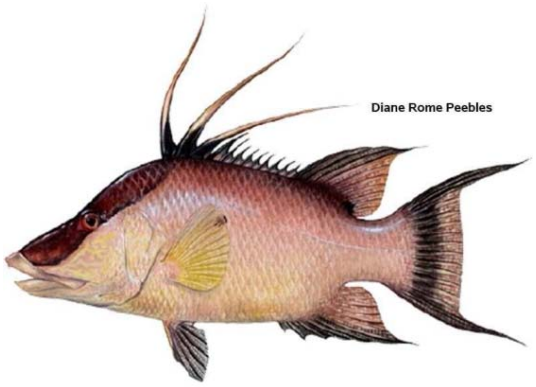
Modification of Gulf of Mexico Red Snapper and West Florida Hogfish Annual Catch Limits



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

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ABBREVIATIONS USED IN THIS DOCUMENT

ABC	allowable biological catch
ACL	annual catch limit
ACT	annual catch target
AM	accountability measure
APAIS	Access Point Angler Intercept Survey
Bi Op	Biological Opinion
Council	Gulf of Mexico Fishery Management Council
CS	Consumer Surplus
CV	Coefficient of Variance
DLMT	Data Limited Toolkit
DPS	Distinct Population Segment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EFP	Exempted Fishing Permits
EJ	Environmental Justice
ESA	Endangered Species Act
F	Fishing Mortality Rate
FL	Fork Length
FWC	Florida Fish and Wildlife Conservation Commission
GMFMC	Gulf of Mexico Fishery Management Council
GSAD	Gulf and South Atlantic Dealer
Gulf	Gulf of Mexico
HAPC	Habitat Areas of Particular Concern
IFQ	Individual Fishing Quota
IPCC	Intergovernmental Panel on Climate Change
LAPPs	Limited Access Privilege Programs
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MFMT	Maximum Fishing Mortality Threshold
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistics Survey
MRIP	Marine Recreational Information Program
MSST	Minimum Stock Size Threshold
NMFS	National Marine Fisheries Service
NOR	Net Operating Revenue
OFL	overfishing limit
OY	Optimum Yield
PAH	Polycyclic Aromatic Hydrocarbons
PS	Producer Surplus
RFFA	Reasonably Foreseeable Future Actions
RQ	Regional Quotient
SEA	Strategic Environmental Assessment Division
SEDAR	Southeast Data, Assessment, and Review process
SEFSC	Southeast Fisheries Science Center
SERO	NMFS Southeast Regional Office

SPR	Spawning Potential Ratio
SOI	Segment of Interest
SRHS	Southeast Region Headboat survey
SSB	Spawning Stock Biomass
SSC	Scientific and Statistical Committee
TAC	Total Allowable Catch
TPWD	Texas Parks and Wildlife Department

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CHAPTER 1. INTRODUCTION

1.1 Background

The Southeast Data, Assessment, and Review (SEDAR) process completed stock assessments on Gulf of Mexico (Gulf) red snapper and the West Florida stock of hogfish in 2018. The red snapper stock assessment, SEDAR 52, was performed by the National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC). The West Florida hogfish stock assessment, which was an update of the 2013 SEDAR 37 stock assessment, was performed by the Florida Fish and Wildlife Conservation Commission (FWC) (2014). These stock assessments were presented at the Gulf of Mexico Fishery Management Council's (Council) Scientific and Statistical Committee (SSC) meeting in May 2018. The SSC determined that both stock assessments represent the best scientific information available, and are suitable for management advice.

1.1.1 Gulf Red Snapper

SEDAR 52 incorporated recent information into the previous assessment (SEDAR 31 Update 2014), with data updated through 2016. Biomass estimates show the western Gulf continues to rebuild, while the eastern Gulf has leveled off over the last few years. The number of older fish present has increased Gulf-wide, indicating rebuilding age structure. Recruitment continues to have no observed correlation to spawning stock biomass.

The Gulf red snapper stock is not considered to be overfished or undergoing overfishing, and is on schedule to be rebuilt by 2032. The change in the overfished threshold (based on 26% spawning potential ratio [SPR]) in Amendment 44 (GMFMC 2017) was the primary reason for the change in stock status from overfished to not overfished. The 2016 stock biomass was estimated to be 18% SPR Gulf-wide, an increase from 14% SPR in 2014.

Projections assumed constant recruitment, selectivity, retention, and discard mortality. The SSC noted that without increases in recruitment (i.e., assuming constant recruitment into the future), the eastern Gulf was projected to decline under current conditions (more removals than recruitment) compared to the western region. The western Gulf appears to be contributing the most to the rebuilding of the stock. Analysts added that projections beyond three years into the future are highly uncertain, and recommended updates at appropriate intervals.

For projections of the overfishing limit (OFL) and acceptable biological catch (ABC), fishing mortality and associated yield was constrained to rebuild the stock by 2032. Per the SEDAR 52 base model, overfishing did not occur in 2017, because the recommended OFL for that year would have been 20.71 million pounds (mp).

The SSC endorsed two possible choices for setting OFL and ABC: annually for 2019-2021, which results in a declining yield stream; or a constant catch OFL and ABC for 2019-2021, consisting of the average of the annual values. The SSC agreed that the two methods of

calculating OFL and ABC were equivalent within the considered three-year period (see Table 1.1.1.1 and the Council should determine which is most appropriate for management.

Table 1.1.1.1. SSC recommendations for OFL and ABC from the SEDAR 52 stock assessment of Gulf red snapper declining yield stream (a) or constant catch (b). Values are in millions of pounds, whole weight.

a. Declining Yield Stream

Year	OFL	ABC
2019	16.6	16.0
2020	15.4	15.0
2021	14.6	14.3

b. Constant Catch

Year	OFL	ABC
2019-2021	15.5	15.1

Current Management and Landings

The stock annual catch limit (ACL) is set equal to the ABC. The ACL is divided 51% to the commercial sector and 49% to the recreational sector. The recreational sector is divided into two components (57.7% to the private angling component and 42.3% to the federal for-hire component) and each is managed under an annual catch target (ACT), which is set 20% below the respective component ACL. The recreational component-specific ACTs determine the duration of their respective fishing seasons each year. Red snapper landings for the recreational and commercial sectors in pounds whole weight for the years 2001 through 2017 are given in Table 1.1.1.2.

Table 1.1.1.2. Red snapper landings for the recreational and commercial sectors in pounds whole weight for the years 2001 through 2017.

Year	Private Angling Component	Federal For-Hire Component	Recreational Total	Commercial Sector	Overall Total
2001	2,846,830	2,397,973	5,244,802	4,625,000	9,869,802
2002	3,037,152	3,484,593	6,521,745	4,779,000	11,300,745
2003	2,987,156	3,106,886	6,094,042	4,409,000	10,503,042
2004	3,198,600	3,261,644	6,460,244	4,651,000	11,111,244
2005	2,175,730	2,500,188	4,675,918	4,096,000	8,771,918
2006	1,692,246	2,438,886	4,131,132	4,649,000	8,780,132
2007	3,142,991	2,665,802	5,808,793	3,182,730	8,991,523
2008	2,298,321	1,757,553	4,055,874	2,483,602	6,539,476
2009	3,362,349	2,234,508	5,596,857	2,483,565	8,080,422
2010	1,784,709	862,660	2,647,369	3,392,208	6,039,577
2011	4,891,368	1,842,739	6,734,107	3,594,551	10,328,658
2012	5,284,921	2,239,320	7,524,241	4,036,398	11,560,639
2013	8,145,917	1,556,985	9,702,902	5,448,543	15,151,445
2014	3,268,558	566,878	3,835,436	5,567,822	9,403,258
2015	3,806,474	2,153,677	5,960,151	7,184,209	13,144,360
2016	5,293,635	2,142,815	7,436,450	6,723,822	14,160,272
2017	6,593,233	2,269,538	8,862,771	6,287,083	15,149,854

Source: SERO ACL and ALS databases, TPWD, and LA Creel.

1.1.2 West Florida Hogfish

The SEDAR 37 Update assessment of the West Florida hogfish stock used the same life history and conversion factors as the 2013 SEDAR 37 stock assessment, and maintained the same model configuration with some small modifications. West Florida hogfish are one distinct population among three stocks that occur in the southeastern United States; the west Florida stock, the Florida Keys/East Florida stock, and the Georgia to North Carolina stock (Figure 1.1.2.1). This document is specific to the West Florida hogfish stock.

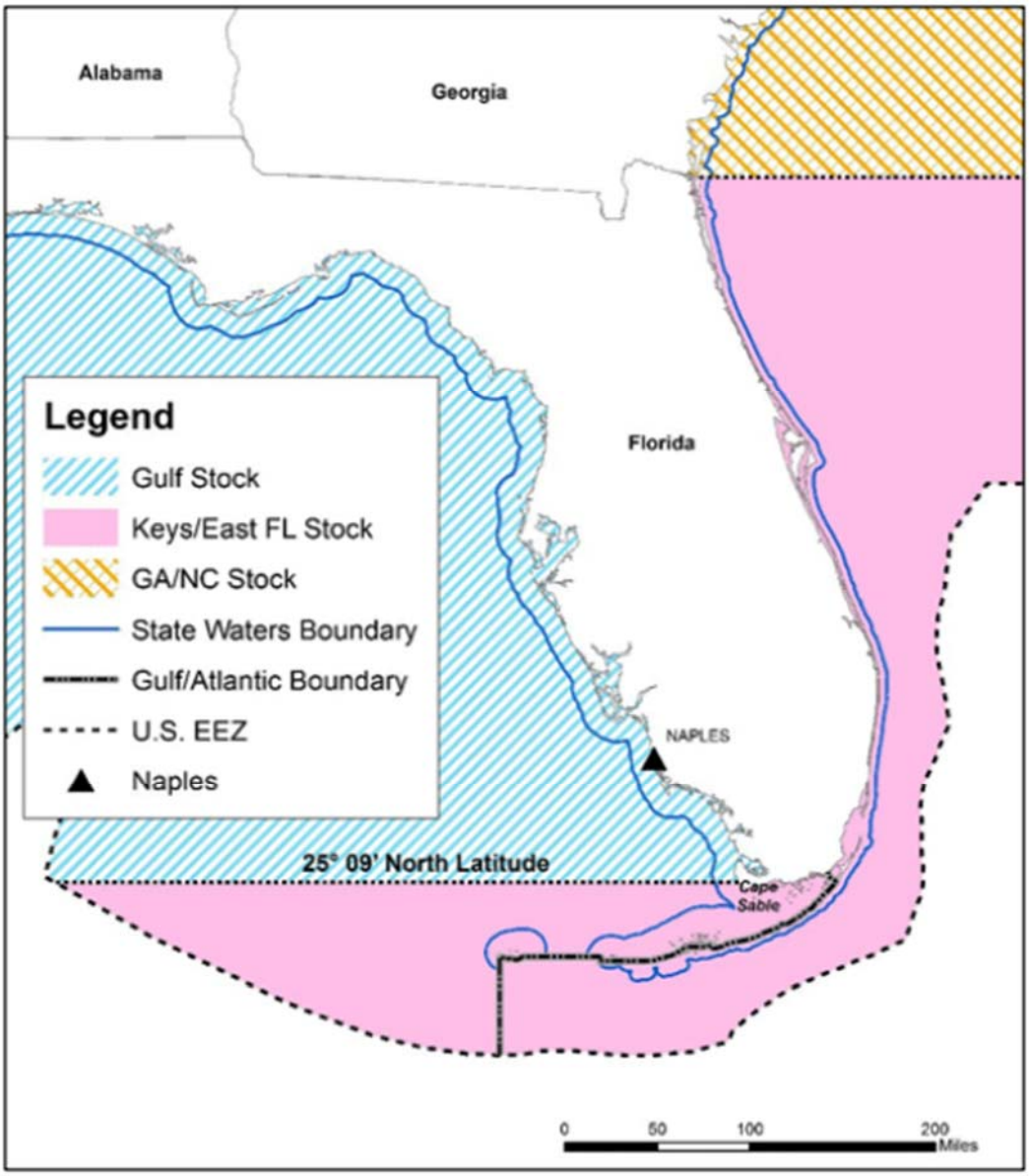

Figure 1.1.2.1. Biological stock boundaries and management delineations for the management of hogfish in the southeastern US both in state and federal waters in the exclusive economic zone.

The update assessment results indicated a higher total biomass estimate over time than the original SEDAR 37 benchmark assessment. The assessment indicated that overfishing was not occurring and that the stock was not overfished. The OFL and ABC projections through 2026 were provided, but due to increasing uncertainties with long-range projections, the SSC limited their OFL and ABC recommendations to three years (Table 1.1.2.1). The SSC thought that, due to the uncertainties in the update assessment and the establishment of the West Florida hogfish stock as a separate stock, the next West Florida hogfish assessment should be a benchmark (or similar) assessment.

Table 1.1.2.1. SSC recommendations for OFL and ABC from the SEDAR 37 Update stock assessment of West Florida hogfish. Values are in pounds whole weight.

Year	OFL	ABC
2019	151,500	129,500
2020	163,700	141,300
2021	172,500	150,400

Current Management and Landings Data

Currently there is no allocation of the West Florida hogfish stock ACL between the recreational and commercial sectors. During the period 2001-2017, 79% of the average harvest was by the recreational sector and 21% was by the commercial sector. The West Florida hogfish stock is currently managed by an ACL of 219,000 lbs whole weight (ww) based on the constant catch ABC recommendation for the years 2016 – 2018 by the SSC. The ACL will revert to 159,300 lbs ww after 2018 until modified by rulemaking. This corresponds to the equilibrium yield at 75% of the fishing mortality rate at maximum sustainable yield, which was selected due to increasing uncertainty in the projections for 2019 and subsequent years.

Hogfish landings from 2001 – 2017 are shown in Table 1.1.2.2, with total landings fluctuating between a minimum of 61,563 lbs ww in 2006 to 306,151 lbs ww in 2016.

Table 1.1.2.2. Hogfish recreational and commercial landings in pounds whole weight for the years 2001 through 2017, and the percent landed of the stock ACL.

Year	Recreational	Commercial	Recreational % Total Landings	Commercial % Total Landings	Total Landings	% of ACL
2001	114,256	27,059	80.9%	19.1%	141,315	n/a
2002	76,349	30,387	71.5%	28.5%	106,736	n/a
2003	205,685	28,036	88.0%	12.0%	233,721	n/a
2004	90,499	25,254	78.2%	21.8%	115,753	n/a
2005	46,194	20,110	69.7%	30.3%	66,304	n/a
2006	45,933	15,630	74.6%	25.4%	61,563	n/a
2007	49,569	18,112	73.2%	26.8%	67,681	n/a
2008	165,327	24,150	87.3%	12.7%	189,477	n/a
2009	97,655	32,316	75.1%	24.9%	129,971	n/a
2010	195,354	34,926	84.8%	15.2%	230,280	n/a
2011	72,500	45,995	61.2%	38.8%	118,495	n/a
2012	148,833	42,989	77.6%	22.4%	191,822	92.2%
2013	244,905	24,874	90.8%	9.2%	269,779	129.7%
2014	83,370	35,593	70.1%	29.9%	118,963	57.2%
2015	109,933	28,417	79.5%	20.5%	138,350	66.5%
2016	275,414	30,737	90.0%	10.0%	306,151	147.2%
2017	92,710	15,899	85.4%	14.6%	108,609	52.2%

Source: NMFS Southeast Regional Office, Commercial ACL dataset (Oct 2017; 2018 In-season monitoring), SEFSC recreational MRIP ACL dataset (June 2018). Recreational landings are post-stratified to reflect the Gulf Council's current management jurisdiction.

1.2 Purpose and Need

The purpose is to modify the ACLs and ACT based on recent stock assessments for Gulf red snapper and West Florida hogfish.

The need is to set ACLs consistent with the best available science for Gulf red snapper and West Florida hogfish, and to achieve optimum yield (OY) consistent with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

1.3 History of Management

The **Fishery Management Plan (FMP) for Reef Fish Resources in the Gulf of Mexico (Reef Fish FMP)** (with Environmental Impact Statement) was implemented in November 1984. The original list of species included in the management unit consisted of snappers, groupers, and sea basses. This summary focuses on management actions pertinent to the harvest of the reef fish species considered for these management actions (red snapper and West Florida hogfish).

The **Generic Sustainable Fisheries Act Amendment** (1999) required the establishment of quotas for recreational and commercial fishing that, when reached, result in a prohibition on the retention of fish caught for each sector, respectively, for the remainder of the fishing year. With the establishment of a recreational quota in 1997, the NMFS Southeast Regional Administrator was authorized to close the recreational season for each species when the quota is reached, as required by the Magnuson-Stevens Act.

The **Reef Fish Amendment 44** (2017) standardized the minimum stock size threshold below which stocks are declared overfished for hogfish and six other reef fish species: gag, red grouper, red snapper, vermilion snapper, gray triggerfish, and greater amberjack. For these stocks, MSST was re-defined to be 50% of the $B_{MSY\ proxy}$. As long as overfishing is prevented, the stock biomass should never drop below the minimum stock size threshold.

1.3.1 Gulf Red Snapper

A summary of red snapper management through 2006 can be found in **Reef Fish Amendment 27/ Shrimp Amendment 14**, and is incorporated herein by reference (GMFMC 2007).

In 1990, **Amendment 1** established the first red snapper rebuilding plan. From 1990 through 2009, red snapper harvest was managed through the setting of an annual total allowable catch (TAC), which was divided into allocations of 51% commercial, and 49% recreational based on historical landings during 1979 through 1987. Amendment 1 also established a commercial red snapper quota of 3.1 mp ww. There was no explicit recreational allocation specified, only a bag limit of seven fish and a minimum size limit of 13 inches total length (TL) (GMFMC 1989). Based on the 51:49 commercial to recreational sector allocation, the commercial quota implied a TAC of approximately 6.1 mp ww in 1990, followed by explicit TACs of 4.0 mp ww in 1991 and 1992, 6.0 mp ww in 1993 through 1995, and 9.12 mp ww from 1996 through 2006. The TAC was reduced to 6.5 mp ww in 2007 and 5.0 mp ww in 2008 and 2009.

In 2006, **Reef Fish Amendment 26** established a red snapper individual fishing quota (IFQ) program for the commercial sector. Commercial fishermen acquired red snapper shares based on their catch history. Allocation of the annual commercial harvest of red snapper is awarded to IFQ shareholders each year based on the commercial ACL and how many shares they own. They are then able to fish that allocation throughout the year until they run out of allocation. Both shares and allocation are transferable, so a fisherman may purchase either shares or allocation from another fisherman during the fishing year (GMFMC 2006).

Beginning in 2010, new biological reference points were introduced under revised National Standard 1 guidelines. From 2010 until the development of an ABC Control Rule, the SSC set the red snapper ABC at 75% of the OFL. The ACL was set by the Council at or below the ABC. The Council did not implement an ACT for red snapper until 2014. The TAC was considered functionally equivalent to the ACL, and usage of the term TAC was phased out in favor of ACL. The Council set an ACL at or below the ABC, which was then allocated between the commercial and recreational sectors. These sector allocations were considered quotas.

In 2010, the ACL was increased to 6.945 mp ww. This increased the commercial quota from 2.550 mp ww to 3.542 mp ww and the recreational quota from 2.450 mp ww to 3.403 mp ww. In 2011, the ACL was raised to 7.185 mp ww, resulting in a 3.664 mp ww commercial quota and a 3.525 mp ww recreational quota. On August 12, 2011, NMFS published an emergency rule that, in part, increased the recreational red snapper quota by 345,000 lbs for the 2011 fishing year. In 2012, the ABC was increased to 8.080 mp ww, resulting in a commercial quota of 4.121 mp ww and recreational quota of 3.959 mp ww.

A scheduled quota increase in 2013 to 8.69 mp ww was cancelled due to an overharvest in 2012 by the recreational sector. After an analysis of the impacts of the overharvest on the red snapper rebuilding plan, the 2013 ABC was increased to 8.46 mp ww. In July 2013, the Council reviewed a new benchmark assessment (SEDAR 31 2013) which showed that the red snapper stock was rebuilding faster than projected. The SSC increased the ABC for 2013 to 13.5 mp ww, but warned that the catch levels would have to be reduced in future years if recruitment returned to average levels. In order to reduce the possibility of having to reduce the quota later, the Council set the 2013 stock ACL to 11.00 mp ww and the commercial quota at 5.61mp ww and the recreational quota at 5.39mp ww. Beginning in 2014, the Council set a recreational ACT at 20% below the recreational allocation of ACL, and added an accountability measure (AM) that required an overage adjustment if the recreational ACL was exceeded while the stock was overfished. The total ACL was set at 10.4 mp ww in 2014, 14.3 mp ww in 2015, 13.960 mp ww in 2016, and 13.740 mp ww in 2017 and subsequent years.

Amendment 40 to the Reef Fish FMP divided the recreational quota into a federal for-hire component quota (42.3%) and a private angling component quota (57.7%) for the recreational harvest of red snapper (GMFMC 2014). In 2015, this resulted in an ACT of 2.371 mp ww for the federally permitted for-hire component and 3.234 mp ww for the private angling component. The amendment also included a 3-year sunset provision on the separation of the recreational sector into distinct components. **Amendment 45** to the Reef Fish FMP extended the separate management of the federal for-hire and private angling components for an additional 5 years through the 2022 red snapper fishing season (GMFMC 2016).

The commercial and recreational sectors have had quota overages, but the commercial sector has not had overages since 2005. Since sector separation began in 2015, the private angling component has had overages in 2015, 2016, and 2017, while the federal for-hire component has not had any overages.

In 2018, all five Gulf states applied for exempted fishing permits (EFP) for a pilot study to test limited state management of the red snapper private angling component. The EFPs granted the requested allocation of the red snapper recreational quota to each state, to be harvested during the 2018 and 2019 fishing years by private anglers. The EFPs allowed the states to establish the private angling fishing season in state and federal waters for anglers landing red snapper in that state. The EFPs applied to private anglers who hold a valid recreational fishing permit issued by

the state they are landing in, and who are in in compliance with all other state requirements for landing red snapper.[1]

1.3.2 West Florida Hogfish

A complete history of management for the **Reef** Fish **FMP** is available on the Council's website: http://www.gulfcouncil.org/fishery_management_plans/reef_fish_management.php including recent hogfish actions.

Hogfish was included in the fishery, but not in the fishery management unit until **Amendment 16B** (GMFMC 1999). Hogfish is regulated by a 14-inch fork length (FL) minimum size limit, and a 5-fish recreational bag limit. The West Florida Hogfish stock is managed as a whole; there is no allocation between the commercial and recreational sectors. Other management measures that affect hogfish fishing include reef fish permit requirements for the commercial sector and for-hire component of the recreational sector.

The fishing season is usually open year-round, January 1-December 31. However, if the ACL for the stock is exceeded in any year, then in the following year the hogfish fishing season is closed on the date when the ACL is projected to be met. This occurred once since ACLs were implemented. In 2012, hogfish landings exceeded the ACL by 85,000 lbs (40% overage). Subsequently in 2013, the hogfish season was closed on December 2, upon NMFS determining that the 2013 ACL had been harvested. This still resulted in a 2013 ACL overage of 35,000 lbs (17% overage). However, the ACL was not exceeded in 2014, and the season remained open year-round in 2014 and each year since.

The **Generic ACL/AM Amendment**, established for hogfish OFL, ABC, ACL, and ACT. Because no assessment was available, but landings data existed and recent landings appeared sustainable, the OFL was set equal to the mean of 1999-2008 landings plus two standard deviations and equaled 272,000 lbs ww. To account for scientific uncertainty, the SSC applied the default buffer from the OFL using the formula ABC = mean of the landings plus 1.0 * standard deviation. With an ACL equal to the ABC, this resulted in an ACL of 208,000 lbs ww and a risk of exceeding OFL of 16%. This amendment also established an ACT for hogfish using a 14% buffer, resulting in an ACT of 179,000 lbs ww (GMFMC 2011).

In 2013-2014, FWC conducted a new benchmark assessment for hogfish (SEDAR 37 2014). This assessment divided hogfish into three stocks based upon genetic analysis (the West Florida [Gulf of Mexico] stock, East Florida/Florida Keys stock, and the Georgia through North Carolina stock) and established several stock reference points. **Amendment 43** consequently revised the West Florida hogfish management unit to include all hogfish found in the Gulf north of the line extending due west from 25°09′ North latitude off the west coast of Florida (Figure 1.1.1.1), and set ACLs for 2017 and 2018 at 219,000 lbs ww. The ACL will revert to 159,300 lbs ww for 2019 and subsequent years. This amendment also increased the minimum size limit to 14 inches

[1] For more information: https://www.fisheries.noaa.gov/southeast/state-recreational-red-snapper-management-exempted-fishing-permits

FL and prohibited the use of powerheads for harvesting hogfish in the Gulf stressed area. The use of an ACT for management purposes was eliminated (GMFMC 2016).

Currently hogfish is managed by a constant catch ACL set at 219,000 lbs ww. The ACL will revert to 159,300 lbs after 2018 until modified by rulemaking. This catch level corresponds to the equilibrium yield at 75% of the fishing mortality rate at maximum sustainable yield, which was selected due to increasing uncertainty in the projections for 2019 and subsequent years from SEDAR 37.

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action 1 – Modify Red Snapper Annual Catch Limits (ACL) and Recreational Annual Catch Targets (ACT)

Alternative 1: No Action. The red snapper ACLs and recreational ACTs will remain at 2017 levels, as shown in the table below.

Year	OFL	ABC	Total ACL	Comm ACL	Rec Total ACL	Private Angling ACL	For-hire ACL	Rec Total ACT	Private Angling ACT	For-hire ACT
2017+	14.80	13.74	13.740	7.007	6.733	3.885	2.848	5.386	3.108	2.278

* Values are in millions of pounds, whole weight.

Alternative 2: Modify the red snapper ACLs and recreational ACTs based on the annual acceptable biological catch (ABC) recommendations of the Scientific and Statistical Committee (SSC) for 2019 – 2021 and subsequent years as determined from the SEDAR 52 stock assessment. The total ACL is equal to the ABC, and allocations and ACTs are applied as appropriate.

Year	OFL	ABC	Total ACL	Comm ACL	Rec Total ACL	Private Angling ACL	For-hire ACL	Rec Total ACT	Private Angling ACT	For-hire ACT
2019	16.6	16.0	16.000	8.160	7.840	4.524	3.316	6.272	3.619	2.653
2020	15.4	15.0	15.000	7.650	7.350	4.241	3.109	5.880	3.393	2.487
2021+	14.6	14.3	14.3	7.293	7.007	4.043	2.964	5.606	3.234	2.371

* Values are in millions of pounds, whole weight.

Alternative 3: Modify the red snapper ACLs and recreational ACTs based on the constant catch ABC recommendations of the SSC for 2019 – 2021 and subsequent years as determined from the SEDAR 52 stock assessment. The total ACL is equal to the ABC, and allocations and ACTs are applied as appropriate.

Year	OFL	ABC	Total ACL	Comm ACL	Rec Total ACL	Private Angling ACL	For-hire ACL	Rec Total ACT	Private Angling ACT	For-hire ACT
2019-2021+	15.5	15.1	15.100	7.701	7.399	4.269	3.130	5.919	3.415	2.504

* Values are in millions of pounds, whole weight.

Discussion:

The Southeast Data, Assessment, and Review (SEDAR) 52 stock assessment for Gulf of Mexico (Gulf) red snapper was presented to the Gulf of Mexico Fishery Management Council's (Council) Scientific and Statistical Committee (SSC) at its May 2018 meeting. The Gulf red snapper stock is not considered to be overfished or undergoing overfishing, but is not projected to be rebuilt until 2032. The SSC determined that the stock assessment represented the best scientific information available, acknowledged the red snapper acceptable biological catch (ABC) could be increased, and recommended two different options to the Council for ABC: a declining yield stream and a constant catch scenario.

Currently the red snapper total annual catch limit (ACL) is set equal to the ABC of 13.74 million pounds (mp) whole weight (ww). The total quota has been allocated 51% to the commercial sector and 49% to the recreational sector. The commercial sector does not have an annual catch target (ACT). When the ACL is reached or projected to be reached, the in-season accountability measure (AM) is triggered to close the fishing season for the remainder of the year. However, the commercial sector has been managed by an individual fishing quota (IFQ) program since 2007, and commercial landings have remained under the commercial sector's ACL since then. See Section 3.1.2 for more information on the red snapper IFQ program.

Beginning in 2015, the recreational sector was split into two components, and separate recreational sub-quotas were established for private anglers and for-hire vessels. The recreational sector allocation of red snapper is currently designated 57.7% for private anglers and federally permitted 42.3% for federally permitted for-hire vessels. The recreational components are currently managed with season durations set to harvest the ACTs, which are 20% below the ACLs for each component. This strategy of a management buffer between the ACT and ACL reduces the likelihood of exceeding the ACL and triggering post-season AMs, which reduces the amount of fish allowed to be harvested in the following year when the stock is declared to be in an overfished condition. In 2018, the red snapper stock was reclassified from overfished to not overfished but rebuilding. Under this reclassification, the amount of fish allowed to be harvested in the following year is not reduced because of the ACL being exceeded. However, overages may have a negative effect on future ABCs.

There is currently a framework action in development which considers changing the buffer between the ACT and the ACL for the private angling and for-hire components of the recreational sector for red snapper. The combination of that framework action, and this document, may result in catch limits for the recreational sector for red snapper that differ from those presented herein.

Alternative 1 (No Action) would maintain the current total ACL equal to the current ABC of 13.74 mp ww, which is below the SSC recommended ABC for 2019 – 2021 and subsequent years based on the most recent stock assessment. It would maintain the current ACL for the commercial sector at 7.007 mp ww, and the current ACT and ACL for the recreational sector at 5.386 mp ww and 6.733 mp ww, respectively. It would maintain the current recreational ACT and ACL for the private angling component at 3.108 and 3.885 mp ww, and the current ACT and ACL for the federal for-hire component at 2.278 and 2.848 mp ww. **Alternative 1** would not

achieve optimum yield, and no longer reflects catch levels based on the best scientific information available.

Alternative 2 would modify the red snapper sector and component ACLs and ACTs based on the annual ABC recommendations of the SSC for 2019 – 2021 and subsequent years from the most recent stock assessment (see table in Action 1 **Alternative 2**). The total ACL would continue to be equal to the ABC. **Alternative 2** results in an increase for all sectors and components from current catch limits by approximately 16% mp ww in 2018, 9% in 2019, and 4% in 2021 (Table 2.1.1). Under **Alternative 2**, the ACL would be highest in 2019 and decline in subsequent years; however, the ACL for 2021 and beyond would still be higher than the current ACL (**Alternative 1**).

Table. 2.1.1. Changes to the ABCs, ACLs, and ACTs for red snapper for **Alternative 2** relative to **Alternative 1**. Values are in million pounds, whole weight.

Year	Change in ABC	Change in Total ACL	Change in Comm ACL	Change in Rec Total ACL	Change in Private Angling ACL	Change in For-hire ACL	Change in Rec Total ACT	Change in Private Angling ACT	Change in For-hire ACT
2019	2.260	2.260	1.153	1.107	0.639	0.468	0.886	0.511	0.375
2020	1.260	1.260	0.643	0.617	0.356	0.261	0.494	0.285	0.209
2021+	0.560	0.560	0.286	0.274	0.158	0.116	0.220	0.127	0.093

Alternative 3 would modify the red snapper ACLs and recreational ACTs based on the constant catch ABC recommendations of the SSC for 2019 – 2021 and subsequent years as determined from the SEDAR 52 stock assessment (see table in Action 1 **Alternative 3**). The total ACL would continue to be equal to the ABC. **Alternative 3** results in an increase from current catch limits by approximately 10% in 2019 and onward (Table 2.1.2). **Alternative 3** provides a consistent catch limit, whereas **Alternative 2** results in slow declines over the next three years.

Table. 2.1.2. Changes to the ABC, ACLs, and ACTs of red snapper for **Alternative 3** relative to the **Alternative 1.** Values are in million pounds, whole weight.

Year	Change in ABC	Change in Total ACL	Change in Comm ACL	Change in Rec Total ACL	Change in Private Angling ACL	Change in For-hire ACL	Change in Rec Total ACT	Change in Private Angling ACT	Change in For-hire ACT
2019+	1.360	1.360	0.694	0.666	0.385	0.282	0.533	0.308	0.226

2.2 Action 2 – Modify the West Florida Hogfish ACL

Alternative 1: No Action. The West Florida hogfish OFL, ABC and ACL will remain at the levels established in 2017, shown in the table below.

Year	OFL	ABC	ACL
2018	232,000	219,000	219,000
2019+	161,900	159,300	159,300

* Values are in pounds whole weight.

Alternative 2: Modify the West Florida hogfish OFL, ABC and ACL based on the recommendations of the SSC for 2019 – 2021 and subsequent years as determined from the 2018 SEDAR 37 update stock assessment. The ACL is equal to the ABC.

Year	OFL	ABC	ACL
2019	151,500	129,500	129,500
2020	163,700	141,300	141,300
2021+	172,500	150,400	150,400

* Values are in pounds whole weight.

Discussion:

West Florida hogfish are one distinct stock among three stocks that occur in the southeastern United States, which also include the Florida Keys/East Florida stock and the Georgia to North Carolina stock (Figure 1.1).

The most recent stock assessment for West Florida hogfish was completed in 2018 and was an update of the 2013 SEDAR 37 stock assessment. The Council's SSC determined that the stock assessment represented the best scientific information available, and was suitable for management advice. The update assessment results indicated a higher total biomass estimate over time than the original SEDAR 37 benchmark assessment. There is currently no allocation of the hogfish ACL between the recreational and commercial sectors. During the period 2001-2017, the average proportion of recreational to commercial harvest was 79% recreational to 21% commercial.

Currently hogfish is managed by a constant catch ACL set at 219,000 lbs ww based on the constant catch ABC recommendation for the years 2016 – 2018 by the SSC, following the 2013 SEDAR 37 benchmark assessment. If no action is taken to adjust the ACL, the ACL will revert to 159,300 lbs after 2018 until modified by rulemaking. This catch level corresponds to the equilibrium yield at 75% of the fishing mortality rate at maximum sustainable yield, which was selected due to increasing uncertainty in the projections for 2019 and subsequent years.

Alternative 1 (No Action) would maintain the current West Florida hogfish stock ABC and ACL of 219,000 lbs ww, which would revert to 159,300 lbs ww after 2018. This would be higher than the ABC recommended by the SSC and does not represent the best scientific

information available. Additionally, per the Magnuson-Stevens Fishery Conservation and Management Act, the ACL cannot be greater than the ABC.

Alternative 2 would modify the West Florida hogfish stock ACL based on the annual ABC recommendations of the SSC for 2019 – 2021 and subsequent years as determined from the 2018 SEDAR 37 update stock assessment (see table in Action 2 **Alternative 2**). The ACL would continue to be equal to the ABC. **Alternative 2** results in a decrease in the ACL by approximately 19% in 2019, 11% in 2020, and 6% in 2021+ (Table 2.2.1). The ABC recommendations from the SSC, based on the SEDAR 37 update stock assessment, reflect an acknowledgement of increased uncertainty in the stock assessment results. As a result, despite the West Florida hogfish stock being neither overfished nor experiencing overfishing, the recommended catch levels have decreased.

Table 2.2.1. Change in OFL, ABC, and ACL of the West Florida hogfish stock relative to **Alternative 1**. Values are in pounds whole weight.

Year	Change to OFL	ABC	ACL
2019	-10,400	-29,800	-29,800
2020	1,800	-18,000	-18,000
2021+	10,600	-8,900	-8,900

The **Alternative 2** ACLs would represent a substantial decrease in catch limits compared to years past (Table 1.1.2.2). For example, the ACL in **Alternative 2** for 2019 would have resulted in the quota being exceeded in nine of the 17 years in the presented time series, or approximately 53% if the time. Further, the increase in the minimum size limit for West Florida hogfish from 12 inches fork length (FL) to 14 inches FL in Amendment 43 (GMFMC 2016a) was projected to decrease landings by approximately 10-35%. This size limit increase may reduce the likelihood of the West Florida hogfish stock ACL being exceeded under the catch levels in **Alternative 2**.

CHAPTER 3. AFFECTED ENVIRONMENT

The actions considered in this amendment with environmental assessment would affect fishing for red snapper and hogfish in federal and (for federally permitted vessels) state waters of the Gulf of Mexico (Gulf). Descriptions of the physical, biological, economic, social, and administrative environments were completed in the environmental impact statements for the following Amendments to the Fishery Management Plan (FMP) for Reef Fish Resources in the Gulf of Mexico (Reef Fish FMP): Amendment 27/Shrimp Amendment 14 (GMFMC 2007), 30A (GMFMC 2008a), 30B (GMFMC 2008b), 32 (GMFMC 2011a), 40 (GMFMC 2014a), 28 (GMFMC 2015a), 43 (GMFMC 2016), the Generic Essential Fish Habitat (EFH) Amendment (GMFMC 2004a), and the Generic Annual Catch Limits/Accountability Measures (ACL/AM) Amendment (GMFMC 2011b). Below, information on each of these environments is summarized or updated, as appropriate.

3.1 Description of the Red Snapper and Hogfish Components of the Reef Fish Fishery

3.1.1 General Information

Commercial Permits

Commercial operators harvesting red snapper from federal waters must have a Gulf reef fish permit, which is a limited access permit. As of August 6, 2018, 840 vessels have the permit. Vessels that use bottom longline gear in federal waters east of 85º30ˈW longitude must also have a valid Eastern Gulf longline endorsement. As of August 6, 2018, 62 Gulf reef fish permit holders also have the longline endorsement, and all but one of the endorsement holders have a mailing address in Florida. Currently, approximately 81% of the commercial reef fish permits have mailing recipients in Florida, followed by Texas with 8%, Alabama with 5%, Louisiana with 5%, and Mississippi with 1% (Table 3.1.1.1).

Table 3.1.1.1. Number of commercial permits for Gulf reef fish by state of hailing port of vessel, 2012-2017.

	Commercial Reef Fish Permits by Hailing Port of Vessel						
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	***Average***
AL	44	42	41	40	38	37	*40*
FL	729	721	715	706	690	686	*708*
LA	53	48	44	43	42	42	*45*
MS	11	9	9	8	7	6	*8*
TX	74	69	67	67	70	72	*70*
Gulf States	*911*	*889*	*876*	*864*	*847*	*843*	*872*
Other	6	5	5	4	5	7	*5*
Total	**917**	**894**	**881**	**868**	**852**	**850**	*877*

Source: National Marine Fisheries Service (NMFS) Southeast Regional Office (SERO)

Recreational Permits

Any for-hire fishing vessel that takes paying anglers into Gulf federal waters where they harvest species in the reef fish fishery must have a valid limited-access Gulf charter/headboat permit for reef fish that is specifically assigned to that vessel. Since 2003, there has been a moratorium on the issuance of new federal reef fish for-hire permits. This means that participation in the federal for-hire component is capped; no additional federal permits are available.

As of August 6, 2018, there were 1,277 vessels with a for-hire permit and another 30 with a historical captain for-hire permit. Currently, approximately 59% of for-hire reef fish permits list mailing addresses in Florida, followed by Texas with 17%, Alabama with 11%, Louisiana with 9%, and Mississippi with 3% (Table 3.1.1.2).

Table 3.1.1.2. Number of for-hire charter/headboat permits for reef fish by state of listed hailing port of vessel, for 2012-2017 (includes historic captain licenses).

	For-Hire Reef Fish Permits by Hailing Port of Vessel						
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	***Average***
AL	157	159	153	143	134	141	*148*
FL	812	803	787	778	776	790	*791*
LA	123	120	117	121	119	118	*120*
MS	48	47	42	38	35	33	*41*
TX	221	219	230	232	232	214	*225*
Gulf States	*1,361*	*1,348*	*1,329*	*1,312*	*1,296*	*1,296*	*1,324*
Other	17	15	16	16	19	17	*17*
Total	**1,378**	**1,363**	**1,345**	**1,328**	**1,315**	**1,313**	***1,340***

Source: NMFS SERO.

Individuals who hold a commercial or charter/headboat permit can either transfer the permit or not renew it. After a permit expires, it is no longer valid, but the permit holder has up to one year to renew or transfer the expired permit before it is terminated. There are multiple brokers online that offer Gulf charter/headboat permits; however, current regulation limits Gulf for-hire permit transfers and renewals to vessels that have the same passenger capacity or a lower passenger capacity. This measure was put in place to limit reef fish fishing effort by the for-hire component.

Private recreational fishing vessels are not required to have a federal permit to catch red snapper or any other reef fish species in federal waters. Anglers aboard these vessels, however, must either be federally registered or licensed in states that have a system to provide complete information on the states' saltwater anglers to the national registry.

3.1.2 Red Snapper

Commercial Sector

Prior to 2007, the red snapper commercial sector was managed through quotas, size limits, trip limits, seasonal closures, fishing days per month, time and area/gear restrictions, and gear requirements (see Section 1.3.1). Since 2007, the commercial sector's harvest of red snapper has operated under an individual fishing quota (RS-IFQ) program.

The RS-IFQ program uses shares and allocation to distribute and account for the commercial fishing quota. Shares for red snapper represent a percentage of the commercial quota, such that 100% of shares represent the total commercial quota for red snapper. These shares are durable; that is, they may remain with the shareholder year after year unless transferred to another shareholder account or are revoked, limited, or modified by the National Marine Fisheries Service (NMFS). Allocation refers to the pounds of quota represented by the shares (percent of quota) held by a shareholder and is distributed to shareholder accounts by January 1 of each year. Allocation may only be used in the year for which it was distributed; any remaining annual allocation is removed from all accounts at the end of the year. The RS-IFQ program was intended to help the Gulf of Mexico Fishery Management Council (Council) address overfishing and rebuild the stock by reducing the rate of discard mortality that normally increases with increased fishing effort in overcapitalized fisheries (NRC 1999; Leal et al. 2005).

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 charter vessels, headboats, and private anglers fishing primarily from private or rental boats.

The recreational sector is currently managed through ACLs, ACTs, AMs, a minimum size limit of 16 inches total length (TL), a two-fish per person bag limit, seasonal closures (the fishing season opens June 1 and closes when the ACT is projected to be met), area/gear restrictions, and gear requirements (see Section 1.3.1). In some cases, state regulations are different from federal regulations. In those circumstances (e.g., red snapper 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.

For federal waters, if landings are estimated to meet the for-hire or private angling component ACT, then the season for that component will be closed. If the total recreational ACL is reached, then the federal season is closed for both components. The primary gear type in the harvest of red snapper is vertical line (rod-and-reel).

For-Hire Component

From 2012 through 2016, charter vessels took an average of 201,348 directed angler trips annually. These are trips when red snapper was the primary or secondary target or was caught

by anglers. Approximately 60% of the annual directed angler trips by charter vessels are out of west Florida.

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%).

Private Angling Component

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. Moreover, with the MRIP APAIS (survey of anglers by the private boat, charter vessel and shore modes as they complete a trip), NMFS estimates how many trips target red snapper, how many trips catch red snapper and how many are being caught, how many red snapper are kept, how many are discarded, the condition of discarded fish, and the size and weight of red snapper caught.

Target effort refers to the number of individual angler trips, regardless of duration, where the intercepted angler indicated that red snapper was targeted as either the first or second primary target for the trip. Red snapper did not have to be caught on a trip for it to be a red snapper targeted trip. Catch effort refers to the number of individual angler trips, regardless of duration and target intent, where red snapper was caught; those red snapper caught did not have to be kept. Those trips can result in double counting of trips, such as when red snapper was both targeted and caught during a specific angler trip. Data from MRIP and LA Creel are used to estimate effort of the private angling component for each Gulf state, except Texas.

Recreational Landings

Long-term recreational landings for red snapper are provided in Table A-1 in Appendix A. 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 with each state reporting 30% of the total recreational harvest, or higher, except in 2015 when Florida reported 27%.

Table 3.1.2.1. Recent 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 3.1.2.3 *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.

3.1.3 Hogfish

Commercial and Recreational Sector

Commercial harvest of hogfish is conducted primarily by spearfishing, hook-and-line, and prior to 2007, traps. Fish traps were prohibited from the Gulf exclusive economic zone (EEZ) in 2007, but occasional small amounts of trap landings may still occur from black sea bass pots, which are legal in selected areas of state waters. Since 2001, commercial hogfish landings from the Gulf have ranged from a high of 45,995 lbs whole weight (ww) in 2011 to a low of 15,630 lbs ww in 2006 (Table 1.1.2.2). The most recent 5 years, of landings fluctuated between about 15,000 and 35,000 lbs ww. Recreational harvest of hogfish occurs primarily by spearfishing. Hogfish are one of the most targeted and caught species by spear. Recreational harvest of hogfish is mostly from private boats, with only a small proportion from either for-hire vessels or

shore-based fishing (Southeast Data, Assessment, and Review (SEDAR) 37 Update 2018). Recreational and commercial landings of hogfish are shown in Table 1.4.

There is currently no allocation of the hogfish ACL into recreational and commercial sectors. During the period 2001-2017, the average proportion of recreational to commercial harvest (in pounds whole weight) was approximately 79% recreational to 21% commercial. However, in any one year, the proportion of recreational to commercial harvest fluctuated from approximately 61%:39% in 2011 to 91%:9% in 2013.

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 73º F through 83º F (23-28º C) including bays and bayous (Figure 3.2.1) between 1982 and 2009, according to satellite-derived measurements.[2] In general, mean sea surface temperature increases from north to south with large seasonal variations in shallow waters.

[2] NODC 2012: http://accession.nodc.noaa.gov/0072888

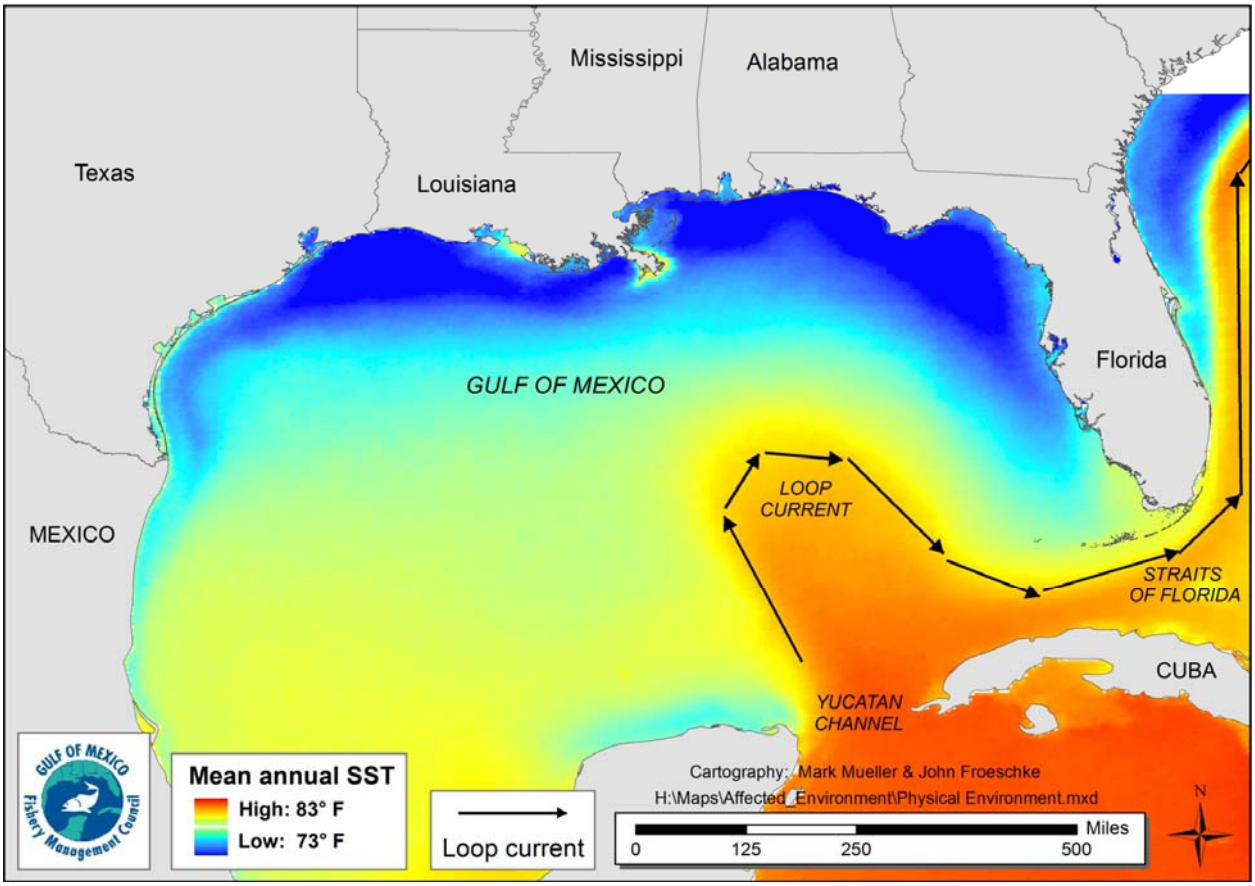

Figure 3.2.1. Physical environment of the Gulf including major feature names and mean annual sea surface temperature as derived from the Advanced Very High Resolution Radiometer Pathfinder Version 5 sea surface temperature data set (http://accession.nodc.noaa.gov/0072888).

The physical environment for Gulf reef fish, including red snapper and West Florida hogfish, is also detailed in the Generic Essential Fish Habitat (EFH) Amendment, the Generic ACL/AM Amendment, and Reef Fish Amendment 40 (GMFMC 2004a; GMFMC 2011b; GMFMC 2014a, respectively) and are incorporated by reference and further summarized below. 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 (less than 100 m) which have high relief, i.e., coral reefs, artificial reefs, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings. However, several species are found over sand and soft-bottom substrates. For example, juvenile red snapper are common on mud bottoms in the northern Gulf, particularly off Texas through Alabama.

In the Gulf, habitat for adult red snapper consists of submarine gullies and depressions, coral reefs, rock outcroppings, gravel bottoms, oil rigs, and other artificial structures (GMFMC 2004a); eggs and larvae are pelagic; and juveniles are found associated with bottom inter-shelf habitat (Szedlmayer and Conti 1998) and prefer shell habitat to sand (Szedlmayer and Howe 1997). Adult red snapper are closely associated with artificial structures in the northern Gulf

(Szedlmayer and Shipp 1994; Shipp and Bortone 2009) and larger individuals have been found to use artificial habitats, but move further from the structure as they increase in size and based on the time of day (Topping and Szedlmayer 2011).

In the Gulf, fish habitat for adult hogfish consists of reef and hard bottom habitats that provide structural cover, and hogfish have been observed at depths greater than 60 m (GMFMC 2004a, SEDAR 37 2014). Juveniles are found in polyhaline estuarine seagrass beds or nearshore reef habitats.

Detailed information pertaining to the Gulf area closures and marine reserves is provided in Amendment 32 (GMFMC 2011b). There are environmental sites of special interest that are discussed in the Generic EFH Amendment (GMFMC 2004a) that are relevant to red snapper and hogfish 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 (HAPC) 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).

With respect to the National Register of Historic Places, there is one site listed in the Gulf. This is the wreck of the *U.S.S. Hatteras*, located in federal waters off Texas. 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.[3]

Northern Gulf of Mexico Hypoxic Zone

Every summer in the northern Gulf, a large hypoxic zone forms. It is the result of allochthonous materials and runoff from agricultural lands by rivers to the Gulf, increasing nutrient inputs from the Mississippi River, and a seasonal layering of waters in the Gulf. The layering of the water is temperature and salinity dependent and prevents the mixing of higher oxygen content surface water with oxygen-poor bottom water. For 2018, the extent of the hypoxic area was estimated to be 2,720 square miles and fourth smallest area mapped since 1985.[4] The hypoxic conditions in the northern Gulf directly affect less mobile benthic macroinvertebrates (e.g., polychaetes) by influencing density, species richness, and community composition (Baustian and Rabalais 2009). However, more mobile macroinvertebrates and demersal fishes (e.g., red snapper, hogfish) are able to detect lower dissolved oxygen levels and move away from hypoxic conditions. Therefore, although not directly affected, these organisms are indirectly affected by limited prey availability and constrained available habitat (Baustian and Rabalais 2009; Craig 2012).

[3] Further information can be found at: http://www.boem.gov/Environmental-Stewardship/Archaeology/Shipwrecks.aspx.
[4] http://gulfhypoxia.net

Greenhouse Gases

The Intergovernmental Panel on Climate Change (IPCC) has indicated greenhouse gas emissions are one of the most important drivers of recent changes in climate. Wilson et al. (2014) inventoried the sources of greenhouse gases in the Gulf from sources associated with oil platforms and those associated with other activities such as fishing. A summary of the results of the inventory are shown in Table 3.2.1 with respect to total emissions and from fishing. Commercial fishing and recreational vessels make up a small percentage of the total estimated greenhouse gas emissions from the Gulf (2.04% and 1.67%, respectively).

Table 3.2.1. Total Gulf greenhouse gas 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*. Data are for 2011 only.

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

*Compiled from Tables 6-11, 6-12, and 6-13 in Wilson et al. (2014). **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.

3.3 Description of the Biological Environment

The biological environment of the Gulf, including that of red snapper and hogfish, is described in detail in the final environmental impact statement for the Generic EFH Amendment (GMFMC 2004a) and is incorporated herein by reference.

3.3.1 Red Snapper

Red Snapper Life History and Biology

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).

Status of the Red Snapper Stock

SEDAR 52 Assessment

Biomass estimates show the western Gulf continues to rebuild, while the eastern Gulf has leveled off over the last few years. The number of older fish present has increased Gulf-wide, indicating rebuilding age structure. The Gulf red snapper stock is not considered to be overfished (spawning stock biomass [SSB]/minimum stock size threshold [MSST] = 1.41) or undergoing overfishing (current fishing mortality rate [F]/maximum fishing mortality threshold [MFMT] = 0.823), but will not be rebuilt until 2032. The change in the MSST value to 50% of the SSB at the maximum sustainable yield (26% spawning potential ratio [SPR]) in Amendment 44 (GMFMC 2017) was the primary reason for the change in stock status from overfished to not overfished.

In January 2012, the Generic ACL/AM Amendment (GMFMC 2011b) became effective. One of the provisions in this amendment was to redefine overfishing. In years when there is a stock assessment, overfishing is defined as the fishing mortality rate exceeding the maximum fishing mortality threshold. In years when there is no stock assessment, overfishing is defined as the catch exceeding the overfishing limit (OFL). The SEDAR 52 stock assessment indicates that, as of 2016, overfishing was not occurring. Note that, because the overfishing threshold is now re-evaluated each year instead of only in years when there is a stock assessment, this status could change on a year-to-year basis.

The MSST is the SSB level at which a stock is declared overfished and a rebuilding plan must be implemented. MSST for red snapper was previously estimated using the formula $(1\text{-}M)*B_{MSY}$, where M is the natural mortality rate and B_{MSY} is the stock biomass level at which the MSY can be harvested on a continuing basis. Using this formula, with M = 0.09, red snapper was considered overfished whenever the SSB was below 91% of B_{MSY}. Under this MSST threshold, red snapper was considered overfished through 2017. Amendment 44 changed the calculation for the red snapper MSST to be 50% of B_{MSY}, which is the widest buffer between SSB at MSY and MSST allowed under the National Standard 1 guidelines. The resulting estimate of MSST reclassified red snapper to not overfished but rebuilding. Despite the reclassification, the rebuilding plan for the stock remains in place until the stock has recovered to its B_{MSY} (GMFMC 2017).

3.3.2 Hogfish

Hogfish Life History and Biology

Hogfish are members of the wrasse (Labridae) family and have been observed to live as long as 23 years (McBride and Richardson 2007). Hogfish are protogynous hermaphrodites, which means that they begin life as females and later change sex to male. All fish older than 10 are

expected to be males (SEDAR 37 2013). The species occurs from Bermuda and North Carolina, south through the Caribbean Sea and northern Gulf of Mexico (Gulf), continuing to the north coast of South America (Figure 3.3.2.1)[5]. In the Gulf, harvest occurs primarily off Florida, with the majority of the landings coming from South/Southeastern and Western Florida (SEDAR 37 Update 2018).

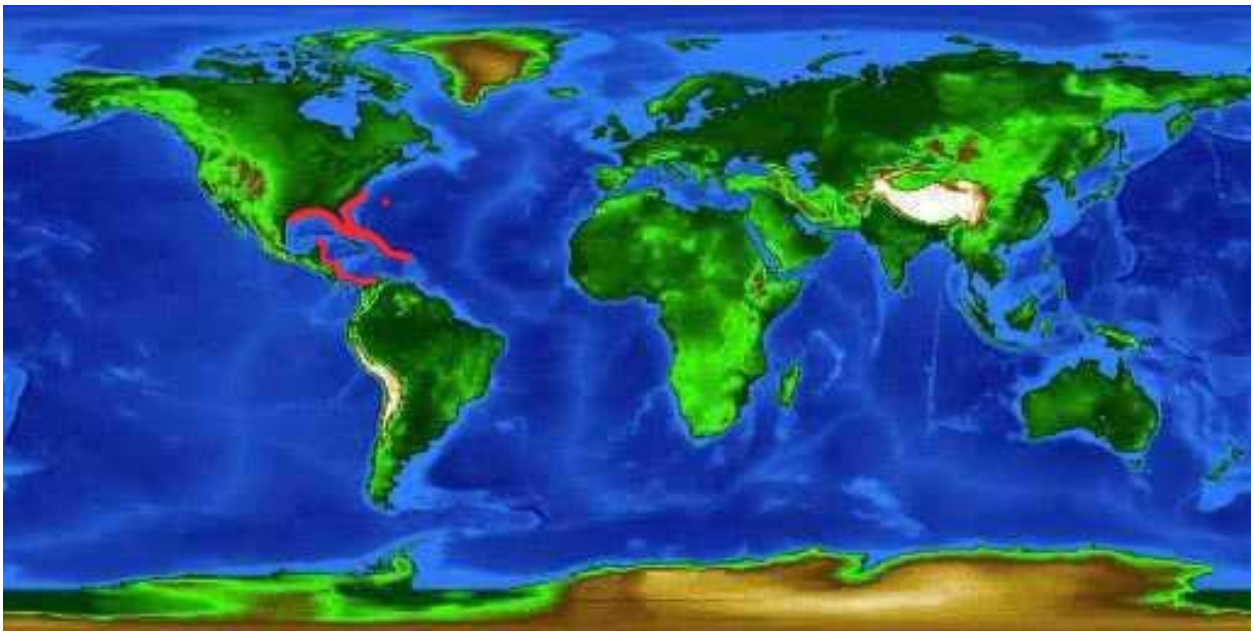

Figure 3.3.2.1 Distribution of hogfish. Source: Florida Museum of Natural History.

Hogfish occur in warm temperate to tropical waters of the western Atlantic Ocean from Brazil to Bermuda and occur throughout the Caribbean and Gulf. Hogfish demonstrate the typical reef fish life history pattern. Eggs and larvae are pelagic while juveniles are found associated with shallow-water coastal habitats. The size and age at which 50% of females are mature occurs between 151.6 – 192.7 mm fork length (FL) and 0.9 – 1.6 years (SEDAR 37 2013). Females may transition into males as small as approximately 200 mm FL, however the size and age at which 50% of males are mature for the West Florida Shelf stock is 426 mm FL and 6.5 years (SEDAR 37 2013). Spawning occurs during the winter and spring months with larger fish in deeper waters having a longer spawning season (SEDAR 37 2013). Hogfish have been aged up to 23 years (McBride and Richardson 2007) with the oldest female being aged to 10 years (Collins and McBride 2011). A more complete description of hogfish life history can be found in the Generic EFH Amendment (GMFMC 2004a) and in SEDAR 37 (2013).

Recent genetic analyses by Seyoum et al. (2014) suggest three distinct stocks in the Gulf and South Atlantic waters. A suite of 24 microsatellite loci were used to examine the genetic structure of hogfish collected in the southeast. Although there were some gaps in sample coverage (primarily between the central east coast of Florida and South Carolina), three distinct groups emerged. The West Florida shelf ("Gulf of Mexico", or "Gulf") stock included samples collected from the Panhandle of Florida south along the west Florida shelf, and converged with

[5] http://www.flmnh.ufl.edu/fish/discover/species-profiles/lachnolaimus-maximus

the Florida Keys/eastern Florida south of Naples. The Florida Keys/eastern Florida stock included samples collected south of Naples, through the Florida Keys and up the southeastern coast of Florida. The third group included hogfish collected off the coast of the Carolinas ("Georgia to North Carolina" stock) and was genetically distinct from the two Florida groups.

Status of the Hogfish Stock

The SEDAR 37 Update assessment of the West Florida hogfish stock used the same life history and conversion factors as the 2013 SEDAR 37 assessment, and maintained the Stock Synthesis 3 model configuration with some small modifications. The update assessment results indicated a higher total biomass estimate over time than the original SEDAR 37 benchmark assessment. The fishing mortality ratio of $F_{CURRENT}/F_{30\% SPR} = 0.51$ indicates that overfishing is not occurring. With the MSST set to 50% of the biomass at $F_{30\% SPR}$, the ratio of current (2016) spawning stock biomass to MSST ($SSB_{CURRENT}/MSST = 4.71$), indicates that the stock is not overfished. The Council's Scientific and Statistical Committee (SSC) thought that, due to the uncertainties in the update assessment and the establishment of the West Florida hogfish stock as a separate stock, the next West Florida hogfish assessment should be a benchmark (or similar) assessment.

3.3.3 General Information on Reef Fish Species

Reef fish are widely distributed in the Gulf, occupying both pelagic and benthic habitats during their life cycle. In general, both eggs and larval stages are planktonic. Larval fish feed on zooplankton and phytoplankton. Gray triggerfish are exceptions to this generalization as they lay their eggs in nests on the sandy bottom (Simmons and Szedlmayer 2012), and gray snapper whose larvae are found around submerged aquatic vegetation.

Status of Reef Fish Stocks

The Reef Fish Fishery FMP currently encompasses 31 species (Table 3.3.3.1). Eleven other species were removed from the FMP in 2012 through the Generic ACL/AM Amendment (GMFMC 2011a).

The NMFS Office of Sustainable Fisheries updates its Status of U.S. Fisheries Report to Congress[6] 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[7] and SEDAR[8] websites. Of the 12 stocks for which stock assessments have been conducted, the fourth quarter report of the 2017 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 3.3.3.1. Reef Fish Amendment 44 (GMFMC 2017),

[6] http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/status_updates.html
[7] www.gulfcouncil.org
[8] www.sedarweb.org

implemented December 2017, modified the MSST for seven species in the Reef Fish FMP. Red snapper and gray triggerfish are now listed as not overfished but rebuilding, because the biomass for the stock is currently estimated to be greater than 50% of B_{MSY}. The greater amberjack stock remains classified as overfished.

The remaining species within the Reef Fish FMP have not been assessed at this time. Therefore, their stock status is unknown (Table 3.3.3.1). For those species that are listed as not undergoing overfishing, that determination has been made based on the annual harvest remaining below the OFL. No other unassessed species are scheduled for a stock assessment at this time.

Table 3.3.3.1. Status of species in the Reef Fish FMP grouped by family.

Common Name	Scientific Name	Stock Status		Most recent assessment or SSC workshop
		Overfishing	Overfished	
Family Balistidae – Triggerfishes				
gray triggerfish	*Balistes capriscus*	Y	N	SEDAR 43 2015
Family Carangidae – Jacks				
greater amberjack	*Seriola dumerili*	Y	Y	SEDAR 33 Update 2016a
lesser amberjack	*Seriola fasciata*	N	Unknown	SEDAR 49 2016
almaco jack	*Seriola rivoliana*	N	Unknown	SEDAR 49 2016
banded rudderfish	*Seriola zonata*	Unknown	Unknown	
Family Labridae – Wrasses				
hogfish	*Lachnolaimus maximus*	N	N	SEDAR 37 Update 2018
Family Malacanthidae – Tilefishes				
tilefish (golden)	*Lopholatilus chamaeleonticeps*	N	N	SEDAR 22 2011a
blueline tilefish	*Caulolatilus microps*	Unknown	Unknown	
goldface tilefish	*Caulolatilus chrysops*	Unknown	Unknown	
Family Serranidae – Groupers				
gag	*Mycteroperca microlepis*	N	N	SEDAR 33 Update 2016b
red grouper	*Epinephelus morio*	N	N	SEDAR 42 2015
scamp	*Mycteroperca phenax*	Unknown	Unknown	
black grouper	*Mycteroperca bonaci*	N	N	SEDAR 19 2010
yellowedge grouper	*Hyporthodus flavolimbatus*	N	N	SEDAR 22 2011b
snowy grouper	*Hyporthodus niveatus*	N	Unknown	SEDAR 49 2016
speckled hind	*Epinephelus drummondhayi*	N	Unknown	SEDAR 49 2016
yellowmouth grouper	*Mycteroperca interstitialis*	N	Unknown	SEDAR 49 2016
yellowfin grouper	*Mycteroperca venenosa*	Unknown	Unknown	
warsaw grouper	*Hyporthodus nigritus*	N	Unknown	
*Atlantic goliath grouper	*Epinephelus itajara*	N	Unknown	SEDAR 47 2016
Family Lutjanidae – Snappers				
queen snapper	*Etelis oculatus*	N	Unknown	
mutton snapper	*Lutjanus analis*	N	N	SEDAR 15A Update 2015
blackfin snapper	*Lutjanus buccanella*	N	Unknown	
red snapper	*Lutjanus campechanus*	N	N	SEDAR 52 2018
cubera snapper	*Lutjanus cyanopterus*	N	Unknown	
gray snapper	*Lutjanus griseus*	Y	Unknown	SEDAR 51 2018
lane snapper	*Lutjanus synagris*	N	Unknown	SEDAR 49 2016
silk snapper	*Lutjanus vivanus*	Unknown	Unknown	
yellowtail snapper	*Ocyurus chrysurus*	N	N	SEDAR 27A 2012
vermilion snapper	*Rhomboplites aurorubens*	N	N	SEDAR 45 2016
wenchman	*Pristipomoides aquilonaris*	N	N	SEDAR 49 2016

Note: *Atlantic goliath grouper is a protected grouper (i.e., ACL is set at zero) and benchmarks do not reflect appropriate stock dynamics.

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 fishery, and specifically red snapper and West Florida hogfish, have been provided in several reef fish amendments (GMFMC 2004b, GMFMC 2007, GMFMC 2014a, GMFMC 2015a, GMFMC 2016). The bycatch related to this action may affect red snapper, hogfish, other reef fish species, protected resources, and birds. However, these impacts are not expected to change from status quo.

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 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 dolphins from this fishery, all belonging to the continental shelf stock

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

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

consultation or Biological Opinion (Bi Op) was finalized on September 30, 2011, and 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.

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.[10] 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 which could change the water balance of coastal ecosystems; altering patterns of wind and water circulation in the ocean environment; and influence the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs. The National Oceanic and Atmospheric Association (NOAA) Climate Change Web Portal[11] 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 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

[10] http://www.ipcc.ch/
[11] https://www.esrl.noaa.gov/psd/ipcc/

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**

General Impacts on Fishery Resources

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. 2011). 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.[12]

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).

In 2014, the inclusion of time-varying red tide mortality in the SEDAR 33 (2014) gag grouper assessment (*Mycteroperca microlepis* improved the model fit, and was incorporated into the base stock assessment for gag. This inclusion of red tide mortality within the base assessment model better explained historical trends in abundance and accounted for interannual variation resulting from environmental influence otherwise viewed by the model as random deviates. Red tide mortality was also incorporated into the SEDAR 42 (2015) red grouper assessment.
Red tide mortality has not been incorporated into either the red snapper or hogfish assessments. As of the time of this writing, a severe red tide event has been occurring of the southwest coast of Florida from Monroe County to Sarasota County that has persisted for more than 10 months and is continuing to expand. During the period January 1, 2018 through August 8, 2018, Florida FWC has recorded 1 red snapper kill attributed to red tide (off Charlotte County) and 4 hogfish kills attributed to red tide off Monroe and Collier Counties.[13]

3.4 Description of the Economic Environment

3.4.1 Commercial Sector

3.4.1.1 Red Snapper

Selected Highlights of the Red Snapper IFQ Program

The Gulf red snapper commercial sector has been managed under an IFQ program since 2007. A more recent amendment affecting the red snapper commercial sector, Amendment 36A, provides a broad summary of the commercial red snapper sector, and is incorporated here by reference. More details on the recent description and performance of the RSIFQ program are found in the latest RS-IFQ Annual Report (NMFS 2016), and are incorporated here by reference. The following presents some features and performance of the RS- IFQ program in the last five years (2012-2016).

[12] Source: http://myfwc.com/research/redtide/general/about/
[13] Soourced: https://public.myfwc.com/FWRI/FishKillReport/SearchResults.aspx

The annual quota is the end of the year quota, considering that in some years in-season quota adjustments were made. In general, the quota increased through the years, except in 2016 when the quota was lower than in the previous years (see Table 3.4.1.1). This decrease was mainly due to the implementation of Amendment 28, which revised the allocation ratio in favor of the recreational sector. The original allocation ratio was later restored in 2017 per court order. Landings have been very close to the quota and averaged approximately 98% of the quota for the 2012-2016 period. Total reported revenues closely followed landings and were only slightly affected by general price increases. Total revenues averaged approximately $23.7 million (2016 dollars) for the last five years.

Table 3.4.1.1. Quota (pounds gutted weight (lbs gw)), landings (lbs gw), and revenues (2016 dollars), 2012-2016.

Year	Quota	Landings as % of Quota	Landings	Revenues
2012	3,712,613	97.90%	3,636,395	$15,016,035
2013	5,054,054	97.10%	4,908,598	$21,997,866
2014	5,054,054	99.20%	5,016,056	$23,571,126
2015	6,570,270	98.50%	6,472,261	$30,147,223
2016	6,097,297	99.40%	6,057,498	$27,980,687
Average	5,297,658	98.42%	5,218,162	$23,742,587

Source: 2016 Gulf of Mexico Red Snapper Individual Fishing Quota Annual Report (NMFS 2016).

The IFQ program has four major types of participants: shareholders, allocation holders, dealers, and vessels. The number of shareholders, or those who hold fixed shares of the quota, declined since 2012 and averaged 389, as some shareholders transferred their shares to other entities (Table 3.4.1.2). This is particularly true for small shareholders (those that hold less than 0.05% of the quota), although large shareholders (shares equal to or more than 1.5%) slightly increased. The number of allocation holders (holders of actual poundage of red snapper) increased over the last five years averaging 615 per year (Table 3.4.1.2). The number of allocation holders with shares decreased over the five-year period, but in contrast, allocation holders without shares increased. The number of dealers that received and processed red snapper averaged 92 and shows no perceptible pattern upward or downward. This appears to be true regardless of whether they are small-sized (those handling less than 1% of the quota), medium-sized (handling 1% to 3% of the quota), or large-sized (handling more than 3% of the quota). Vessels harvesting red snapper allocations have to have both a commercial reef fish permit and IFQ vessel account. The number of vessels ranged from 368 in 2013 to 430 in 2016, and averaged 397 for 2012-2016. The highest number of vessels is still below the average (2002-2006) number of vessels harvesting red snapper before the IFQ program commenced.

Table 3.4.1.2. Number of program participants, 2012-2016.

Year	Shareholders	Allocation Holders	Dealers	Vessels
2012	407	599	82	371
2013	399	598	81	368
2014	378	606	96	401
2015	386	635	105	415
2016	374	639	96	430
Average	389	615	92	397

Source: 2016 Gulf of Mexico Red Snapper Individual Fishing Quota Annual Report (NMFS 2016).

Average per pound ex-vessel prices, allocation transfer prices, and share transfer prices, all expressed in 2016 prices, along with certain ratios, are presented in Table 3.4.1.3. The ex-vessel price ranged from $4.70 in 2012 to $4.94 in 2014, averaging $4.81 per pound. These prices are relatively higher than in the pre-IFQ years (2002-2006). Ex-vessel prices vary from month to month, with generally higher prices from April through October. Ex-vessel prices also vary from state to state, with Texas and Florida generally registering the highest prices. Allocation prices reflect the additional cost for harvesters on a per pound basis in their fishing operations. Over the years 2012-2016, allocation prices appear to be relatively stable, with an average of $3.14 per pound. Allocations last only a year, and would be forfeited if not utilize within a given year. Shares, on the other hand, are relatively permanent (until modified through regulations, for example). To an extent, the allocation prices may be associated with short-term valuation of red snapper while share prices may be associated with long-term valuation, partly because they are sources of annual allocations. In 2012-2016, share prices were more than 10 times those of allocation prices. The price ratios are some of the indicators of economic performance, providing information about implicit discount rate of the quota market. Both the allocation prices to ex-vessel prices and allocation prices to share prices remained relatively stable in the last five years, possibly indicating that anglers have neutral stance regarding their short-term and long-term confidence about the IFQ program.

Table 3.4.1.3. Per pound ex-vessel prices, allocation transfer prices, share transfer prices, and price ratios, 2012-2016.

Year	Ex-vessel Prices	Allocation Prices	Share Prices	Allocation/Ex-vessel Price Ratio	Allocation/Share Price Ratio
2012	$4.70	$3.18	$36.81	9%	68%
2013	$4.65	$3.10	$38.33	8%	67%
2014	$4.94	$3.10	$35.19	9%	63%
2015	$4.91	$3.13	$34.06	9%	64%
2016	$4.87	$3.21	$30.66	10%	66%
Average	$4.81	$3.14	$35.01	9%	66%

Source: 2016 Gulf of Mexico Red Snapper Individual Fishing Quota Annual Report (NMFS 2016).

Red Snapper Ex-vessel Prices

The dockside or ex-vessel price is the price the vessel receives at the first sale of harvest. Over the period 2012-2016, the average annual ex-vessel price per pound for red snapper per the red snapper IFQ tracking system was $4.81 (2016 dollars), and ranged from $4.65 in 2013 to $4.94 in 2014.

Red Snapper Vessel Level Economic Performance

A more in-depth analysis of the economics of the commercial sector of the Gulf reef fish fishery has been conducted by the Southeast Fishery Science Center (SEFSC) (Overstreet et al. (2017) and Overstreet and Liese 2018a, 2018b)), and is incorporated herein by reference. The analysis combines trip logbook data (effort and catch at the trip-level) with two supplemental economic sample surveys - one on the logbook itself (and hence at the trip level); the other is an annual mail survey at the vessel level. The economic surveys elicit revenue, variable and/or fixed costs by category, and some auxiliary economic variables, such as a vessel's market value. Logbook information, such as landings and revenues, corresponds to approximately 95% of that in the IFQ tracking system. Red snapper is one of the segments of interest (SOI) the analysis focuses on.

The following two tables present some highlights from the SEFSC economic analysis of the commercial red snapper sector. Table 3.4.1.4 presents information from all trips taken by vessels that landed at least one pound of Gulf red snapper. From 2014 through 2016, an average of 409 vessels took 6,332 total trips totaling 27,937 days at sea. On average, these vessels landed approximately 15.51 million pounds of all species, of which about 36% were red snapper, and generated revenues of approximately $60.37 million, of which 41% were from red snapper. Some of these vessels (24%) possessed a for-hire fishing permit.

Table 3.4.1.4. Annual vessel level summary, 2014-2016. SOI means segment of interest, which is red snapper in the present case.

	2014	2015	2016	Average
Effort				
Vessels	401	406	421	409
Trips - Total	5,886	6,420	6,690	6,332
SOI Trips	3,786	4,230	4,513	4,176
Non-SOI Trips	2,100	2,190	2,177	2,156
Days at Sea	27,086	28,218	28,508	27,937
Landings (lbs gw)				
Total	15,150,195	15,883,024	15,505,728	15,512,982
SOI	4,719,836	6,149,237	5,745,323	5,538,132
Non-SOI	10,430,359	9,733,787	9,760,405	9,974,850
% SOI	31%	39%	37%	36%
Revenue				
Total	$58,413,679	$62,203,582	$60,494,446	$60,370,569
SOI	$21,692,689	$27,564,928	$25,616,821	$24,958,146
Non-SOI	$36,720,991	$34,638,654	$34,877,625	$35,412,423
% SOI	37%	44%	42%	41%
Vessel Characteristics				
Length	39	39	39	39
Year Built	1986	1986	1987	1986
For-Hire Fishing Permit	24%	23%	24%	24%

Source: Overstreet and Liese (2018b). Note: Dollar figures are in 2016 dollars.

Information in Table 3.4.1.5 is based on an economic survey of a sample of trips reported in logbooks and an annual mail economic survey of a sample of vessels. See Overstreet et al. (2017) and Overstreet and Liese (2018a, 2018b) for a description of these surveys.

On average, 72% of vessels are owner-operated and 13% are active in the for-hire business. The average value of a vessel is approximately $105,000. Also reported in Table 3.4.1.5 are total revenues and itemized costs as a percent of total revenue as well as some indicators of economic/financial performance. IFQ purchase (16.8% of revenue) refers to the cost of purchasing allocations and excludes buying or selling IFQ shares. OC Owner-Captain Time (5.7% of revenue) refers to the opportunity cost of an owner's time as a captain. This value is imputed based on hired crew remuneration and the profitability of a trip. Net cash flow (27% of revenue) focuses on actual cash transactions and is estimated as revenue minus all cost items, except opportunity cost of an owner's time. Generally, the higher this value, the more liquid is the business entity. Net revenue from operations (36%) reflects the inherent productivity of the commercial sector, and is estimated as revenue minus all cost items and in-kind contributions (opportunity cost of an owner's time and depreciation). Economic return (59.9%), which is calculated by dividing net revenue from operation by the vessel value, measures the productivity of the vessel asset.

Table 3.4.1.5. Annual vessel-level economics, 2014-2016. SOI means segment of interest, which is red snapper in the present case.

	2014	2015	2016	Average
Number of Observations	72	92	103	
Response Rate (%)	67%	78%	87%	
SOI Vessel				
Owner-Operated	73%	66%	77%	72%
For-Hire Active	7%	13%	18%	13%
Vessel Value	$126,022	$100,618	$87,935	$104,858
Total Revenue	100%	100%	100%	100%
Costs (% of Revenue)				
Fuel	7.9%	5.7%	6.2%	6.6%
Other Supplies	9.7%	9%	10.2%	9.6%
Hired Crew	26.9%	25.7%	24.4%	25.7%
Vessel Repair & Maintenance	7.4%	6.6%	8.3%	7.4%
Insurance	1%	0.8%	1%	0.9%
Overhead	5%	5.4%	4.9%	5.1%
Loan Payment	0.9%	1.3%	1.3%	1.2%
IFQ Purchase	11.5%	24.8%	14.2%	16.8%
OC Owner-Captain Time	5.4%	5%	6.6%	5.7%
Net Cash Flow	30%	21%	30%	27%
Net Revenue for Operations	33%	39%	35%	36%
Depreciation	3.4%	2.7%	3%	3%
Fixed Costs	13%	13%	14%	13%
Labor - Hired & Owner	32%	31%	31%	31%
Fuel & Supplies	18%	15%	16%	16%
Economic Return (on asset value)	48.2%	72.7%	58.8%	59.9%

Source: Overstreet and Liese (2018b). Note: Dollar figures are in 2016 dollars.

Permits

As of August 1, 2018, there were 839 valid or renewable commercial reef fish permits and 62 valid or renewable bottom longline endorsements. These permits and endorsements are currently under a limited access program. From 2012 through 2017, there were an average of 877 commercial reef fish permits and 62 longline endorsements issued.

Dealers

Commercial vessels landing reef fish can only sell their catch to seafood dealers with valid Gulf and South Atlantic Dealer (GSAD) permit. On July 17, 2018, there were 404 dealers with valid GSAD permit. There are no income or sales requirements to acquire a GSAD permit. As a result, the total number of dealers can vary over the course of the year and from year to year. Dealers receiving IFQ species are required to possess an IFQ dealer account.

Imports

Information on the imports of all snapper and grouper species, either fresh or frozen, are available at http://www.st.nmfs.noaa.gov/st1/trade/cumulative_data/TradeDataProduct.html.

Information on the imports of individual snapper or grouper species is not available. In 2016, imports of all snapper and grouper species (fresh and frozen) were approximately 57.21 (58.74 in 2017) million pounds (mp) valued at approximately $176.88 million in 2016 dollars ($177.22 million in 2017 dollars). These amounts are contrasted with the domestic harvest of all snapper and grouper in the U.S. in 2016 of approximately 18.66 mp valued at approximately $67.49 million in 2016 dollars (data available at: http://www.st.nmfs.noaa.gov/commercial-fisheries/publications/index). Although the levels of domestic production and imports are not completely comparable for several reasons, including considerations of different product form such as fresh versus frozen, and possible product mislabeling, the difference in the magnitude of imports relative to the amount of domestic harvest is indicative of the dominance of imports in the domestic market. Final comparable data for more recent years are not currently available.

Red Snapper Commercial Sector Business Activity

Estimates of the business activity (economic impacts) in the U.S. associated with red snapper commercial harvests were derived using the model developed for and applied in NMFS (2015b) and are provided in Table 3.4.1.6. Business activity for the commercial sector is characterized in the form of full-time equivalent jobs, output (sales) impacts (gross business sales), income impacts (wages, salaries, and self-employed income), and value added impacts (difference between the sales price of a good and the cost of the goods and services needed to produce it). Income impacts should not be added to output (sales) impacts because this would result in double counting. The estimates of economic activity include the direct effects (effects in the sector where an expenditure is actually made), indirect effects (effects in sectors providing goods and services to directly affected sectors), and induced effects (effects induced by the personal consumption expenditures of employees in the direct and indirectly affected sectors). Due to the inclusion of other species, not just red snapper, revenue data used in generating business activity is based on Table 3.4.1.5.

Table 3.4.1.6. Average annual business activity (thousand 2016 dollars) associated with the harvests of vessels that harvested red snapper in the Gulf.

Species	Average Annual Dockside Revenue	Jobs	Output (Sales) Impacts	Income Impacts	Value Added Impacts
Red Snapper	$24,958	3,332	$247,505	$90,893	$128,421
All species*	$60,370	8,059	$598,684	$219,858	$310,633

*Includes dockside revenues and economic activity associated with the average annual harvest of all species, including red snapper, landed by vessels that harvested red snapper in the Gulf.
Source: Revenue data from NMFS SEFSC Logbook and ALS data, economic impact results calculated by NMFS SERO using the model developed for NMFS (2016).

In addition to the business activities generated by commercial vessel landings of red snapper, business activities associated with commercial vessel landings of all other species landed by commercial vessels are also presented in the table above. Vessels that harvested red snapper also harvested other species on trips where red snapper were harvested, and some took other trips in

the Gulf on which no red snapper were harvested, as well as trips in the South Atlantic. All revenues from all species harvested on all of these trips contributed towards making these vessels economically viable and contribute to the economic activity associated with these vessels.

3.4.1.2 Hogfish

Hogfish Vessel Level Economic Performance

The SEFSC study did not include hogfish as one of species of interest. For the current purpose, vessel level performance for hogfish is based on the dataset assembled by the SEFSC Social Science Research Group (SEFSC-SSRG Economic Panel Dataset). Tables 3.4.1.7 and 3.4.1.8 contain information on vessel performance for commercial vessels that landed at least one pound of hogfish in the Gulf in 2012-2017. The tables contain vessel counts from the logbook data (vessel count, trips, and landings). Dockside values were generated using landings information from logbook data and price information from the accumulated landings system (ALS) data. The data cover all vessels that harvested hogfish anywhere in the Gulf, regardless of trip length or species target intent. Federally permitted vessels required to submit logbooks generally report their harvest of most species regardless of whether the fish were caught in state or federal waters.

On average, 61 vessels per year landed hogfish in the Gulf (Table 3.4.1.7). These vessels, combined, averaged 314 trips per year in the Gulf on which hogfish were landed and 575 other trips. The average annual total dockside revenue (2017 dollars) was approximately $0.12 million from hogfish, approximately $0.51 million from other species co-harvested with hogfish (on the same trips), and approximately $1.66 million from other trips by these vessels on trips in the Gulf on which no hogfish were harvested or occurred in the South Atlantic (Table 3.4.1.8). Total average annual revenue from all species harvested by vessels harvesting hogfish in the Gulf was approximately $2.29 million, or approximately $37,000 per vessel.

Table 3.4.1.7. Summary of vessel counts, trips, and logbook landings (pounds gutted weight (lbs gw)) for vessels landing at least one pound of hogfish, 2012-2017.

Year	Number of Vessels	Number of Gulf Trips that Caught Hogfish	Hogfish Landings (lbs gw)	"Other Species" Landings Jointly Caught with Hogfish (lbs gw)	Number of Other Trips*	Landings on Other Trips (lbs gw)
2012	58	348	42,588	154,929	585	495,950
2013	59	236	19,891	112,381	554	580,327
2014	76	360	33,563	191,386	753	454,968
2015	61	360	25,132	144,779	564	491,818
2016	61	356	27,462	130,508	541	500,856
2017	51	225	15,253	98,549	452	330,056
Average	61	314	27,315	138,755	575	475,663

Source: NMFS SEFSC Economic Query System, July 17, 2018.
*Includes Gulf trips on which hogfish were not harvested as well as trips in the South Atlantic regardless of what species were harvested, including hogfish.

Table 3.4.1.8. Summary of vessel counts and revenue (2017 dollars) for vessels landing at least one pound of hogfish, 2012-2017.

Year	Number of Vessels	Dockside Revenue from West Florida Hogfish	Dockside Revenue from "Other Species" Jointly Caught with Hogfish	Dockside Revenue on Other Trips	Total Dockside Revenue	Average Total Dockside Revenue per Vessel
2012	58	$172,741	$534,834	$1,510,997	$2,218,572	$38,251
2013	59	$81,912	$411,698	$1,821,712	$2,315,322	$39,243
2014	76	$143,133	$692,361	$1,529,491	$2,364,985	$31,118
2015	61	$112,045	$524,861	$2,008,044	$2,644,950	$43,360
2016	61	$124,185	$510,043	$1,867,891	$2,502,119	$41,018
2017	51	$68,172	$365,733	$1,230,920	$1,664,825	$32,644
Average	61	$117,031	$506,588	$1,661,509	$2,285,129	$37,461

Source: NMFS SEFSC Economic Query System, July17, 2018.

Ex-vessel Prices

The dockside or ex-vessel price is the price the vessel receives at the first sale of harvest. Over the period 2012-2017, the average annual ex-vessel price per lb for hogfish harvested in the Gulf was $4.31 (2017 dollars), and ranged from $4.06 in 2012 to $4.52 in 2016.

Permits

See the section on permits for red snapper.

Dealers

See the section on dealers for red snapper.

Imports

See the section on imports for red snapper.

Hogfish Commercial Sector Business Activity

Estimates of the business activity (economic impacts) in the U.S. associated with the West Florida hogfish commercial harvests were derived using the same model as that used for red snapper and are provided in Table 3.4.1.9.

Table 3.4.1.9. Average annual business activity (thousand 2016 dollars) associated with the harvests of vessels that harvested hogfish in the Gulf.

Species	Average Annual Dockside Revenue	Jobs	Output (Sales) Impacts	Income Impacts	Value Added Impacts
Hogfish	$124	17	$12,235	$454	$641
All species*	$23,666	316	$23,469	$8,619	$12,177

*Includes dockside revenues and economic activity associated with the average annual harvest of all species, including hogfish, harvested by vessels that harvested hogfish in the Gulf.
Source: Revenue data from NMFS SEFSC Logbook and ALS data, economic impact results calculated by NMFS SERO using the model developed for NMFS (2016).

3.4.2 Recreational Sector

3.4.2.1 Red Snapper

Red Snapper Landings

Information on recreational landings and effort for Gulf red snapper are found in Section 3.1.1.2, and are not repeated here. More details on the Gulf red snapper recreational sector may be found in Amendment 40 and are incorporated herein by reference.

Red Snapper Effort

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

- Target effort – The number of individual angler trips, regardless of duration, where the intercepted angler indicated that the species or a species in the species group was targeted as either the first or the second primary target for the trip. The species did not have to be caught.
- Catch effort – The number of individual angler trips, regardless of duration and target intent, where the individual species or a species in the species group was caught. The fish did not have to be kept.
- Total recreational trips – The total estimated number of recreational trips in the Gulf, regardless of target intent or catch success.

Other measures of effort are possible, such as directed trips (the number of individual angler trips that either targeted or caught a particular species). Estimates of the number of red snapper target trips and catch trips for the shore, charter, and private/rental boat modes in the Gulf for 2012-2016 are provided in Table 3.4.2.1. Effort data for 2017 are not available. Over the period examined, total red snapper target effort averaged approximately 470,000 trips across all modes (Table 3.4.2.1). Red snapper were most commonly targeted by private/rental anglers. Florida and Alabama are the dominant states for targeting red snapper. As shown in Table 3.4.2.1,

considerably more trips caught red snapper, approximately 697,000 trips from all modes, than targeted red snapper. The private/rental mode was also the dominant mode in terms of catch effort.

Table 3.4.2.1. Average number of red snapper recreational target and catch trips, by mode, by state, 2012-2016.

	Shore Mode	Charter Mode	Private/Rental Mode	All Modes
Target Trips				
Alabama	844	21,017	123,878	145,401
W. Florida	nr*	33,662	233,761	267,423
Mississippi	nr*	399	15,891	16,290
Louisiana	nr*	7,198	34,119	41,317
Total	844	62,276	407,649	470,431
Catch Trips				
Alabama	957	41,507	153,156	194,854
W. Florida	817	103,373	312,104	415,804
Mississippi	0	439	21,104	21,543
Louisiana	0	11,411	53,528	64,939
Total	1,774	156,730	539,892	697,140

Source: MRIP database, NMFS, SERO.

*"nr" = none recorded. Averages based on positive entries; "nr" entries are not assumed equivalent to "0" trips; Texas is not covered in the MRFSS/MRIP, so no target or catch trips are available for the state. Louisiana effort from 2014 to present is collected through LA Creel and not available in the MRIP database.

Similar analysis of red snapper 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 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. Estimates of headboat effort (angler days) are provided in Table 3.4.2.2. Headboat data is collected by the NMFS Southeast Region Headboat Survey (SRHS).

Table 3.4.2.2. Headboat angler days and percent distribution, by state, 2012-2016.

	Angler Days				Percent Distribution			
Year	**FLW**	**NWFL-AL***	**MS-LA****	**TX**	**FLW**	**FL-AL**	**MS-LA**	**TX**
2012	84,205	77,770	3,680	51,776	38.7%	35.8%	1.7%	23.8%
2013	94,752	80,048	3,406	55,749	40.5%	34.2%	1.5%	23.8%
2014	102,841	88,524	3,257	51,231	41.8%	36.0%	1.3%	20.8%
2015	107,910	86,473	3,587	55,135	42.6%	34.2%	1.4%	21.8%
2016	109,098	90,875	2,952	54,077	42.5%	35.4%	1.1%	21.0%
Average	99,761	84,738	3,376	53,594	41.3%	35.1%	1.4%	22.2%

Source: NMFS Southeast Region Headboat Survey (SRHS).
*Beginning in 2013, HBS data was reported separately for NW Florida and Alabama, but has been combined here for consistency with previous years.
**Headboats from Mississippi and Louisiana are combined for confidentiality purposes.

Permits

Section 3.1.1.2 provides information regarding the number of federally permitted headboats and charter vessels.

Information on Gulf charter vessel and headboat operating characteristics is included in Savolainen et al. (2012) and is incorporated herein by reference. The average charter vessel operation took 46 full-day (9 hours) and 55 half-day (5 hours) trips per year, carried 4.8 and 4.6 passengers per trip type, respectively, targeted reef fish and pelagic species on 64% and 19% of all trips, respectively, and took 68% of all trips in the EEZ. The average headboat operation took 83 full-day (10 hours) and 37 half-day (6 hours) trips per year, carried 13.1 and 14.6 passengers per trip type, respectively, targeted reef fish and pelagic species on 84% and 6% of all trips, respectively, and took 81% of all trips in the EEZ.

There are no specific federal permitting requirements for recreational anglers to fish for or harvest reef fish. Instead, anglers are required to either possess a state recreational fishing permit that authorizes saltwater fishing in general, or be registered in the federal National Saltwater Angler Registry system, subject to appropriate exemptions. For the for-hire sector, customers are authorized to fish under the charter or headboat vessel license and are not required to hold their own fishing licenses. As a result, it is not possible to identify with available data how many individual anglers may be affected by this amendment.

Economic Value

Economic value can be measured in the form of consumer surplus (CS) per additional fish kept on a trip for anglers (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 CS value per fish for 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 $155 (2015 dollars) per charter angler trip (Liese and Carter 2011). The estimated NOR value per headboat angler trip is $54 (2015 dollars) (C. Liese, NMFS SEFSC, pers. comm.).

Business Activity

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 red snapper were derived using average impact coefficients for recreational angling for all species, as derived from an add-on survey to the Marine Recreational Fisheries Statistics Survey (MRFSS). The ad-on survey collected economic expenditure information, which is described and used in NMFS Fisheries Economics of the U.S. (2015b). Estimates of the average expenditures by recreational anglers are also provided in NMFS (2015b) and are incorporated herein by reference.

Recreational fishing generates business activity (economic impacts). Business activity for the recreational sector is characterized in the form of full-time equivalent jobs, output (sales) impacts (gross business sales), income impacts, and value-added impacts (difference between the value of goods and the cost of materials or supplies). Estimates of the average red snapper target effort (2012-2016) and associated business activity (2016 dollars) are provided in Table 3.4.2.3.

The average annual target effort for red snapper over the period 2012-2016 supported an estimated 255 jobs in Florida and generated approximately $30.6 million in output (sales) impacts, $17.3 million in value added impacts, and $10.9 million in income impacts. The corresponding numbers for the other states are: 174 jobs, $19.4 million in output impacts, $10.1 million in value added impacts, and $6.6 million in income impacts in Alabama; 6 jobs, $0.7 million in output impacts, $0.3 million in value added impacts, and $0.2 million in income impacts in Mississippi; 44 jobs, $6.3 million in output impacts, $3.4 million in value added impacts, and $2.2 million in income impacts in Louisiana. Output, value added, and income impacts are not additive.

Estimates of the business activity associated with headboat effort are not available. Headboat vessels are not covered in the MRFSS/MRIP 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. For the same reason, estimation of business activity for Texas has not been conducted.

Table 3.4.2.3. Summary of red snapper target trips (2012-2016 average) and associated business activity (thousand 2016 dollars).

	Impacts			
Impact Type	**Florida**	**Alabama**	**Mississippi**	**Louisiana**
	Shore Mode	**Shore Mode**	**Shore Mode**	**Shore Mode**
Target Trips	0	844	0	0
Value Added	$0	$30	$0	$0
Output	$0	$55	$0	$0
Income	$0	$18	$0	$0
Jobs	0	1	0	0
	Priv/Ren Mode	**Priv/Ren Mode**	**Priv/Ren Mode**	**Priv/Ren Mode**
Target Trips	233,761	123,878	15,891	34,119
Value Added	$5,155	$3,439	$224	$1,204
Output	$8,699	$6,642	$516	$2,481
Income	$2,989	$1,997	$134	$650
Jobs	79	66	4	18
	Charter Mode	**Charter Mode**	**Charter Mode**	**Charter Mode**
Target Trips	33,662	21,017	399	7,198
Value Added	$12,100	$6,656	$90	$2,238
Output	$21,931	$12,748	$181	$3,879
Income	$7,899	$4,545	$62	$1,506
Jobs	175	107	1	26
	All Modes	**All Modes**	**All Modes**	**All Modes**
Target Trips	267,423	145,739	16,290	41,317
Value Added	$17,255	$10,125	$314	$3,442
Output	$30,630	$19,446	$697	$6,360
Income	$10,888	$6,560	$196	$2,157
Jobs	255	174	6	44

Source: Effort data from the MRIP, economic impact results calculated by NMFS SERO using the model developed for NMFS (2016).

3.4.2.2 Hogfish

Hogfish Recreational Landings

Total recreational, together with total commercial, landings of hogfish are presented in Section 3.1.2 because the quota is not allocated between the two sectors. The following (Tables 3.4.2.4-3.4.2.7) presents additional landings information for hogfish for the years 2012-2017. It is noted that greater than 99% of hogfish recreational landings are from Florida, with Alabama and Texas accounting for the rest (LAPP, pers. comm. 2018).

On average, the private fishing mode is the dominant sector in terms of landings by weight or number of fish. For the private fishing mode, landings averaged approximately 140,000 pounds by weight and ranged from approximately 63,000 pounds in 2014 to 246,000 pounds in 2016; landings by number of fish average approximately 61,000 fish, and ranged from approximately 34,000 fish to 111,000 fish. Wave 4 (July/August) registered the highest landings by weight and number of fish. Landings in this wave averaged more than twice those of some of the waves.

Table 3.4.2.4. Hogfish recreational landings, pounds whole weight (lbs ww), 2012-2017, by mode.

Year	Charter	Headboat	Private	Shore
2012	14,281	8,560	125,992	0
2013	1,257	2,921	240,727	0
2014	8,459	2,869	63,524	8,519
2015	7,444	2,127	100,361	0
2016	23,150	5,299	246,966	0
2017	18,818	3,391	70,501	0
Average	12,235	4,194	141,345	1,420

Source: NMFS SERO LAPPS based on SEFSC recreational ACL dataset (6/11/2018).

Table 3.4.2.5. Hogfish recreational landings, number of fish, 2012-2017, by mode.

Year	Charter	Headboat	Private	Shore
2012	6,485	4,137	48,273	0
2013	557	1,980	102,836	0
2014	4,242	2,032	34,030	4,482
2015	4,081	1,273	44,605	0
2016	11,411	2,553	111,479	0
2017	9,452	2,157	28,385	0
Average	6,038	2,355	61,601	747

Source: NMFS SERO LAPPS based on SEFSC recreational ACL dataset (6/11/2018).

Table 3.4.2.6. Hogfish recreational landings, pounds whole weight (lbs ww), 2012-2017, by wave (2-month intervals).

Year	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
2012	42,792	20,600	2,157	53,711	12,036	17,537
2013	13,982	12,849	56,666	127,882	27,531	5,994
2014	2,514	2,295	15,543	27,925	5,843	29,250
2015	23,309	30,742	13,290	34,428	5,416	2,747
2016	17,355	10,280	31,564	29,702	115,007	71,507
2017	33,173	16,032	5,304	15,714	7,790	14,696
Average	22,188	15,466	20,754	48,227	28,937	23,622

Source: NMFS SERO LAPPS based on SEFSC recreational ACL dataset (6/11/2018).

Table 3.4.2.7. Hogfish recreational landings, number of fish, 2012-2017, pounds whole weight (lbs ww), 2012-2017, by wave (2-month intervals).

Year	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
2012	16,795	8,440	1,057	21,041	4,755	6,806
2013	6,123	5,606	24,086	54,160	12,816	2,581
2014	1,365	1,327	8,552	14,865	3,164	15,513
2015	10,794	14,206	5,551	15,500	2,505	1,404
2016	8,477	4,792	14,380	13,469	52,027	32,298
2017	15,459	6,639	2,205	6,471	3,191	6,029
Average	9,835	6,835	9,305	20,918	13,076	10,772

Source: NMFS SERO LAPPS based on SEFSC recreational ACL dataset (6/11/2018).

Hogfish Angler Effort

Refer to the discussion on red snapper angler effort for a description of recreational effort derived from the MRIP database. Estimates of the number of hogfish target trips and catch trips for the shore, charter, and private/rental boat modes in the Gulf for 2012-2016 are provided in Table 3.4.2.8. Effort data for 2017 are not available. Target and catch trips are reported for Florida only as there is no reported target or catch trips for other states in the Gulf.

Over the period examined, total hogfish target effort averaged approximately 62,000 trips across all modes (Table 3.4.2.8). Hogfish were most commonly targeted by private/rental anglers. Considerably more trips caught hogfish, approximately 90,000 trips from all modes, than targeted hogfish. The private/rental mode was also the dominant mode in terms of catch effort.

Table 3.4.2.8. Target and catch trips for hogfish in Florida, by mode, 2012-2016.

Year	Shore Mode*	Charter Mode	Private/Rental Mode	All Modes
Target Trips				
2012	0	2,574	65,344	67,918
2013	0	282	60,606	60,888
2014	0	477	64,441	64,918
2015	2,432	2,269	50,306	55,006
2016	0	8,371	50,749	59,120
Average	486	2,795	58,289	61,570
Catch Trips				
2012	1,742	3,380	91,419	96,541
2013	6,507	412	99,011	105,929
2014	13,113	3,992	78,914	96,019
2015	0	1,188	44,518	45,706
2016	3,531	20,153	83,562	107,247
Average	4,979	5,825	79,485	90,288

Source: MRIP database, NMFS, SERO.
Notes: Zero entries may be a case of non-reported effort but are considered zeros for averaging purposes; 2017 effort data is not available.

Permits

See the section on permits for the red snapper recreational sector.

Economic Value

The CS value per fish for hogfish is unknown but a proxy may be used to approximate the CS per fish. Haab et al. (2012) estimated a CS for an additional snapper caught and kept of $12.47 (2017 dollars), with bounds of $8.31 and $18.01 at the 95% confidence interval. The corresponding CS estimate for an additional grouper caught and kept is $135.74 (2017 dollars), with bounds of $121.89 and $152.36. The NOR values are the same as those discussed for red snapper.

Business Activity

Refer to the business activity section for red snapper for a description of economic activity in the recreational sector. Estimates of the average hogfish target effort (2012-2016) and associated business activity (2016 dollars) are provided in Table 3.4.2.9. Only Florida reported target trips for hogfish.

The average annual target effort for hogfish over the period 2012-2016 supported an estimated 34 jobs in Florida and generated approximately $4.0 million in output (sales) impacts, $2.3 million in value added impacts, and $1.4 million in income impacts. Output, value added, and income impacts are not additive.

Table 3.4.2.9. Summary of hogfish target trips (2012-2016 average) and associated business activity (thousand 2016 dollars) in Florida.

Impact Type	Fishing Mode
	Shore Mode
Target Trips	2,795
Output Impact	$1,821
Value Added Impact	$1,005
Income Impact	$656
Jobs	15
	Private/Rental Mode
Target Trips	58,289
Output Impact	$2,169
Value Added Impact	$1,285
Income Impact	$745
Jobs	20
	Charter Mode
Target Trips	486
Output Impact	$13
Value Added Impact	$8
Income Impact	$5
Jobs	0
	All Modes
Target Trips	61,570
Output Impact	$4,003
Value Added Impact	$2,298
Income Impact	$1,406
Jobs	34

Source: Effort data from the MRIP, economic impact results calculated by NMFS SERO using the model developed for NMFS (2016).

3.5 Description of the Social Environment

This framework action affects the commercial and recreational management of red snapper and hogfish in the Gulf. This section provides the background for the proposed actions that are evaluated in Chapter 4.

Commercial and recreational landings by state are included to provide information on the geographic distribution of fishing involvement. Descriptions of the top ranking communities by the number of commercial reef fish permits are included, along with descriptions of the top communities involved in commercial hogfish and commercial red snapper. Descriptions of the top ranking communities by the number of federal for-hire permits are included, along with top recreational fishing communities based on recreational engagement, and communities with SRHS landings of red snapper. Community level data are presented in order to meet the requirements of National Standard 8 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), which requires the consideration of the importance of fishery resources to human communities when changes to fishing regulations are considered. Lastly, social vulnerability data are presented to assess the potential for environmental justice concerns.

A description of the social environment for commercial and recreational sectors' harvest of hogfish is provided in GMFMC (2016) and is incorporated herein by reference. This amendment includes detailed information on commercial and recreational landings and commercial gear types. A description of the social environment for the commercial sector of red snapper is provided in GMFMC (2017) and is incorporated by reference. This amendment includes detailed information on permits by state and community, landings, IFQ participants, and fishing communities' landings and engagement.

3.5.1 Landings by State

3.5.1.1 Red Snapper

Red snapper is harvested in all five Gulf states. The majority of Gulf commercial red snapper landings are from waters adjacent to Florida and Texas, followed by Louisiana, and Alabama and Mississippi (Table 3.5.1.1). Total Gulf recreational red snapper landings by state for the years 1987 through 2017 is provided in Appendix A, Table A-1. Landings by state are not constant; the proportion of the quota landed by anglers from each state varies from year to year. Across time, the proportion of landings made up by the eastern Gulf states (Alabama and western Florida) has increased compared to the western Gulf states (Texas and Louisiana), as the red snapper rebuilding plan has proceeded.

Table 3.5.1.1. Percentage of total commercial red snapper landings by state for 2012-2017.

Year	FL	AL/MS	LA	TX
2012	47%	5%	20%	28%
2013	41%	5%	22%	33%
2014	39%	5%	13%	42%
2015	40%	6%	16%	38%
2016	35%	7%	17%	41%
2017	37%	9%	18%	36%

Source: NMFS 2018.
Note: The state represents the address of the dealer facility and not necessarily the landing location.

3.5.1.2 Hogfish

From 2012 to 2017, all commercial hogfish landings are from waters adjacent to Florida (SEFSC Commercial Dataset). Nearly all recreational landings are from waters adjacent to Florida (greater than 99%) with a small proportion of landings from Alabama and Florida combined, followed by Texas (SEFSC Recreational ACL Dataset). Recreational landings for Florida and Alabama are aggregated together because of the manner in which headboat landings are reported.

3.5.2 Fishing Communities

3.5.2.1 Commercial Fishing Communities

Gulf commercial reef fish permits are held by entities with mailing addresses in 233 communities, located in 14 states (SERO Permit Office, July 22, 2018). Communities with the most Gulf commercial reef fish permits are located in Florida and Texas (Table 3.5.1.2). The community with the most Gulf commercial reef fish permits is Panama City, Florida (approximately 8% of commercial reef fish permits, Table 3.5.2.1).

Table 3.5.2.1. Top ranking communities based on the number of Gulf commercial reef fish permits.

State	Community	Permits
FL	Panama City	67
FL	Key West	37
FL	St. Petersburg	27
FL	Largo	23
TX	Galveston	23
FL	Destin	21
FL	Seminole	19
FL	Cortez	18
FL	Pensacola	17
FL	Clearwater	15
FL	Tampa	14
FL	Miami	13
FL	Lecanto	12
FL	Steinhatchee	12
TX	Houston	12
FL	Apalachicola	11
FL	Fort Myers	11
FL	Naples	11

Source: NMFS SERO permit office, July 22, 2018.

The descriptions of communities include information about the top communities based on a "regional quotient" (RQ) of commercial landings and value for hogfish and red snapper. The RQ

is the proportion of landings and value out of the total landings and value of that species for that region, and is a relative measure. These communities would be most likely to experience the effects of the proposed actions that could change the fishery and impact participants, associated businesses, and communities within the region. If a community is identified as a hogfish or red snapper community based on the RQ, this does not necessarily mean that the community would experience significant impacts due to changes in the fishery if a different species or number of species were also important to the local community and economy. Additional detailed information about communities with the highest RQs can be found on the SERO Community Snapshots website.[14]

The top red snapper communities are located in Texas, Florida, Louisiana, and Alabama (Figure 3.5.2.1). About 23% of red snapper is landed in the top community of Galveston, Texas, representing about 25% of the Gulf-wide ex-vessel value for the species. The community of Panama City, Florida ranks second and represents about 10.8% of landings and 8% of value. The community of Destin, Florida ranks third and represents about 10.4% of landings and 11% of value.

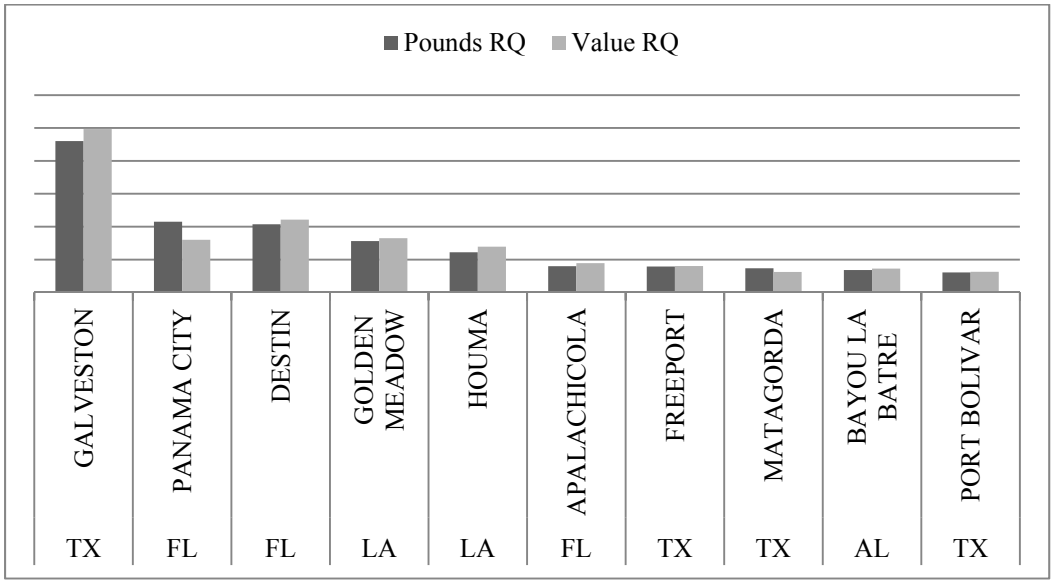

Figure 3.5.2.1. Top ten Gulf communities ranked by pounds and value RQ of red snapper. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.
Source: NMFS SERO, IFQ Database 2017.

All of the top hogfish communities are located in Florida (Figure 3.5.2.2). About 24% of hogfish is landed in the top community of St. Petersburg, representing about 23% of the Gulf-wide ex-vessel value for the species. Several additional Pinellas County communities (Largo, Tarpon Springs, and Seminole) are included in the top communities and collectively represent about 19% of landings and 17% of value.

[14] http://sero.nmfs.noaa.gov/sustainable_fisheries/social/community_snapshot/

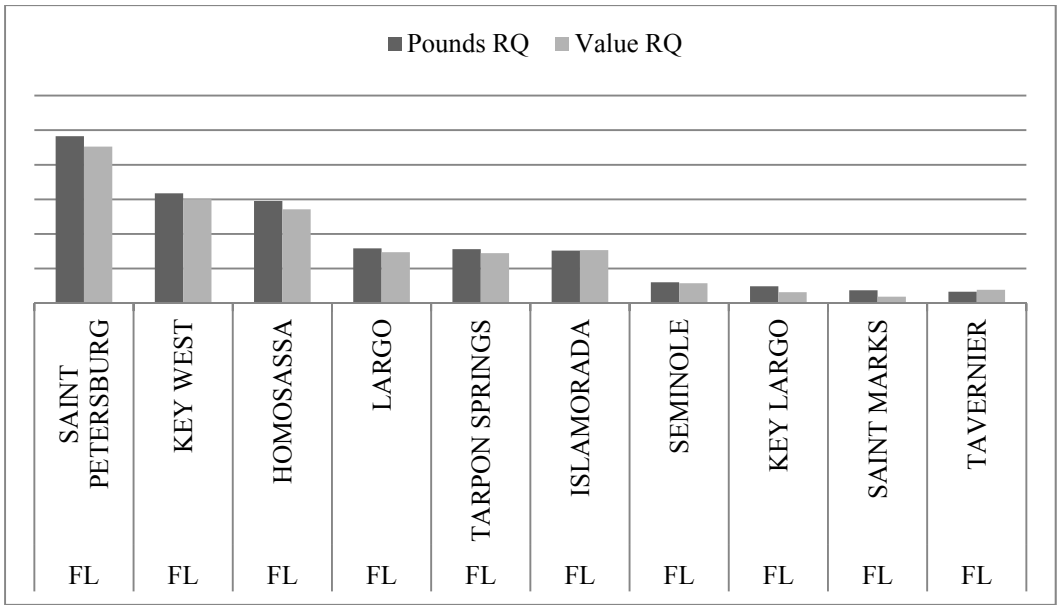

Figure 3.5.2.2. Top ten Gulf communities ranked by pounds and value RQ of hogfish. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.
Source: SERO, Community ALS 2016.

3.5.2.2 Recreational Fishing Communities

Federal for-hire permits are held by those with mailing addresses in 364 communities, located in 23 states (SERO permit office, July 22, 2018). The communities with the most for-hire permits for reef fish are provided in Table 3.5.2.2.

Table 3.5.2.2. Top ranking communities based on the number of federal for-hire permits for Gulf reef fish, including historical captain permits, in descending order.

State	Community	Permits
FL	Destin	67
AL	Orange Beach	51
FL	Panama City	51
FL	Naples	46
FL	Key West	42
FL	Pensacola	26
TX	Galveston	23
FL	St. Petersburg	22
FL	Sarasota	20
FL	Cape Coral	17
FL	Clearwater	17
FL	Fort Myers	17
LA	Metairie	17
TX	Houston	17
FL	Panama City Beach	15
MS	Biloxi	15
TX	Port Aransas	15
FL	Marco Island	14
TX	Freeport	14

Source: NMFS SERO permit office, July 22, 2018.

When Gulf reef fish for-hire vessels are separated into charter vessels or headboats, the majority are charter vessels (95% of for-hire vessels as of September 20, 2016) and a smaller proportion are headboats (approximately 5%, NMFS SERO permit office).

Charter vessels and headboats target red snapper throughout the Gulf. At this time, it is not possible to determine which species are targeted by specific charter vessels, and associate those vessels with their homeport communities. However, harvest data are available for headboats by species and can be linked to specific communities through the homeport identified for each vessel. These data are available for headboats registered in the SRHS.

In 2016, 69 federal for-hire vessels in the Gulf were registered in the SRHS (SRHS, SERO Limited Access Privilege Program [LAPPs]/Data Management database). Of these, 57 vessels landed red snapper in 2016 (SEFSC SRHS). The majority of these headboats with red snapper landings are registered in Florida (approximately 49%), with smaller numbers of vessels registered in Texas (26%), Alabama (16%), and Louisiana and Mississippi (9%, SEFSC SRHS 2016).

Figure 3.5.2.3 includes all Gulf communities based on a 'regional quotient' (RQ) of recreational headboat landings for red snapper. The RQ is the proportion of landings out of the total SRHS

landings for that region, and is a relative measure. The top four homeports represent about 73% of the red snapper landings by vessels participating in the SRHS. Homeports with the greatest landings of red snapper include Galveston, Texas (27.2% of red snapper landed by SRHS vessels in 2016); Port Aransas, Texas (23.5%); Panama City Beach, Florida (11.4%); and Orange Beach, Alabama (10.5%; SEFSC SRHS 2016).

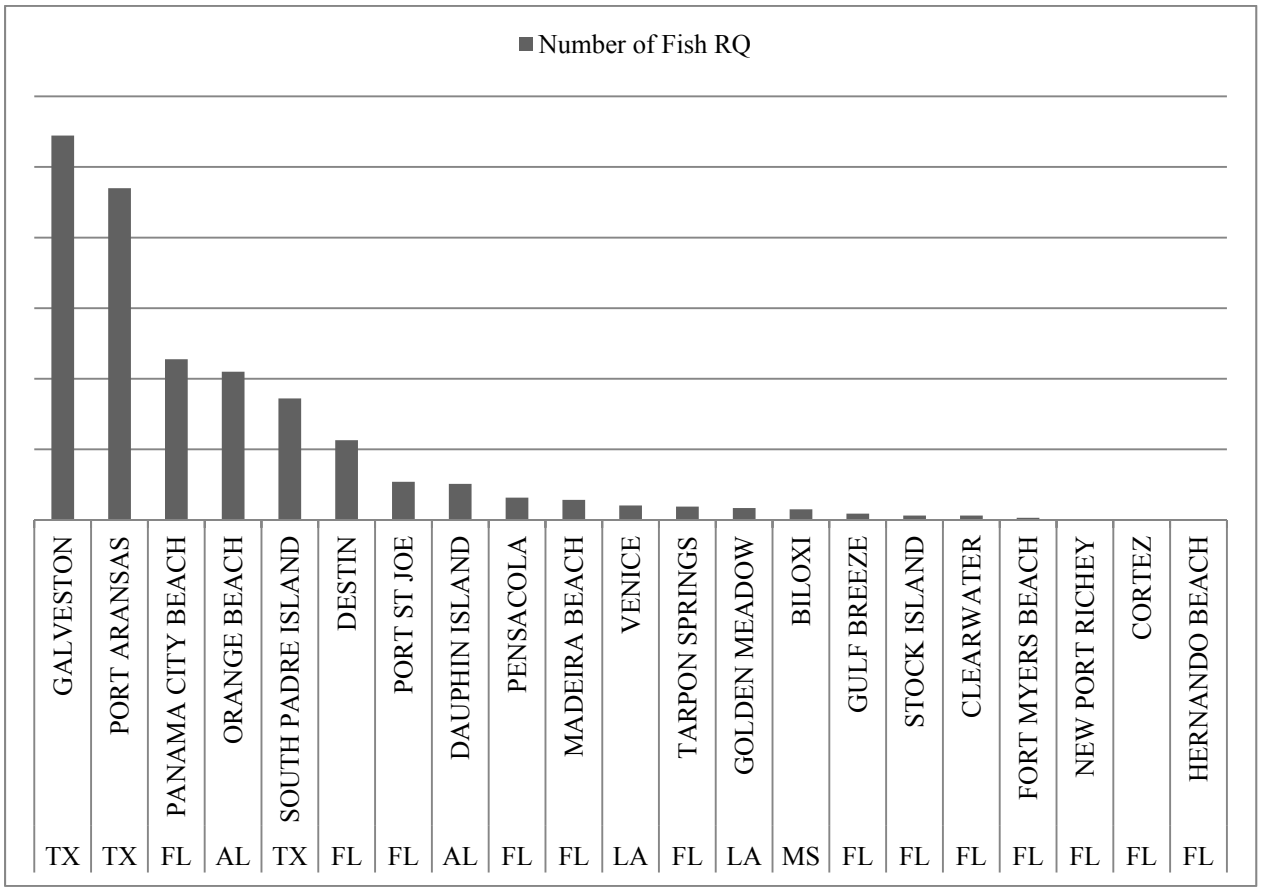

Figure 3.5.2.3. All Gulf communities ranked by number of fish landed by headboats included in the SRHS RQ for red snapper. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.
Source: SEFSC SRHS (2016).

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

Figure 3.5.2.4 identifies the top Gulf communities that are engaged and reliant upon recreational fishing in general. Two thresholds of one and one-half standard deviation above the mean were plotted to help determine a threshold for significance. Communities are presented in ranked order by fishing engagement and all 20 included communities demonstrate high levels of recreational engagement, although this is not specific to fishing for hogfish or red snapper. Because the analysis used discrete geo-political boundaries, Panama City and Panama City Beach had separate values for the associated variables. Calculated independently, each still ranked high enough to appear in the top 20 list suggesting a greater importance for recreational fishing in that area.

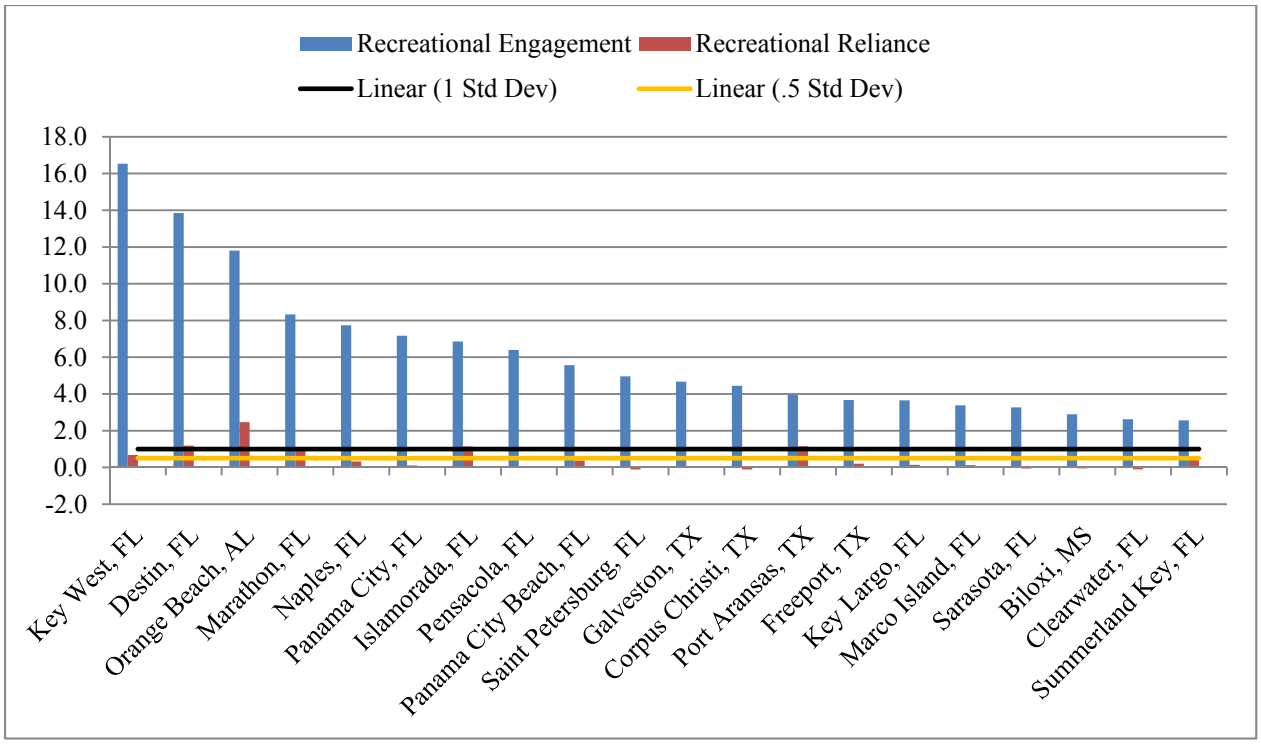

Figure 3.5.2.4. Top 20 recreational fishing communities' engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators Database 2016 (ACS 2010-2014).

3.5.3 Environmental Justice Considerations

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

Commercial and recreational anglers and associated industries could be impacted by the proposed actions. However, information on the race and income status for groups at the different participation levels is not available. Although information is available concerning communities overall status with regard to minorities and poverty (e.g., census data), such information is not available specific to anglers and those involved in the industries and activities, themselves. To help assess whether any EJ concerns arise from the actions in this amendment, a suite of indices were created to examine the social vulnerability of coastal communities. The three indices are poverty, population composition, and personal disruptions. The variables included in each of these indices have been identified through the literature as being important components that contribute to a community's vulnerability. Indicators such as increased poverty rates for different groups, more single female-headed households and households with children under the age of five, disruptions such as higher separation rates, higher crime rates, and unemployment all are signs of populations experiencing vulnerabilities. Again, for those communities that exceed the threshold it would be expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

Figures 3.5.3.1 and 3.5.3.2 provide the social vulnerability of the top recreational and commercial communities. Three communities exceed the threshold of one standard deviation above the mean for all three indices, Bayou La Batre, Alabama; Miami, Florida; and Freeport, Texas. Several communities exceed the threshold of one-half standard deviation above the mean for more than one index (Bayou La Batre, Alabama; Apalachicola, Florida; Fort Myers Beach, Florida; Miami, Florida; New Port Richey, Florida; Panama City, Florida; Sarasota, Florida; Stock Island, Florida; Tampa, Florida; Freeport, Texas; Galveston, Texas; and Houston, Texas). These communities would be the most likely to exhibit vulnerabilities to social or economic disruption due to regulatory change.

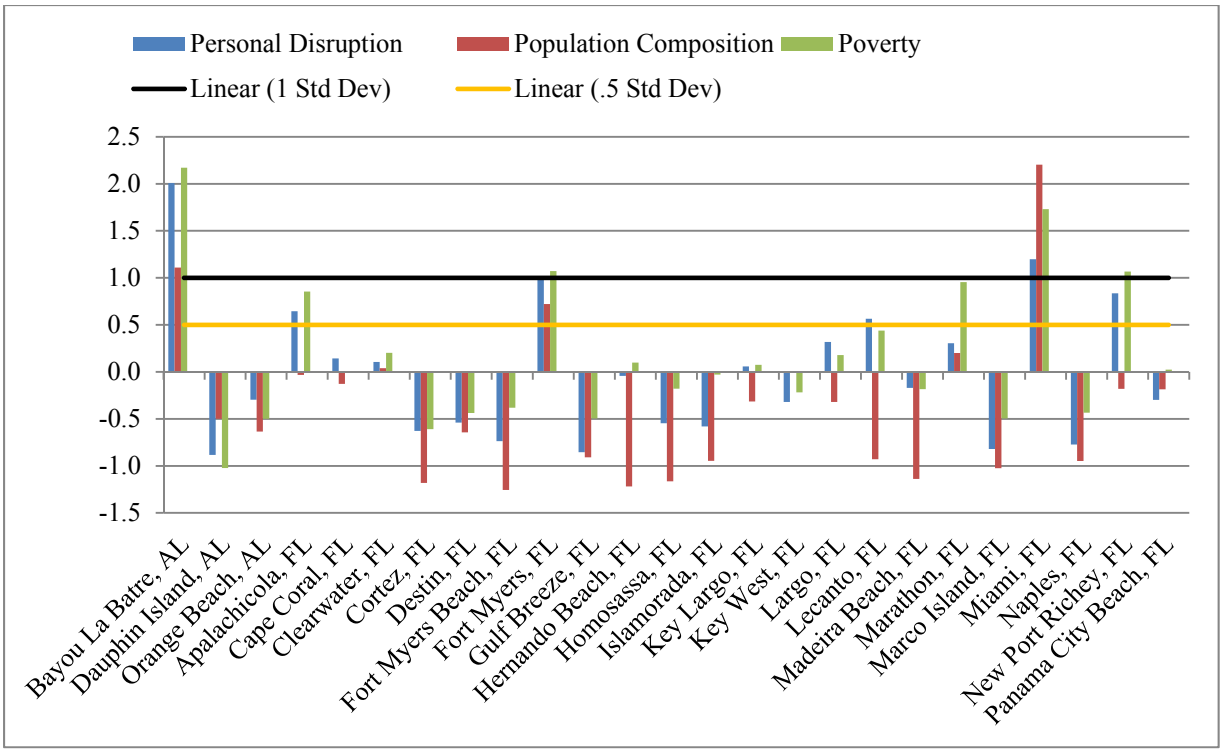

Figure 3.5.3.1. Social vulnerability indices for top commercial and recreational fishing communities.

Source: SERO, Community Social Vulnerability Indicators Database 2014 (American Community Survey 2010-2014).

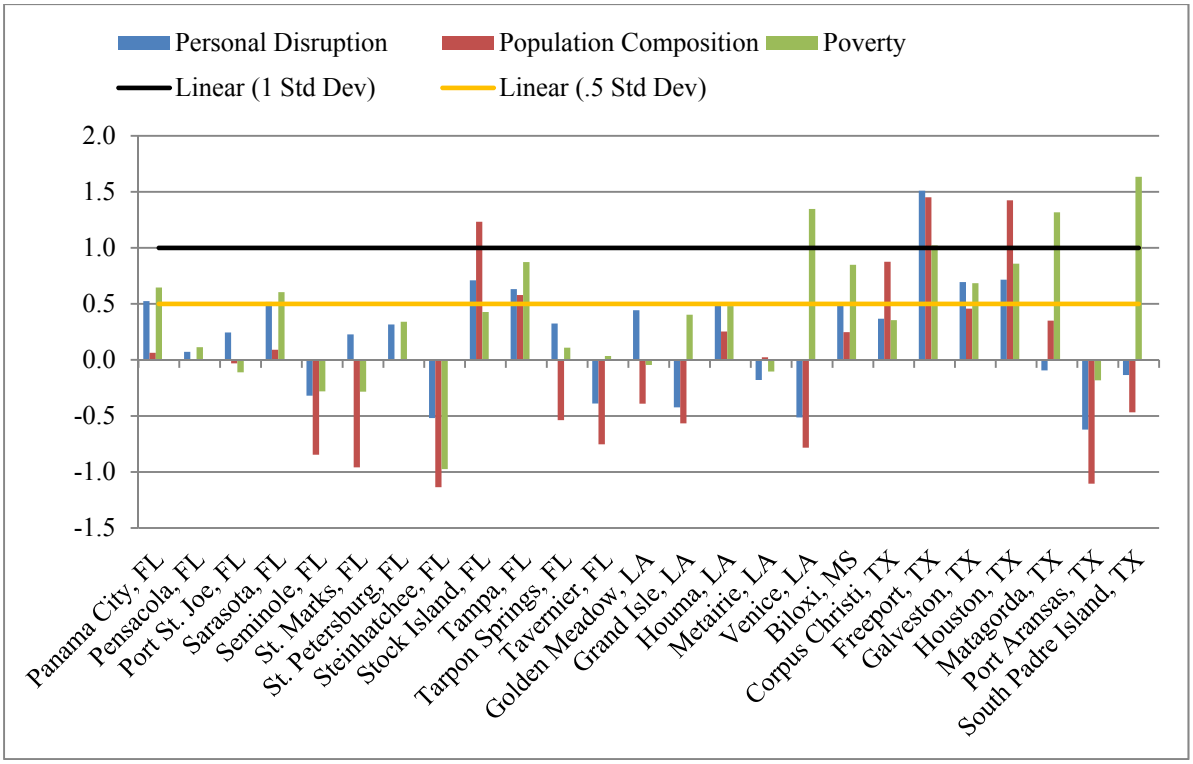

Figure 3.5.3.2. Social vulnerability indices for top commercial and recreational fishing communities continued.
Source: SERO, Community Social Vulnerability Indicators Database 2014 (American Community Survey 2010-2014).

People in these communities may be affected by fishing regulations in two ways: participation and employment. Although these communities may have the greatest potential for EJ concerns, no data are available on the race and income status for those involved in the local fishing industry (employment), or for their dependence on hogfish and red snapper specifically (participation). However, the implementation of the proposed actions of this amendment would not discriminate against any group based on their race, ethnicity, or income status because the proposed actions would be applied to all participants in the fishery. Further, there is no known subsistence fishing for hogfish or red snapper. Thus, the actions of this amendment are not expected to result in adverse or disproportionate environmental or public health impacts to EJ populations. Although no EJ issues have been identified, the absence of potential EJ concerns cannot be assumed.

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 – Modify Red Snapper Annual Catch Limits (ACL) and Recreational Annual Catch Targets (ACT)

Alternative 1: No Action. The red snapper ACLs and recreational ACTs will remain at 2017 levels, as shown in the table below.

Year	OFL	ABC	Total ACL	Comm ACL	Rec Total ACL	Private Angling ACL	For-hire ACL	Rec Total ACT	Private Angling ACT	For-hire ACT
2017+	14.80	13.74	13.74	7.01	6.73	3.88	2.85	5.39	3.11	2.28

* Values are in millions of pounds, whole weight.

Alternative 2: Modify the red snapper ACLs and recreational ACTs based on the annual acceptable biological catch (ABC) recommendations of the Scientific and Statistical Committee (SSC) for 2019 – 2021 and subsequent years as determined from the SEDAR 52 recent stock assessment. Set the total ACL equal to the ABC, and apply allocations and ACTs as appropriate.

Year	OFL	ABC	Total ACL	Comm ACL	Rec Total ACL	Private Angling ACL	For-hire ACL	Rec Total ACT	Private Angling ACT	For-hire ACT
2019	16.60	16.00	16.00	8.16	7.84	4.52	3.32	6.27	3.62	2.65
2020	15.40	15.00	15.00	7.65	7.35	4.24	3.11	5.88	3.39	2.49
2021+	14.60	14.30	14.30	7.29	7.01	4.04	2.96	5.61	3.23	2.37

* Values are in millions of pounds, whole weight.

Alternative 3: Modify the red snapper ACLs and recreational ACTs based on the constant catch ABC recommendations of the SSC for 2019 – 2021 and subsequent years as determined from the SEDAR 52 stock assessment. Set the total ACL equal to the ABC, and apply allocations and ACTs as appropriate.

Year	OFL	ABC	Total ACL	Comm ACL	Rec Total ACL	Private Angling ACL	For-hire ACL	Rec Total ACT	Private Angling ACT	For-hire ACT
2019-2021+	15.50	15.10	15.10	7.70	7.40	4.27	3.13	5.92	3.42	2.50

* Values are in millions of pounds, whole weight.

4.1.1 Direct and Indirect Effects on the Physical Environment

Setting red snapper catch limits does not directly affect the physical environment. However, specifying these values may indirectly affect the physical environment by defining the future level of fishing effort needed to harvest the annual catch limit (ACL). Effects on the physical environment from fishing are associated with gear coming into contact with bottom. Different gears have different levels of impact. Recreational red snapper fishing 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 red snapper fishing, most use handlines (mostly bandit rigs and electric reels, occasionally rod-and-reel) with a small percentage caught with bottom longlines. Effects from fishing on the physical environment are generally tied to fishing effort. The greater the fishing effort, the more gear interacts with the bottom.

Alternative 1 (No Action,) would not change the current catch limits, and therefore would not result in change in effects to the physical environment. **Alternative 2** and **Alternative 3** would increase the catch limits and therefore increase the amount of fishing activity, resulting in indirect negative effects to the physical environment. While **Alternative 2** would have the largest indirect effects initially, by 2020 **Alternative 2** would have a lower ACL, thereby reducing indirect effects to the physical environment. However, any effects under **Alternative 2** or **Alternative 3** are expected to be minimal because a significant change in overall fishing effort is not expected.

Another framework action currently in development considers changing the buffer between the annual catch target (ACT) and the ACL for the private angling and for-hire components of the recreational sector for red snapper. Regardless of the alternative selected in this document, the combined effects with the other framework action would likely increase the amount of indirect physical effects from any decrease in a component's ACT buffer for 2019 only. However, if **Alternative 2** or **3** are selected, raising the ACT and ACL, combined with the framework action to modify the recreational sector component ACT buffers, the indirect physical effects would be greater than **Alternative 1**.

4.1.2 Direct and Indirect Effects on the Biological/Ecological Environment

Alternative 1 (No Action) would maintain lower catch limits than those recommended by the SSC, and would therefore result in direct positive effects to the red snapper stock. For 2019 – 2021, **Alternative 2** and **3** would provide a higher harvest limit (summed ACL = 45.300 million pounds [mp] whole weight [ww] compared to **Alternative 1** (summed ACL = 41.220 mp ww). This higher limit would increase the removal of red snapper from the stock more than **Alternative 1**. Thus, **Alternative 2** and **3** would have a greater adverse effect on the red snapper stock compared to **Alternative 1** through greater removals over these years. Initially, **Alternative 2** has a greater impact to the red snapper stock than **Alternative 3**. However, with the declining yield stream, after 2021, **Alternative 2** would remove fewer red snapper from the stock. Should the ACL be exceeded, accountability measures (AMs) would be triggered. The

AMs are designed to reduce the likelihood of an overage in the following fishing year. However, over the three-year period, **Alternatives 2** and **3** would result in the same amount of removals from the red snapper stock, and would therefor result in equivalent biological effects. The harvest limits specified in **Alternatives 2** and **3** represent the best scientific information available, and are consistent with the rebuilding plan timeframe.

Another framework action currently in development considers changing the buffer between the ACT and the ACL for the private angling and for-hire components of the recreational sector for red snapper. Regardless of the alternative selected in this document, the combined effects with the other framework action would likely increase the amount of direct biological effects from any decrease in a component's ACT buffer for 2019 only. However, if **Alternative 2** or **3** are selected, raising the ACT and ACL, combined with the framework action to modify the recreational sector component ACT buffers, the direct biological effects would be greater than **Alternative 1**.

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 red snapper abundance. However, the relationships between red snapper and non-target species caught on trips where red snapper are directly targeted are not fully understood. Further, changes in the prosecution of the reef fish fishery are not expected from this action, so no additional effects to protected resources (see Section 3.3) are anticipated.

4.1.3 Direct and Indirect Effects on the Economic Environment

Commercial Sector

Alternative 1 (No Action) would maintain the current commercial red snapper ACL of approximately 7.01 mp ww. Therefore, changes in ex-vessel value, gross revenue, and share and allocation value would not be expected to result from this alternative. However, **Alternative 1** would be expected to result in adverse indirect economic effects due to fishing opportunities forgone by red snapper IFQ participants.

Estimates of the proposed increase in the red snapper commercial quota and associated expected change in ex-vessel value, gross revenues (ex-vessel value net of 3% cost recovery fee), IFQ share values, and individual fishing quota (IFQ) allocation values for **Alternatives 2** and **3** are provided in Table 4.1.3.1. The mean values in 2017 for the ex-vessel, share, and allocation prices were $4.97, $34.80, and $3.32 per pound gutted weight (gw), respectively (Southeast Regional Office [SERO] IFQ Database). Mean values are used in this analysis, since outliers in share and allocation transactions such as zeros are excluded from calculation of both mean and median values. The median values are $5.00, $35.75, and $3.35 (all values in 2017 dollars) for ex-vessel value, share, and allocation prices per pound gw of red snapper, respectively, derived from 2017 transactions (SERO IFQ Database).

Table 4.1.3.1. Alternatives 2 and **3** - Proposed increase in the red snapper commercial quota (relative to the status quo) and associated estimated change in ex-vessel value, gross revenue (ex-vessel value net of 3% cost recovery fee), share value, and allocation value per pound gutted weight. Quotas in million pounds; dollar values in million 2017 dollars. A discount rate of 7% is applied to dollar values, with 2019 as the base year.

	Year	Commercial Quota (mp)		Ex-Vessel Value	Gross Revenues	Share Value	Allocation Value
		Whole weight	Gutted Weight				
Alternative 2	2019	1.150	1.307	$6.497	$6.302	$45.491	$4.340
	2020	0.640	0.853	$3.963	$3.845	$27.752	$2.648
	2021	0.280	0.533	$2.313	$2.244	$16.198	$1.545
	Total	2.070	2.693	$12.774	$12.390	$89.441	$8.533
Alternative 3	2019	0.690	0.898	$4.462	$4.328	$45.491	$4.340
	2020	0.690	0.898	$4.170	$4.045	$31.243	$2.981
	2021	0.690	0.898	$3.897	$3.780	$29.199	$2.786
	Total	2.070	2.693	$12.530	$12.154	$87.732	$8.370
Difference between Alternative 2 and 3 Totals		0	0	$0.244	$0.237	$1.708	$0.163

Source: SERO IFQ Database (July 23, 2018).

Although the total difference between **Alternatives 2** and **3** in pounds from 2019-2021 is zero, the differences in ex-vessel value, gross revenues, IFQ share values, and IFQ allocations value are non-zero. This is due to the timing of the changes in ACL from 2019-2021 in **Alternative 2** compared to **Alternative 3** and the effect that discounting has. In essence, because a larger proportion of the total ACL from 2019-2021 in **Alternative 2** is apportioned earlier in that timeframe, a lower proportion occurs later in that timeframe, of which the resulting values need to be discounted to reflect the equivalent values in 2019 dollars. Because **Alternative 3** has a constant ACL, more of the resulting values are discounted to 2019 dollars than under **Alternative 2**. As a result, **Alternative 2** should have a larger, positive impact on the commercial sector than **Alternative 3**. As **Alternatives 2** and **3** both increase the commercial sector ACL from the ACL set in **Alternative 1**, **Alternatives 2** and **3** should both have a larger, positive impact on the commercial sector than **Alternative 1**.

Although IFQ shares are considered a privilege that can be revoked, they are assets that can be freely exchanged in markets and used as collateral for loans. If red snapper IFQ shares are traded in well-functioning markets, IFQ share prices should be a reflection of the stream of discounted net benefits expected to be derived from holding an additional unit of IFQ share. Detailed discussions on IFQ markets and on determinants of share prices in IFQ markets are

provided in Newell et al. (2005a, 2005b). Because IFQ share prices reflect the stream of net benefits expected to derive from an IFQ share, an evaluation of the potential economic effects based on changes in overall asset values would capture long-term economic changes. Short-term economic effects can be approximated by the estimating changes in the aggregate value of red snapper annual allocations. The proposed increases in the red snapper commercial quota would be expected to result in a total increase in IFQ share value for 2019-2021 ranging from approximately $87.7 million (**Alternative 3**) to approximately $89.4 million (**Alternative 2**). Annual sale (leasing) of the proposed increased quota would be expected to result in a total increase in allocation value ranging from approximately $8.4 million (**Alternative 3**) to approximately $8.5 million (**Alternative 2**) per year.

Recreational Sector

Alternative 1 (No Action) would maintain the current recreational ACL and annual catch target (ACT) of 6.73 mp and 5.39 mp, respectively. From the recreational ACL and ACT, the for-hire ACL and ACT would be maintained at 2.85 mp and 2.28 mp, respectively, and the private angling ACL and ACT would be maintained at 3.88 mp and 3.11 mp, respectively. Therefore, changes in economic value would not be expected to result from this alternative. However, **Alternative 1** would be expected to result in adverse indirect economic effects due to fishing opportunities that would be forgone by recreational red snapper anglers, compared to either **Alternative 2** or **3**.

The evaluation of changes in economic value expected to result from ACT increases for the private angling and for-hire components of the recreational sector is based on work by Liese and Carter (2011). The consumer surplus (CS) value per fish for a second red snapper kept is estimated at $82.34 (2017 dollars). Estimated increases in economic value are approximated by dividing the change in ACT by 6.46 lbs, which is the weight of a Gulf recreationally landed red snapper from 2015-2017 (SERO Recreational ACL file, accessed June 11, 2018), to obtain the increase in number of red snapper, which is then multiplied by the CS value per fish of $82.34. The estimated changes in economic value in this section do not include any increases in producer surplus or net operating revenue (NOR) that would accrue to a for-hire operator. The NOR is based on charter angler trips, and since changes in trips resulting from a change in red snapper ACT cannot be estimated, the resulting change to the NOR cannot be estimated either. Although quantifying potential changes in producer surplus would result in larger total changes in economic values, the addition of producer surplus estimates to the changes in economic value provided would not affect the ordinal ranking of the economic effects of the proposed ACT increases. The proposed increases in private angling and for-hire ACTs and discounted estimates of associated changes in economic values for **Alternatives 2** and **3** are provided in Table 4.1.3.2.

Table 4.1.3.2. Alternatives 2 and **3** - Proposed increase in the red snapper private angling ACT and for-hire ACT (relative to the status quo) and associated estimated change in economic value. ACTs in million pounds; dollar values in million 2017 dollars. A discount rate of 7% is applied to dollar values, with 2019 as the base year.

	Year	Private Angling ACT Increase	Private Angling Economic Value Increase	For-Hire ACT Increase	For-Hire Economic Value Increase
Alternative 2	2019	0.51	$6.500	0.37	$4.716
	2020	0.28	$3.335	0.21	$2.401
	2021	0.12	$1.336	0.09	$1.002
	Total	0.91	$11.171	0.67	$8.219
Alternative 3	2019	0.31	$3.951	0.22	$2.804
	2020	0.31	$3.693	0.22	$2.621
	2021	0.31	$3.451	0.22	$2.449
	Total	0.93	$11.095	0.66	$7.874
Difference between Alternative 2 and 3 Totals		-0.02	$0.077	0.01	$0.345

Under **Alternative 2**, the red snapper private angling component ACT would increase by 0.91 mp from 2019-2021, compared to **Alternative 1**. As a result, an increase in private angling economic value from 2019-2021 of $11.171 million (discounted, in 2017 dollars) would be expected. Under **Alternative 2**, the red snapper for-hire ACT would increase by 0.67 mp from 2019-2021, compared to **Alternative 1**. As a result, an increase in for-hire economic value from 2019-2021 of $8.219 million (discounted, in 2017 dollars) would be expected. An increase in the recreational sector economic value from 2019-2021 of $19.391 million (discounted, in 2017 dollars) would be expected from **Alternative 2**; this is a sum from the increases in total private angling and for-hire economic values. In comparison, under **Alternative 3**, an increase in the recreational sector economic value from 2019-2021 of $18.969 million (discounted, in 2017 dollars) would be expected.

Although the increase in red snapper private angling ACT is larger under **Alternative 3** than under **Alternative 2**, the increase in private angling economic value under **Alternative 2** is expected to be $0.077 million (discounted, in 2017 dollars) greater than that under **Alternative 3**. This is due to the timing of the changes in ACT in **Alternative 2** and the effect that discounting has. In essence, even though the total ACT is slightly larger under **Alternative 3** than under **Alternative 2** from 2019-2021, because a larger proportion of the total ACT in **Alternative 2** is apportioned earlier in that timeframe, a lower proportion occurs later in that timeframe, of which the resulting values need to be discounted to reflect the equivalent values in

2019 dollars. Because **Alternative 3** has a constant ACT, more of the resulting values are discounted to 2019 dollars than under **Alternative 2**. With the red snapper for-hire ACT, the increase is larger under **Alternative 2** than under **Alternative 3**, and the increase in for-hire economic value under **Alternative 2** is expected to be $0.345 million (discounted, in 2017 dollars) greater than under **Alternative 3**. The increase in the recreational sector economic value from 2019-2021 under **Alternative 2** is expected to be $0.422 million (discounted, in 2017 dollars) greater than under **Alternative 3**. Both the private angling economic value and the for-hire economic value are expected to increase under both **Alternatives 2** and **3**, compared to **Alternative 1**.

4.1.4 Direct and Indirect Effects on the Social Environment

In general, the social effects of modifying the catch levels would be expected to change in direction and magnitude with the expected change in economic effects discussed in Section 4.1.3. Direct impacts on the social environment resulting from the proposed action would relate to the change in the amount of quota available for harvest compared to the current quota. Generally, assuming the biological needs of the resource remain protected, short and long-term social benefits would be expected to increase if the quota is increased (**Alternatives 2** and **3**).

Additional effects are not expected from **Alternative 1**, and the red snapper ACLs and recreational ACTs will remain at the 2017 levels. **Alternatives 2** and **3** would increase the red snapper catch levels for both the commercial and recreational sectors and both would be expected to meet recovery goals, satisfying the biological needs of the stock. Therefore, the proposed catch levels would not be expected to jeopardize the long-term health of the resource or associated long-term stream of social or economic benefits. As a result, the proposed increases would be expected to allow both short and long-term increases in broad social benefits. Communities and businesses associated with the recreational sector would be expected to receive increased social benefits as a result of potentially increased recreational activity and expenditures flowing to these communities and businesses. For the commercial sector, these benefits would arise from increased availability of individual fishing quota allocation and the resulting revenue and profits, which would accrue to commercial families and businesses. Implementing quota increases, when biologically appropriate, would also be expected to increase confidence in and support of the fishery management process.

Both **Alternatives 2** and **3** propose increases to the red snapper catch levels compared to **Alternative 1** and would therefore result in greater social benefits compared with **Alternative 1**. **Alternative 2** proposes larger catch levels than **Alternative 3** for 2019, then 100,000 lbs ww more in 2020, and from 2021 and subsequent years, the total ACL under **Alternative 3** (15.10 mp ww) would be greater than **Alternative 2** (14.30 mp ww). Generally, stable catch levels such as under **Alternative 3** are preferred by both sectors, as a consistent amount of fish may be assumed to allow other management measures to remain stable. (For the recreational sector, it cannot be assumed that a consistent quantity of quota will result in the same season length. Other factors, including changes in effort and variable state water seasons affect the season length projections.) However, the difference between the changing annual catch levels for 2019-2021 (**Alternative 2**) are not large enough to substantially affect quota availability in the commercial sector or the length of the fishing season for the recreational sector. While

Alternative 2 would provide more quota during the year 2019, it would provide roughly the same in 2020, and then less from 2021 forward. Thus, while **Alternative 3** would be expected to provide additional social benefits from a stable quota, these benefits may be perceived as almost negligible in terms of fishermen's access compared with **Alternative 2.**

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. Specifically for red snapper, this includes setting fishing seasons, quota monitoring and enforcing fishing regulations. These activities already occur and would not constitute an additional impact or benefit.

Indirect effects of setting ACLs and ACTs include actions required if the recreational sector ACL is exceeded. Although red snapper is not considered overfished at this time, and so paybacks from exceeding recreational sector and component ACLs do not apply, further action on adjusting fishing season duration or ACTs would likely result if the ACLs were regularly exceeded. While raising the ACL and ACT does not prevent overages, it does potentially allow for a longer fishing season. Raising the ACL and ACT could reduce the likelihood of an overage, and therefore **Alternative 2** and **3** could reduce the administrative effects of implementing AMs.

It should be noted that another framework action under development considers modifying the buffer between the ACL and ACT for the recreational sector components for red snapper. The options include decreasing the ACT buffer for the for-hire component and either increasing or retaining the ACT buffer for the private angling component. To reduce administrative burden, that action and the ones in this document would be combined during rulemaking to simplify that administrative process.

4.2 Action 2 – Modify the West Florida Hogfish ACL

Alternative 1: No Action. The west Florida hogfish ACL will remain at the levels shown in the table below.

Year	OFL	ABC	ACL
2017	232,000	219,000	219,000
2018	232,000	219,000	219,000
2019+	161,900	159,300	159,300

* Values are in pounds whole weight.

Alternative 2: Modify the West Florida hogfish ACL based on the annual ABC recommendations of the SSC for 2019 – 2021 and subsequent years as determined from the 2018 SEDAR 37 update stock assessment. Set the ACL equal to the ABC.

Year	OFL	ABC	ACL
2019	151,500	129,500	129,500
2020	163,700	141,300	141,300
2021+	172,500	150,400	150,400

* Values are in pounds whole weight.

4.2.1 Direct and Indirect Effects on the Physical Environment

Setting a hogfish ACL does not directly affect the physical environment. However, specifying an ACL may indirectly affect the physical environment if it affects fishing effort. Effects on the physical environment from fishing are associated with gear coming into contact with bottom. Different gears have different levels of impact. Spearfishing and hook-and-line gear, the primary gears used to harvest hogfish, have minimal adverse effects on the physical environment. In general, an alternative which allows greater levels of fishing effort (more gear being used) would have a greater negative effect than an alternative which allows for less fishing effort.

Alternative 2 would set a lower ACL for 2019 – 2021 and subsequent years than **Alternative 1** (No Action). **Alternative 2** would result in greater effort restrictions compared to **Alternative 1**, and correspondingly, less adverse effect on the physical environment. However, any effects are expected to be minimal because a significant change in overall fishing effort is not expected. The reef fish fishery is a multispecies fishery. If anglers are not able to retain one species, they often shift their effort to other species, maintaining overall reef fish fishing effort.

4.2.2 Direct and Indirect Effects on the Biological/Ecological Environment

Alternative 2 would provide a lower harvest limit compared to **Alternative 1** (No Action). This lower limit would reduce the removals of hogfish and provide greater benefits to the West Florida hogfish stock than **Alternative 1**. Should the ACL be exceeded, the hogfish accountability measures (AMs) would be triggered. The AMs are designed to reduce the

likelihood of an overage in the following year. If the ACL for West Florida hogfish is exceeded in a given year, then in the following fishing year, if the ACL is expected to be met, the fishing season will be closed at that point for the remainder of that fishing year.

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 West Florida hogfish abundance. However, the relationships between hogfish and non-target species caught on trips where hogfish are directly targeted are not fully understood. Further, changes in the prosecution of the reef fish fishery as a whole are not expected from this action, so no additional effects to protected resources (see Section 3.3) are anticipated. Additionally, because of the multispecies nature of this fishery and that the primary gear used to harvest hogfish is spearfishing (as discussed in Section 3.1.3), this action should have minimal impacts in terms of bycatch.

4.2.3 Direct and Indirect Effects on the Economic Environment

Alternative 1 (No Action) would maintain the hogfish ACL, beginning in 2019, at 159,300 lbs, which is a decrease from the 2017 and 2018 ACLs of 219,000 lbs. **Alternative 2** would allow less hogfish harvest over the 3-year period (2019-2021) than **Alternative 1**. **Alternative 2** would establish ACLs between 2019 and 2021 that increase annually, with 129,500 lbs in 2019, 141,300 lbs in 2020, and 150,400 lbs in 2021. The following discussion will describe and quantify, where possible, the expected differences in economic effects of **Alternative 2** from the perspective that the associated allowable harvest would be lower compared to **Alternative 1** during the period 2019-2021.

Based on Table 2.2.1, the recreational and commercial sectors accounted, on average, for 78.7% and 21.3% of hogfish landings from 2001-2017, respectively. Using these percentages, hogfish harvests expected to result from ACLs proposed in **Alternative 2** are provided for the commercial and recreational sectors in Table 4.2.3.1.

Table 4.2.3.1. Estimated commercial and recreational hogfish harvests (2019-2021+) by alternative.

Commercial			
	2019	**2020**	**2021+**
Alternative 1	33,930.9	33,930.9	33,930.9
Alternative 2	27,583.5	30,096.9	32,035.2
Recreational			
	2019	**2020**	**2021+**
Alternative 1	125,369.1	125,369.1	125,369.1
Alternative 2	101,916.5	111,203.1	118,364.8

For the commercial sector, the economic effects expected to result from proposed changes in ACLs were estimated based on an average annual ex-vessel price per pound of hogfish harvested in the Gulf. From 2012 to 2017, the average ex-vessel price is estimated at $4.31 per pound (2017 dollars). The estimated changes in commercial landings and associated ex-vessel revenue for **Alternative 2** are provided in Table 4.2.3.2. It should be noted that these results are not equivalent to changes in economic value, similar to the analysis of the recreational sector provided below.

Table 4.2.3.2. Difference between expected commercial hogfish harvests under **Alternative 2** and commercial status quo harvests (in pounds) and estimated changes in ex-vessel revenues (in $2017)

	2019		2020		2021+	
	lbs	$	lbs	$	lbs	$
Alternative 2	-6,374.4	-$27,387	-3,834	-$16,543	-1,895.7	-$8,179

For a given year, changes in ACL that would result in expected commercial hogfish harvests lower than the commercial status quo harvests would be expected to result in negative economic effects, i.e. losses in ex-vessel revenues. For example, in 2019, **Alternative 2** would be expected to result in negative economic effects estimated at -$27,387 because the expected commercial hogfish harvests are estimated to be lower than the commercial harvests under **Alternative 1** by 6,374.4 lbs.

For the recreational sector, the expected economic effects of the proposed alternatives were measured in changes in economic value, i.e., changes in consumer surplus (CS) for anglers. The expected changes in CS were based on the estimated CS per hogfish and on the change in the number of hogfish harvested. See Section 3.4 for a definition of CS. Estimates of the CS per fish for most individual species are not available, and this includes hogfish. Because the value of the CS per hogfish is not known, the proxy value used in this analysis is the CS value for an additional "snapper" (not specific to the species) kept on a trip, i.e., $12.75 (Haab et al. 2012; values updated to 2017 dollars). Estimates of the expected changes in the number of hogfish harvested were obtained by dividing the expected changes in ACLs by the estimated average weight of a hogfish, 2.02 lbs, from 2015-2017 (SEFSC SRHS data; MRIP Intercept data, https://www.st.nmfs.noaa.gov/st1/recreational/MRIP_Survey_Data/). This analysis does not include changes in producer surplus (PS) or net operating revenue (NOR) that would accrue to for-hire operators. The NOR is based on charter angler trips, and since changes in trips resulting from a change in hogfish ACL cannot be estimated, the resulting change to the NOR cannot be estimated either. The exclusion of PS or NOR estimates would not affect the ranking of the proposed alternatives. For **Alternative 2**, expected changes in recreational hogfish harvests (in pounds and in number of fish) and associated changes in CS are provided in Table 4.2.3.3.

Table 4.2.3.3. Differences between expected recreational hogfish harvests under **Alternative 2** and recreational status quo harvests and (in pounds and number of fish) and estimated changes in consumer surplus (CS) (in 2018 dollars).

		Alternative 2
2019	Pounds	-23,452.6
	Number	-11,610.2
	CS	-$148,030
2020	Pounds	-14,166
	Number	-7,012.8
	CS	-$89,414
2021+	Pounds	-7,004.3
	Number	-3,467.5
	CS	-$44,210

For both sectors, the economic effects expected to result from **Alternative 2** are summarized in Table 4.2.3.4. It should be noted that the effects on the commercial sector should not be added to the effects on the recreational sector because the commercial effects are changes in ex-vessel revenue whereas the recreational effects are changes in economic value. Because **Alternative 2** would result in a decrease in allowable harvest compared to **Alternative 1**, it would be expected to result in a reduction in revenue to the commercial sector and losses in value to the recreational sector.

Table 4.2.3.4. Changes in annual commercial revenue and recreational consumer surplus (CS) for **Alternative 2** (in 2017 dollars) and net present discounted value (NPDV) by alternative.

	2019*	**2020**	**2021+**	**Total NPDV (2019-2021)**
Alternative 2				
Commercial (Revenue)	-$27,387	-$16,543	-$8,179	-$49,992
Recreational (CS)	-$148,030	-$89,414	-$44,210	-$270,210

*Annual changes are nominal values (not discounted). The Total Net Present Discounted Value (NPDV) is based on a 7% discount rate, with 2019 as the base year.

4.2.4 Direct and Indirect Effects on the Social Environment

As discussed in Section 4.1.4, direct impacts would relate to the change in the amount of quota available for harvest compared to the current quota. Additional effects are not expected from **Alternative 1**, and the hogfish ACL will remain at the current level. **Alternative 2** would decrease the hogfish ACL by 29,800 lbs ww for 2019, 18,000 lbs ww in 2020, and 8,900 lbs ww

in 2021 compared to **Alternative 1** and could result in some negative effects if the ACL is exceeded two years in a row. Although the volume of the quota change is small, a 29,800-lb decrease represents 19% of the current quota. Estimated hogfish landings have varied by year (Table 2.2.1); while landings were only 108,609 lbs ww in 2017, nearly three times as much hogfish was landed in 2016 (306,151 lbs ww). Thus, it is difficult to anticipate whether landings will meet the ACL. Negative effects would result if landings were exceeded two years in a row, as an in-season closure would occur in the second year. To date, there has been one in-season closure, on December 2, 2013. Since then, the minimum size for hogfish was increased from 12 inches total length (TL) to 14 inches TL. This minimum size limit increase has likely slowed the rate of harvest, decreasing the likelihood of reaching the ACL before the end of the year.

4.2.5 Direct and Indirect Effects on the Administrative Environment

ACLs can have indirect effects on the administrative environment if they result in a closure. Currently, if the sum of the commercial and recreational landings exceeds the stock ACL, then during the following fishing year, if the sum of commercial and recreational landings reaches or is projected to reach the stock ACL, NMFS will close commercial and recreational fishing for the remainder of that fishing year. Generally, the higher the ACL, the lower the probability it will be exceeded and of the need to close the commercial and recreational sectors.

Alternative 2 has the lowest ACLs for 2019 – 2021 and, therefore, is more likely to be exceeded than **Alternative 1**. However, hogfish landings have varied from year to year (Table 1.1.2.2). For example, landings were only 108,609 lbs ww in 2017, which is below the ACL under either alternative, but were 306,151 lbs ww in 2016, which is above the ACL under either alternative. Therefore, the ACL would have been exceeded in one year but, because harvest went down the following year, no closure would have been necessary, had either of the ACLs in this action been in effect at that time.

Indirect effects of ACLs require monitoring of harvests and evaluating annual harvests relative to these catch limits. Regardless of which alternative is selected as preferred, these management activities need to continue. Therefore, the indirect effects from each alternative should be similar.

4.3 Cumulative Effects

The cumulative effects of modifying the acceptable biological catch (ABC) and setting the ACLs and ACTs (quotas) in this framework action are similar to those in Reef Fish Amendment 43 for hogfish (GMFMC 2016), and in the framework action to modify the quota for red snapper 2015-2017 (GMFMC 2015), which are incorporated by reference and further summarized below.

These actions are not likely to result in significant effects when considered in combination with other relevant past, present, and reasonably foreseeable future actions because they will not substantially alter the manner in which the red snapper or West Florida hogfish fishery is prosecuted. Pertinent past actions are summarized in the history of management in Section 1.3. RFFAs that the Council is considering for the reef fish fishery include: Amendment 36B, which would further revise the red snapper and grouper-tilefish commercial IFQ programs; Amendments 41 and 42, which would provide flexibility in the headboat and charter vessel sectors, respectively; Amendment 48, which would establish status determination criteria for many reef fish stocks; Amendment 49, which would revise sea turtle release requirements; Amendment 50, which would establish state recreational management programs for red snapper; and other amendments addressing the carryover of unharvested quota, acceptable biological catch control rule revisions and framework procedures, and modifying charter vessel and headboat reporting requirements. Descriptions of these actions can be found on the Council's website at http://gulfcouncil.org/. The cumulative impacts of the actions regarding state management of recreationally harvested red snapper will be addressed fully in the environmental analyses for those amendments.

In addition, a framework action is being developed which considers changing the buffer between the ACT and the ACL for the private angling and for-hire components of the recreational sector for red snapper. Based on the current preferred alternatives in that framework action, the resultant management changes would result in a smaller buffer between the ACT and the ACL for the for-hire component. That framework action is expected to proceed along a similar timeline, and the rulemaking for that framework action and this document would likely be combined. The actions regarding modifications to the recreational sector's red snapper component-specific ACT buffers may result in an increase in harvest of red snapper by the recreational fishing sector, as a decrease in the buffer between the ACT and ACL for the for-hire component will likely increase the duration of that component's fishing season.

The actions in this framework action, combined with past and RFFAs are not expected to have substantial adverse effects on public health or safety. Because the reef fish fishery is a multispecies fishery, there are alternative species to target throughout the year for the commercial and recreational sectors such that the proposed actions, along with past and RFFAs, are not expected to substantially alter the manner in which the fishery is prosecuted.

There is a large and growing body of literature on past, present, and future impacts of global climate change induced by human activities. Some of the likely effects commonly mentioned are sea level rise, increased frequency of severe weather events, and change in air and water temperatures. The Environmental Protection Agency's climate change web page provides basic background information on these and other measured or anticipated effects. In addition, the

Intergovernmental Panel on Climate Change has numerous reports addressing their assessments of climate change (http://www.ipcc.ch/publications_and_data/publications_and_data.shtml). Global climate changes could have significant effects on Gulf fisheries; however, the extent of these effects is not known at this time. Possible impacts include temperature changes in coastal and marine ecosystems that can influence organism metabolism and alter ecological processes such as productivity and species interactions; changes in precipitation patterns and a rise in sea level which could change the water balance of coastal ecosystems; altering patterns of wind and water circulation in the ocean environment; and influencing the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs (Kennedy et al. 2002). Modeling of climate change in relation to the northern Gulf hypoxic zone may exacerbate attempts to reduce the area affected by these events (Justic et al. 2003). It is unclear how climate change would affect reef fish, and likely would affect species differently. Climate change can affect factors such as migration, range, larval and juvenile survival, prey availability, and susceptibility to predators. In addition, the distribution of native and exotic species may change with increased water temperature, as may the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms. Climate change may significantly affect Gulf reef fish species in the future, but the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts would occur. Actions proposed in this amendment are not expected to significantly contribute to climate change through the increase or decrease the carbon footprint from fishing.

The effects of the proposed actions for both red snapper and West Florida hogfish are, and will continue to be, monitored through the 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 in the Gulf are collected through the Marine Recreational Information Program, the Southeast Region Headboat Survey, the Louisiana Creel Survey, and the Texas Parks and Wildlife Department Creel Survey. In addition, Alabama and Mississippi both have programs to collect recreational landings information for red snapper in their respective states; and have recently been certified and those data will be used in the future. Commercial data are collected through state trip ticket programs, port samplers, and logbook programs, as well as dealer reporting through the IFQ program.

Impacts from the *Deepwater Horizon* MC252 oil spill are still being examined, but several peer-reviewed studies have documented the impacts to various important reef fish species (see Section 3.3.3.). However, the analyses of the effects of this oil spill on red snapper and other reef fish populations are incomplete. The oil has affected essential habitat for deep-sea coral reefs. Several studies have documented declines in coral health or coral death in the presence of oil from the 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 red snapper or West Florida hogfish 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.

CHAPTER 5. REGULATORY IMPACT REVIEW

CHAPTER 6. REGULATORY FLEXIBILITY ANALYSIS

CHAPTER 7. AGENCIES, ORGANIZATIONS, AND PERSONS CONSULTED

The following have or will be consulted:

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

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

CHAPTER 8. LIST OF PREPARERS

Preparers:

Name	Expertise	Responsibility
Ryan Rindone, GMFMC	Fishery Biologist	Co-Team Lead – amendment development, introduction, physical, biological, ecological, and administrative effects
Lauren Waters, NMFS/SF	Fishery Biologist	Co-Team Lead – amendment development, introduction, physical, biological, ecological, and administrative effects
Matt Freeman, GMFMC	Economist	Economic effects, Regulatory Impact Review
Ava Lasseter, GMFMC	Anthropologist	Social effects
Tony Lamberte, NMFS/SF	Economist	Economic environment, Regulatory Flexibility Act analysis
Christina Package-Ward, NMFS/SF	Anthropologist	Social environment, Environmental Justice
Jeff Pulver, NMFS/SF	Fishery Biologist, Data Analyst	Data analysis

Reviewers:

Name	Discipline/Expertise	Role in EA Preparation
Mara Levy, NOAA GC	Attorney	Legal review
Noah Silverman, NMFS	Natural Resource Management Specialist	NEPA review
David Dale, NMFS/HC	EFH Specialist	Habitat review
Jennifer Lee, NMFS/PR	Protected Resources Specialist	Protected resources review
Scott Sandorf, NMFS/SF	Regulatory Writer	Regulatory preparation and review
Matt Smith, NMFS SEFSC	Research Fishery Biologist	Physical, biological, and ecological review
Carrie Simmons, GMFMC	Fishery Biologist	Physical, biological, and ecological review
Sue Gerhart, NMFS/SF	Fishery Biologist	Physical, biological, and ecological review

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

CHAPTER 9. REFERENCES

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APPENDIX A: PUBLIC COMMENTS RECEIVED

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. However, management decision-making is also affected by a number of other federal statutes designed to protect the biological and human components of U.S. fisheries, as well as the ecosystems that support those fisheries. Major laws affecting federal fishery management decision-making include the Endangered Species Act (Section 3.3.3), E.O. 12866 (Regulatory Planning and Review, Chapter 5) and E.O. 12898 (Environmental Justice, Section 3.5). Other applicable laws are summarized below.

Administrative Procedure Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the Act, the National Marine Fisheries Service (NMFS) is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider, and respond to public comment on those rules before they are finalized. The Act also establishes a 30-day waiting period from the time a final rule is published until it takes effect. 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 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 does not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places nor is it expected to cause loss or destruction of significant scientific, cultural, or historical resources. In the Gulf of Mexico (Gulf), the *U.S.S. Hatteras*, located in federal waters off Texas, is listed in the National Register of Historic Places. Fishing activity already occurs in the vicinity of this site, but the proposed action would have no additional adverse impacts on listed historic resources, nor would they alter any regulations intended to protect them.

Executive Orders (E.O.)

E.O. 12630: Takings

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

E.O. 12962: Recreational Fisheries

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

E.O. 13089: Coral Reef Protection

The E.O. on Coral Reef Protection requires federal agencies whose actions may affect U.S. coral reef ecosystems to identify those actions, utilize their programs and authorities to protect and enhance the conditions of such ecosystems, and, to the extent permitted by law, ensure actions that they authorize, fund, or carry out do not degrade the condition of that ecosystem. By definition, a U.S. coral reef ecosystem means those species, habitats, and other national resources associated with coral reefs in all maritime areas and zones subject to the jurisdiction or control of the United States (e.g., federal, state, territorial, or commonwealth waters).

Regulations are already in place to limit or reduce habitat impacts within the Flower Garden Banks National Marine Sanctuary. Additionally, NMFS approved and implemented Generic Amendment 3 for Essential Fish Habitat (GMFMC 2005), 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.