.1.1. No direct physical effects would be expected from modifications of the framework procedure.

4.3.2 Direct and Indirect Effects on the Biological/Ecological Environment

The general impacts on the biological and ecological environment from reef fish and CMP fishing are detailed in Sections 4.1.2 and 4.2.2. No direct effects would be expected from modifications of the framework procedure.

4.3.3 Direct and Indirect Effects on the Economic Environment

Alternative 1 (No Action) would not modify existing framework procedures and could potentially slow down or even prevent the implementation of carryover provisions. **Alternative 1** would not be expected to result in direct economic effects because it does not affect fishing practices or harvests. However, **Alternative 1** would be expected to result in indirect adverse economic effects due to the undue delays or cancellation of carryovers. Because carryovers of unused portions of ACLs are only applicable during the following fishing year, an untimely implementation of carryover provisions may unnecessarily curtail or even cancel the additional fishing opportunities that would have resulted from the carryovers. Remaining alternatives in this action consider methods to expedite the establishment of carryover provisions and revisions to AMs.

Preferred Alternative 2 would update the closed framework procedures for the relevant FMPs to allow the NMFS RA to adjust the ABC, ACL, ACT, and quota for a stock or stock component to account for carryover of the unused portion of the ACL (as derived from the ABC set by the ABC control rule). **Preferred Alternative 2** would grant the RA the authority to make these adjustments through notifications in the Federal Register. **Preferred Alternative 3** would revise the abbreviated framework procedures for the relevant FMPs to allow the establishment of an ABC recommended by the SSC based on results of a new stock assessment and using the ABC control rule. In and of themselves, neither **Preferred Alternative 2** nor **Preferred Alternative 3** would be expected to alter the fishing practices or landings. **Preferred Alternatives 2** and **3** would therefore not be expected to result in direct economic effects. However, because **Preferred Alternative 2** is expected to facilitate a timely implementation of carryover provisions, potentially allowing recreational anglers and commercial fishermen to take advantage of additional fishing opportunities made available through carryovers, **Preferred Alternative 2** would be expected to result in indirect positive economic effects. These economic benefits cannot be quantified at this time because they would be determined by the sector(s) benefitting from the carryover, the species considered, and the amount carried over. Because **Preferred**

Alternative 3 would allow for a timelier establishment of ABCs relative to Alternative 1, it would be expected to hasten subsequent management measures based on updated ABCs. Therefore, **Preferred Alternative 3** would be expected to result in indirect economic benefits.

Preferred Alternative 4 would update the framework procedures for the relevant FMPs to hasten changes to in-season and post-season accountability measures. Timelier implementation of AMs for the Coral and Coral Reefs and Spiny Lobster FMPs would be expected to benefit the stocks included in these FMPs. Therefore, **Preferred Alternative 4** would be expected to result in economic benefits because it would indirectly contribute to affording more protection to the stocks in the FMPs considered.

4.3.4 Direct and Indirect Effects on the Social Environment

Modification of the framework procedure of for Gulf FMPs would not be expected to result in any direct impacts. Rather, indirect effects would be expected and would result in broad, long-term social benefits, and minimal negative social effects. Although a framework procedure is currently in place for each FMP (**Alternative 1**), the proposed modifications to improve timeliness and incorporate regulatory updates (**Preferred Alternatives 2-4**) would be expected to contribute to improved management of the stocks and would allow the Council to respond to management needs. The relative speed at which beneficial regulatory changes can be implemented under **Preferred Alternatives 2-4** would determine the magnitude of the anticipated indirect social benefits. Public participation and the review process would continue as part of the framework procedure under all alternatives, although public involvement would be more limited under the closed framework procedure in **Preferred Alternative 2**.

Preferred Alternatives 2 and **3** expand the range of management measures that the Council can implement without a full plan amendment. **Preferred Alternative 2** would only affect participants in the reef fish and CMP fisheries, and would reduce the required time to modify the ACLs for reef fish and CMP species if a carryover occurs by allowing NMFS to implement the changes through the closed framework procedure. Although **Preferred Alternative 2** reduces the opportunity for public comment of proposed measures, the expedited process is expected to benefit fishery participants through more timely management changes to respond to new information and may result in improved fishing opportunities. **Preferred Alternative 3** could affect participants in the reef fish, CMP, and spiny lobster fisheries, along with permitted harvesters of aquacultured live rock, but the inclusion of changes to the ABC through the abbreviated process would be expected to benefit fishery participants in the long term by allowing more timely management changes and response to new information. However, if changes to an ABC result in restricted access (due to an increased potential for triggering an AM if the ABC requires the ACL to be reduced), there may be some short-term negative effects due to fewer public comment opportunities and expedited implementation.

The proposed changes in **Preferred Alternative 4** are expected to have some positive effects on fishery participants due to consistent language in the framework procedures for all Gulf FMPs. This would be expected to reduce complexity for the public and management when determining actions that are appropriate for a framework action. For participants associated with the coral and spiny lobster fisheries, the proposed change to include modifications to AMs through a more

timely process (open framework action) could have some negative effects if any future changes in the AMs result in restricted access, due to fewer opportunities for public comment and faster implementation of the modifications.

4.3.5 Direct and Indirect Effects on the Administrative Environment

Alternative 1 would be the most administratively burdensome of the alternatives being considered, because any modifications to the ABC, ACL, ACT, and quota for a species, sector, or component of a sector to allow for carryover of unused ACL, as determined by the ABC control rule, would have to go through the open framework procedure. Specification of an ABC following a stock assessment would also continue to have to go through the open framework procedure under **Alternative 1**. This process is slower and more administratively burdensome than that proposed under **Preferred Alternative 2** (closed framework procedure) and **Preferred Alternative 3** (abbreviated documentation process). **Preferred Alternative 2** and **Preferred Alternative 3** would give NMFS and the Council flexibility by allowing for the adjustment of catch levels under the carryover provision, and for other purposes, through more efficient documentation processes, allowing for timelier implementation of Council-approved management modifications. Closed framework amendments and actions generally require less time and staff effort than plan amendments open framework amendments and actions, and would lessen the administrative burden on the agency.

Preferred Alternative 4 would decrease the administrative burden by modifying the framework procedures for the Reef Fish, CMP, Coral and Coral Reefs, and Spiny Lobster FMPs to have consistent terminology and format, and to include changes to the standard framework procedure for the Coral and Coral Reefs and Spiny Lobster FMPs regarding accountability measures. Consistency in format, terminology, and the types of management changes which are permitted under the framework procedures across FMPs will result in more efficient use of administrative resources.

4.4 Cumulative Effects Analysis

As directed by the National Environmental Policy Act, federal agencies are mandated to assess not only the indirect and direct impacts, but cumulative impacts of actions as well. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The cumulative impacts of Reef Fish species were analyzed in detail in the Generic Annual Catch Limits/Accountability Measures Amendment (GMFMC 2012a), and are incorporated herein by reference. The Generic Federally-Permitted Dealer Reporting Amendment (GMFMC 2013) analyzed the cumulative impacts to Reef Fish, CMP, Spiny Lobster, and Coral and Coral Reefs, and is incorporated here by reference.

Amendment 26 to the Fishery Management Plan for CMP to Change Allocations, Stock Boundaries, and Sale Provisions analyzed the cumulative impacts to CMP species in detail and is hereby incorporated by reference (GMFMC 2016).

Amendment 13 to the Fishery Management Plan for Spiny Lobster in the Gulf of Mexico and the South Atlantic, currently under development, modifies spiny lobster gear requirements and cooperative management measures, and analyzes the cumulative impacts to spiny lobster in detail, and is hereby incorporated by reference (GMFMC/SAFMC 2018).

There are several environmental considerations which may contribute to the cumulative effects including the PaV1 pathogenic virus, the *Deepwater Horizon* MC252 oil spill, tropical weather events, economic changes and potential climate change impacts. The impacts from these environmental influences are not necessarily quantifiable at this time; however, the potential effects are described below.

A naturally occurring, pathogenic virus, PaV1, infects juvenile Caribbean spiny lobsters. This virus is lethal to lobsters. Infection is highest in smaller juveniles; mortality occurs after larval settlement but before recruitment to the fishery. PaV1 was first detected in the U.S. spiny lobster population around 1996. No evidence shows PaV1 has increased in prevalence or virulence since 2000, so mortality from PaV1 may explain why landings declined beginning about that time while the post-larval recruitment index remained steady or environmental conditions outside of the PaV1 virus caused the stock to natural fluctuate.

Amendment 9 to the Fishery Management Plan for Coral and Coral Reefs of the Gulf of Mexico Region, which has been submitted for implementation, to Coral Habitat Areas for consideration for Habitat Area of Particular Concern Designation in the Gulf of Mexico, and analyzes the cumulative impacts to coral and coral reefs in detail, and is hereby incorporated by reference (GMFMC 2018).

Overall, these actions are not likely to result in significant effects when considered in combination with other relevant past, present, and reasonably foreseeable actions because they would not substantially alter the manner in which the Reef Fish, CMP, Spiny Lobster, and Coral and Coral Reefs FMPs are prosecuted. Past actions are summarized in the History of Management in Section 1.4.

Past Actions

Participation in and the economic performance of the Reef Fish, CMP, Spiny Lobster, and Coral and Coral Reef fisheries addressed in this document have been affected by a combination of regulatory, biological, social, and external economic factors. Section 1.4 discusses the history of management actions that have affected reef fish, CMP species, spiny lobster, and coral and coral reefs in further detail.

The cumulative effects from the *Deepwater Horizon* MC252 (DWH) oil spill and response may not be known for years. The impacts of the oil spill on the physical environment are expected to be significant and may be long-term. Oil was dispersed on the surface, and because of the heavy use of dispersants, oil was also documented as being suspended within the water column. Floating and suspended oil washed onto shore in several areas of the Gulf as well as non-floating tar balls. Whereas suspended and floating oil degrades over time, tar balls are more persistent in the environment and can be transported hundreds of miles.

Impacts from the DWH oil spill are still being examined, but several peer-reviewed studies have documented the impacts to various important reef fish species (see Section 3.3.). However, the analyses of the effects of this oil spill on fish populations are incomplete.

Indirect and inter-related effects on the ecological environment of the Reef Fish and CMP fishery in concert with the DWH oil spill are not well understood. Changes in the population size structure could result from shifting fishing effort to specific geographic segments of populations, combined with any anthropogenically induced natural mortality that may occur from the impacts of the oil spill. The impacts on the food web from phytoplankton, to zooplankton, to mollusks, to top predators may be significant in the future. Specific to the species eligible for carryover in this amendment, impacts to the eligible reef fish and king mackerel from the oil spill may similarly impact other species that may be preyed upon by these species, or that might benefit from these reduced stocks. However, since the majority of the spawning biomass for these species occur outside the main areas affected by the DWH oil spill plume, it is less likely that a direct effect on these species will be detected.

It is unknown whether the impacts of the DWH oil spill affected south Florida where spiny lobster are harvested. Information on the effects of the oil on the spiny lobster fishery is incomplete and unavailable at this time. Although not reported in the primary spiny lobster fishing area, there have been reports of increased incidences of diseased fish by some scientists that may be related to the spill; however, others have argued there is no baseline from which to judge the prevalence of disease, so no correlation can be conclusively determined. In a recent study, Weisberg et al. (2014) suggested the hydrocarbons associated with the DWH oil spill did transit onto the Florida shelf and may be associated with the occurrences of reef fish with lesions and other deformities. The Programmatic Damage Assessment and Restoration Plan (PDARP) for the DWH oil spill, outlines the extent and severity of injuries to the ecosystem and the toxicity impacts of exposure to various organisms (2016). The PDARP suggests that fish embryos and larvae were vulnerable to the exposure to oil causing developmental abnormalities, inhibited growth, decreased swimming ability, and additional negative impacts and increased

mortality. The PDARP also assesses the effects of oil exposure on the benthic resources, water quality, nearshore marine ecosystem, benthic resources, birds, sea turtles, and marine mammals.

Several studies have documented declines in coral health or coral death in the presence of oil from the DWH oil spill (White et al. 2012; Hsing et al. 2013; Fisher et al. 2014). Sites as far as 11 km southwest of the spill were documented to have greater than 45% of the coral colonies affected by oil (White et al. 2012; Hsing et al. 2013), and, though less affected, a site 22 km in 1,900 m of water had coral damage caused by oil (Fisher et al. 2014). The interaction of deep-sea coral communities with reef fish or CMP species' life cycles is uncertain. However, what is known is that it will take decades to centuries for some of these deep-sea areas to recover. Further, if the disruption in these ecosystems interrupts critical life history stages of these fish stocks, the effects could reduce these species' population sizes.

The proposed actions are directed towards the management of naturally occurring species in the Gulf, so the introduction or spread of non-indigenous species should not occur. Additionally, the action does not propose any activity, such as increased ballast water discharge from foreign vessels, which is associated with the introduction or spread on non-indigenous species.

Present Actions

The following are actions important to species in the Reef Fish, CMP, Corals and Coral Reefs, and Spiny Lobster FMPs in general[36]:

- The Gulf Council and the Department of Commerce approved exempted fishing permits for Florida, Alabama, Mississippi, Louisiana, and Texas to demonstrate alternative management strategies for the private angling component of the recreational red snapper fishery for 2018 and 2019.
- The Gulf Council approved a reef fish framework action to modify the catch limits for red snapper and hogfish.
- The Gulf Council approved a reef fish framework action to modify the buffer between the ACT and the ACL for the federal for-hire component for red snapper.
- The Gulf Council approved Amendment 9 to the Corals and Coral Reefs FMP to modify deep sea coral protection areas. The Council requested that NMFS Highly Migratory Species division implement bottom-tending gear rules consistent with those in this amendment.
- The Gulf Council approved Amendment 13 to the Spiny Lobster FMP to modify spiny lobster gear requirements and cooperative management procedures.

Reasonably Foreseeable Future Actions

The following are actions important to Reef Fish and King Mackerel[37]:

- The Gulf Council is considering a reef fish framework action to modify commercial trip limits for greater amberjack.
- The Gulf Council is considering Reef Fish Amendment 50, which would create a recreational management program for the five Gulf states for red snapper.

[36] Information on these developing actions can be found on the Council's website at www.gulfcouncil.org.
[37] Information on these developing actions can be found on the Council's website at www.gulfcouncil.org.

- The Gulf Council is considering decreasing the ACLs and ACTs for red grouper based on an interim stock analysis and public comment.
- The Gulf Council is considering Amendment 36B to modify Commercial Individual Fishing Quota Programs.
- The Gulf Council is considering Amendment 51 to the Reef Fish FMP to Establish Gray Snapper Status Determination Criteria and Modify ACLs.
- The Gulf Council is considering modifications to the allocations for red snapper.
- The Gulf Council is considering an amendment subsequent to Coral Amendment 9 that would address the 24 areas proposed by the Coral Working Group that were not included in Coral Amendment 9.
- The Flower Garden Banks National Marine Sanctuary (FGBNMS) is proposing to add additional banks that are comprised of approximately 289 nm^2 of coral and coral reef habitat. The timeline for this effort is uncertain, but the draft environmental impact statement (EIS) has already been presented at public hearings.
- The Florida Keys National Marine Sanctuary is currently analyzing information and developing alternatives for a marine zoning and regulatory review process.

Global climate change can affect marine ecosystems through ocean warming by increased thermal stratification, reduced upwelling, sea level rise, through increases in wave height and frequency, loss of sea ice, and increased risk of diseases in marine biota. Decreases in surface ocean pH due to absorption of anthropogenic carbon dioxide emissions may impact a wide range of organisms and ecosystems (Solomon et al. 2007). These influences could affect biological factors such as migration, range, larval and juvenile survival, prey availability, and susceptibility to predators. At this time, the level of impacts cannot be quantified, nor is the time frame known in which these impacts would occur. The Environmental Protection Agency's climate change webpage (http://www.epa.gov/climatechange/) provides basic background information on these and other measured or anticipated effects. A compilation of scientific information on climate change can be found in the United Nations Intergovernmental Panel on Climate Change's Fourth Assessment Report (Solomon et al. 2007) and is incorporated here by reference. Global climate change could have significant effects on Gulf fisheries; however, the extent of these effects is not known at this time. Possible impacts are outlined in the Generic Annual Catch Limits/Accountability Measures Amendment (GMFMC 2012).

The potential impacts of climate change on the deep-water coral community is qualitatively discussed in the NOAA Strategic Plan for Deep-Sea Coral and Sponge Ecosystems (2010). These slow-growing long-lived organisms have a carbonaceous or proteinaceous skeleton. It is likely that changes in ocean acidification could impact the growth rate and composition of the skeleton in addition to the geographic range of suitable habitat and depth for colonization. Climate change is also likely to change deep sea temperatures and currents (Lumsden et al. 2007). During 1961 to 2003, global ocean temperature rose 0.1°C from the surface to 700 m (Bindoff et al. 2007), the region where many deep corals are found. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change concluded that ocean warming has affected deep-sea ecosystems at least down to 2,000 m. Effects of warming on deep-sea coral and sponge communities include direct impacts on survival and an array of indirect effects linked to increasing water temperature. These include decreased dissolved oxygen concentrations, altered hydrodynamics, or decreased productivity of surface waters and export of

food to the deep-sea (Hourigan et al. 2017). Thermohaline circulation is the major driving force behind currents in the deep ocean. A weakening of this process could reduce transport of food and oxygen to deep coral communities and eventually alter the structure of deep sea ecosystems. It is unclear how these changes might affect deep corals (Lumsden et al. 2007). A change in deep ocean currents could affect deep-sea coral distribution or may stress species not able to adapt to warmer temperatures. While the potential impacts are not quantifiable at this time, climate change and ocean acidification further contribute to the cumulative effects on the resource and should be considered for management strategies and conservation planning.

Monitoring

The effects of the proposed action are, and will continue to be, monitored through collection of landings data by NMFS, stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations. Landings data for the recreational sector are collected through Marine Recreational Fishing Statistics Survey (MRFSS)/Marine Recreational Information Program (MRIP), Southeast Region Headboat Survey, Texas Parks and Wildlife's Marine Recreational Fishing Survey, and Louisiana's Creel Survey. Commercial data are collected through trip ticket programs, port samplers, and logbook programs.

The proposed actions relate to the harvest of indigenous species in the Gulf, and the activities being altered do not introduce non-indigenous species, and are not reasonably expected to facilitate the spread of such species through depressing the populations of native species. Additionally, the aforementioned actions do not propose any activity, such as increased ballast water discharge from foreign vessels, which is associated with the introduction or spread on non-indigenous species.

Conclusion

These actions, in combination with any past, present, or reasonably foreseeable future actions are not expected to have significant beneficial or adverse cumulative effects on the physical and biological/ecological environments. The intent of this amendment is to improve prospects for expanded participation in the respective fisheries, and the proposed actions in this amendment are expected to result in some important short-term benefits to the commercial and for-hire fishing fleets, fishing communities and associated businesses, and private recreational anglers. The proposed changes in management will contribute to changes in the fishery within the context of the current economic and regulatory environment at the local and regional level.

CHAPTER 5. REGULATORY IMPACT REVIEW

5.1 Introduction

5.2 Problems and Objectives

5.3 Methodology and Framework for Analysis

5.4 Description of the Fishery

A description of the xx fishery, with particular reference to xx, is contained in Chapter 3.

5.5 Effects on Management Measures

5.5.1 Action 1: Eligibility for a Carryover Provision for Managed Reef Fish and Coastal Migratory Pelagic (CMP) Stocks in the Gulf of Mexico (Gulf)

5.5.2 Action 2: Adjustment in the Carryover Provision Accounting for Management Uncertainty

5.5.3 Action 3: Modify the Framework Procedures for Gulf Council FMPs

5.6 Public and Private Costs of Regulations

Council costs of document preparation, meetings, public hearings, and information Dissemination $x0,000

NOAA Fisheries administrative costs of document

preparation, meetings and review $x0,000

TOTAL $x0,000

5.7 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. REGULATORY FLEXIBILITY ACT ANALYSIS

6.1 Introduction

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

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

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

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

6.6 Significance of economic impacts on small entities

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

CHAPTER 7. LIST OF PREPARERS

PREPARERS

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CHAPTER 8. LIST OF AGENCIES AND PERSONS CONSULTED

LIST OF AGENCIES CONSULTED

National Marine Fisheries Service
- Southeast Fisheries Science Center
- Southeast Regional Office
    - Protected Resources
    - Habitat Conservation
    - Sustainable Fisheries

NOAA General Counsel
U.S. Coast Guard
U.S. Fish and Wildlife Service

CHAPTER 9. REFERENCES

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APPENDIX A. ALTERNATIVES CONSIDERED BUT REJECTED

At the January 2018 Council meeting:

Action 1 – Eligibility for a Carryover Provision for Managed Reef Fish and Coastal Migratory Pelagic Stocks in the Gulf of Mexico (Gulf)

Alternative 4: Apply a carryover provision to harvest the unused portion of the ACL for any managed reef fish or coastal migratory pelagic stock in the Gulf ***except*** those which are currently managed under a stock ACL, meaning an ACL which is not subdivided by sector allocations. Any unused portion of the ACL remaining at the end of a fishing year for those stocks will not be carried over to a successive fishing year.

*The Council moved **Alternative 4** to the considered, but rejected section at their January 2018 Council meeting. Council members felt that there was not a reason to exempt stocks from a carryover provision simply because there was no allocation among sectors. Furthermore, based on Table 2.1.1, there was a large overlap with **Alternative 3** of affected stocks, making this alternative somewhat redundant. The motion to move **Alternative 4** to Considered but Rejected carried with no opposition. Note: as a result of this move, the subsequent alternatives that were previously numbered **Alternative 5** and **Alternative 6** have been renumbered **Alternative 4** and **Alternative 5**.*

Action 4 – Adjustments to the Carryover Provision

Alternative 1: No Action. Do not reduce the amount of the unused portion of an ACL to be carried over. Any amount of the unused portion of the ACL to be carried over, as specified in Action 1, would be applied in full to the following fishing year, contingent on the alternative selected in Action 3.

Alternative 2: Reduce the amount of the unused portion of an ACL to be carried over by the mean natural mortality rate of the subject species as used in the most recent accepted quantitative stock assessment.

Alternative 3: Reduce the amount of the unused portion of an ACL to be carried over by an amount which accounts for management uncertainty. This amount would apply to any stock for which a carryover is considered.

Option 3a: Reduce the amount of ACL to be carried over by 5%
Option 3b: Reduce the amount of ACL to be carried over by 10%
Option 3c: Reduce the amount of ACL to be carried over by 15%

The Council moved the entire Action 4 to Considered but Rejected. Based on simulation runs presented to the SSC, Council members felt that natural mortality is already accounted for in the stock assessment. Consequently, adjusting the carryover amount to account for natural mortality would amount to double-counting the natural mortality. In addition, the Science Center representative at the January Council meeting suggested that there would be no harm over a period of years from allowing the full carryover of unharvested ACL as long as the cumulative catch did not exceed the cumulative ACL. The motion to move ***Action 4*** *to Considered but Rejected carried with no opposition. Note: as a result of this move, the subsequent action previously numbered* ***Action 5*** *has been renumbered* ***Action 4****.*

June 2018 Council Meeting

Alternative 2: Apply a carryover provision to harvest the unused portion of the ACL for any managed reef fish or CMP stock/stock complex in the Gulf ***except*** stocks/stock complexes under the following conditions:

> **Option 2d:** Do not allow carryover of unused quota or ACL for stock components managed under an individual fishing quota program.

and

Action 2 – Parameters for Applying the Carryover Provision to Stocks managed under Individual Fishing Quota (IFQ) Programs in the Gulf

Alternative 1: No Action – Do not establish parameters for applying the carryover provision, as outlined in Action 1, to stocks managed under IFQ programs in the Gulf.

Alternative 2: If a species/stock complex managed under an IFQ program is determined to be eligible for a carryover under Action 1, then the unused portion of the commercial ACL for that species will be carried over to the following fishing year, so long as the unused portion of the commercial ACL amounts to less than:

Option 2a: 2% of the total commercial ACL
Option 2b: 5% of the total commercial ACL
Option 2c: 10% of the total commercial ACL

Alternative 3: If a species managed under an IFQ program is determined to be eligible for a carryover under Action 1, then the amount to be carried over to the following fishing year will be equal to:

Option 3a: Either the unused portion of the commercial ACL or 2% of the commercial ACL for that species, whichever is less
Option 3b: Either the unused portion of the commercial ACL or 5% of the commercial ACL for that species, whichever is less
Option 3c: Either the unused portion of the commercial ACL or 10% of the commercial ACL for that species, whichever is less

The Council discussed the inclusion of stock components managed under IFQ programs in the document. The combination of no season restrictions and the ability to lease shares that were not being landed within a fishing year made the IFQ program-managed fisheries unique when compared to non-IFQ fisheries. The Council thought that pulling stock components managed with IFQ programs out of this amendment and addressing them later would be most appropriate.

APPENDIX B. OTHER APPLICABLE LAW

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 (EEZ). 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 generally 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, unless an exception applies. Proposed and final rules will be published before implementing the actions in this amendment.

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 the National Oceanic and Atmospheric Administration (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 required to provide a consistency determination to the relevant state agency at least 90 days before taking final action.

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 and amendments and the use of best available information is the second national standard under the Magnuson-Stevens Act. To be consistent with the Magnuson-Stevens Act, FMPs and amendments must be based on the best 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 would 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, and 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 includes a Takings Implication Assessment, if applicable. 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 2005a), 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 and amendments 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 recreational harvest of greater amberjack. 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.

APPENDIX C. SUMMARIES OF PUBLIC COMMENTS RECEIVED

(List the locations of the scoping hearings and public hearings, then list the summaries and written comments)

Webinar Public Hearing
6 March 2019

Council/Staff
Emily Muehlstein
Ryan Rindone

The complete comments can be read here:

APPENDIX D. REEF FISH FRAMEWORK PROCEDURE

As Approved by the Gulf Council – August 2011
And Modified by Amendment 38 – March 2013

This framework procedure provides standardized procedures for implementing management changes pursuant to the provisions of the above Fishery Management Plans. There are two basic processes, the open framework process and the closed framework process. Open frameworks are further divided into abbreviated or standard documentation processes. Open frameworks address issues where there is more policy discretion in selecting among various management options developed to address an identified management issue, such as changing a size limit to reduce harvest. Closed frameworks address much more specific factual circumstances, where the FMP and implementing regulations identify specific action to be taken in the event of specific facts occurring, such as closing a sector of a fishery after their quota has been harvested.

Open Framework:

1. Situations under which this framework procedure may be used to implement management changes include the following:

    a. A new stock assessment resulting in changes to the overfishing limit, acceptable biological catch, or other associated management parameters.

    In such instances the Council may, as part of a proposed framework action, propose an annual catch limit (ACL) or series of ACLs and optionally an annual catch target (ACT) or series of ACTs, as well as any corresponding adjustments to MSY, OY, and related management parameters.

    b. New information or circumstances.

    The Council will, as part of a proposed framework action, identify the new information and provide rationale as to why this new information indicates that management measures should be changed.

    c. Changes are required to comply with applicable law such as MSA, ESA, MMPA, or are required as a result of a court order.

    In such instances the Regional Administrator will notify the Council in writing of the issue and that action is required. If there is a legal deadline for taking action, the deadline will be included in the notification.

2. Open framework actions may be implemented in either of two ways, abbreviated documentation, or standard documentation process.

    a. **Abbreviated documentation process.** Regulatory changes that may be categorized as a routine or insignificant may be proposed in the form of a letter or memo from the Council to the Regional Administrator containing the proposed action, and the relevant biological, social and economic information to support the action. If multiple actions are proposed, a finding that the actions are also routine or insignificant must also be included. If the Regional Administrator concurs with the determination and approves the proposed action, the action will be implemented through publication of appropriate notification in the Federal Register. Actions that may be viewed as routine or insignificant include, among others:

        i. Reporting and monitoring requirements,

        ii. Permitting requirements,

        iii. Gear marking requirements,

        iv. Vessel marking requirements,

        v. Restrictions relating to maintaining fish in a specific condition (whole condition, filleting, use as bait, etc.),

        vi. Bag and possession limit changes of not more than 1 fish,

        vii. Size limit changes of not more than 10% of the prior size limit,

        viii. Vessel trip limit changes of not more than 10% of the prior trip limit,

        ix. Closed seasons of not more than 10% of the overall open fishing season,

        x. Species complex composition, including species subject to limited access privilege program (LAPP) management, requiring new share specification,

        xi. Restricted areas (seasonal or year-round) affecting no more than a total of 100 square nautical miles,

        xii. Respecification of ACL, ACT or quotas that had been previously approved as part of a series of ACLs, ACTs or quotas,

        xiii. Specification of MSY, OY, and associated management parameters (such as overfished and overfishing definitions) where new values are calculated based on previously approved specifications,

xiv. Gear restrictions, except those that result significant changes in the fishery, such as complete prohibitions on gear types,

xv. Quota changes of not more than 10%, or retention of portion of an annual quota in anticipation of future regulatory changes during the same fishing year.

b. **Standard documentation process.** Regulatory changes that do not qualify as a routine or insignificant may be proposed in the form of a framework document with supporting analyses. Non routine or significant actions that may be implemented under a framework action include:

i. Specification of ACTs or sector ACTs, and modifications to ACL/ACT control rule,

ii. Specification of ABC and ABC control rules,

iii. Rebuilding plans and revisions to approved rebuilding plans,

iv. The addition of new species to existing limited access privilege programs (LAPP),

v. Changes specified in section 4(a) that exceed the established thresholds.

vi. Implementation or changes to in-season accountability measures
1. Closure and closure procedures
2. Trip limit implementation or change
3. Designation of an existing limited access privilege program as the accountability measure for species in the IFQ program
4. Implementation of gear restrictions

vii. Implementation or changes to post-season accountability measures
5. Adjustment of season length
6. Implementation of closed seasons/time periods
7. Adjustment or implementation of bag, trip, or possession limit
8. Reduction of the ACL/ACT to account for the previous year overage
9. Revoking a scheduled increase in the ACL/ACT if the ACL was exceeded in the previous year
10. Implementation of gear restrictions
11. Reporting and monitoring requirements

3. The Council will initiate the open framework process to inform the public of the issues and develop potential alternatives to address the issues. The framework process will include the development of documentation and public discussion during at least one council meeting.

4. Prior to taking final action on the proposed framework action, the Council may convene its advisory committees and panels, as appropriate, to provide recommendations on the proposed actions.
5. For all framework actions, the Council will provide the letter, memo, or the completed framework document along with proposed regulations to the Regional Administrator in a timely manner following final action by the Council.
6. For all framework action requests, the Regional Administrator will review the Council's recommendations and supporting information and notify the Council of the determinations, in accordance with the MSA[1] and other applicable law.

Closed Framework:

1. Consistent with existing requirements in the FMP and implementing regulations, the Regional Administrator is authorized to conduct the following framework actions through appropriate notification in the Federal Register:

    a. Close or adjust harvest any sector of the fishery for a species, sub-species, or species group that has a quota or sub-quota at such time as projected to be necessary to prevent the sector from exceeding its sector-quota for the remainder of the fishing year or sub-quota season,

    b. Reopen any sector of the fishery that had been prematurely closed,

    c. Implement accountability measures, either in-season or post-season.

Footnote 1:
SEC. 304. ACTION BY THE SECRETARY 16 U.S.C. 1854
(a) REVIEW OF PLANS.—
(1) Upon transmittal by the Council to the Secretary of a fishery management plan or plan amendment, the Secretary shall—
(A) Immediately commence a review of the plan or amendment to determine whether it is consistent with the national standards, the other provisions of this Act, and any other applicable law; and
(B) Immediately publish in the Federal Register a notice stating that the plan or amendment is available and that written information, views, or comments of interested persons on the plan or amendment may be submitted to the Secretary during the 60-day period beginning on the date the notice is published.
(2) In undertaking the review required under paragraph (1), the Secretary shall—
(A) Take into account the information, views, and comments received from interested persons;
(B) Consult with the Secretary of State with respect to foreign fishing; and
(C) consult with the Secretary of the department in which the Coast Guard is operating with respect to enforcement at sea and to fishery access adjustments referred to in section 303(a)(6).

(3) The Secretary shall approve, disapprove, or partially approve a plan or amendment within 30 days of the end of the comment period under paragraph (1) by written notice to the Council. A notice of disapproval or partial approval shall specify—

(A) The applicable law with which the plan or amendment is inconsistent;

(B) The nature of such inconsistencies; and

(C) Recommendations concerning the actions that could be taken by the Council to conform such plan or amendment to the requirements of applicable law. If the Secretary does not notify a Council within 30 days of the end of the comment period of the approval, disapproval, or partial approval of a plan or amendment, then such plan or amendment shall take effect as if approved.

(4) If the Secretary disapproves or partially approves a plan or amendment, the Council may submit a revised plan or amendment to the Secretary for review under this subsection.

(5) For purposes of this subsection and subsection (b), the term "immediately" means on or before the 5th day after the day on which a Council transmits to the Secretary a fishery management plan, plan amendment, or proposed regulation that the Council characterizes as final.

(b) REVIEW OF REGULATIONS.—

(1) Upon transmittal by the Council to the Secretary of proposed regulations prepared under section 303(c), the Secretary shall immediately initiate an evaluation of the proposed regulations to determine whether they are consistent with the fishery management plan, plan amendment, this Act and other applicable law. Within 15 days of initiating such evaluation the Secretary shall make a determination and—

(A) If that determination is affirmative, the Secretary shall publish such regulations in the Federal Register, with such technical changes as may be necessary for clarity and an explanation of those changes, for a public comment period of 15 to 60 days; or

(B) If that determination is negative, the Secretary shall notify the Council in writing of the inconsistencies and provide recommendations on revisions that would make the proposed regulations consistent with the fishery management plan, plan amendment, this Act, and other applicable law.

(2) Upon receiving a notification under paragraph (1)(B), the Council may revise the proposed regulations and submit them to the Secretary for reevaluation under paragraph (1).

APPENDIX E. COASTAL MIGRATORY PELAGICS FRAMEWORK PROCEDURE

The framework procedure, as outlined in Coastal Migratory Pelagics Amendment 20B, is provided below.

This framework procedure provides standardized procedures for implementing management changes pursuant to the provisions of the Coastal Migratory Pelagic Fishery Management Plan (FMP) managed jointly between the Gulf of Mexico and South Atlantic Fishery Management Councils (Councils). Two basic processes are included: the open framework process and the closed framework process. The open framework process/procedure addresses issues where more policy discretion exists in selecting among various management options developed to address an identified management issue, such as changing a size limit to reduce harvest. The closed framework process addresses much more specific factual circumstances, where the FMP and implementing regulations identify specific action to be taken in the event of specific facts occurring, such as closing a sector of a fishery when the quota is or is projected to be harvested.

Open Framework Procedure:

1. Situations under which this framework procedure may be used to implement management changes include the following:
   a. A new stock assessment resulting in changes to the overfishing limit, acceptable biological catch, or other associated management parameters. In such instances the Councils may, as part of a proposed framework action, propose an annual catch limit (ACL) or series of ACLs and optionally an annual catch target (ACT) or series of ACTs, as well as any corresponding adjustments to MSY, OY, and related management parameters.
   b. New information or circumstances. The Councils will, as part of a proposed framework action, identify the new information and provide rationale as to why this new information indicates that management measures should be changed.
   c. Changes are required to comply with applicable law such as the Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, Marine Mammal Protection Act, or are required as a result of a court order. In such instances the NMFS Regional Administrator (RA) will notify the Councils in writing of the issue and that action is required. If there is a legal deadline for taking action, the deadline will be included in the notification.

2. Open framework actions may be implemented in either of two ways: abbreviated documentation or standard documentation process.
   a. Abbreviated documentation process: Regulatory changes that may be categorized as a routine or insignificant may be proposed in the form of a letter or memo from the Councils to the RA containing the proposed action, and the relevant biological, social and economic information to support the action. Either Council may initiate the letter or memo, but both Councils must approve it. If multiple actions are proposed, a finding that the actions are also routine or insignificant must also be included. If the RA concurs with the determination and approves the proposed action, the action will be implemented through publication of

appropriate notification in the Federal Register. Changes that may be viewed as routine or insignificant include, among others:

i. Reporting and monitoring requirements;

ii. Permitting requirements;

iii. Gear marking requirements;

iv. Vessel marking requirements;

v. Restrictions relating to maintaining fish in a specific condition (whole condition, filleting, use as bait, etc.);

vi. Bag and possession limit changes of not more than one fish;

vii. Size limit changes of not more than 10% of the prior size limit;

viii. Vessel trip limit changes of not more than 10% of the prior trip limit;

ix. Closed seasons of not more than 10% of the overall open fishing season,

x. Species complex composition;

xi. Restricted areas (seasonal or year-round) affecting no more than a total of 100 nautical square miles;

xii. Re-specification of ACL, ACT or quotas that had been previously approved as part of a series of ACLs, ACTs or quotas;

xiii. Specification of MSY proxy, OY, and associated management parameters (such as overfished and overfishing definitions) where new values are calculated based on previously approved specifications;

xiv. Gear restrictions, except those that result significant changes in the fishery, such as complete prohibitions on gear types;

xv. Quota changes of not more than 10%, or retention of portion of an annual quota in anticipation of future regulatory changes during the same fishing year.

b. Standard documentation process: Regulatory changes that do not qualify as a routine or insignificant may be proposed in the form of a framework document with supporting analyses. Non-routine or significant actions that may be implemented under a framework action include:

i. Specification of ACTs or sector ACTs;

ii. Specification of ABC and ABC/ACL control rules;

iii. Rebuilding plans and revisions to approved rebuilding plans;

iv. The addition of new species to existing limited access privilege programs (LAPP);

v. Changes specified in section 2(a) that exceed the established thresholds;

vi. Changes to AMs including:

<u>In-season AMs</u>

1. Closures and closure procedures
2. Trip limit reductions or increases
3. Designation of an existing IFQ program as the AM for species in the IFQ program
4. Implementation of gear restrictions

<u>Post-season AMs</u>

5. Adjustment of season length
6. Implementation of closed seasons/time periods
7. Adjustment or implementation of bag, trip, or possession limit

8. Reduction of the ACL/ACT to account for the previous year overage
9. Revoking a scheduled increase in the ACL/ACT if the ACL was exceeded in the previous year
10. Implementation of gear restrictions
11. Reporting and monitoring requirements

3. Either Council may initiate the open framework process to inform the public of the issues and develop potential alternatives to address those issues. The framework process will include the development of documentation and public discussion during at least one meeting for each Council.

4. Prior to taking final action on the proposed framework action, each Council may convene their advisory committees and panels, as appropriate, to provide recommendations on the proposed actions.

5. For all framework actions, the initiating Council will provide the letter, memo, or completed framework document along with proposed regulations to the RA in a timely manner following final action by both Councils.

6. For all framework action requests, the RA will review the Councils' recommendations and supporting information and notify the Councils of the determinations, in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (Section 304) and other applicable law.

Closed Framework Procedure:

Consistent with existing requirements in the FMP and implementing regulations, the RA is authorized to conduct the following framework actions through appropriate notification in the *Federal Register*:

1. Close or adjust harvest any sector of the fishery for a species, sub-species, or species group that has a quota or sub-quota at such time as projected to be necessary to prevent the sector from exceeding its sector-quota for the remainder of the fishing year or sub-quota season;
2. Reopen any sector of the fishery that had been prematurely closed;
3. Implement an in-season AM for a sector that has reached or is projected to reach, or is approaching or is projected to approach its ACL, or implement a post-season AM for a sector that exceeded its ACL in the current year.

Responsibilities of Each Council:

1. Recommendations with respect to the Atlantic migratory groups of king mackerel, Spanish mackerel, and cobia will be the responsibility of the South Atlantic Council, and those for the Gulf migratory groups of king mackerel, Spanish mackerel, and cobia will be the responsibility of the Gulf Council, with the following exceptions:

   The South Atlantic Council will have responsibility to set vessel trip limits, closed seasons or areas, or gear restrictions for:
   a. The Eastern Zone - East Coast Subzone for Gulf migratory group king mackerel

b. The east coast of Florida including the Atlantic side of the Florida Keys for Gulf migratory group cobia.

2. For stocks where a stock assessment indicates a different boundary between the Gulf and Atlantic migratory groups than the management boundary, a portion of the ACL for one migratory group may be apportioned to the appropriate zone, but management measures for that zone will be the responsibility of the Council within whose management area that zone is located.

3. Both councils must concur on recommendations that affect both migratory groups.

APPENDIX F. SPINY LOBSTER FRAMEWORK PROCEDURE

Joint Spiny Lobster FMP Framework Procedure for Specification of Annual Catch Limits, Annual Catch Targets, Overfishing Limits, Acceptable Biological Catch, and Annual Adjustments:

1. At times determined by NOAA Fisheries Service Southeast Regional Office (SERO) and Florida Fish and Wildlife Conservation Commission (FWC), stock assessments or assessment updates will be conducted under the SEDAR process for spiny lobster in the Gulf and South Atlantic. Each SEDAR stock assessment or assessment update will: a) assess to the extent possible the current biomass, biomass proxy, or SPR levels for each stock; b) estimate fishing mortality (F) in relation to F_{MSY} (MFMT) and F_{OY}; c) determine the overfishing limit (OFL); d) estimate other population parameters deemed appropriate; e) summarize statistics on the fishery; f) specify the geographical variations in stock abundance, mortality recruitment, and age of entry into the fishery for each stock or stock complex; and g) develop estimates of B_{MSY}.

2. The Councils and the FWC will consider SEDAR stock assessments, or other documentation deemed appropriate, to provide the biological analysis and data listed above in paragraph 1. Either the SEFSC or the stock assessment branch of a State agency may serve as the lead in conducting the analysis, as determined by the SEDAR Steering Committee. The joint Gulf and South Atlantic Scientific and Statistical Committees (SSCs), or some subgroup thereof, will prepare a written report to the Councils and FWC specifying an OFL and may recommend a range of ABCs for attaining or maintaining OY. The OFL is the annual harvest level corresponding to fishing at MFMT (F_{MSY}). The ABC range is intended to provide guidance to the joint SSCs, and is the OFL as reduced due to scientific uncertainty in order to reduce the probability that overfishing will occur in a year. To the extent practicable, the probability that overfishing will occur at various levels of ABC and the annual transitional yields (i.e., catch streams) calculated for each level of fishing mortality within the ABC range should be included with the recommended range.

If the spiny lobster stock is determined to be undergoing overfishing or is overfished, the recommended range of ABCs shall be calculated so as to end overfishing and achieve spiny lobster levels at or above B_{MSY} within the rebuilding periods specified by the Councils and FWC and approved by NOAA Fisheries Service. The SEDAR report or joint SSCs will recommend rebuilding periods based on the provisions of the National Standard Guidelines, including generation times for the affected stocks. Generation times are to be specified by the stock assessment panel based on the biological characteristics of the individual stocks. The report will recommend to the Councils and FWC a B_{MSY} level and a MSST from B_{MSY}. The report may also recommend more appropriate estimates of F_{MSY} for any stock. The report may also recommend more

appropriate levels for the MSY proxy, OY, the overfishing threshold (MFMT), and overfished threshold (MSST). Where data are inadequate to compute an OFL and recommended ABC range, the report will use other available information as a guide in providing their best estimate of an OFL corresponding to MFMT and ABC range that should result in not exceeding the MFMT.

3. The joint SSCs will examine SEDAR reports or other new information, the OFL determination, and the recommended range of ABC. In addition, the joint SSCs will examine information provided by the social scientists and economists from the Councils' staffs and from the SERO Fisheries Social Science Branch analyzing social and economic impacts of any specification demanding adjustments of allocations, ACLs, ACTs, AMs, quotas, bag limits, or other fishing restrictions. The joint SSCs will use the ABC control rule to set their ABC recommendation at or below the OFL, taking in account scientific uncertainty. If the joint SSCs set their ABC recommendations equal to OFL, they will provide rational why it believes that level of fishing will not exceed MFMT.

4. The Councils and FWC may conduct a public hearing on the reports and the joint SSCs' ABC recommendation at, or prior to, the time it is considered by the Council for action. Other public hearings may be held also. The Councils and FWC may request a review of the report by their Spiny Lobster Advisory Panels and optionally by their socioeconomic experts, and convene these groups before taking action.

5. The Councils and FWC in selecting an ACL, ACT, AM, and a stock restoration time period, if necessary, will, in addition to taking into consideration the recommendations and information provided for in paragraphs 1, 2, 3, and 4, utilize the following criteria:

> **a.** Set ACL at or below the ABC specified by the SSCs or set a series of annual ACLs at or below the projected ABCs in order to account for management uncertainty. If the Councils and FWC set the ACL equal to ABC, and ABC has been set equal to OFL, the Councils and FWC will provide its rationale as to why it believes that level of fishing will not exceed MFMT.
>
> **b.** May subdivide the ACLs into commercial, for-hire, and private recreational sector ACLs or gear specific ACLs that maximize the net benefits of the fishery to the nation. The Sector ACLs will be based on allocations determined by criteria established by the Councils and FWC, and specified by the Councils through a plan amendment. If spiny lobster is overfished, and harvest in any year exceeds the ACL or sector ACL, management measure and catch levels for that sector will be adjusted in accordance with the AMs established for that stock.
>
> **c.** Set ACTs or sector ACTs at or below ACLs and in accordance with the provision of the AM for spiny lobster. The ACT is the management target that accounts for management uncertainty in controlling the actual catch at or below the ACL. If an ACL is exceeded repeatedly, the Councils and FWC have the option to establish an ACT if one does not already exist for a particular stock, and adjust or establish AMs for that stock as well.

6. The Councils will provide the joint SSCs' specification of OFL and recommendation of ABC and its recommendations for ACLs, sector ACLs, ACTs, sector ACTs, AMs, sector AMs; stock restoration target dates for each stock or stock complex; estimates of B_{MSY} and MSST; estimates of MFMT; and the quotas, bag limits, trip limits, size limits, closed seasons, and gear restrictions necessary to avoid exceeding the ACL or sector ACLS to the NOAA Fisheries Service Regional Administrator. The Councils will also provide the joint SSC reports, a regulatory impact review, proper National Environmental Policy Act (NEPA) documentation, and the proposed regulations within a predetermined time as agreed upon by the Councils, FWC and Regional Administrator. The Councils and FWC may also recommend new levels or statements for MSY (or proxy) and OY.

7. The Regional Administrator will review the Councils' recommendations and supporting information; and, if he concurs that the recommendations are consistent with the objectives of the FMP, the National Standards, and other applicable law, he shall prepare a regulatory amendment and forward notice of proposed rules to the Assistant Administrator for publication (providing appropriate time for additional public comment). The Regional Administrator will take into consideration all public comment and information received and will forward a final rule for publication in the *Federal Register* within 30 days of the close of the public comment, or such other time as agreed upon by the Councils and Regional Administrator.

8. Appropriate regulatory changes that may be implemented by final rule in the *Federal Register* include:

a. ACLs or sector ACLs, or a series of annual ACLs or sector ACLs.

b. ACTs or sector ACTs, or a series of annual ACTs or sector ACTs, and establish ACTs to stocks which do not have an ACT.

c. AMs, or sector AMs.

d. Bag limits, size limits, vessel trip limits, closed seasons or area, gear restrictions, and quotas designed to achieve OY and keep harvest levels from exceeding the ACL or sector ACL.

e. New levels or statements of MSY (or proxy) and OY for any stock.

f. Adjust fishing seasons/years.

9. The Regional Administrator is authorized, through notice action, to conduct the following activities.

a. Close the commercial fishery for spiny lobster at such time as projected to be necessary to prevent the commercial sector from exceeding its sector ACL or ACT for the remainder of the fishing year or sub-quota season.

b. Close the recreational fishery for spiny lobster at such time as projected to be necessary to prevent recreational sector ACLs or ACTs from being exceeded.

c. Reopen a commercial or recreational season that had been prematurely closed if needed to assure that a sector ACL or ACT can be reached.

10. If NOAA Fisheries Service decides not to publish the proposed rule of the recommended management measures, or to otherwise hold the measures in abeyance, then the Regional Administrator must notify the Councils and FWC of its intended action and the reasons for concern along with suggested changes to the proposed management measures that would alleviate the concerns. Such notice shall specify: 1) The applicable law with which the amendment is inconsistent; 2) the nature of such inconsistencies; and 3) recommendation concerning the action that could be taken by the Councils to conform the amendment to the requirements of applicable law.

APPENDIX G. CORALS AND CORAL REEFS FRAMEWORK PROCEDURE

This framework procedure provides standardized procedures for implementing management changes pursuant to the provisions of the FMP. There are two basic processes, the open framework process and the closed framework process. Open frameworks address issues where there is more policy discretion in selecting among various management options developed to address an identified management issue, such as changing a size limit to reduce harvest. Closed frameworks address much more specific factual circumstances, where the FMP and implementing regulations identify specific action to be taken in the event of specific facts occurring, such as closing a sector of a fishery after their quota has been harvested.

Open Framework:

1. Situations under which this framework procedure may be used to implement management changes include the following:

   a. A new stock assessment resulting in changes to the overfishing limit, acceptable biological catch, or other associated management parameters.

      In such instances the Council may, as part of a proposed framework action, propose an annual catch limit (ACL) or series of ACLs and optionally an annual catch target (ACT) or series of ACTs, as well as any corresponding adjustments to MSY, OY, and related management parameters.

   b. New information or circumstances.

      The Council will, as part of a proposed framework action, identify the new information and provide rationale as to why this new information indicates that management measures should be changed.

   c. Changes are required to comply with applicable law such as MSA, ESA, MMPA, or are required as a result of a court order.

      In such instances the Regional Administrator will notify the Council in writing of the issue and that action is required. If there is a legal deadline for taking action, the deadline will be included in the notification.

2. Open framework actions may be implemented in either of two ways, abbreviated documentation, or standard documentation process.

a. Abbreviated documentation process. Regulatory changes that may be categorized as a routine or insignificant may be proposed in the form of a letter or memo from the Council to the Regional Administrator containing the proposed action, and the relevant biological, social and economic information to support the action. If multiple actions are proposed, a finding that the actions are also routine or insignificant must also be included. If the Regional Administrator concurs with the determination and approves the proposed action, the action will be implemented through publication of appropriate notification in the Federal Register. Actions that may be viewed as routine or insignificant include, among others:

i. Reporting and monitoring requirements,

ii. Permitting requirements,

iii. Gear marking requirements,

iv. Vessel marking requirements,

v. Restrictions relating to maintaining fish in a specific condition (whole condition, filleting, use as bait, etc.),

vi. Bag and possession limit changes of not more than 1 fish,

vii. Size limit changes of not more than 10% of the prior size limit,

viii. Vessel trip limit changes of not more than 10% of the prior trip limit,

ix. Closed seasons of not more than 10% of the overall open fishing season,

x. Species complex composition, including species subject to limited access privilege program (LAPP) management, requiring new share specification,

xi. Restricted areas (seasonal or year-round) affecting no more than a total of 100 square nautical miles,

xii. Respecification of ACL, ACT or quotas that had been previously approved as part of a series of ACLs, ACTs or quotas,

xiii. Specification of MSY, OY, and associated management parameters (such as overfished and overfishing definitions) where new values are calculated based on previously approved specifications,

xiv. Gear restrictions, except those that result significant changes in the fishery, such as complete prohibitions on gear types,

xv. Quota changes of not more than 10%, or retention of portion of an annual quota in anticipation of future regulatory changes during the same fishing year,

b. Standard documentation process. Regulatory changes that do not qualify as a routine or insignificant may be proposed in the form of a framework document with supporting analyses. Non routine or significant actions that may be implemented under a framework action include:

i. Specification of ACTs or sector ACTs, and modifications to ACL/ACT control rule,

ii. Specification of ABC and ABC control rules,

iii. Rebuilding plans and revisions to approved rebuilding plans,

iv. The addition of new species to existing limited access privilege programs (LAPP),

v. Changes specified in section 4(a) that exceed the established thresholds.

3. The Council will initiate the open framework process to inform the public of the issues and develop potential alternatives to address the issues. The framework process will include the development of documentation and public discussion during at least one council meeting.

4. Prior to taking final action on the proposed framework action, the Council may convene its SSC, SEP, or AP, as appropriate, to provide recommendations on the proposed actions.

5. For all framework actions, the Council will provide the letter, memo, or the completed framework document along with proposed regulations to the Regional Administrator in a timely manner following final action by the Council.

6. For all framework action requests, the Regional Administrator will review the Council's recommendations and supporting information and notify the Council of the determinations, in accordance with the MSA[38] and other applicable law.

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[38] SEC. 304. ACTION BY THE SECRETARY 16 U.S.C. 1854
(a) REVIEW OF PLANS.—
(1) Upon transmittal by the Council to the Secretary of a fishery management plan or plan amendment, the Secretary shall—
(A) immediately commence a review of the plan or amendment to determine whether it is consistent with the national standards, the other provisions of this Act, and any other applicable law; and
(B) immediately publish in the Federal Register a notice stating that the plan or amendment is available and that written information, views, or comments of interested persons on the plan or amendment may be submitted to the Secretary during the 60-day period beginning on the date the notice is published.
(2) In undertaking the review required under paragraph (1), the Secretary shall—
(A) take into account the information, views, and comments received from interested persons;
(B) consult with the Secretary of State with respect to foreign fishing; and
(C) consult with the Secretary of the department in which the Coast Guard is operating with respect to enforcement at sea and to fishery access adjustments referred to in section 303(a)(6).
(3) The Secretary shall approve, disapprove, or partially approve a plan or amendment within 30 days of the end of the comment period under paragraph (1) by written notice to the Council. A notice of disapproval or partial approval shall specify—
(A) the applicable law with which the plan or amendment is inconsistent;

Closed Framework:

1. Consistent with existing requirements in the FMP and implementing regulations, the Regional Administrator is authorized to conduct the following framework actions through appropriate notification in the Federal Register:

   a. Close or adjust harvest any sector of the fishery for a species, sub-species, or species group that has a quota or sub-quota at such time as projected to be

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(B) the nature of such inconsistencies; and
(C) recommendations concerning the actions that could be taken by the Council to conform such plan or amendment to the requirements of applicable law. If the Secretary does not notify a Council within 30 days of the end of the comment period of the approval, disapproval, or partial approval of a plan or amendment, then such plan or amendment shall take effect as if approved.

(4) If the Secretary disapproves or partially approves a plan or amendment, the Council may submit a revised plan or amendment to the Secretary for review under this subsection.
(5) For purposes of this subsection and subsection (b), the term "immediately" means on or before the 5th day after the day on which a Council transmits to the Secretary a fishery management plan, plan amendment, or proposed regulation that the Council characterizes as final.

(b) REVIEW OF REGULATIONS.—
(1) Upon transmittal by the Council to the Secretary of proposed regulations prepared under section 303(c), the Secretary shall immediately initiate an evaluation of the proposed regulations to determine whether they are consistent with the fishery management plan, plan amendment, this Act and other applicable law. Within 15 days of initiating such evaluation the Secretary shall make a determination and—

(A) if that determination is affirmative, the Secretary shall publish such regulations in the Federal Register, with such technical changes as may be necessary for clarity and an explanation of those changes, for a public comment period of 15 to 60 days; or
(B) if that determination is negative, the Secretary shall notify the Council in writing of the inconsistencies and provide recommendations on revisions that would make the proposed regulations consistent with the fishery management plan, plan amendment, this Act, and other applicable law.

(2) Upon receiving a notification under paragraph (1)(B), the Council may revise the proposed regulations and submit them to the Secretary for reevaluation under paragraph (1).
(3) The Secretary shall promulgate final regulations within 30 days after the end of the comment period under paragraph (1)(A). The Secretary shall consult with the Council before making any revisions to the proposed regulations, and must publish in the Federal Register an explanation of any differences between the proposed and final regulations.

necessary to prevent the sector from exceeding its sector-quota for the remainder of the fishing year or sub-quota season,

b. Reopen any sector of the fishery that had been prematurely closed,

c. Implement accountability measures, either in-season or post-season.

APPENDIX H. OVERALL GOAL AND OBJECTIVES OF THE FISHERY MANAGEMENT PLAN FOR REEF FISH RESOURCES IN THE GULF OF MEXICO, PRE-OCTOBER 2018 COUNCIL MEETING

The overall goal of the Reef Fish Fishery Management Plan (FMP) is:

To manage the reef fish fishery of the United States within the waters of the Gulf of Mexico Fishery Management Council jurisdiction to attain the greatest overall benefit to the nation with particular reference to food production and recreational opportunities on the basis of the maximum sustainable yield as reduced by relevant ecological, economic, or social factors.

The Reef Fish FMP objectives are as follows:

1. To rebuild the declining fish stocks wherever they occur within the fishery.
2. To establish a fishery reporting system for monitoring the reef fish fishery
3. To conserve and increase reef fish habitats in appropriate areas and to provide protection for juveniles while protecting existing and new habitats.
4. To minimize conflicts between user groups of the resource and conflicts for space
5. The primary objective and definition of Optimum Yield for the Reef Fish Fishery Management Plan is to stabilize long term population levels of all reef fish species by establishing a certain survival rate of biomass into the stock of spawning age to achieve at least 20 percent spawning potential ratio.
6. To reduce user conflicts and near shore fishing mortality.
7. To re-specify the reporting requirements necessary to establish a database for monitoring the reef fish fishery and evaluating management actions.
8. To revise the definitions of the fishery management unit and fishery to reflect the current species composition of the reef fish fishery.
9. To revise the definition of optimum yield to allow specification at the species level
10. To encourage research on the effects of artificial reefs.
11. To maximize net socioeconomic benefits from the reef fish fishery.
12. To increase the stability of the red snapper fishery in terms of fishing patterns and markets.
13. To avoid to the extent practicable the "derby" type fishing season.
14. To promote flexibility for the fishermen in their fishing operations.
15. To provide for cost-effective and enforceable management of the fishery.
16. To optimize, to the extent practicable and allowed by law, net benefits from the fishery.
17. To reduce the harvesting capacity of the red snapper fleet in an equitable manner utilizing demonstrated historical dependence on the red snapper resource as a criterion.
18. To maximize the available days to recreational fishermen.