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Red Snapper Allocation

Final Amendment 28
to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico

Including Environmental Impact Statement, Fishery Impact Statement, Regulatory Impact Review, and Regulatory Flexibility Act Analysis

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Gulf of Mexico Reef Fish Amendment 28
Environmental Impact Statement Cover Sheet

Red Snapper Allocation Amendment 28 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico, including a Final Environmental Impact Statement (FEIS), Fishery Impact Statement, Regulatory Impact Review, and Regulatory Flexibility Act Analysis.

Abstract:
This FEIS is prepared pursuant to the National Environmental Policy Act to assess the environmental impacts associated with a regulatory action. The FEIS analyzes the impacts of a reasonable range of alternatives intended to evaluate changing the current commercial: recreational red snapper allocation of 51:49 percent, respectively. The purpose of this action is to reallocate the red snapper harvest consistent with the 2014 red snapper assessment update to ensure the allowable catch and recovery benefits are fairly and equitably allocated between the commercial and recreational sectors to achieve optimum yield.

Responsible Agencies:

National Marine Fisheries Service
(Lead Agency)
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701
727-824-5305
727-824-5308 (fax)
http://sero.nmfs.noaa.gov
Contact: Peter Hood
peter.hood@noaa.gov

Gulf of Mexico Fishery Management Council
2203 North Lois Avenue, Suite 1100
Tampa, Florida 33607
813-348-1630
813-348-1711 (fax)
http://www.gulfcouncil.org
Contact: Assane Diagne
assane.diagne@gulfcouncil.org

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ABBREVIATIONS USED IN THIS DOCUMENT

ABC	acceptable biological catch
ACL	annual catch limit
ALS	Accumulated Landings System
AM	accountability measure
Committee	Reef Fish Committee
Council	Gulf of Mexico Fishery Management Council
DEIS	Draft Environmental Impact Statement
EEZ	exclusive economic zone
EFH	Essential Fish Habitat
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FMP	Fishery Management Plan
FTE	full-time equivalent
HBS	Southeast Headboat Survey
IFQ	individual fishing quota
LAPP	Limited Access Privilege Program
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MRFSS	Marine Recreational Fisheries Survey and Statistics
MRIP	Marine Recreational Information Program
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OFL	overfishing limit
PDF	probability density function
RFFA	reasonably foreseeable future action
RQ	regional quotient
SAV	submerged aquatic vegetation
SEAMAP	Southeast Area Monitoring and Assessment Program
Secretary	Secretary of Commerce
SEDAR	Southeast Data Assessment and Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office of NMFS
SESSC	Socioeconomic Scientific and Statistical Committee
SSBR	spawning stock biomass per recruit
SSC	Scientific and Statistical Committee
SPR	spawning potential ratio
TAC	total allowable catch
TL	total length
TPWD	Texas Parks and Wildlife Department

VEC	valued environmental components
VOC	volatile organic compounds
ww	whole weight

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EXECUTIVE SUMMARY

The red snapper stock in the Gulf of Mexico (Gulf) has been declared overfished based on the Status of U.S. Fisheries Report to Congress[1], but is not undergoing overfishing. The Gulf of Mexico Fishery Management Council (Council) has worked toward rebuilding the red snapper stock since 1997 and the stock is currently in the 15th year of a 32-year rebuilding plan.

The most recent stock assessment update[2] indicates the stock is recovering (SEDAR 31 Update 2015). Currently, the commercial sector fishing for red snapper is regulated by a 13-inch total length (TL) minimum size limit and managed under an individual fishing quota program. Recreational fishing for red snapper is managed with a 16-inch TL minimum size limit, 2-fish bag limit, and a season beginning on June 1 and ending when the recreational quota is projected to be caught. Other reef fish fishery management measures that affect red snapper fishing include permit requirements for the commercial and for-hire sectors as well as season-area closures.

Since 2007, the recreational red snapper season length has become progressively shorter and frustrated the recreational sector because of limited red snapper fishing opportunities. Current recreational fishing season length projections are dependent on several factors, including estimated red snapper average weights and daily catch rates. As the daily catches and average weight of landed red snapper have increased, the season has become progressively shorter despite increasing quotas. As a result, overharvests by the recreational sector have occurred in every year but two. This has led to using an annual catch target set below the recreational quota to project season lengths from. The commercial sector has had a year-round season and has consistently harvested below its quota since the implementation of the Individual Fishing Quota (IFQ) program in 2007.

In recent years, the Council has expressed its intent to evaluate and possibly adjust the allocation of reef fish resources between the commercial and recreational sectors. These Council discussions have included consideration of comprehensive changes to the structure of the recreational sector and to sector allocations for red snapper and several grouper species. Reef Fish Amendment 1 (GMFMC 1989) specified a framework procedure for setting the total allowable catch to allow for annual management changes. A part of that specification was to establish a species' allocation. These were based on the percentage of total landings during the base period of 1979-1987. For red snapper, the commercial sector landed 51% and the recreational sector landed 49% of red snapper over the base period, hence the current 51% commercial:49%: recreational allocation.

[1] http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/

[2] A presentation describing the assessment was presented to the Council at its January 2015 meeting, and is available at the January 2015 briefing materials on the Council website (http://www.gulfcouncil.org) or by going directly to: http://www.gulfcouncil.org/council_meetings/Briefing%20Materials/BB-01-2015/B%20-%2014%20Red%20Snapper%202014%20Update%20Presentation.pdf . The written report for the assessment update is SEDAR 31 Update (2015).

The Council's evaluation of the allocations between the commercial and recreational sectors is consistent with NOAA's Catch Share Policy[3]. The Policy recommends that, for all fishery management plans (FMPs), "the underlying harvest allocations to specific fishery sectors (i.e., commercial and recreational) should be revisited on a regular basis, and the basis for the allocation should include consideration of conservation, economic, and social criteria used in specifying optimum yield and in furtherance of the goals of the underlying FMP."

In response to the challenges inherent to allocating limited resources between competing interests, the Council established an Ad Hoc Allocation Committee composed of Council members to assist in drafting an allocation policy that would streamline future allocation decisions. The Council's allocation policy was adopted in early 2009 and provides principles, guidelines, and suggested methods for allocating fisheries resources between or within sectors (Appendix B). In February 2012, the National Marine Fisheries Service (NMFS) released a technical memorandum on the principles and practice of allocating fishery harvests, which provides additional guidance to the Council (Plummer et al. 2012).

This action addresses red snapper allocation. Specifically, the purpose of this action is to reallocate the red snapper harvest consistent with the 2014 red snapper assessment update (SEDAR 31 Update 2015) to ensure the allowable catch and recovery benefits are fairly and equitably allocated between the commercial and recreational sectors to achieve optimum yield. The need is to base sector allocations on the best scientific information available, while achieving optimum yield, particularly with respect to food production and recreational opportunities, and rebuilding the red snapper stock.

Reef Fish Amendment 28 analyzes one action with nine alternatives (including no action) that evaluate different allocation ratios of the stock red snapper annual catch limit between the commercial and recreational sectors. The following is a description of the alternatives.

Alternative 1 (no action) would continue to allocate 49% of the red snapper quota to the recreational sector and 51% to the commercial sector. As mentioned above, this allocation was established in 1990 through Amendment 1 and was based on the historical average red snapper landings by each sector for the base period of 1979-1987.

Alternatives 2, **3**, and **4** are similar in that they consider fixed percentage increases to the recreational red snapper allocation of 3%, 5%, and 10%, respectively, from **Alternative 1** (no action). The respective increases would yield recreational allocations of 52%, 54%, and 59%, respectively, of the red snapper annual catch limit. Commercial and recreational red snapper quotas that would result from the alternative allocations included in this action are shown in the table below.

Alternatives 5, **6**, and **7** allocate increases in annual catch limit (ACL) above a certain threshold. At or below the threshold, red snapper would continue to be allocated with 51% of the red snapper ACL comprising the commercial quota and 49% comprising the recreational quota. Above the threshold, either all the increase in the ACL would go to the recreational sector (**Alternative 6**), or 75% of the increase would go to the recreational sector and 25% to the

[3] http://www.st.nmfs.noaa.gov/economics/fisheries/commercial/catch-share-program/

commercial sector (**Alternatives 5** and **7**). For **Alternatives 5** and **6**, the threshold would be 9.12 million pounds (mp), which was the red snapper total allowable catch from 1996 through 2006. The threshold for **Alternative 7** is 10.0 mp. Note that for these alternatives, the annual percent allocations changes between 2016 and 2017 (see the table below). This is because the stock annual catch limit for 2016 and 2017 is different. For 2016, the commercial and recreational allocations for these alternatives range from 33.3% and 66.7% (**Alternative 6**) to 43.6% and 56.4% (**Alternative 7**), respectively. For 2017, the commercial and recreational allocations for these alternatives range from 33.9% and 66.1% (**Alternative 6**) to 43.9% and 56.1% (**Alternative 7**), respectively.

Preferred Alternative 8 and **Alternative 9** would base reallocation on the effects of revised recreational data used in the update stock assessment that led to a higher stock ACL. These revisions included calibrated Marine Recreational Information Program (MRIP) catch estimates in the recreational sector and changes in the recreational size selectivity due to recreational fishermen targeting larger fish. During its May 2015 meeting, following a review of sensitivity runs and projections based on the changing allocation scenarios between the commercial and recreational sectors of the Gulf red snapper fisheries (Appendix H), the SSC concluded that if the Council changes the allocation between the two sectors, this would prompt the need to reevaluate the OFL and ABC projections. The SSC meeting summary is available on the Council's ftp server (http://gulfcouncil.org/about/ftp.php). Under **Preferred Alternative 8**, the resulting allocation is calculated by 1) adding the increase in the annual catch limit projections attributed to the using the calibrated MRIP catch estimates to the recreational sector, and 2) averaging the projected increases over a 2015 to 2017 time period. Thus, **Preferred Alternative 8** would allocate 51.5% and 48.5% of the red snapper quota to the recreational and commercial sectors, respectively. In addition to the amount of quota attributable to the recalibration of MRIP catch estimates, **Alternative 9** would allocate the amount of quota attributable to the change in size selectivity by the recreational sector. Amounts of quota due to the change in selectivity were also derived from the projections provided by the SEFSC and included in Appendix H. As done for **Preferred Alternative 8, Alternative 9** averages the allocation change over the 2015 to 2017 time period and yields recreational and commercial allocations of 57.5% and 42.5%, respectively.

A summary of the alternatives and the percent allocations is provided in a summary table below where ACL is the annual catch limit and Avg is the average.

Alternative	Year	Total ACL	Commercial ACL	Commercial Percent	Recreational ACL	Recreational Percent
Alternative 1: No action (i.e., Status Quo)	2016	13.960	7.120	51.0%	6.840	49.0%
	2017	13.740	7.007	51.0%	6.733	49.0%
Alternative 2: Increase the recreational sector's allocation by **3%**	2016	13.960	6.701	48.0%	7.259	52.0%
	2017	13.740	6.595	48.0%	7.145	52.0%
Alternative 3: Increase the recreational sector's allocation by **5%**	2016	13.960	6.422	46.0%	7.538	54.0%
	2017	13.740	6.320	46.0%	7.420	54.0%
Alternative 4: Increase the recreational sector's allocation by **10%**	2016	13.960	5.724	41.0%	8.236	59.0%
	2017	13.740	5.633	41.0%	8.107	59.0%
Alternative 5: After RS TAC reaches 9.12 mp, allocate 75% of ACL increases to the rec sector	2016	13.960	5.861	42.0%	8.099	58.0%
	2017	13.740	5.806	42.3%	7.934	57.7%
Alternative 6: After RS TAC reaches 9.12 mp, allocate all ACL increases to the rec sector	2016	13.960	4.651	33.3%	9.309	66.7%
	2017	13.740	4.651	33.9%	9.089	66.1%
Alternative 7: After RS TAC reaches 10.0 mp, allocate 75% of ACL increases to the rec sector	2016	13.960	6.090	43.6%	7.870	56.4%
	2017	13.740	6.035	43.9%	7.705	56.1%
Preferred Alternative 8: Allocate increases due to the recalibration of MRIP catch estimates to recreational sector. For each sector, average the percentages between 2015 and 2017.	2015	14.300	6.951	48.6%	7.349	51.4%
	2016	13.960	6.768	48.5%	7.192	51.5%
	2017	13.740	6.645	48.4%	7.095	51.6%
	Avg.			**48.5%**		**51.5%**
Alternative 9: Allocate increases due to the recalibration of MRIP catch estimates and to the change in size selectivity to rec sector; for each sector, average the percentages between 2015 and 2017	2015	14.300	6.105	42.7%	8.195	57.3%
	2016	13.960	5.911	42.3%	8.049	57.7%
	2017	13.740	5.829	42.4%	7.911	57.6%
	Avg.			**42.5%**		**57.5%**

An evaluation of the effects of the alternatives on the physical and biological/ecological environments relative to the no action alternative indicates that this action does not directly affect these environments and likely has only minimal indirect effects. The magnitude of these effects should be change with the change in allocation. For the physical environment, some effort shifting between sectors is likely to occur for red snapper; however, because the reef fish fishery is a multispecies fishery, any shifting is likely to be small given the overall effort of the fishery as a whole. For the biological/ecological environment, the effects of changes in recreational selectivities towards catching larger fish are unknown. However, increases in the rate of commercial dead discards would be expected to occur as fish in access of the commercial quota that could have been caught under a 51% commercial allocation (Alternative 1) would be discarded. For the recreational sector, this action is expected to result in a decrease in dead

discards as fish caught in access of a 49% recreational allocation (Alternative 1) could be kept rather than discarded. Analyses examining the effect of increasing the recreational allocation indicate that this shift could allow the overfishing limit, and consequently the acceptable biological catch, to be increased. However, increasing the acceptable biological catch would have adverse effects on the eastern portion of the stock. The analyses indicated the greater the shift in allocation towards the recreational sector, the lower the spawning potential ratio of the eastern part of the stock.

All the alternatives propose to redistribute allocation from the commercial to the recreational sector, thus, the social effects of this action are expected to be negative for the commercial sector and positive for the recreational sector. Although the extent of anticipated disruptions cannot be quantified, effects would be expected relative to the amount of quota that is reallocated, such that greater negative effects correspond with a greater shift in allocation. Direct effects would be expected due to a decrease in available commercial quota. Some instability in the individual fishing quota program would be expected and be evidenced by short-term volatility in the quota market. Potential adverse long-term impacts would result if confidence in the future of the quota market and commercial fishing industry is undermined.

The reallocation alternatives in this amendment would increase the percentage of the red snapper quota allocated to the recreational sector (and decrease the commercial sector's share by an equivalent percentage). Therefore, any one of these alternatives compared to **Alternative 1** would be expected to result in economic losses to the commercial sector and generate economic benefits for the recreational sector. The economic effects expected to result from reallocations of the red snapper quota between the recreational and commercial sectors are usually evaluated based on aggregate (sum of recreational and commercial) changes in economic benefit relative to a baseline allocation (51% commercial and 49% recreational). Although it logically follows that the allocation of greater proportions of the red snapper quota to a given sector would be expected to result in greater economic benefits for that sector and lower economic benefits for the other sector, inferences about overall changes in economic efficiency are not provided here because it cannot be assumed that the resource allocation within each sector is efficient. The resource allocation within the commercial sector, which is managed under an IFQ system, would constitute a reasonable approximation for an efficient resource allocation. However, the open access management approach in the recreational sector cannot be conducive to an efficient allocation of red snapper within the recreational sector. As suggested in Holzer and McConnell (2014) an in Abbott (2015), changes in net benefit estimates based on the traditionally accepted application of the equimarginal principle and associated inferences about economic efficiency are not valid when each sector's quota is not efficiently allocated within the sector. Therefore, it is not possible to provide policy-relevant rankings of the reallocation alternatives in this amendment based on the expected net economic outcome, i.e., the sum of the change in economic benefits to the recreational and commercial sectors. It can only be stated that greater percentages of the red snapper quota allocated to the recreational sector would be expected to increase economic benefits to the recreational sector and decrease benefits to the commercial sector.

In addition to potential changes in net benefits, several other factors should be considered in the evaluation of the economic effects that would be expected to result from the reallocation

alternatives. These factors include the Magnuson-Stevens Fishery Conservation and Management Act mandates, discrepancies between allocations set by Council regulations and actual percentages of total red snapper landings attributed to each sector, potential impacts of the reduced availability of IFQ allocation due to reallocation, and distributional considerations within each sector relative to which individuals/entities may be better or worse off following a reallocation.

This action does directly affect the administrative environment. Putting in a new allocation would require rulemaking, but this is a routine event and should only minimally impact this environment. Indirect effects of setting new allocations require monitoring of the resultant quotas, enforcement of the quotas, and setting management measures to minimize the risk of quotas being exceeded. However, these activities would continue regardless of which alternative is selected. Therefore, the indirect effects from each alternative should be similar.

A cumulative effects analysis identified seven valued environmental components. These were habitat, managed resources (red snapper and other reef fish species), vessel owners, captain and crew (commercial and for-hire), wholesale/retail businesses, anglers, infrastructure, and administration. The cumulative effects of changing the allocation of red snapper on the biophysical environment are likely neutral because it should not have much effect on overall fishing effort and the amount of fish harvested. For the socioeconomic environments, effects would be positive for the recreational sector and negative for the commercial sector.

FISHERY IMPACT STATEMENT

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

Red snapper is a federally managed species and is under a rebuilding plan. Under the Magnuson-Stevens Act, the recreational harvest of red snapper is limited to an annual catch limit (ACL) and the recreational harvest of red snapper must be closed once the recreational sector's ACL is determined to have been met. In addition, the recreational sector was recently separated into a for-hire component and private angling component with a portion of the recreational ACL allocated to each component. For both components, the season length is determined by an annual catch target (ACT) set at 20% below the ACL. These component ACLs and ACTs are effective through 2017 unless changed by the Council.

Like the recreational sector, the commercial sector is limited to an ACL and the commercial harvest of red snapper must be closed once the commercial sector's ACL is determined to have been met. However, the commercial sector has been managed under an individual fishing quota (IFQ) program since 2007 and has not exceeded its ACL. The program works by allocation being 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.

In recent years, the Council has expressed its intent to evaluate and possibly adjust the allocation of reef fish resources between the commercial and recreational sectors. These Council discussions have included consideration of comprehensive changes to the structure of the recreational sector and to sector allocations for red snapper and several grouper species. The Council, in examining red snapper reallocation, has been following NOAA's Catch Share Policy[4], the Council's own allocation policy adopted in 2009 (Appendix B), and the National Marine Fisheries Service's (NMFS) technical memorandum on the principles and practice of allocating fishery harvests (Plummer et al. 2012).

In addition to the above information, two other factors have influenced the Council's approach to reallocation. The first was a Southeast Fishery Science Center (SEFSC) study evaluating the economic efficiency of the current allocation of red snapper resources between the commercial and recreational sectors. The study concluded that existing allocations between the commercial and recreational sectors fishing for red snapper are not economically efficient. The study was

[4] http://www.nmfs.noaa.gov/sfa/domes_fish/catchshare/index.htm

reviewed by the Council's Socioeconomic Scientific and Statistical Committee (SESSC) (for more information on the study and review, visit http://www.gulfcouncil.org/about/ftp.php). The second factor was an updated red snapper stock assessment that included updated Marine Resource Information Program (MRIP) protocols causing an increase in landings estimates, as well as a shift in selectivity to larger, older fish caught by recreational fisherman leading to a new selectivity timeblock in the stock assessment (i.e., for the years 2011-2013). This revised stock assessment projected higher yields than earlier versions.

Amendment 28 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico consists of one management action. This action would reallocate the Gulf of Mexico red snapper stock annual catch limit from the commercial sector to recreational sector based on the increase in allowable harvest due to changes in recreational landings data from the update assessment. The allocation has been 51% of the stock ACL to the commercial sector and 49% to the recreational sector since 1990. The increase for the recreational sector would be the amount of the increase in total allowable catch between 2015 and 207 that is attributable to the recalibration of MRIP catch estimates. Commercial and recreational allocations would be based on the average percentages of the red snapper ACL that would be allocated to each sector between 2015 and 2017 and the resulting percentages allocated to each sector (48.5% and 51.5%, respectively) would remain until changed by the Council.

The Gulf of Mexico red snapper stock is managed under the Council's Reef Fish Fishery Management Plan. Therefore, the action from this amendment would not be expected to impact fishery participants in areas adjacent to the Gulf of Mexico, such as fisheries managed under the Caribbean and South Atlantic Councils' jurisdictions.

Biological Effects (Conservation Effects)

The reallocation of the red snapper stock ACL is not expected to have any direct effects for the biological environment as detailed in Sections 4.1.1 and 4.1.2. This is because these actions do not change the stock red snapper ACL, so little change is expected in overall red snapper fishing effort and removals of fish from the stock. However, reallocating the stock ACL is expected to have indirect effects on the red snapper stock. Fishing gears have different selectivity patterns, which refer to a fishing method's ability to target and capture organisms by size and species. This would include the number of discards, mostly sublegal fish or fish caught during seasonal closures, and the mortality associated with releasing these fish. Because the recreational and commercial sectors use gears differently, selectivity patterns would be expected to differ between sectors.

As described in Section 4.1.2, indirect effects from this action on the biological environment could occur if there are changes in the total number of red snapper killed (landed or discarded dead) by either sector or any changes to the frequency or magnitude of any ACL overages due to modifications to the red snapper allocation. Gear types used by the commercial and recreational sectors and their expected effects are discussed in Sections 3.1 and 4.1.1 of this document.

Shifting the allocation to the recreational sector and increasing this sector's ACL would likely result in a decrease in the recreational number of discards because more fish can be kept rather than discarded. However, this benefit to the red snapper stock would likely be offset by

increases in discards as a result of a reduced commercial ACL. The discard mortality rate is generally higher in the commercial sector than the recreational sector, in part because of the depth fished and the gear used. Therefore, it is difficult to assess whether this action, in terms of dead discards, would be beneficial, adverse, or have no effect on the red snapper stock. These effects need to be qualified because they are largely based upon fishermen behavior and this behavior could change in response to the changed allocation. Current monitoring of harvests and discards could provide insights into these effects in the future.

With the introduction of the IFQ program, no overages of the commercial ACL have occurred and are not likely to occur in the near future. For the recreational sector, ACL overages have occurred frequently in recent years and could adversely affect the stock's recovery if they continue (NMFS 2013d; SEDAR 31 2013). Recreational ACL overages have occurred because of difficulties assessing past fishing patterns and projecting them into the future to estimate season length (NMFS 2013). These problems could lead to greater recreational overages. However, to reduce the likelihood of overages, the projected recreational season length is now based on an ACT set 20% below the ACL. Harvest information for 2014, the first year the ACT was applied, indicates the recreational ACL was not exceeded.

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 as a result of this action. The most recent red snapper stock assessment indicated the stock is rebuilding. Consequently, it is possible that red snapper forage and competitor species could decrease in abundance in response to an increase in red snapper abundance. This action, regardless of the alternative, should not affect the red snapper recovery, thus any effects on forage species and competitor species would not likely be different from not taking action. Changes in the bycatch of red snapper are not expected to directly affect other species in the ecosystem. Although birds, dolphins, and other predators may feed on red snapper discards, there is no evidence that any of these species rely on red snapper discards for food.

Economic Effects

The reallocation alternatives in this amendment would increase the percentage of the red snapper quota allocated to the recreational sector (and decrease the commercial sector's share by an equivalent percentage). Therefore, any one of these alternatives compared to **Alternative 1** would be expected to result in economic losses to the commercial sector and generate economic benefits for the recreational sector. The economic effects expected to result from reallocations of the red snapper quota between the recreational and commercial sectors are usually evaluated based on aggregate (sum of recreational and commercial) changes in economic benefit relative to a baseline allocation (51% commercial and 49% recreational). Although it logically follows that the allocation of greater proportions of the red snapper quota to a given sector would be expected to result in greater economic benefits for that sector and lower economic benefits for the other sector, inferences about overall changes in economic efficiency are not provided here because it cannot be assumed that the resource allocation within each sector is efficient. The resource allocation within the commercial sector, which is managed under an IFQ system, would constitute a reasonable approximation for an efficient resource allocation. However, the open access management approach in the recreational sector cannot be conducive to an efficient

allocation of red snapper within the recreational sector. As suggested in Holzer and McConnell (2014) an in Abbott (2015), changes in net benefit estimates based on the traditionally accepted application of the equimarginal principle and associated inferences about economic efficiency are not valid when each sector's quota is not efficiently allocated within the sector. Therefore, it is not possible to provide policy-relevant rankings of the reallocation alternatives in this amendment based on the expected net economic outcome, i.e., the sum of the change in economic benefits to the recreational and commercial sectors. It can only be stated that greater percentages of the red snapper quota allocated to the recreational sector would be expected to increase economic benefits to the recreational sector and decrease benefits to the commercial sector.

Social Effects

All the alternatives propose to redistribute allocation from the commercial to the recreational sector, thus, the social effects of this action are expected to be negative for the commercial sector and positive for the recreational sector. The quality of social impacts differs between the sectors, in that a loss of commercial access to red snapper could affect the livelihoods of commercial fishermen, especially small-scale owner-operators, hired captains and crew who do not own red snapper shares, and the well-being of commercial communities. In addition, some negative effects would be expected for red snapper consumers if decreased commercial access is associated with decreased availability. Although the extent of anticipated disruptions cannot be quantified, effects would be expected relative to the amount of quota that is reallocated, such that greater negative effects for the commercial sector correspond with a greater shift in allocation.

Direct effects would be expected due to a decrease in available commercial quota. Some instability in the individual fishing quota program would be expected and be evidenced by short-term volatility in the quota market. Potential adverse long-term impacts would result if confidence in the future of the quota market and commercial fishing industry is undermined.

For the recreational sector, the gains in recreational quota would provide additional recreational opportunities to retain red snapper and could potentially provide some temporary relief to the shortened recreational fishing seasons. However, these additional opportunities may not result in a longer fishing season in federal waters, as it would be expected that some States continue providing expanded red snapper fishing opportunities in their state waters. Thus, increases to the recreational sector's allocation may not be assumed to benefit recreational anglers Gulf-wide as an unknown amount of the reallocated quota may be caught through extended state water fishing seasons which vary by State.

Red snapper is an iconic Gulf species, and the issue of red snapper reallocation is affected by the conflict between the commercial and recreational sectors over access to the resource. The commercial sector currently retains the majority share of the resource (51%), although for most years, the majority of landings have been made by the recreational sector. With a reallocation of red snapper, the recreational sector will assume the majority share, a benefit sought after by the recreational sector, regardless of the poundage corresponding to the selected reallocation. Thus, the reallocation of red snapper has an additional socio-cultural significance, symbolizing the inter-sector struggle over a highly sought after resource.

CHAPTER 1. INTRODUCTION

1.1 Background

The red snapper stock in the Gulf of Mexico (Gulf) has been declared overfished based on the Status of U.S. Fisheries Report to Congress[5] and is in the 14th year of a 32-year rebuilding plan. The Gulf of Mexico Fishery Management Council (Council) has worked toward rebuilding the red snapper stock since 1997 and overfishing was projected to have ended in 2009. Overfishing was not officially declared to end in the Status of U.S. Fisheries Report until 2012 after the new overfishing definition developed in the Generic Annual Catch Limits and Accountability Measures (ACLs/AMs) Amendment was implemented (GMFMC 2011a).

Since 2007, the recreational red snapper season length has become progressively shorter (Figure 1.1) and overharvests have occurred in every year but one since 2007 (Figure 2.1.1). The commercial sector has the potential for a year-round season and has consistently harvested below its quota since the implementation of the Individual Fishing Quota (IFQ) program in 2007.

Gulf of Mexico Fishery Management Council (Council)

- Responsible for conservation and management of fish stocks
- Consists of 17 voting members: 11 appointed by the Secretary of Commerce; 1 representative from each of the 5 Gulf States, the Southeast Regional Administrator of National Marine Fisheries Service (NMFS); and 4 non-voting members
- Responsible for developing fishery management plans and amendments, and recommends actions to NMFS for implementation

National Marine Fisheries Service (NMFS)

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

[5] http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/

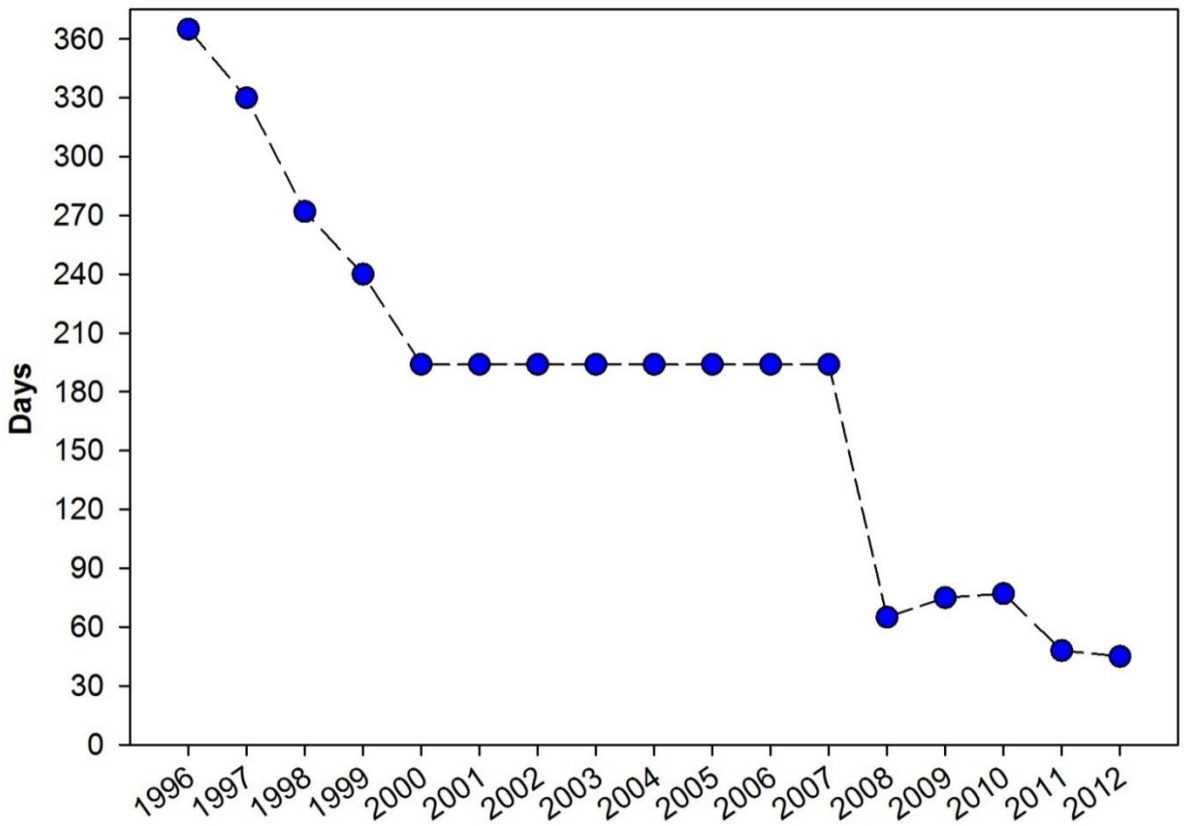

Figure 1.1. Season length (days) that the recreational red snapper season was open from 1996 through 2012 in the Gulf.

Current recreational fishing season length projections are dependent on estimated red snapper average weights and daily catch rates. As the daily catches and average weight of landed red snapper increases the season becomes progressively shorter (NMFS 2012a). Since 2007, when the rebuilding plan was revised, the estimated average weight of red snapper increased from 3.30 to 7.07 lbs whole weight (ww) in 2013 (Table 1.1.1). Following receipt of the 2013 benchmark assessment (SEDAR 31 2013) results, the 8.46 million pound (mp) quota was increased to 11.0 mp, and a supplemental fall recreational season was opened. Thus, the recreational harvest of red snapper was open 42 days in federal waters in 2013. In 2014, the season was open nine days in federal waters.

In January 2013, the Council convened a special meeting of their Reef Fish Committee (Committee) to focus on red snapper management issues. The Committee requested that Amendment 28 focus on red snapper allocation only and decided to address allocation of groupers (i.e., gag, red, and black) in a separate amendment (see Appendix I). During the meeting, the Committee discussed and modified the goals and objectives of the Reef Fish FMP, including suggestions for objectives that better focus the purpose and need of this amendment. The requested changes to the document were discussed and adopted by the Council at the April 2014 meeting (see Section 1.2).

Table 1.1.1. Recreational red snapper landings, in pounds whole weight and in number of fish.

Year	Recreational Landings		Average Weight
	Pounds	Number	
1986	3,490,842	1,469,588	2.38
1987	2,089,548	1,175,076	1.78
1988	3,139,142	1,412,895	2.22
1989	2,940,340	1,207,466	2.44
1990	1,624,534	725,405	2.24
1991	2,917,126	1,231,079	2.37
1992	4,618,290	1,837,446	2.51
1993	7,161,264	2,496,649	2.87
1994	6,075,760	1,828,077	3.32
1995	5,463,742	1,578,667	3.46
1996	5,338,889	1,348,792	3.96
1997	6,804,229	1,853,371	3.67
1998	4,854,098	1,447,264	3.35
1999	4,972,407	1,210,655	4.11
2000	4,750,106	1,199,578	3.96
2001	5,252,285	1,302,021	4.03
2002	6,535,146	1,676,023	3.90
2003	6,105,444	1,535,670	3.98
2004	6,460,244	1,740,770	3.71
2005	4,675,920	1,209,434	3.87
2006	4,131,131	1,225,413	3.37
2007	5,808,795	1,758,320	3.30
2008	4,055,877	941,241	4.31
2009	5,596,857	1,141,275	4.90
2010	2,650,851	486,791	5.45
2011	6,734,109	1,014,046	6.64
2012	7,524,241	1,058,309	7.11
2013	9,658,791	1,366,165	7.07

Sources: Recreational landings from the Southeast Fisheries Science Center including landings from the Marine Recreational Information Program, Texas Parks and Wildlife Department, and the Southeast Headboat Survey.

A 2014 update assessment was presented in PowerPoint format at the January 2015 meeting of the SSC (see SEDAR 31 Update 2015). In addition to the updated data through the 2013 terminal year, changes in the stock assessment results were primarily due to updated Marine Resource Information Program (MRIP) protocols causing an increase in landings estimates, while a shift in selectivity to larger, older fish by recreational fisherman led to a new selectivity timeblock in the stock assessment (i.e., for the years 2011-2013). See Section 3.2 for more information on the stock assessment.

The SSC reviewed the assessment and determined the ABC could be increased to 13 mp in 2015 with further increases over the next two years. However, the recreational red snapper landings in the original 2014 update assessment were only available through 2013, so the ABC projections for 2015 and beyond were made assuming that the 2014 landings would equal those in 2013. Provisional 2014 recreational landings provided by the Southeast Fisheries Science Center (SEFSC) were actually less than 2013 landings. Due to the landings being lower in 2014 than previously assumed, the SEFSC projections concluded that the 2015 ABC could be set higher than the level set by the SSC. However, there would then need to be subsequent annual reductions in order to adhere to the 2032 rebuilding schedule.

The Council asked the SSC to re-evaluate its ABC recommendations in light of the new information on 2014 landings. The SSC convened via internet webinar on February 19, 2015, and recommended an ABC for 2015-2017 provided in Table 1.1.2. Subsequently, the Council met via internet webinar to make a determination for the 2015-2017 red snapper quotas. These quotas were implemented through a 2015 framework action (GMFMC 2015). The Council then approved a framework action to implement these quotas and the recreational annual catch target (ACT), which are listed in Table 1.1.2.

Table 1.1.2. Gulf of Mexico red snapper acceptable biological catch (ABC), total, commercial, and recreational quotas, and recreational annual catch targets (ACT) for 2015-2017 in million pounds (mp) whole weight.

Year	ABC	Total Quota	Commercial Quota	Recreational Quota	Recreational ACT
2015	14.30 mp	14.30 mp	7.293 mp	7.007 mp	5.605 mp
2016	13.96 mp	13.96 mp	7.120 mp	6.840 mp	5.473 mp
2017+	13.74 mp	13.74 mp	7.007 mp	6.733 mp	5.386 mp

Allocation

In recent years, the Council has expressed its intent to evaluate and possibly adjust the allocation of reef fish resources between the commercial and recreational sectors. These Council discussions have included consideration of comprehensive changes to the structure of the recreational sector and to sector allocations for red snapper and several grouper species in Amendment 28 (See Appendix I for a timeline).

The Council's evaluation of the allocations between the commercial and recreational sectors is consistent with NOAA's Catch Share Policy[6]. The Policy recommends that, for all fishery management plans (FMPs), "the underlying harvest allocations to specific fishery sectors (i.e., commercial and recreational) should be revisited on a regular basis, and the basis for the allocation should include consideration of conservation, economic, and social criteria used in specifying optimum yield and in furtherance of the goals of the underlying FMP" (NOAA's Catch Share Policy 2010, page iii).

In response to the challenges inherent to allocating limited resources between competing interests, the Council established an Ad Hoc Allocation Committee composed of Council members to assist in drafting an allocation policy that would streamline future allocation decisions. The Council's allocation policy was adopted in early 2009 and provides principles, guidelines, and suggested methods for allocating fisheries resources between or within sectors. The principles and guidelines developed by the Council are provided in Appendix B. In February 2012, the National Marine Fisheries Service (NMFS) released a technical memorandum on the principles and practice of allocating fishery harvests, which provides additional guidance to the Council (Plummer et al. 2012).

At the Council's request, the Southeast Fishery Science Center (SEFSC) conducted a study evaluating the economic efficiency of the current allocation of red snapper resources between the commercial and recreational sectors. The study was discussed by the Socioeconomic Scientific and Statistical Committee (SESSC) during its October 2012 meeting. Conclusions of the study and recommendations provided by the SESSC were presented to the Council in October 2012. An economic evaluation of allocation alternatives proposed in this amendment was also requested. Drs. Agar and Carter of the SEFSC conducted the analyses and presented their findings to the SESSC during a November 2013 meeting and a January 2014 follow-up webinar. SESSC recommendations were discussed during the February 2014 Council meeting. Allocation studies conducted by the SEFSC, study reviews and SESSC recommendations relative to red snapper allocation are available on the Council's ftp in the archived Socioeconomic SSC meetings folder (http://www.gulfcouncil.org/about/ftp.php).

1.2 Purpose and Need

This regulatory action addresses red snapper allocation. Specifically, the purpose of this action is to reallocate the red snapper harvest consistent with the 2014 red snapper assessment update to ensure the allowable catch and recovery benefits are fairly and equitably allocated between the commercial and recreational sectors to achieve optimum yield.

The need is to base sector allocations on the best scientific information available to determine sector allocations, while achieving optimum yield, particularly with respect to food production and recreational opportunities, and rebuilding the red snapper stock.

[6] http://www.nmfs.noaa.gov/sfa/domes_fish/catchshare/index.htm

1.3 History of Management

This history of management covers events pertinent to red snapper allocation, setting quotas, and AMs. A complete history of management for the FMP is available on the Council's website: http://www.gulfcouncil.org/fishery_management_plans/reef_fish_management.php including recent red snapper actions and a history of red snapper management through 2006 is presented in Hood et al. (2007). The final rule for the Reef Fish FMP (with its associated environmental impact statement [EIS]) (GMFMC 1981) was effective November 8, 1984, and defined the Reef Fish fishery management unit to include red snapper and other important reef fish. A detailed history of the commercial red snapper IFQ program and a discussion of the program performance during the first years of the program are provided in Agar and al. (2014).

Currently, the commercial sector fishing for red snapper is regulated by a 13-inch total length (TL) minimum size limit and managed under an individual fishing quota program. The individual fishing quota program was established through Amendment 26 (GMFMC 2006) and information on this program including annual reports and the program's five-year review can be found on the NMFS' Southeast Regional Office's web page (https://portal.southeast.fisheries.noaa.gov/cs/main.html#). Recreational fishing for red snapper is managed with a 16-inch TL minimum size limit, 2-fish bag limit, and a season beginning on June 1 and ending when the recreational quota is projected to be caught. Other reef fish fishery management measures that affect red snapper fishing include permit requirements for the commercial and for-hire sectors as well as season-area closures. These measures are discussed in more detail in Section 3.1.

Red snapper allocation and quotas: The final rule for **Amendment 1** (GMFMC 1989) to the Reef Fish FMP (with its associated environmental assessment (EA), regulatory impact review (RIR) was effective in February 1990. The amendment specified a framework procedure for setting the total allowable catch (TAC) to allow for annual management changes. A part of that specification was to establish a species' allocation. These were based on the percentage of total landings during the base period of 1979-1987. For red snapper, the commercial sector landed 51% and the recreational sector landed 49% of red snapper over the base period, hence the current 51% commercial:49%: recreational allocation. **Amendment 1** also established a commercial quota allowing the Regional Administrator to close commercial red snapper fishing when the quota was caught. The recreational quota was established through a 1997 regulatory amendment (with its associated EA and RIR) (GMFMC 1995) with a final rule effective in October 1997. Prior to 1997, the recreational sector had exceeded its allocation of the red snapper TAC, though the overages were declining through more restrictive recreational management measures (Figure 2.1.1). With the establishment of a recreational quota, the Regional Administrator was authorized to close the recreational season when the quota is reached as required by the Magnuson-Stevens Act.

Amendment 40 was approved on April 2015. This amendment divides the recreational red snapper quota into two component subquotas, with the federal for-hire component allocated 42.3% of the recreational quota and the private angling component allocated 57.7% of the red snapper recreational quota. This division sunsets three calendar years after implementation.

Season closures are determined separately for each component based on the component's annual catch target (ACT). The final rule to implement this amendment published on April 22, 2015 [80 FR 22422].

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Allocation of Red Snapper

Alternative 1: No Action – Maintain the allocation set in Reef Fish Amendment 1. The commercial and recreational red snapper allocations remain at 51% and 49% of the red snapper quota[7], respectively. Based on red snapper quotas between 2016 and 2017, resulting allocations (in million pounds whole weight and in percent) to the commercial and recreational sectors are:

Alternative	Year	Total	Commercial		Recreational	
		ACL	ACL	Percent	ACL	Percent
Alternative 1: No Action (i.e., Status Quo)	2016	13.960	7.120	51.0%	6.840	49.0%
	2017	13.740	7.007	51.0%	6.733	49.0%

For the components of the recreational sector, resulting ACLs and ACTs (in million pounds whole weight) are as follows:

Alternative	Year	Total Recreational		Private Angling Component		Federal For-Hire Component	
		ACL	ACT	ACL	ACT	ACL	ACT
Alternative 1	2016	6.840	5.472	3.947	3.158	2.893	2.315
	2017	6.733	5.386	3.885	3.108	2.848	2.278

<u>Reallocation of Quota</u>

Alternative 2: Increase the recreational sector's allocation by **3 percent**[8]; allocate 48% of the red snapper quota to the commercial sector and 52% of the quota to the recreational sector. Based on red snapper quotas between 2016 and 2017, resulting allocations (in million pounds whole weight and in percent) to the commercial and recreational sectors are:

Alternative	Year	Total	Commercial		Recreational	
		ACL	ACL	Percent	ACL	Percent
Alternative 2: Increase the recreational sector's allocation by **3%**	2016	13.960	6.701	48.0%	7.259	52.0%
	2017	13.740	6.595	48.0%	7.145	52.0%

[7] The red snapper quota (commercial and recreational quotas) is equivalent to a red snapper ACL.

[8] Unless otherwise indicated, specified percentages refer to percentages of the red snapper quota.

For the components of the recreational sector, resulting ACLs and ACTs (in million pounds whole weight) are as follows:

Alternative	Year	Total Recreational		Private Angling Component		Federal For-Hire Component	
		ACL	ACT	ACL	ACT	ACL	ACT
Alternative 2	2016	7.259	5.807	4.189	3.351	3.071	2.457
	2017	7.145	5.716	4.123	3.298	3.022	2.418

Alternative 3: Increase the recreational sector's allocation by **5 percent**; allocate 46% of the red snapper quota to the commercial sector and 54% of the quota to the recreational sector. Based on red snapper quotas between 2016 and 2017, resulting allocations (in million pounds whole weight and in percent) to the commercial and recreational sectors are:

Alternative	Year	Total ACL	Commercial		Recreational	
			ACL	Percent	ACL	Percent
Alternative 3: Increase the recreational sector's allocation by **5%**	2016	13.960	6.422	46.0%	7.538	54.0%
	2017	13.740	6.320	46.0%	7.420	54.0%

For the components of the recreational sector, resulting ACLs and ACTs (in million pounds whole weight) are as follows:

Alternative	Year	Total Recreational		Private Angling Component		Federal For-Hire Component	
		ACL	ACT	ACL	ACT	ACL	ACT
Alternative 3	2016	7.538	6.031	4.350	3.480	3.189	2.551
	2017	7.420	5.936	4.281	3.425	3.138	2.511

Alternative 4: Increase the recreational sector's allocation by **10 percent**; allocate 41% of the red snapper quota to the commercial sector and 59% of the quota to the recreational sector. Based on red snapper quotas between 2016 and 2017, resulting allocations (in million pounds whole weight and in percent) to the commercial and recreational sectors are:

Alternative	Year	Total ACL	Commercial		Recreational	
			ACL	Percent	ACL	Percent
Alternative 4: Increase the recreational sector's allocation by **10%**	2016	13.960	5.724	41.0%	8.236	59.0%
	2017	13.740	5.633	41.0%	8.107	59.0%

For the components of the recreational sector, resulting ACLs and ACTs (in million pounds whole weight) are as follows:

Alternative	Year	Total Recreational		Private Angling Component		Federal For-Hire Component	
		ACL	ACT	ACL	ACT	ACL	ACT
Alternative 4	2016	8.236	6.589	4.752	3.802	3.484	2.787
	2017	8.107	6.485	4.678	3.742	3.429	2.743

Allocation of Quota Increases

Alternative 5: If the red snapper quota is less than or equal to 9.12 million pounds (mp), maintain the commercial and recreational red snapper allocations at 51% and 49% of the red snapper quota, respectively. If the red snapper quota is greater than 9.12 mp, allocate 75% of the amount in excess of 9.12 mp to the recreational sector and 25% to the commercial sector. Based on red snapper quotas between 2016 and 2017, resulting allocations (in million pounds whole weight and in percent) to the commercial and recreational sectors are:

Alternative	Year	Total	Commercial		Recreational	
		ACL	ACL	Percent	ACL	Percent
Alternative 5: After RS TAC reaches 9.12 mp, allocate 75% of ACL increases to the rec sector	2016	13.960	5.861	42.0%	8.099	58.0%
	2017	13.740	5.806	42.3%	7.934	57.7%

For the components of the recreational sector, resulting ACLs and ACTs (in million pounds whole weight) are as follows:

Alternative	Year	Total Recreational		Private Angling Component		Federal For-Hire Component	
		ACL	ACT	ACL	ACT	ACL	ACT
Alternative 5	2016	8.099	6.479	4.673	3.738	3.426	2.741
	2017	7.934	6.347	4.578	3.662	3.356	2.685

Alternative 6: If the red snapper quota is less than or equal to 9.12 million pounds (mp), maintain the commercial and recreational red snapper allocations at 51% and 49% of the red snapper quota, respectively. If the red snapper quota is greater than 9.12 mp, allocate 100% of the amount in excess of 9.12 mp to the recreational sector. Based on red snapper quotas between 2016 and 2017, resulting allocations (in million pounds whole weight and in percent) to the commercial and recreational sectors are:

Alternative	Year	Total	Commercial		Recreational	
		ACL	ACL	Percent	ACL	Percent
Alternative 6: After RS TAC reaches 9.12 mp, allocate all ACL increases to the rec sector	2016	13.960	4.651	33.3%	9.309	66.7%
	2017	13.740	4.651	33.9%	9.089	66.1%

For the components of the recreational sector, resulting ACLs and ACTs (in million pounds whole weight) are as follows:

Alternative	Year	Total Recreational		Private Angling Component		Federal For-Hire Component	
		ACL	ACT	ACL	ACT	ACL	ACT
Alternative 6	2016	9.309	7.447	5.371	4.297	3.938	3.150
	2017	9.089	7.271	5.244	4.195	3.845	3.076

Alternative 7: If the red snapper quota is less than or equal to 10.0 million pounds (mp), maintain the commercial and recreational red snapper allocations at 51% and 49% of the red snapper quota, respectively. If the red snapper quota is greater than 10.0 mp, allocate 75% of the amount in excess of 10.0 mp to the recreational sector and 25% to the commercial sector. Based on red snapper quotas between 2016 and 2017, resulting allocations (in million pounds whole weight and in percent) to the commercial and recreational sectors are:

Alternative	Year	Total	Commercial		Recreational	
		ACL	ACL	Percent	ACL	Percent
Alternative 7: After RS TAC reaches 10.0 mp, allocate 75% of ACL increases to the rec sector	2016	13.960	6.090	43.6%	7.870	56.4%
	2017	13.740	6.035	43.9%	7.705	56.1%

For the components of the recreational sector, resulting ACLs and ACTs (in million pounds whole weight) are as follows:

Alternative	Year	Total Recreational		Private Angling Component		Federal For-Hire Component	
		ACL	ACT	ACL	ACT	ACL	ACT
Alternative 7	2016	7.870	6.296	4.541	3.633	3.329	2.663
	2017	7.705	6.164	4.446	3.557	3.259	2.607

Reallocation of Quota based on Changes in Recreational Data

Preferred Alternative 8: The increase in allowable harvest (due to changes in recreational data) from the update assessment will be allocated to the recreational sector. The increase for the recreational sector should be the amount attributable to the recalibration of MRIP catch estimates between 2015 and 2017. Commercial and recreational allocations are based on the average percentages of the red snapper quota that would be allocated to each sector between 2015 and 2017.

Alternative	Year	Total ACL	Commercial		Recreational	
			ACL	Percent	ACL	Percent
Preferred Alternative 8: Allocate increases due to the recalibration of MRIP catch estimates to recreational sector; Average percentages between 2015 and 2017	2016	13.960	6.768	48.5%	7.192	51.5%
	2017	13.740	6.664	48.5%	7.076	51.5%

For the components of the recreational sector, resulting ACLs and ACTs (in million pounds whole weight) are as follows:

Alternative	Year	Total Recreational		Private Angling Component		Federal For-Hire Component	
		ACL	ACT	ACL	ACT	ACL	ACT
Preferred Alternative 8	2016	7.192	5.754	4.150	3.320	3.042	2.434
	2017	7.076	5.661	4.083	3.266	2.993	2.395

Alternative 9: The increase in allowable harvest (due to changes in recreational data) from the update assessment will be allocated to the recreational sector. The increase for the recreational sector should be the amount attributable to the change in size selectivity and to the recalibration of MRIP catch estimates between 2015 and 2017. Commercial and recreational allocations are based on the average percentages of the red snapper quota that would be allocated to each sector between 2015 and 2017.

Alternative	Year	Total ACL	Commercial		Recreational	
			ACL	Percent	ACL	Percent
Alternative 9: Allocate increases due to the recalibration of MRIP catch estimates and to the change in size selectivity to rec sector; Average percentages between 2015 and 2017	2016	13.960	5.933	42.5%	8.027	57.5%
	2017	13.740	5.840	42.5%	7.901	57.5%

For the components of the recreational sector, resulting ACLs and ACTs (in million pounds whole weight) are as follows:

Alternative	Year	Total Recreational		Private Angling Component		Federal For-Hire Component	
		ACL	ACT	ACL	ACT	ACL	ACT
Alternative 9	2016	8.027	6.422	4.632	3.705	3.395	2.716
	2017	7.901	6.320	4.559	3.647	3.342	2.674

Discussion

The Gulf of Mexico Fishery Management Council (Council) initially considered alternatives that increased the allocation above the commercial sector's current 51%. However, in considering the economic analyses conducted by the Southeast Fisheries Science Center (SEFSC) (which concluded that the red snapper allocation between sectors is not efficient) and the loss of fishing opportunities by the recreational sector, the Council concluded that such a reallocation would not meet the purpose and need of this action. The issue was discussed during a special Gulf Council Reef Fish Committee meeting held in January 2013 in Tampa, FL. It was requested that alternatives that would increase the percentage of the red snapper quota allocated to the commercial sector be removed from the amendment. Therefore, this amendment includes a no action alternative and eight alternatives that would increase the recreational sector's allocation above 49%.

Alternative 1 would continue to allocate 49% of the red snapper quota to the recreational sector and 51% to the commercial sector. This allocation was established in 1990 through Reef Fish Amendment 1 (GMFMC 1989) and was based on the historical average red snapper landings by each sector for the base period of 1979-1987. Average percentages landed by each sector for various time series are provided in Table 2.1.1. Annual commercial and recreational red snapper landings between 1986 and 2014 are provided in Table 2.1.2.

Table 2.1.1. Red snapper average percentages landed by the commercial and recreational sectors.

Years	Recreational	Commercial
1986-2014	55.2%	44.8%
1991-2014	57.6%	42.4%
1996-2014	56.1%	43.8%
2001-2014	57.3%	42.7%
2006-2014	57.9%	42.1%

For the recreational and commercial sectors, the differences between the quotas and annual landings are provided in Figure 2.1.1. The Council has had limited success in consistently constraining the amounts harvested by the commercial and recreational sectors to their allotted share of the red snapper quota. As a result, the actual proportions of the aggregate quota harvested by each sector have fluctuated widely over time and consistently departed from the

sector allocation set by the Council. Figure 2.1.2 compares the resource allocation established by the Council with the proportions of red snapper landings attributed to the recreational and commercial sectors.

Table 2.1.2. Recreational and commercial red snapper landings, in million pounds whole weight and in percent of the total landings.

Year	Recreational		Commercial	
	Pounds	Percent	Pounds	Percent
1986	3.491	48.55%	3.700	51.45%
1987	2.090	40.51%	3.069	59.49%
1988	3.139	44.22%	3.960	55.78%
1989	2.940	48.69%	3.098	51.31%
1990	1.625	38.00%	2.650	62.00%
1991	2.917	56.86%	2.213	43.14%
1992	4.618	59.79%	3.106	40.21%
1993	7.161	67.97%	3.374	32.03%
1994	6.076	65.35%	3.222	34.65%
1995	5.464	65.06%	2.934	34.94%
1996	5.339	55.31%	4.313	44.69%
1997	6.804	58.59%	4.810	41.41%
1998	4.854	50.91%	4.680	49.09%
1999	4.972	50.49%	4.876	49.51%
2000	4.750	49.55%	4.837	50.45%
2001	5.252	53.18%	4.625	46.82%
2002	6.535	57.76%	4.779	42.24%
2003	6.105	58.07%	4.409	41.93%
2004	6.460	58.14%	4.651	41.86%
2005	4.676	53.31%	4.096	46.69%
2006	4.131	47.05%	4.649	52.95%
2007	5.809	64.60%	3.183	35.40%
2008	4.056	62.02%	2.484	37.98%
2009	5.597	69.26%	2.484	30.74%
2010	2.651	43.87%	3.392	56.13%
2011	6.734	65.20%	3.595	34.80%
2012	7.524	65.09%	4.036	34.91%
2013	9.659	63.93%	5.449	36.06%
2014	3.826	40.07%	5.568	59.27%

Sources: Recreational landings from the Southeast Fisheries Science Center including landings from the Marine Recreational Information Program, Texas Parks and Wildlife Department, and the Southeast Headboat Survey. Commercial landings from the Southeast Data Assessment and Review 31 Data Workshop Report (1990-2006), commercial catch allowances report from the National Marine Fisheries Service /Southeast Regional Office IFQ landings website (2007-2013): http://sero.nmfs.noaa.gov/sf/ifq/CommercialQuotasCatchAllowanceTable.pdf.

Commercial landings in gutted weight were multiplied by 1.11 to convert to ww.

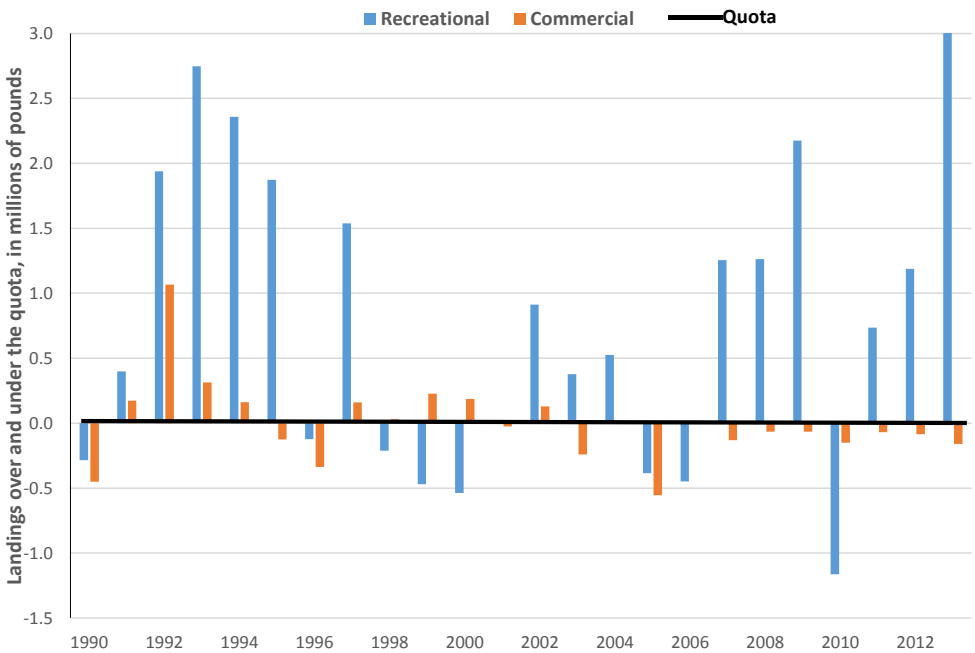

Figure 2.1.1. Differences between annual red snapper landings and quotas by sector, 1990 – 2013. For each sector, positive values indicate that landings are greater than the quota; negative values indicate that landings are less than the quota.

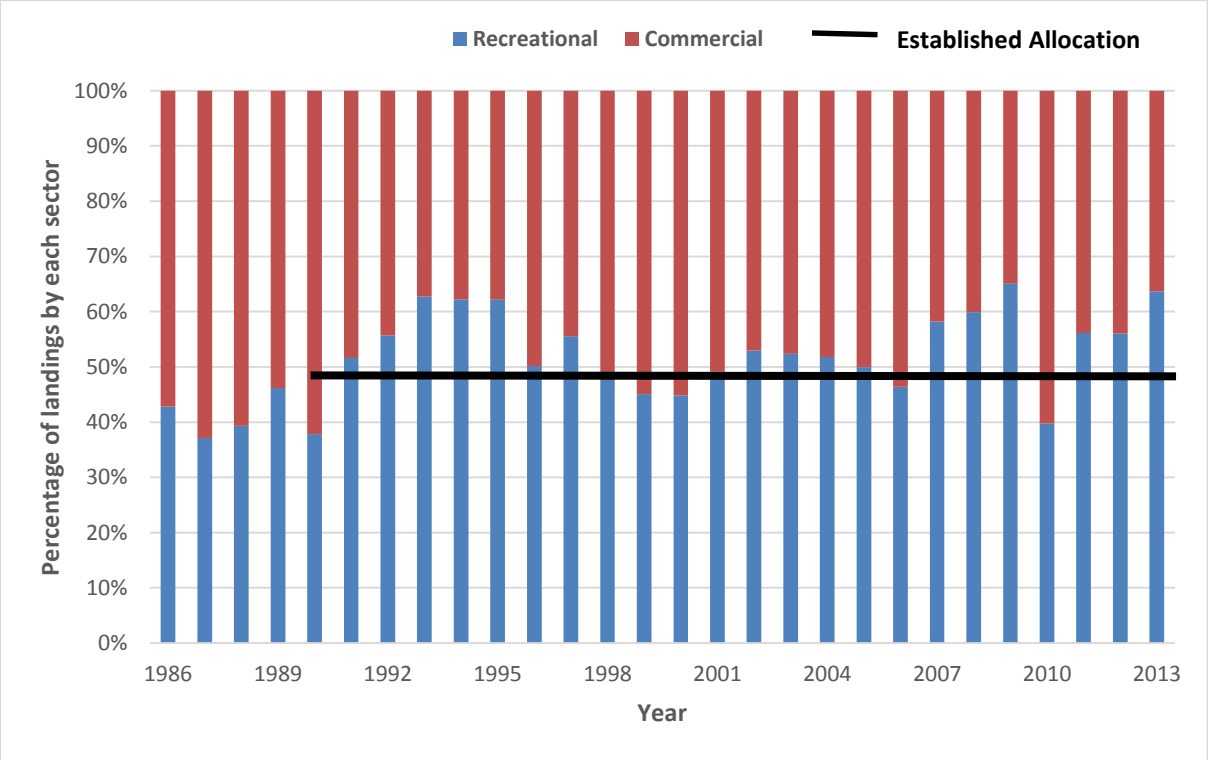

Figure 2.1.2. Comparison between the proportions of red snapper landed by each sector and the

commercial/recreational split of the quota (established allocation of 51% and 49% to the commercial and recreational sectors, respectively).

Based on a status quo aggregate red snapper quota of 13.96 million pounds (mp) in 2016, **Alternative 1** would allocate 7.12 mp and 6.84 mp to the commercial and recreational sectors in 2016, respectively. **Alternatives 2, 3,** and **4** consider increases to the recreational red snapper allocation by 3%, 5%, and 10% from the status quo (**Alternative 1)**, increasing the recreational allocation to 52%, 54%, and 59% of the red snapper quota, respectively. These allocations would remain in effect until changed by the Council. Table 2.1.3 provides a summary of the commercial and recreational red snapper quotas that would result from the alternative allocations included in this action.

Table 2.1.3. Commercial and recreational red snapper allocations (mp, whole weight) based on 2016-2017 red snapper quotas (total ACLs).

Alternative	Year	Total ACL	Commercial		Recreational	
			ACL	Percent	ACL	Percent
Alternative 1: No Action (i.e., Status Quo)	2016	13.960	7.120	51.0%	6.840	49.0%
	2017	13.740	7.007	51.0%	6.733	49.0%
Alternative 2: Increase the recreational sector's allocation by **3%**	2016	13.960	6.701	48.0%	7.259	52.0%
	2017	13.740	6.595	48.0%	7.145	52.0%
Alternative 3: Increase the recreational sector's allocation by **5%**	2016	13.960	6.422	46.0%	7.538	54.0%
	2017	13.740	6.320	46.0%	7.420	54.0%
Alternative 4: Increase the recreational sector's allocation by **10%**	2016	13.960	5.724	41.0%	8.236	59.0%
	2017	13.740	5.633	41.0%	8.107	59.0%
Alternative 5: After RS TAC reaches 9.12 mp, allocate 75% of ACL increases to the recreational sector	2016	13.960	5.861	42.0%	8.099	58.0%
	2017	13.740	5.806	42.3%	7.934	57.7%
Alternative 6: After RS TAC reaches 9.12 mp, allocate all ACL increases to the recreational sector	2016	13.960	4.651	33.3%	9.309	66.7%
	2017	13.740	4.651	33.9%	9.089	66.1%
Alternative 7: After RS TAC reaches 10.0 mp, allocate 75% of ACL increases to the recreational sector	2016	13.960	6.090	43.6%	7.870	56.4%
	2017	13.740	6.035	43.9%	7.705	56.1%
Preferred Alternative 8: Allocate increases due to the recalibration of MRIP catch estimates to recreational sector; Average percentages between 2015 and 2017	2016	13.960	6.768	48.5%	7.192	51.5%
	2017	13.740	6.664	48.5%	7.076	51.5%
Alternative 9: Allocate increases due to the recalibration of MRIP catch estimates and to the change in size selectivity to rec sector; Average percentages between 2015 and 2017	2016	13.960	5.933	42.5%	8.027	57.5%
	2017	13.740	5.840	42.5%	7.901	57.5%

Note: For **Alternatives 2,3,4, Preferred Alternative 8** and **Alternative 9,** the resulting allocations would remain in effect until changed by the Council.

Alternative 5 would continue to allocate 51% of the red snapper quota to the commercial sector and 49% of the red snapper quota to the recreational sector as long as the aggregate red snapper quota is below or equal to 9.12 mp, which was the total allowable catch from 1996 through 2006. Once the threshold is reached, 75% of quota amounts in excess of 9.12 mp would be allocated to the recreational sector and 25% to the commercial sector. In 2016, with a red snapper aggregate quota of 13.96 mp, **Alternative 5** would allocate 5.861 mp and 8.099 mp to the commercial and recreational sectors, respectively. In percentage points, **Alternative 5** would allocate 42.0% and 58.0% of the red snapper quota to the commercial and recreational sectors in 2015, respectively. Provided the quota is at least 9.12 mp, any increase or decrease from the 14.30 mp aggregate quota will result in different percentages allocated to each sector. For example, with a red snapper quota of 13.74 mp in 2017, **Alternative 5** would allocate 42.3% and 57.7.0% of the red snapper quota to the commercial and recreational sectors, respectively

Like **Alternative 5**, **Alternative 6** would maintain the 51/49 commercial/recreational split of the red snapper quota as long as the red snapper quota is less than or equal to 9.12 mp. However, if the red snapper quota is greater than 9.12 mp, **Alternative 6** would allocate the totality of the quota greater than 9.12 mp to the recreational sector, rather than 75% of the quota above the baseline of 9.12 mp, as in **Alternative 5**. In 2016, with a red snapper aggregate quota of 13.96 mp, **Alternative 6** would allocate 4.651 mp and 9.309 mp to the commercial and recreational sectors, respectively. In percentage points, **Alternative 6** would allocate 33.3% and 66.7% of the red snapper quota to the commercial and recreational sectors in 2016, respectively. Again, provided the red snapper aggregate quota is at least 9.12 mp, any increase or decrease from the 13.96 mp aggregate quota will result in different percentages allocated to each sector.

Alternative 7 would continue to allocate 51% of the red snapper quota to the commercial sector and 49% of the red snapper quota to the recreational sector as long as the aggregate red snapper quota is below or equal to 10.0 mp. However, if the red snapper quota is greater than 10.0 mp, 75% of quota amounts in excess of 10.0 mp would be allocated to the recreational sector and 25% to the commercial sector.

Based on an aggregate red snapper quota of 13.96 mp in 2016, **Alternative 7** would allocate 6.09 mp and 7.87 mp to the commercial and recreational sectors, respectively. In percentage points, **Alternative 7** would allocate 43.6% and 56.4% of the red snapper quota to the commercial and recreational sectors in 2016, respectively. Provided the quota is at least 10.0 mp, any increase or decrease from the 13.96 mp aggregate quota will result in different percentages allocated to each sector.

Preferred Alternative 8 would allocate quota increases due to the recalibration of MRIP catch estimates to the recreational sector. The resulting allocation is therefore determined by first allocating the quota that would result if MRIP catch estimates were not recalibrating according to the status quo percentages (51% commercial and 49% recreational) and second, adding the amount of quota estimated to result from the recalibration to the recreational sector. For 2015 to 2017, the amounts of quota attributable to the MRIP recalibration were derived from projections provided by the SEFSC (Appendix H). Percentages of the red snapper quota allocated to each sector on an annual basis would fluctuate based on the quota and on the amounts attributed to the recalibration. However, for **Preferred Alternative 8,** the Council elected to base the

commercial and recreational allocations on the average percentages of the red snapper quota that would be allocated to each sector between 2015 and 2017. Consequently, **Preferred Alternative 8** would allocate 48.5% and 51.5% of the red snapper quota to the commercial and recreational sectors, respectively.

In addition to the amount of quota attributable to the recalibration of MRIP catch estimates, **Alternative 9** would allocate the amount of quota attributable to the change in size selectivity to the recreational sector. Amounts of quota due to the change in selectivity were also derived from the projections provided by the SEFSC and included in Appendix H. As **Preferred Alternative 8, Alternative 9** bases the commercial and recreational allocations on the average percentages of the red snapper quota that would be allocated to each sector between 2015 and 2017. **Alternative 9** would allocate 42.5% and 57.5% of the red snapper quota to the commercial and recreational sectors, respectively. For **Preferred Alternative 8** and **Alternative 9**, resulting allocations would remain in effect until changed by the Council. Quota amounts and percentages allocated to each sector between 2016 and 2017 are provided in Table 2.1.3.

As illustrated in Figure 2.1.2, the percentages of the red snapper aggregate quota harvested by the commercial and recreational sectors do not reflect the established allocation of 51% and 49% assigned to the commercial and recreational sectors, respectively. Alongside allocation discussions and reallocation decisions, the Council has implemented management measures (accountability measures) intended to reduce the recreational quota overages, thereby minimizing the difference between the proportion of red snapper landings attributed to each sector and the allocation established by the Council.

Recent allocation studies completed by the SEFSC and reviewed by the Socioeconomic Scientific and Statistical Committee (SESSC) have concluded that existing allocations between the commercial and recreational sectors of several reef fish resources, including red snapper, are not economically efficient. In a 2012 study evaluating the economic efficiency of the allocation of red snapper resources, Agar and Carter[9] compared estimated commercial and recreational marginal willingness to pay for red snapper and indicated that the relative magnitude of the estimates suggests that economic efficiency could potentially be improved by reallocating red snapper resources. The SESSC reviewed and accepted the methodology of the study. The SESSC further stated that although the study results indicated that the marginal value of a recreationally caught red snapper is likely higher than the marginal value of a commercially caught red snapper, given the data used, e.g., data collection time periods (recreational data collected from a 2003 survey; commercial data collected during the last 5 years of the red snapper IFQ program), it cannot specify the potential efficiency gains from possible quota shifts because it does not know how the marginal valuations would change with the switch. The SESSC also indicated that incentive-based approaches to reallocation would be more appropriate for increasing net benefits than mandated allocations. A study evaluating potential changes in net benefits expected to result from alternatives proposed in this amendment is provided in Appendix G.

[9] Agar and Carter presentation to the SESSC in October 2012 titled "Are the 2012 allocations of red snapper in the Gulf of Mexico economically efficient?"

CHAPTER 3. AFFECTED ENVIRONMENT

The action considered in this environmental impact statement (EIS) would affect commercial and recreational fishing for red snapper in federal and state waters of the Gulf of Mexico (Gulf). Descriptions of the physical, biological, economic, social, and administrative environments were completed in the EISs for Reef Fish Amendments 27/Shrimp Amendment 14 (GMFMC 2007), 30A (GMFMC 2008a), 30B (GMFMC 2008b), 32 (GMFMC 2011b), the Generic Essential Fish Habitat (EFH) Amendment (GMFMC 2004a), and the Generic Annual Catch Limits/Accountability Measures (ACL/AM) Amendment (GMFMC 2011a). Below, information on each of these environments is summarized or updated, as appropriate.

3.1 Description of the Red Snapper Component of the Reef Fish Fishery

A description of the fishery and affected environment relative to red snapper was last fully discussed in joint Reef Fish Amendment 27/Shrimp Amendment 14 (GMFMC 2007). This section updates the previous description to include additional information since publication of that EIS.

General Features

Commercial harvest of red snapper from the Gulf began in the mid-1800s (Shipp 2001). In the 1930s, party boats built exclusively for recreational fishing began to appear (Chester 2001). Currently, the commercial sector operates under an individual fishing quota (IFQ) program. In 2011, 362 vessels participated in the IFQ program (NMFS 2012c). The recreational sector operates in the following three modes: charter boats, headboats, and private vessels. In 2012 private vessels accounted for 61.1% of recreational red snapper landings, followed by charter boats (24.8%) and headboats (14.1%). On a state-by-state basis, Florida accounted for the most landings (41.5%), followed by Alabama (28.1%), Louisiana (14.8%), Texas (12.0%), and Mississippi (3.7%) (Table 3.1.1).

Table 3.1.1. Recreational red snapper landings in 2012 by state and mode.

State	Landings (lbs whole weight)				% by State
	Charter	Headboat	Private	All Modes	
FL (west)	641,437	205,114	1,289,253	2,135,804	41.5%
AL	359,469	72,199	1,013,460	1,445,128	28.1%
MS	997	5,894	182,767	189,658	3.7%
LA	236,302	21,999	501,704	760,005	14.8%
TX	39,128	419,671	157,726	616,525	12.0%
Total	**1,277,333**	**724,077**	**3,144,911**	**5,147,120**	
% by Mode	**24.8%**	**14.1%**	**61.1%**		**100%**

Source: NMFS 2013a.

The red snapper stock has been found to be in decline or in an overfished condition since the first red snapper stock assessment in 1986 (Parrack and McClellan 1986). The first red snapper rebuilding plan was implemented in 1990 through Amendment 1 (GMFMC 1989). From 1990 through 2009, red snapper harvest was managed through the setting of an annual total allowable catch (TAC). This TAC was allocated with 51% going to the commercial sector and 49% to the recreational sector. Beginning in 2010, TAC was phased out in favor of an ACL as a result of revisions to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). The red snapper rebuilding plan has not formally adopted the use of the term ACL. However, by allocating the acceptable biological catch (ABC) between the commercial and recreational sectors, and then setting quotas for each sector that do not exceed those allocations, the terminology and approaches used in the red snapper rebuilding plan are consistent with the use of ACLs. Such alternative terminology is allowed under the guidelines.

Amendment 1 also established a 1990 commercial red snapper quota of 3.1 million pounds (mp) whole weight (ww) (Table 3.1.2). There was no explicit recreational quota or allocation specified in Amendment 1, only a bag limit of 7 fish and a minimum size limit of 13 inches total length. Beginning in 1991, an explicit recreational allocation in pounds was based on 49% of the TAC was specified, and this allocation was specified through Council action until 1997 when the recreational allocation was changed to a quota (Table 3.1.2). Based on the 51:49 commercial to recreational sector allocation, the commercial quota implied a TAC of about 5.2 mp in 1990, followed by explicit TACs of 4.0 mp in 1991 and 1992, 6.0 mp in 1993 through 1995, and 9.12 mp from 1996 through 2006 (Table 3.1.2). The TAC was reduced to 6.5 mp in 2007 and 5.0 mp in 2008 and 2009 as the Gulf of Mexico Fishery Management Council (Council) shifted from a constant catch rebuilding plan to a constant fishing mortality rebuilding plan (GMFMC 2007). Under a constant fishing mortality rate rebuilding plan, the ABC is allowed to increase as the stock rebuilds, thus the ABCs for 2010, 2011, and 2012 were increased to 6.945, 7.530, and 8.080 mp, respectively[10].

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, partly due to strong recruitment in some recent years. Initially in 2013, a scheduled increase in the ABC to 8.690 mp 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 8.460 mp. However, once the new benchmark assessment was completed, the Scientific and Statistical Committee (SSC) increased the ABC for 2013 to 13.5 mp with the caveat that catch levels would have to be reduced in future years unless recruitment returned to average levels. After incorporating a buffer to reduce the possibility of having to later reduce the quota, the Council further increased the 2013 commercial and recreational quotas to a combined 11.0 mp (5.61 mp and 5.39 mp, respectively) (GMFMC 2013a), and this ABC carried through to 2014 (Table 3.1.2). A 2014 update assessment was presented to the SSC in January 2015. The SSC reviewed the assessment and determined the ABC could be increased to 13 mp in 2015 with further increases over the next two years. However, the recreational red snapper landings in the original 2014 update assessment were only available through 2013, so the ABC projections for 2015 and beyond were made assuming that the 2014 landings would equal those in 2013. However, the 2014 recreational landings were actually less than in 2013. Due to the landings

[10] Note the allocation for the commercial and recreational quotas shifted from the TAC to the ABC in 2010.

being lower in 2014 than previously assumed, the SEFSC projections concluded that the 2015 ABC could be set higher than the level set by the SSC, but that there would then need to be subsequent annual reductions in order to adhere to the 2032 rebuilding schedule. The SSC to re-evaluated its ABC recommendations in light of the new information on 2014 landings and recommended an ABC for 2015-2017 provided in Table 1.1.2. The Council then approved a framework action to implement these quotas and the recreational annual catch target (ACT), which are listed in Table 1.1.2.

Table 3.1.2. Red snapper landings and overage/underage by sector, 1986-2014. Landings are in mp ww. Commercial quotas began in 1990. Recreational allocations began in 1991 and recreational quotas began in 1997. Summing the recreational allocation/quota and the commercial quota yields the total allowable catch (TAC) for the years 1991-2009 and the acceptable biological catch (ABC) for 2010-2014.

	Recreational			Commercial			Total		
Year	**Alloc-ation Quota**	**Actual landings**	**Difference**	**Quota**	**Actual landings**	**Difference**	**TAC/ ABC**	**Actual landings**	**Difference**
1986	na	3.491	na	na	3.700	na	na	6.470	na
1987	na	2.090	na	na	3.069	na	na	4.883	na
1988	na	3.139	na	na	3.960	na	na	6.528	na
1989	na	2.940	na	na	3.098	na	na	5.754	na
1990	na	1.625	na	3.1	2.650	-0.450	na	4.264	na
1991	1.96	2.917	+0.957	2.04	2.213	+0.173	4.0	5.130	+1.130
1992	1.96	4.618	+2.658	2.04	3.106	+1.066	4.0	7.724	+3.724
1993	2.94	7.161	+4.221	3.06	3.374	+0.314	6.0	10.535	+4.535
1994	2.94	6.076	+3.136	3.06	3.222	+0.162	6.0	9.298	+3.298
1995	2.94	5.464	+2.524	3.06	2.934	-0.126	6.0	8.398	+2.398
1996	4.47	5.339	+0.869	4.65	4.313	-0.337	9.12	9.652	+0.532
1997	4.47	6.804	+2.334	4.65	4.810	+0.160	9.12	11.614	+2.494
1998	4.47	4.854	+0.384	4.65	4.680	+0.030	9.12	9.534	+0.414
1999	4.47	4.972	+0.502	4.65	4.876	+0.226	9.12	9.848	+0.728
2000	4.47	4.750	+0.280	4.65	4.837	+0.187	9.12	9.587	+0.467
2001	4.47	5.252	+0.782	4.65	4.625	-0.025	9.12	9.877	+0.757
2002	4.47	6.535	+2.065	4.65	4.779	+0.129	9.12	11.314	+2.194
2003	4.47	6.105	+1.635	4.65	4.409	-0.241	9.12	10.514	+1.394
2004	4.47	6.460	+1.990	4.65	4.651	+0.001	9.12	11.111	+1.991
2005	4.47	4.676	+0.206	4.65	4.096	-0.554	9.12	8.772	-0.348
2006	4.47	4.131	-0.339	4.65	4.649	-0.001	9.12	8.780	-0.340
2007	3.185	5.809	+2.624	3.315	3.183	-0.132	6.5	8.962	+2.462
2008	2.45	4.056	+1.606	2.55	2.484	-0.066	5.0	6.517	+1.517
2009	2.45	5.597	+3.147	2.55	2.484	-0.066	5.0	8.058	+3.058
2010	3.403	2.651	-0.752	3.542	3.392	-0.150	6.945	6.013	-0.932
2011	3.866	6.734	+2.868	3.664	3.595	-0.069	7.53	10.296	+2.766
2012	3.959	7.524	+3.565	4.121	4.036	-0.085	8.08	11.524	+3.444
2013	5.390	9.659	+4.269	5.610	5.449	-0.161	11.00	15.108	+4.108
2014	5.390	3.826	-1.564	5.610	5.568	-0.042	11.00	9.394	-1.606

Sources: Recreational landings from the Southeast Fisheries Science Center including landings from the Marine Recreational Information Program, Texas Parks and Wildlife Department, and the Southeast Headboat Survey. Commercial landings from the Southeast Data Assessment and Review 31 Data Workshop Report (1990-2006), commercial quotas/catch allowances report from the National Marine Fisheries Service /Southeast Regional Office IFQ landings website (2007-2014): http://sero.nmfs.noaa.gov/sf/ifq/CommercialQuotasCatchAllowanceTable.pdf. Commercial quotas/landings in gutted weight were multiplied by 1.11 to convert to ww. Values highlighted in red are those where landings exceeded quotas.

Both the commercial and recreational sectors have had numerous allocation or quota overruns. Table 3.1.2 shows a comparison of quotas and actual harvests from 1990 through 2012. The recreational sector has had allocation/quota overruns in 14 out of 22 years in which an allocation or quota was specified, while the commercial sector has had quota overruns in 10 of 23 years. However, the commercial sector has not had overruns since 2005, including the years 2007 onward when the commercial harvest of red snapper has operated under an IFQ program.

Recreational Sector

Red snapper are an important component of the recreational sector's harvest of reef fish in the Gulf. Red snapper are caught from charter boats, headboats (or party boats), and private anglers fishing primarily from private or rental boats. Red snapper are primarily caught with hook-and-line gear in association with bottom structures. Recreational red snapper harvest allocations since 1991 have been set at 49% of the TAC, or 1.96 mp in 1991 and 1992, 2.94 mp for 1993 through 1995, and 4.47 mp in 1996. In 1997, a 4.47 mp recreational quota was created and it was maintained at this level through 2006. In 2007, the recreational quota was reduced to 3.185 mp. It was reduced again to 2.45 mp in 2008 and 2009. Since 2010, the recreational quota has been increased each year: 3.403 mp in 2010, 3.866 mp in 2011, 3.959 mp in 2012, and 5.390 mp in 2013 and 2014 (Table 3.1.3).

Before 1984, there were no restrictions on the recreational harvest of red snapper. In November 1984, a 12-inch total length size limit was implemented, but with an allowance for five undersized fish per person. In 1990, the undersized allowance was eliminated, and the recreational sector was managed through bag and size limits with a year-round open season. In 1997, the recreational red snapper allocation was converted into a quota with accompanying quota closure should the sector exceed its quota. Recreational quota closures occurred in 1997, 1998, and 1999, becoming progressively shorter each year even though the quota remained a constant 4.47 mp.

A fixed recreational season of April 21 through October 31 (194 days) was established for 2000 through 2007. However, National Marine Fisheries Service (NMFS) returned to variable length seasons beginning in 2008. Under this management approach, due to a lag in the reporting of recreational catches, catch rates over the course of the season were projected in advance based on past trends and changes in the average size of a recreationally harvested red snapper. The recreational season opened each year on June 1 and closed on the date when the quota was projected to be reached. In 2008, the season length was reduced from 194 days to 65 days in conjunction with a reduction in quota to 2.45 mp. The season length then increased to 75 days in 2009. In 2010, the recreational red snapper season was originally projected to be 53 days. However, due to reduced effort and large emergency area closures resulting from the Deepwater Horizon MC252 oil spill, catches were below projections, and a one-time supplemental season of weekend only openings (Friday, Saturday, and Sunday) was established from October 1 through November 22. This added 24 fishing days to the 2010 season for a total of 77 days. In 2011, the season was reduced to 48 days despite an increase in the quota, due to an increase in the average size of a recreationally harvested fish. In 2012 the season was initially scheduled to be 40 days, but was extended to 46 days to compensate for the loss of fishing days due to storms (Table 3.1.3). For 2013, an increase in the ABC occurred too late to extend the June recreational

season, so the Council requested that NMFS reopen the recreational season on October 1 for whatever number of days would be needed to harvest the additional quota. NMFS estimated that the additional recreational quota would take 14 days to be caught, and therefore announced a supplemental season of October 1 through 14. In 2014, the season was 9 days starting on June 1. The season length used new MRIP information to estimate catch rates and was based on an ACT set 20% below the quota.

Table 3.1.3. Red snapper recreational landings vs. allocation/quota and days open, bag limit, and minimum size limits 1986-2014. Landings are in mp ww. Minimum size limits are in inches total length. Recreational allocations began in 1991, and became quotas in 1997.

Year	Allocation/ Quota	Actual landings	Difference	% over or under	Days open	Bag limit	Minimum size limit
1986	na	3.491	na		365	none	13
1987	na	2.090	na		365	none	13
1988	na	3.139	na		365	none	13
1989	na	2.940	na		365	none	13
1990	na	1.625	na		365	7	13
1991	1.96	2.917	+0.957	+49%	365	7	13
1992	1.96	4.618	+2.658	+136%	365	7	13
1993	2.94	7.161	+4.221	+144%	365	7	13
1994	2.94	6.076	+3.136	+107%	365	7	14
1995	2.94	5.464	+2.524	+86%	365	5	15
1996	4.47	5.339	+0.869	+19%	365	5	15
1997	4.47	6.804	+2.334	+52%	330	5	15
1998	4.47	4.854	+0.384	+9%	272	4	15
1999	4.47	4.972	+0.502	+11%	240	4	15
2000	4.47	4.750	+0.280	+6%	194	4	16
2001	4.47	5.252	+0.782	+17%	194	4	16
2002	4.47	6.535	+2.065	+46%	194	4	16
2003	4.47	6.105	+1.635	+37%	194	4	16
2004	4.47	6.460	+1.990	+45%	194	4	16
2005	4.47	4.676	+0.206	+5%	194	4	16
2006	4.47	4.131	-0.339	-8%	194	2	16
2007	3.185	5.809	+2.624	+82%	194	2	16
2008	2.45	4.056	+1.606	+66%	65	2	16
2009	2.45	5.597	+3.147	+128%	75	2	16
2010	3.403	2.651	-0.752	-22%	53 + 24 = 77	2	16
2011	3.866	6.734	+2.868	+74%	48	2	16
2012	3.959	7.524	+3.565	+90%	46	2	16
2013	5.390	9.659	+4.269	+79%	42	2	16
2014	5.390	3.826	-1.564	-29	9	2	16

Sources: Southeast Fisheries Science Center including landings from the Marine Recreational Information Program, Texas Parks and Wildlife Department, and the Southeast Headboat Survey (May 2013). Values highlighted in red are those where landings exceeded quotas.

During the six years when the recreational harvest was an allocation, not a quota (1991 – 1996), actual recreational harvests in pounds of red snapper exceeded the allocation every year except 1996. During the period when the recreational harvest was managed as a quota (1997 – 2012), actual recreational harvest in pounds of red snapper exceeded the quota in 9 out of 16 years, including 5 of the last 6 years (Table 3.1.3). It should also be noted that overages have been quite substantial when they occur (often 30% or greater than the quota) while underages are generally minor (often 12% or less of the quota). Historical recreational landings estimates have recently been revised to reflect changes in methodology under the Marine Recreational Information Program (MRIP). Landings for 2014 indicate the recreational quota was not exceeded in this year.

For-hire vessels have operated under a limited access system with respect to the issuance of new for-hire permits for fishing reef fish or coastal migratory pelagics since 2003. A total of 3,340 reef fish and coastal migratory pelagic charter permits were issued under the moratorium, and they are associated with 1,779 vessels. Of these vessels, 1,561 have both reef fish and coastal migratory pelagics permits, 64 have only reef fish permits, and 154 have only coastal migratory pelagics permits.

Savolainen et al (2012) surveyed the charter and headboat fleets in the Gulf. They found that most charter boat trips occurred in the exclusive economic zone (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 boat operators were king mackerel (41%), grouper (~37%), snapper (~34%), cobia (25%), and Spanish mackerel (20%). For the rest of the Gulf, Sutton et al. (1999) using the same survey reported that the majority of charter boats targeted snapper (91%), king mackerel (89%), cobia (76%), and tuna (55%).

For headboats, Savolainen et al (2012) reported that most head boats 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 Gulf coast Florida headboats were snapper (60%), grouper (60%) and sharks (20%) with species receiving the largest percentage of effort 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%).

Commercial Sector

In the Gulf, red snapper are primarily harvested commercially with hook-and-line and bandit gear, with bandit gear being more prevalent. Longline gear captures a small percentage of total landings (generally < 5%; SEDAR 31 2013). Current regulations prohibit longline gear for the

harvest of reef fish inside of 50 fathoms west of Cape San Blas. East of Cape San Blas, longline gear is prohibited for harvest of reef fish inside of 20 fathoms from September through May. From June through August, the longline boundary is shifted out to 35 fathoms to protect foraging sea turtles.

Between 1990 and 2006, the principal method of managing the commercial sector for red snapper was with quotas set at 51% of TAC and seasonal closures after each year's quota was filled. The result was a race for fish in which fishermen were compelled to fish as quickly as possible to maximize their catch of the overall quota before the season was closed. The fishing year was characterized by short periods of intense fishing activity with large quantities of red snapper landed during the open seasons. The result was short seasons and frequent quota overruns (Table 3.1.4). From 1993 through 2006, trip limits, limited access endorsements, split seasons and partial monthly season openings were implemented in an effort to slow the race for fish. At the beginning of the 1993 season, 131 boats qualified for red snapper endorsements on their reef fish permits that entitled them to land 2,000 lbs of red snapper per trip.

In 2007, an IFQ program was implemented for the commercial red snapper sector. Each vessel that qualified for the program was issued shares of the commercial quota. The amount of shares was based on historical participation. At the beginning of each year, each shareholder is issued allocation in pounds based on the amount of shares they have. Each shareholder is then allowed to harvest or their allocation to other fishermen, or purchase allocation from other fishermen. In addition, shares can be bought and sold. As a result of this program, the commercial red snapper season has not closed since 2007, but a commercial vessel cannot land red snapper unless it has sufficient allocation in its vessel account to cover the landing poundage. Thus, the IFQ program has ended quota overruns (Table 3.1.4). Recently, a 5-year review of the IFQ program was completed (GMFMC 2013b) and the Council is working to determine if changes are needed to the program.

Table 3.1.4. Commercial red snapper harvest vs. days open, by sector, 1986-2014.

Year	Quota	Actual landings	Days Open (days that open or close at noon are counted as half-days) ("+" = split season)
1986	na	3.700	365
1987	na	3.069	365
1988	na	3.960	365
1989	na	3.098	365
1990	3.1	2.650	365
1991	2.04	2.213	235
1992	2.04	3.106	52½ + 42 = 94½
1993	3.06	3.374	94
1994	3.06	3.222	77
1995	3.06	2.934	50 + 1½ = 51½
1996	4.65	4.313	64 + 22 = 86
1997	4.65	4.810	53 + 18 = 71
1998	4.65	4.680	39 + 28 = 67
1999	4.65	4.876	42 + 22 = 64
2000	4.65	4.837	34 + 25 = 59
2001	4.65	4.625	50 + 20 = 70
2002	4.65	4.779	57 + 24 = 81
2003	4.65	4.409	60 + 24 = 84
2004	4.65	4.651	63 + 32 = 95
2005	4.65	4.096	72 + 48 = 120
2006	4.65	4.649	72 + 43 = 115
2007	3.315	3.183	IFQ
2008	2.55	2.484	IFQ
2009	2.55	2.484	IFQ
2010	3.542	3.392	IFQ
2011	3.664	3.595	IFQ
2012	4.121	4.036	IFQ
2013	5.610	5.449	IFQ
2014	5.610	5.568	IFQ

Sources: Southeast Data Assessment and Review 31 Data Workshop Report (1990-2011 landings), commercial quotas/catch allowances report from National Marine Fisheries Service/Southeast Regional Office Individual Fishing Quota landings website. Commercial quotas/landings in gutted weight were multiplied by 1.11 to convert to ww. Values highlighted in red are those where landings exceeded quotas.

3.2 Description of the Physical Environment

The Gulf has a total area of approximately 600,000 square miles (1.5 million km^2), including state waters (Gore 1992). It is a semi-enclosed, oceanic basin connected to the Atlantic Ocean by the Straits of Florida and to the Caribbean Sea by the Yucatan Channel (Figure 3.2.1). Oceanographic conditions are affected by the Loop Current, discharge of freshwater into the northern Gulf, and a semi-permanent, anti-cyclonic gyre in the western Gulf. The Gulf includes

both temperate and tropical waters (McEachran and Fechhelm 2005). Gulf water temperatures range from 54º F to 84º F (12º C to 29º C) depending on time of year and depth of water. Mean annual sea surface temperatures ranged from 73 º F through 83º F (23-28º C) including bays and bayous (Figure 3.2.1) between 1982 and 2009, according to satellite-derived measurements (NODC 2012: http://accession.nodc.noaa.gov/0072888). In general, mean sea surface temperature increases from north to south with large seasonal variations in shallow waters.

The physical environment for Gulf reef fish, including red snapper, is also detailed in the EIS for the Generic EFH Amendment, the Generic ACL/AM Amendment, and Reef Fish Amendment 40 (refer to GMFMC 2004a; GMFMC 2011a; GMFMC 2014a) 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 (<100m) which have high relief, i.e., coral reefs, artificial reefs, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings. However, several species are found over sand and soft-bottom substrates. For example, juvenile red snapper are common on mud bottoms in the northern Gulf, particularly off Texas through Alabama. Also, some juvenile snapper (e.g. mutton, gray, red, dog, lane, and yellowtail snappers) and grouper (e.g. Goliath grouper, red, gag, and yellowfin groupers) have been documented in inshore seagrass beds, mangrove estuaries, lagoons, and larger bay systems.

In the Gulf, fish habitat for adult red snapper consists of submarine gullies and depressions; coral reefs, rock outcroppings, and gravel bottoms; oilrigs; and other artificial structures (GMFMC 2004a). Detailed information pertaining to the closures and preserves is provided in the February 2010 Regulatory Amendment (GMFMC 2010).

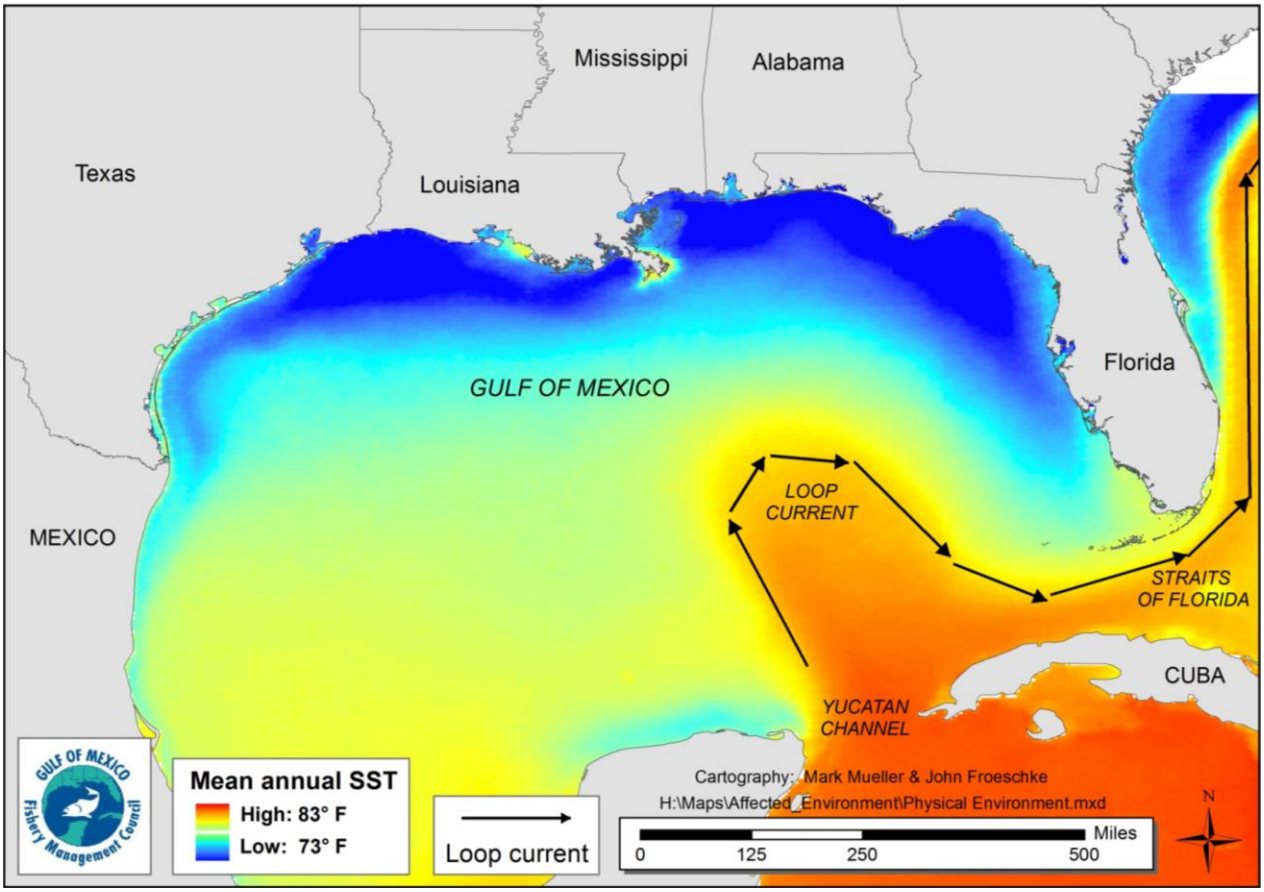

Figure 3.2.1. Physical environment of the Gulf including major feature names and mean annual sea surface temperature as derived from the Advanced Very High Resolution Radiometer Pathfinder Version 5 sea surface temperature data set (http://accession.nodc.noaa.gov/0072888)

3.3 Description of the Biological Environment

The biological environment of the Gulf, including the species addressed in this amendment, is described in detail in the final EISs for Generic EFH Amendment, the Generic ACL/AM Amendment, and Reef Fish Amendment 40 (refer to GMFMC 2004a; GMFMC 2011a; GMFMC 2014a) and is incorporated here by reference and further summarized below.

Red Snapper Life History and Biology

Red snapper demonstrate the typical reef fish life history pattern (Appendix C). Eggs and larvae are pelagic while juveniles are found associated with bottom features or over barren bottom. Spawning occurs over firm sand bottom with little relief away from reefs during the summer and fall. Most females are mature by age two and almost all are mature by age 5 (Woods et al. 2003). Red snapper have been aged up to 57 years (Wilson and Nieland 2001). In the late 1990s, most caught by the directed fishery were 2- to 4-years old (Wilson and Nieland 2001), but a recently completed stock assessment suggests that the age and size of red snapper in the directed fishery has increased in recent years (SEDAR 31 2013). A more complete description of red snapper life history can be found in the EIS for the Generic EFH Amendment (GMFMC 2004a).

Status of the Red Snapper Stock

Southeast Data Assessment and Review (SEDAR) 31 Benchmark Stock Assessment and 2014 update

Commercial harvest of red snapper from the Gulf began in the mid-1800s (Shipp 2001). In the 1930s, party boats built exclusively for recreational fishing began to appear (Chester 2001). The first stock assessment conducted by NMFS in 1986 suggested that the stock was in decline (Parrack and McLellan 1986) and since 1988 (Goodyear 1988) the stock biomass has been in an overfished condition.

A red snapper update assessment was conducted by the Southeast Fishery Science Center (SEFSC) in 2014 (SEDAR 31 Update 2015) and presented to the Scientific and Statistical Committee (SSC) in January 2015 SSC[11]. This update assessment was based on the SEDAR 31 benchmark in 2012 and 2013 (SEDAR 31 2013). The primary assessment model selected for the SEDAR 31 Gulf red snapper stock evaluation assessment was Stock Synthesis (Methot 2010). Stock Synthesis is an integrated statistical catch-at-age model which is widely used for stock assessments in the United States and throughout the world. Commercial landings data included commercial handline and longline landings from the accumulated landings system from 1964 through 2011. For landings between 1880 and 1963, previously constructed historical landings were used. Total annual landings from the IFQ program for years 2007-2011 were used to

[11] The written report for the 2014 red snapper update assessment was not available to the SSC or Council in January. A PowerPoint presentation describing the assessment was presented to the Council at its January 2015 meeting, and is available at the January 2015 briefing materials on the Council website (http://www.gulfcouncil.org) or by going directly to: http://www.gulfcouncil.org/council_meetings/Briefing%20Materials/BB-01-2015/B%20-%2014%20Red%20Snapper%202014%20Update%20Presentation.pdf

reapportion 2007-2011 accumulated landings system data across strata. Recreational landings data included the Marine Recreational Information Program (MRIP) /Marine Recreational Fishery Statistics Survey (MRFSS) from 1981-2011, Southeast Headboat Survey for 1981-2011, and Texas Parks and Wildlife Department survey for 1983-2011. For the years 2004-2011, MRIP landings are available. For earlier years, MRFSS data were calibrated to MRIP estimates using a standardized approach for calculating average weight that accounts for species, region, year, state, mode, wave, and area.

Standardized indices of relative abundance from both fishery dependent and independent data sources were included in the model. The fishery dependent indices came from the commercial handline fleet, recreational headboats, and recreational private/for-hire sectors. Fishery independent indices came from the Southeast Area Monitoring and Assessment Program (SEAMAP) bottom trawl survey, SEAMAP reef fish video survey, NMFS bottom longline survey, and the SEAMAP plankton survey.

The benchmark stock assessment (SEDAR 31 2013) estimated dead discard rates separately for each sector. Note these same values were used in the recent 2014 update assessment and at this time are considered the best scientific information available. Red snapper discards in the Gulf were calculated from data collected by the self-reported commercial logbook data and the NMFS Gulf reef fish observer program. In addition to these directed fisheries discards, estimates of red snapper bycatch from the commercial shrimp fleet were also generated. Based on the commercial observer program, dead discard rate estimates were based on average depths, gear type (handline or longline), region (eastern or western Gulf), and season (open or closed). The assessment defined open season discard rates as those occurring on commercial fishing trips with IFQ allocation, while discards from trips without IFQ allocation were considered closed season dead discard rates. For the recreational sector, average depths at which discards occurred for each region (eastern or western Gulf) and season (open or closed) were calculated using self-reported discard data from the iSnapper program and reflected fishing depths, in general, reported by recreational anglers (SEDAR 31 2013). The stock assessment also estimated discard mortality rates before and after the implementation of the circle hook and venting tool requirement in 2008 for both sectors (GMFMC 2007). In August 2013, the Council decided to remove the venting tool requirement due to questions of its efficacy and also allow fishermen to use other methods to minimize barotrauma (e.g., fish descending devices; GMFMC 2013c). Fishermen may still continue to use venting tools.

For the commercial sector, estimates of discard mortality rates are higher compared to the recreational sector (Table 3.3.1) due to gear types and depth fished (GMFMC 2007; SEDAR 7 2005; SEDAR 31 2013). Since the implementation of the red snapper IFQ program, the overall rate of dead discards by the commercial sector has been reduced (GMFMC 2013b). Regardless of whether the recreational red snapper season is open or closed, the recreational discard mortality rates are lower than commercial rates because they fish in shallower depths and typically used hook and line gear (Table 3.3.1).

Table 3.3.1. Average depth fished and estimated discard mortality rates of red snapper by sector during the closed and open seasons in the eastern and western Gulf. The associated discard mortality estimates for the recreational and commercial sector listed are based on use of circle hooks and the venting tool requirement.

Recreational sector		**Commercial handline**		**Commercial bottom longline**	
Open		**Open**		**Open**	
East	West	East	West	East	West
102 ft	105 ft	135 ft	159 ft	186 ft	312 ft
10%	10%	56%	60%	64%	81%
Closed		**Closed**		**Closed**	
East	West	East	West	East	West
99 ft	108 ft	126 ft	252 ft	198 ft	396 ft
10%	10%	55%	74%	66%	88%

Source: Tables 5.1 and 5.2 in SEDAR 31 2013

For the update assessment, the model and methods used were the same as SEDAR 31 except as follows.

1. Because recreational fishermen appear to be selecting for larger and older fish in recent years, a new selectivity timeblock (2011-2013) was added in the model for all recreational fleets to accommodate recent changes in fishing patterns. For the purposes of the red snapper assessment, selectivity is defined as the probability of fish being caught (landed or discarded) by a fishing gear as a function of the age of the fish. This definition incorporates both gear attributes and availability of the stock to the fishery (e.g. if no fish are present < 20cm, the selectivity will be zero < 20cm even if the gear could theoretically catch a fish this small). A retention function is then applied to estimate the proportion of fish that were caught that are subsequently discarded (dead or alive), and dead discards are calculated using a discard mortality rate that, in this case of recreational red snapper, is constant with length and age.

2. The MRIP implemented new data collection methods beginning in March 2013. Due in part to the addition of dockside interviews in late afternoon and evening, which was beyond the time frame previously used, landings data collected under the new methodology appear to be higher than comparable landings in earlier years. An MRIP calibration workshop convened by NMFS in the summer of 2014 developed methods to rescale MRIP estimates from 2004-2012 to account for possible undersampling outside "peak hours". The "rescaled" MRIP (2004-2013) landings were then used in turn to rescale years prior to 2004 as in SEDAR 31. The east and west portions of the stock were modeled separately. The revised recreational landings are generally 10% to 20% higher than in SEDAR 31, and the revised discards show proportionately higher rates than in SEDAR 31.

The results of the 2014 update assessment indicated that overfishing was not occurring and the stock is continuing to rebuild, but it remains overfished. Based on the assessment, the SSC recommended overfishing limits (OFL) and acceptable biological catch (ABC) for the years 2015-2017. The OFL is the resulting yield when the fishing mortality (F) level is set to the rate that maximizes long-term yield (i.e., fishing at F_{MSY}, which results in attainment of the maximum

sustainable yield (MSY)). The ABC was derived by determining a harvest rate ($F_{REBUILD\text{-}26\%\ SPR}$) that would rebuild the stock to a spawning potential ratio (SPR) of 26% of the unfished spawning potential ($B_{26\%SPR}$; a proxy for B_{MSY}) by 2032. To account for uncertainty in the true value of $F_{REBUILD\text{-}26\%\ SPR}$, a probability density function that reflects scientific uncertainty was developed. Based on Tier 1 of the Council's ABC control rule (GMFMC 2011a), a P* (acceptable probability of overfishing) of 0.427 was established to determine ABC for each year.

The original SSC recommendations for red snapper OFL and ABC were based on projections that assumed harvest in 2014 would be the same as in 2013. Provisional landings estimates for 2014 indicated that the recreational 2014 landings were less than in 2013. When the projections were re-run using the provisional 2014 landings, revised OFL and ABC yields were produced. The SSC reviewed the updated analysis at a webinar meeting in February 2015, and approved the revised 2015-2017 OFL and ABC yields[12]. In doing so, they noted three uncertainties in the projections including the final 2014 landings estimates would not be available until later in the year, there were questions about the accuracy of the average weight of recreationally caught fish from Texas (2014 average weights were lower than 2013 average weights), and 2014 discards were assumed to continue at 2013 rates. The original and revised OFLs and ABCs are listed in Table 3.3.2.

Table 3.3.2. SSC projections for red snapper OFL and ABC 2015-2017

Year	Original Projections		Projections with Provisional 2014 Landings	
	OFL	**ABC**	**OFL**	**ABC**
2015	14.73 mp	13.00 mp	16.13 mp	14.30 mp
2016	14.56 mp	13.21 mp	15.32 mp	13.96 mp
2017	14.40 mp	13.32 mp	14.80 mp	13.74 mp

Other analyses tiered off the 2014 update assessment

The SEFSC did additional analyses based on the 2014 update assessment that were requested by the Council and evaluated by the SSC. One analysis reviewed alternative F_{MSY} proxies for the Gulf red snapper stock including fishing mortality rates (Fs) based on several SPRs ($F_{40\%SPR}$ to $F_{20\%SPR}$)[13]. The SSC noted that "Over the long-term, fishing at target SPR levels less than 30% will result in declines in the eastern Gulf stock of red snapper, while in the west the SPR will increase at all SPR levels between 20% and 40%." They also noted that for at SPRs less than 26%, there were short-term increases in ABC; however target SPRs of 20% to 30% tended to converge to similar ABC levels over the long term. In the end, the SSC concluded that there was insufficient biological evidence for a better MSY proxy than what is currently used by the Council (i.e., the yield at 26% SPR).

Another SEFSC analysis reviewed by the SSC at the same meeting was a series of sensitivity runs to evaluate the effect of recalibrated recreational removals and recreational selectivity on

[12] Gulf of Mexico Fishery Management Council Standing and Special Scientific and Statistical Webinar Summary. February 19, 2015.
[13] Gulf of Mexico Fishery Management Council Standing and Special Scientific and Statistical Meeting Summary. May 20, 2015.

OFL and ABC projections. The sensitivity runs consisted of using the update assessment base model with the following projections:

- Project the annual OFLs at $F_{26\%SPR}$ and the ABCs at $F_{REBUILD}$ from 2015-2032 using pre-MRIP recalibrated estimates.
- Project the annual OFLs at $F_{26\%SPR}$ and the ABCs at $F_{REBUILD}$ from 2015-2032 using pre-MRIP recalibrated estimates and no new recreational selectivity block for 2011-2013.

There is some evidence that recreational fishing selectivity in recent years has been shifting toward larger and older red snapper. Therefore, in these runs the model was allowed to re-estimate recreational selectivities in the most recent years (2011-2014). The runs suggested that there are two reasons why higher OFLs and ABCs were projected in the update assessment. The first was the use of the larger MRIP recalibrated estimates of recreational catch and the second was because of the recalibration of recreational selectivity in recent years.

The last analysis conducted by the SEFSC evaluated the effects of changing the commercial:recreational allocation on OFL and ABC yield streams. This analysis was also reviewed by the SSC at their May 20, 2015 meeting. The recreational allocation was adjusted from the current 49% up to 70% and included the recreational allocation of 51.5%, which was the preferred alternative (Alternative 8) at the time the analysis was conducted. The OFL and ABC yields for the directed fisheries presented to the SSC increased with increasing recreational allocation and achieve a Gulf-wide stock rebuilding to 26% SPR by 2032 (Tables 3.3.3 and 3.3.4). However, when looking at the projected regional stock SPRs, the western portion of the Gulf stock continued to increase while the SPR in the eastern Gulf declined (Figure 3.3.1). This decline for the eastern stock was exacerbated by increasing the recreational allocation. At a 70% recreational allocation, the eastern SPR is projected to decrease to 4% of the unfished condition by 2032.

Table 3.3.3. Red snapper overfishing level (OFL) yield streams and equilibrium yield for several allocations of recreational harvest and a target of 26% spawning potential ratio (SPR) by 2032.

OFL (Retained Yield Millions of Pounds Whole Weight)						
YEAR	**Rec 49%**	**Rec 51.5%**	**Rec 55%**	**Rec 60%**	**Rec 65%**	**Rec 70%**
2015	16.10 mp	16.35	16.70	17.19	17.69	18.17
2016	15.31	15.50	15.72	16.06	16.39	16.71
2017	14.79	14.96	15.12	15.38	15.64	15.89
2018	14.25	14.40	14.54	14.77	15.00	15.23
2019	13.60	13.73	13.87	14.09	14.31	14.52
2020	13.17	13.29	13.43	13.65	13.86	14.07
Equil	12.91	13.00	13.11	13.27	13.42	13.57

Table 3.3.4. Red snapper acceptable biological catch (ABC) yield streams and equilibrium yield for several allocations of recreational harvest and a target of 26% spawning potential ratio (SPR) by 2032.

ABC (Retained Yield Millions of Pounds Whole Weight)						
YEAR	**Rec 49%**	**Rec 51.5%**	**Rec 55%**	**Rec 60%**	**Rec 65%**	**Rec 70%**
2015	14.29	14.49	14.76	15.18	15.61	16.05
2016	13.96	14.13	14.31	14.62	14.93	15.24
2017	13.75	13.89	14.04	14.29	14.53	14.78
2018	13.39	13.52	13.65	13.87	14.09	14.32
2019	12.85	12.97	13.10	13.31	13.52	13.73
2020	12.49	12.60	12.73	12.94	13.15	13.35
Equil	12.40	12.48	12.59	12.73	12.87	12.98

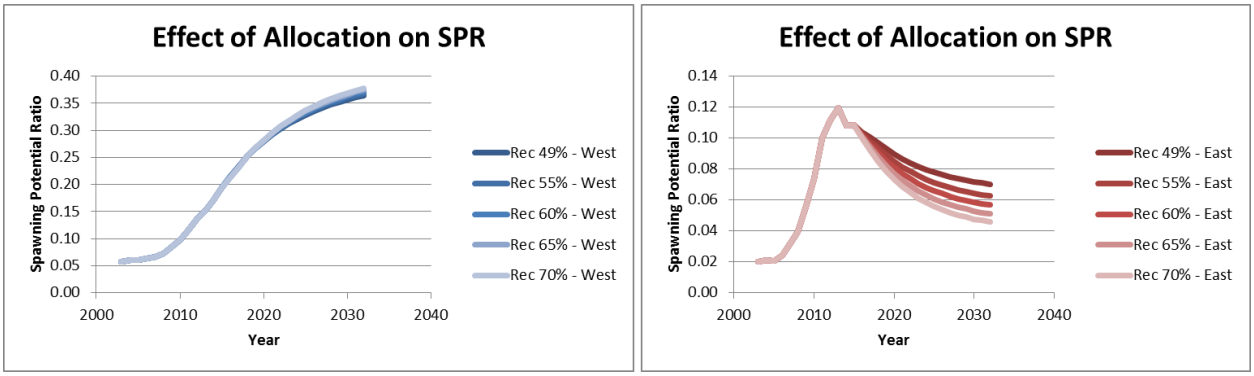

Figure 3.3.1. Regional trends in west and east red snapper spawning potential ratio (SPR) under various recreational allocations. Note that the graphs are drawn to different Y-axis scales.

The SEFSC attributed the differences in SPR changes between the eastern and western stocks to the distribution of the red snapper population and regional fishing effort. Increasing the recreational allocation disproportionately increases the fishing effort in the east (where most recreational fishing occurs) leading to an increased fraction of the population removed in the east as the recreational allocation increases thus leading to a depressed stock size. In addition, the selectivity patterns differ, with the recreational sector in the east selecting larger fish than the commercial sector.

General Information on Reef Fish Species

The National Ocean Service collaborated with NMFS and the Council to develop distributions of reef fish (and other species) in the Gulf (SEA 1998). The National Ocean Service obtained fishery-independent data sets for the Gulf, including SEAMAP, and state trawl surveys. Data from the Estuarine Living Marine Resources Program contain information on the relative abundance of specific species (highly abundant, abundant, common, rare, not found, and no data) for a series of estuaries, by five life stages (adult, spawning, egg, larvae, and juvenile) and month for five seasonal salinity zones (0-0.5, 0.5-5, 5-15, 15-25, and >25 parts per thousand). National Ocean Service staff analyzed these data to determine relative abundance of the mapped species by estuary, salinity zone, and month. For some species not in the Estuarine Living Marine Resources Program database, distribution was classified as only observed or not observed for adult, juvenile, and spawning stages.

In general, reef fish are widely distributed in the Gulf, occupying both pelagic and benthic habitats during their life cycle. Habitat types and life history stages are summarized in Appendix C and can be found in more detail in GMFMC (2004a). In general, both eggs and larval stages are planktonic. Larvae feed on zooplankton and phytoplankton. Exceptions to these generalizations include the gray triggerfish that lay their eggs in depressions in the sandy bottom, and gray snapper whose larvae are found around submerged aquatic vegetation. Juvenile and adult reef fish are typically demersal, and are usually associated with bottom topographies on the continental shelf (<328 feet; <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. Juvenile red snapper are common on mud bottoms in the northern Gulf, particularly from Texas to Alabama. Also, some juvenile snappers (e.g. mutton, gray, red, dog, lane, and yellowtail snappers) and groupers (e.g. goliath grouper, red, gag, and yellowfin groupers) have been documented in inshore seagrass beds, mangrove estuaries, lagoons, and larger bay systems (GMFMC 1981). More detail on hard bottom substrate and coral can be found in the Fishery Management Plan (FMP) for Corals and Coral Reefs (GMFMC and SAFMC 1982).

Many of these species co-occur with red snapper and can be incidentally caught during red snapper fishing. In some cases, these fish may be discarded for regulatory reasons and thus are considered bycatch. Appendix D (bycatch practicability analysis) examines the effects of fishing on these species. In general, this analysis coupled with previous analyses has found that reducing bycatch provides biological benefits to managed species as well as benefits to the fishery through less waste, higher yields, and less forgone yield. However, in some cases, actions are approved that can increase bycatch through regulatory discards such as increased minimum sizes and closed seasons. In these cases, there is some biological benefit to the managed species that outweighs any increases in discards.

Status of Reef Fish Stocks

The Reef Fish FMP currently encompasses 31 species (Table 3.3.2). Eleven other species were removed from the FMP in 2012 through the Generic ACL/AM Amendment (GMFMC 2011a). Stock assessments and stock assessment reviews have been conducted for 13 species and can be found on the Council (www.gulfcouncil.org) and SEDAR (www.sefsc.noaa.gov/sedar) websites. The assessed species are:

- Red Snapper (SEDAR 7 2005; SEDAR 7 Update 2009; SEDAR 31 2013; SEDAR 31 Update 2015)
- Vermilion Snapper (Porch and Cass-Calay 2001; SEDAR 9 2006c; SEDAR 9 Update 2011a)
- Yellowtail Snapper (Muller et al. 2003; SEDAR 3 2003; O'Hop et al. 2012)
- Mutton Snapper (SEDAR 15A 2008)
- Gray Triggerfish (Valle et al. 2001; SEDAR 9 2006a; SEDAR 9 Update 2011b)
- Greater Amberjack (Turner et al. 2000; SEDAR 9 2006b; SEDAR 9 Update 2010; SEDAR 33 2014a)
- Hogfish (Ault et al. 2003; SEDAR 6 2004b; Cooper et al. 2013)
- Red Grouper (NMFS 2002; SEDAR 12 2007; SEDAR 12 Update 2009)

- Gag (Turner et al. 2001; SEDAR 10 2006; SEDAR 10 Update 2009; SEDAR 33 2014b)
- Black Grouper (SEDAR 19 2010)
- Yellowedge Grouper (Cass-Calay and Bahnick 2002; SEDAR 22 2011b)
- Tilefish (Golden) (SEDAR 22 2011a)
- Atlantic Goliath Grouper (Porch et al. 2003; SEDAR 6 2004a; SEDAR 23 2011)

The NMFS Office of Sustainable Fisheries updates its Status of U.S. Fisheries Report to Congress on a quarterly basis utilizing the most current stock assessment information. The most recent update can be found at: http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/. The status of both assessed and unassessed stocks as of the writing of this report is shown in Table 3.3.2.

Table 3.3.2. Species of the Reef Fish FMP grouped by family.

Common Name	Scientific Name	Stock Status
Family Balistidae – Triggerfishes		
Gray Triggerfish	*Balistes capriscus*	Overfished, overfishing
Family Carangidae – Jacks		
Greater Amberjack	*Seriola dumerili*	Overfished, overfishing
Lesser Amberjack	*Seriola fasciata*	Unknown
Almaco Jack	*Seriola rivoliana*	Unknown
Banded Rudderfish	*Seriola zonata*	Unknown
Family Labridae - Wrasses		
Hogfish	*Lachnolaimus maximus*	Unknown, overfishing
Family Malacanthidae - Tilefishes		
Tilefish (Golden)	*Lopholatilus chamaeleonticeps*	Not overfished, no overfishing
Blueline Tilefish	*Caulolatilus microps*	Unknown
Goldface Tilefish	*Caulolatilus chrysops*	Unknown
Family Serranidae - Groupers		
Gag	*Mycteroperca microlepis*	Not overfished, no overfishing
Red Grouper	*Epinephelus morio*	Not overfished, no overfishing
Scamp	*Mycteroperca phenax*	Unknown
Black Grouper	*Mycteroperca bonaci*	Not overfished, no overfishing
Yellowedge Grouper	**Hyporthodus flavolimbatus*	Not overfished, no overfishing
Snowy Grouper	**Hyporthodus niveatus*	Unknown
Speckled Hind	*Epinephelus drummondhayi*	Unknown
Yellowmouth Grouper	*Mycteroperca interstitialis*	Unknown
Yellowfin Grouper	*Mycteroperca venenosa*	Unknown
Warsaw Grouper	**Hyporthodus nigritus*	Unknown
**Atlantic Goliath Grouper	*Epinephelus itajara*	Unknown
Family Lutjanidae - Snappers		
Queen Snapper	*Etelis oculatus*	Unknown
Mutton Snapper	*Lutjanus analis*	Not overfished, no overfishing
Blackfin Snapper	*Lutjanus buccanella*	Unknown
Red Snapper	*Lutjanus campechanus*	Overfished, no overfishing
Cubera Snapper	*Lutjanus cyanopterus*	Unknown, no overfishing
Gray Snapper	*Lutjanus griseus*	Unknown, no overfishing
Lane Snapper	*Lutjanus synagris*	Unknown, no overfishing
Silk Snapper	*Lutjanus vivanus*	Unknown
Yellowtail Snapper	*Ocyurus chrysurus*	Not overfished, no overfishing
Vermilion Snapper	*Rhomboplites aurorubens*	Not overfished, no overfishing
Wenchman	*Pristipomoides aquilonaris*	Unknown

Notes: * In 2013 the genus for yellowedge grouper, snowy grouper, and warsaw grouper was changed by the American Fisheries Society from *Epinephelus* to *Hyporthodus* (American Fisheries Society 2013).

**Atlantic goliath grouper is a protected grouper and benchmarks do not reflect appropriate stock dynamics. In 2013 the common name was changed from goliath grouper to Atlantic goliath grouper by the American Fisheries Society to differentiate from the Pacific goliath grouper, a newly named species (American Fisheries Society 2013).

Protected Species

There are 40 species protected by federal law that may occur in the Gulf. Thirty-nine of these are under the jurisdiction of NMFS, while the West Indian manatee (*Trichechus manatus*) is managed by the U.S. Fish and Wildlife Service. Of the species under NMFS's jurisdiction, 27 are marine mammals that are protected under the Marine Mammal Protection Act (MMPA). The MMPA requires that each commercial fishery be classified by the number of marine mammals they seriously injure or kill. NMFS's List of Fisheries (LOF) classifies U.S. commercial fisheries into three categories based on the number of incidental mortality or serious injury they cause to marine mammals. More information about the LOF and the classification process can be found at: http://www.nmfs.noaa.gov/pr/interactions/lof/. Five of these marine mammal species are also listed as endangered under the Endangered Species Act (ESA) (i.e., sperm, sei, fin, blue, and humpback). In addition to those five marine mammals, five sea turtle species (Kemp's ridley, loggerhead, green, leatherback, and hawksbill), two fish species (Gulf sturgeon and smalltooth sawfish), and five coral species (elkhorn, staghorn, lobed star, mountainous star, and boulder star) are also protected under the ESA. Designated critical habitat for smalltooth sawfish, Gulf sturgeon, and the Northwest Atlantic Ocean distinct population segment of loggerhead sea turtles also occur within nearshore waters of the Gulf, though only loggerhead critical habitat occurs in federal waters.

NMFS has conducted specific analyses ("Section 7 consultations") to evaluate potential effects from the Gulf reef fish fishery on species and critical habitats protected under the ESA. On September 30, 2011, the Protected Resources Division released a biological opinion (Opinion), which concluded that the continued operation of the Gulf reef fish fishery is not likely to jeopardize the continued existence of sea turtles (loggerhead, Kemp's ridley, green, hawksbill, and leatherback) or smalltooth sawfish (NMFS 2011a). The Opinion also concluded that other ESA-listed species are not likely to be adversely affected by the FMP. 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. The Council addressed further measures to reduce take in the reef fish fishery's longline component in Amendment 31 (GMFMC 2009).

Subsequent to the completion of the biological opinion, NMFS published final rules listing 20 new coral species (September 10, 2014), and designating critical habitat for the Northwest Atlantic Ocean distinct population segment of loggerhead sea turtles (July 10, 2014). NMFS addressed these changes in a series of consultation memoranda. In consultation memoranda dated September 16, 2014, and October 7, 2014, NMFS assessed the continued operation of the Gulf reef fish fishery's potential impact on the newly-listed coral species occurring in the Gulf (3 species of *Orbicella* and *Mycetophyllia ferox*) and concluded the fishery is not likely to adversely affect any of the protected coral species. Similarly, in consultation memoranda dated September 16, 2014, NMFS assessed the continued authorization of South Atlantic and Gulf of Mexico fisheries' potential impacts on loggerhead critical habitat and concluded the Gulf reef fish fishery is not likely to adversely affect the newly designated critical habitat. The effects of reef fish fishing on these species is further considered in a bycatch practicability analysis in Appendix D.

Marine Mammals
The gear used by the Gulf reef fish fishery is classified in the Marine Mammal Protection Act 2015 List of Fisheries as a Category III fishery (79 FR 77919). This classification indicates the annual mortality and serious injury of a marine mammal stock resulting from any fishery is less than or equal to 1% of the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. Dolphins are the only species documented as interacting with these fisheries. Bottlenose dolphins prey upon on the bait, catch, and/or released discards of fish from the reef fish fishery. They are also a common predator around reef fish vessels, feeding on the discards. Marine Mammal Stock Assessment Reports and additional information are available on the NMFS Office of Protected Species website: http://www.nmfs.noaa.gov/pr/sspecies/.

Turtles
Green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles are all highly migratory and travel widely throughout the Gulf. The following sections are a brief overview of the general life history characteristics of the sea turtles found in the Gulf region. Several volumes exist that cover the biology and ecology of these species more thoroughly (i.e., Lutz and Musick (eds.) 1997, Lutz et al. (eds.) 2003).

Green sea turtle hatchlings are thought to occupy pelagic areas of the open ocean and are often associated with *Sargassum* rafts (Carr 1987, Walker 1994). Pelagic stage green sea turtles are thought to be carnivorous. Stomach samples of these animals found ctenophores and pelagic snails (Frick 1976, Hughes 1974). At approximately 20 to 25 cm carapace length, juveniles migrate from pelagic habitats to benthic foraging areas (Bjorndal 1997). As juveniles move into benthic foraging areas a diet shift towards herbivory occurs. They consume primarily seagrasses and algae, but are also know to consume jellyfish, salps, and sponges (Bjorndal 1980, 1997; Paredes 1969; Mortimer 1981, 1982). The diving abilities of all sea turtles species vary by their life stages. The maximum diving range of green sea turtles is estimated at 110 m (360 ft) (Frick 1976), but they are most frequently making dives of less than 20 m (65 ft.) (Walker 1994). The time of these dives also varies by life stage. The maximum dive length is estimated at 66 minutes with most dives lasting from 9 to 23 minutes (Walker 1994).

The **hawksbill's** pelagic stage lasts from the time they leave the nesting beach as hatchlings until they are approximately 22-25 cm in straight carapace length (Meylan 1988, Meylan and Donnelly 1999). The pelagic stage is followed by residency in developmental habitats (foraging areas where juveniles reside and grow) in coastal waters. Little is known about the diet of pelagic stage hawksbills. Adult foraging typically occurs over coral reefs, although other hard-bottom communities and mangrove-fringed areas are occupied occasionally. Hawksbills show fidelity to their foraging areas over several years (van Dam and Diéz 1998). The hawksbill's diet is highly specialized and consists primarily of sponges (Meylan 1988). Gravid females have been noted ingesting coralline substrate (Meylan 1984) and calcareous algae (Anderes Alvarez and Uchida 1994), which are believed to be possible sources of calcium to aid in eggshell production. The maximum diving depths of these animals are not known, but the maximum length of dives is estimated at 73.5 minutes. More routinely, dives last about 56 minutes (Hughes 1974).

Kemp's ridley hatchlings are also pelagic during the early stages of life and feed in surface waters (Carr 1987, Ogren 1989). Once the juveniles reach approximately 20 cm carapace length they move to relatively shallow (less than 50m) benthic foraging habitat over unconsolidated substrates (Márquez-M. 1994). They have also been observed transiting long distances between foraging habitats (Ogren 1989). Kemp's ridleys feeding in these nearshore areas primarily prey on crabs, though they are also known to ingest mollusks, fish, marine vegetation, and shrimp (Shaver 1991). The fish and shrimp Kemp's ridleys ingest are not thought to be a primary prey item but instead may be scavenged opportunistically from bycatch discards or from discarded bait (Shaver 1991). Given their predilection for shallower water, Kemp's ridleys most routinely make dives of 50 m or less (Soma 1985, Byles 1988). Their maximum diving range is unknown. Depending on the life stage a Kemp's ridleys may be able to stay submerged anywhere from 167 minutes to 300 minutes, though dives of 12.7 minutes to 16.7 minutes are much more common (Soma 1985, Mendonca and Pritchard 1986, Byles 1988). Kemp's ridleys may also spend as much as 96% of their time underwater (Soma 1985, Byles 1988).

Leatherbacks are the most pelagic of all ESA-listed sea turtles and spend most of their time in the open ocean. Although they will enter coastal waters and are seen over the continental shelf on a seasonal basis to feed in areas where jellyfish are concentrated. Leatherbacks feed primarily on cnidarians (medusae, siphonophores) and tunicates. Unlike other sea turtles, leatherbacks' diets do not shift during their life cycles. Because leatherbacks' ability to capture and eat jellyfish is not constrained by size or age, they continue to feed on these species regardless of life stage (Bjorndal 1997). Leatherbacks are the deepest diving of all sea turtles. It is estimated that these species can dive in excess of 1000 m (Eckert et al. 1989) but more frequently dive to depths of 50 m to 84 m (Eckert et al. 1986). Dive times range from a maximum of 37 minutes to more routines dives of 4 to 14.5 minutes (Standora et al. 1984, Eckert et al. 1986, Eckert et al. 1989, Keinath and Musick 1993). Leatherbacks may spend 74% to 91% of their time submerged (Standora et al. 1984).

Loggerhead hatchlings forage in the open ocean and are often associated with *Sargassum* rafts (Hughes 1974, Carr 1987, Walker 1994, Bolten and Balazs 1995). The pelagic stage of these sea turtles are known to eat a wide range of things including salps, jellyfish, amphipods, crabs, syngnathid fish, squid, and pelagic snails (Brongersma 1972). Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm straight-line carapace length they begin to live in coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic (Witzell 2002). Here they forage over hard- and soft-bottom habitats (Carr 1986). Benthic foraging loggerheads eat a variety of invertebrates with crabs and mollusks being an important prey source (Burke et al. 1993). Estimates of the maximum diving depths of loggerheads range from 211 m to 233 m (692-764ft.) (Thayer et al. 1984, Limpus and Nichols 1988). The lengths of loggerhead dives are frequently between 17 and 30 minutes (Thayer et al. 1984, Limpus and Nichols 1988, Limpus and Nichols 1994, Lanyon et al. 1989) and they may spend anywhere from 80 to 94% of their time submerged (Limpus and Nichols 1994, Lanyon et al. 1989).

All five species of sea turtles are adversely affected by the Gulf reef fish fishery. Incidental captures are relatively infrequent, but occur in all commercial and recreational hook-and-line and longline components of the reef fish fishery. Captured sea turtles can be released alive or can be

found dead upon retrieval of the gear as a result of forced submergence. Sea turtles released alive may later succumb to injuries sustained at the time of capture or from exacerbated trauma from fishing hooks or lines that were ingested, entangled, or otherwise still attached when they were released. Sea turtle release gear and handling protocols are required in the commercial and for-hire reef fish fisheries to minimize post-release mortality.

Fish

Historically the **smalltooth sawfish** in the U.S. ranged from New York to the Mexico border. Their current range is poorly understood but believed to have contracted from these historical areas. In the South Atlantic region, they are most commonly found in Florida, primarily off the Florida Keys (Simpfendorfer and Wiley 2004). Only two smalltooth sawfish have been recorded north of Florida since 1963 (the first was captured off North Carolina in 1963 and the other off Georgia in 2002 (National Smalltooth Sawfish Database, Florida Museum of Natural History)). Historical accounts and recent encounter data suggest that immature individuals are most common in shallow coastal waters less than 25 meters (Bigelow and Schroeder 1953, Adams and Wilson 1995), while mature animals occur in waters in excess of 100 meters (Simpfendorfer pers. comm. 2006). Smalltooth sawfish feed primarily on fish. Mullet, jacks, and ladyfish are believed to be their primary food resources (Simpfendorfer 2001). Smalltooth sawfish also prey on crustaceans (mostly shrimp and crabs) by disturbing bottom sediment with their saw (Norman and Fraser 1938, Bigelow and Schroeder 1953).

Smalltooth sawfish are also adversely affected by the Gulf reef fish fishery, but to a much lesser extent. Smalltooth sawfish primarily occur in the Gulf off peninsular Florida. Incidental captures in the commercial and recreational hook-and-line components of the reef fish fishery are rare events, with only eight smalltooth sawfish estimated to be incidentally caught annually, and none are expected to result in mortality (NMFS 2005). Fishermen in this fishery are required to follow smalltooth sawfish safe handling guidelines. The long, toothed rostrum of the smalltooth sawfish causes this species to be particularly vulnerable to entanglement in fishing gear.

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 (see http://www.gulfhypoxia.net/). 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 2014, the extent of the hypoxic area was estimated to be 5,052 square miles and is similar the running average for over the past five years of 5,543 square miles Gulf (see http://www.gulfhypoxia.net/).

The hypoxic conditions in the northern Gulf directly impact 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) are able to detect lower dissolved oxygen levels and move away from hypoxic conditions. Therefore, these organisms are indirectly effect by limiting prey

availability and constraining available habitat (Baustian and Rabalais 2009, Craig 2012). For red snapper, Courtney et al. (2013) have conjectured that the hypoxic zone could have an indirect positive effect on red snapper populations in the western Gulf. They theorize that increased nutrient loading may be working in 'synergy' with abundant red snapper artificial habitats (oil platforms). Nutrient loading likely increases forage species biomass and productivity providing ample prey for red snapper residing on the oil rigs, thus increasing red snapper productivity.

Climate change

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. NOAA's Climate Change Web Portal (http://www.esrl.noaa.gov/psd/ipcc/ocn/) indicates the average sea surface temperature in the Gulf will increase by 1.2-1.4ºC for 2006-2055 compared to the average over the years 1956-2005. 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. Although there has been little change in latitudinal distribution of red snapper from 1985-2013, the OceanAdapt model (http://oceanadapt.rutgers.edu/regional_data/) shows a distributional trend towards deeper water later in the model's1985-2013 time series. This could be a response by red snapper to environmental factors such as increases in temperature.

The distribution of native and exotic species may change with increased water temperature, as may the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms. Hollowed et al. (2013) provided a review of projected effects of climate change on the marine fisheries and dependent communities. Integrating the potential effects of climate change into the fisheries assessment is currently difficult due to the time scale differences (Hollowed et al. 2013). The fisheries stock assessments rarely project through a time span that would include detectable climate change effects.

Deepwater Horizon MC252 Oil Spill

On April 20, 2010 an explosion occurred on the Deepwater Horizon MC252 oil rig approximately 36 nautical miles (41 statute miles) off the Louisiana coast. Two days later the rig sank. An uncontrolled oil leak from the damaged well continued for 87 days until the well was successfully capped by British Petroleum on July 15, 2010. The Deepwater Horizon MC252 oil spill affected at least one-third of the Gulf area from western Louisiana east to the Florida Panhandle and south to the Campeche Bank in Mexico (Figure 3.3.2).

As reported by the National Oceanic and Atmospheric Administration Office of Response and Restoration (NOAA 2010), the oil from the Deepwater Horizon MC252 spill is relatively high in alkanes, which can readily be used by microorganisms as a food source. As a result, the oil from this spill is likely to biodegrade more readily than crude oil in general. The Deepwater Horizon

MC252 oil is also relatively much lower in polyaromatic hydrocarbons. Polyaromatic hydrocarbons are highly toxic chemicals that tend to persist in the environment for long periods of time, especially if the spilled oil penetrates into the substrate on beaches or shorelines. Like all crude oils, MC252 oil contains volatile organic compounds (VOCs) such as benzene, toluene, and xylene. Some VOCs are acutely toxic but because they evaporate readily, they are generally a concern only when oil is fresh.[14]

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 well head (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. However, a study found that, while Corexit 9500A® and oil are similar in their toxicity, when Corexit 9500A® and oil were mixed in lab tests, toxicity to microscopic rotifers increased up to 52-fold (Rico-Martínez et al. 2013). This suggests that the toxicity of the oil and dispersant combined may be greater than anticipated.

Oil could exacerbate development of the hypoxic "dead" zone in the Gulf as could higher than normal input of water from the Mississippi River drainage. For example, oil on the surface of the water could restrict the normal process of atmospheric oxygen mixing into and replenishing oxygen concentrations in the water column. In addition, microbes in the water that break down oil and dispersant also consume oxygen; this could lead to further oxygen depletion.

Changes have occurred in the amount and distribution of fishing effort in the Gulf in response to the oil spill. This has made the analysis of the number of days needed for the recreational sector to fill its quota more complex and uncertain, and will make the requirement to allow the recreational sector to harvest its quota of red snapper while not exceeding the quota particularly challenging. Nevertheless, substantial portions of the red snapper population are found in the northwestern and western Gulf (western Louisiana and Texas) and an increasing population of red snapper is developing off the west Florida continental shelf. Thus, spawning by this segment of the stock may not be impacted, which would mitigate the overall impact of a failed spawn by that portion of the stock located in oil-affected areas. An increase in lesions were found in red snapper in the area affected by the oil, but Murowski et al. (2014) found that the incidence of lesions had declined between 2011 and 2012. The 2013 stock assessment for red snapper (SEDAR 31, 2013) showed a steep decline in the 2010 recruitment; however, the recruitment increased in 2011 and 2012.

As a result of the Deepwater Horizon MC252 spill, a consultation pursuant to ESA Section 7(a)(2) was reinitiated. As discussed above, on September 30, 2011, the Protected Resources Division released a biological opinion, which after analyzing best available data, the current status of the species, environmental baseline (including the impacts of the recent Deepwater Horizon MC252 oil release event in the northern Gulf), effects of the proposed action, and cumulative effects, concluded that the continued operation of the Gulf reef fish fishery is not likely to jeopardize the continued existence of green, hawksbill, Kemp's ridley, leatherback, or loggerhead sea turtles, nor the continued existence of smalltooth sawfish (NMFS 2011a).

[14] Source: http://sero.nmfs.noaa.gov/sf/deepwater_horizon/OilCharacteristics.pdf

For additional information on the Deepwater Horizon MC252 oil spill and associated closures, see:
http://sero.nmfs.noaa.gov/deepwater_horizon_oil_spill.htm.

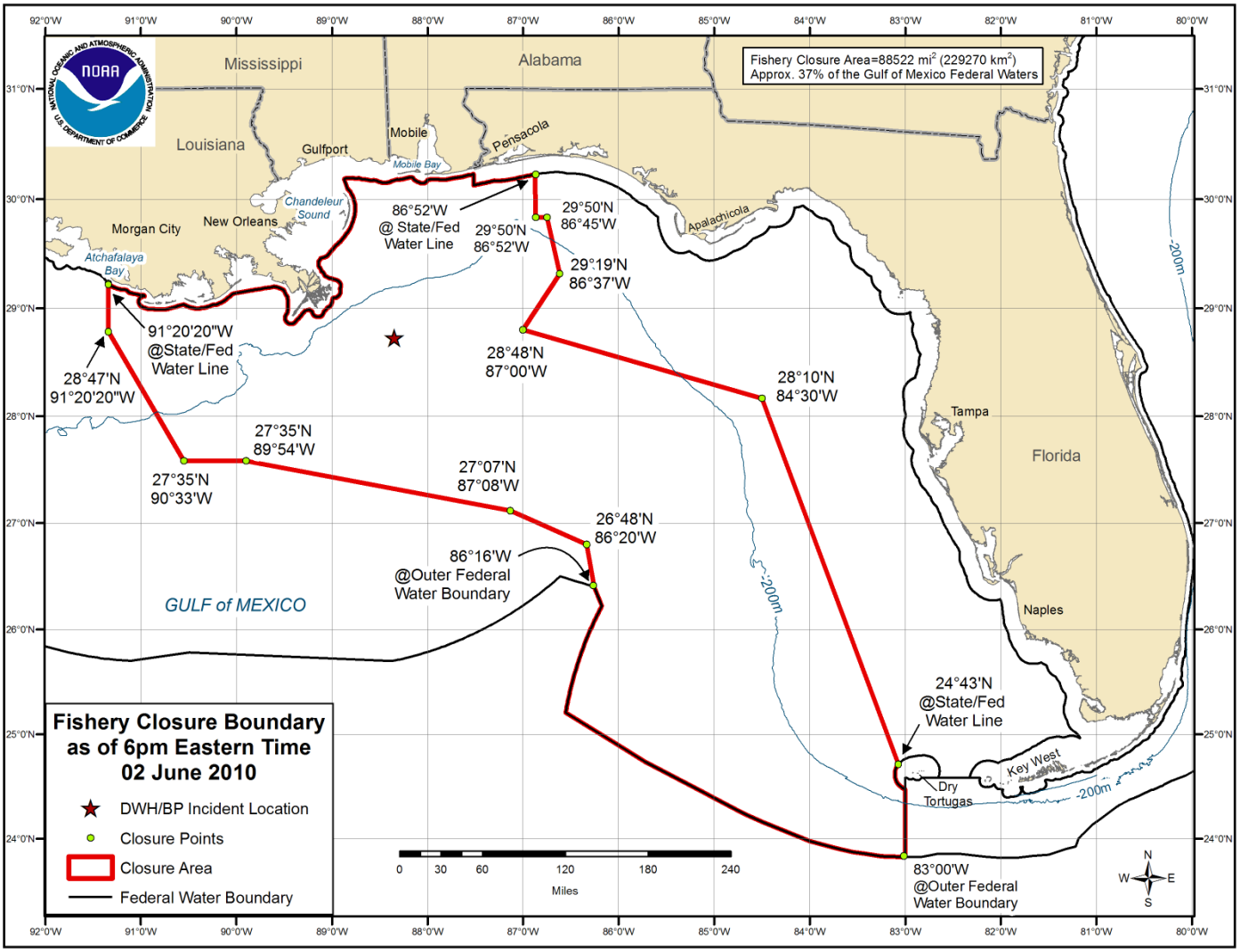

Figure 3.3.2. Fishery closure at the height of the Deepwater Horizon MC252 oil spill.

3.4 Description of the Social Environment

This section provides the conceptual and historical background for the proposed action which will be evaluated in Chapter 4.

Allocation is a social issue of assigning access to a scarce resource. Allocating between sectors is difficult to determine because the "characteristics, motivations, and output measures for participants differ dramatically" (Gislason 2006). Reallocation is inherently controversial when the result will benefit some and be detrimental to others. When considering allocations of fishing privileges, the Magnuson-Stevens Act requires fishery managers to examine social and economic factors as laid out in the National Standards. These include National Standard 4 which states if it becomes necessary to allocate fishing privileges among fishermen, the allocation will be fair and equitable, will promote conservation, and be carried out such that no particular entity receives an excessive share; National Standard 5 which states conservation and management measures will consider efficiency in the utilization of fishery resources except that no such measure will have economic allocation as its sole purpose; and National Standard 8 which states that conservation and management measures shall take into account the importance of fishery resources to fishing communities.

NMFS' technical memorandum on the principles and practice of allocation (Plummer et al. 2012) identifies two main criteria for the national standard mandates. Each criterion is based on a conceptual approach from distinct social sciences: economic efficiency and social equity. While a quantitative framework exists for analyzing economic efficiency, there is no such quantitative framework for evaluating fairness and equity (Plummer et al. 2012).

Plummer et al.'s (2012) review of approaches to evaluate fairness focuses on critiques of the application of efficiency analyses to policy. Specifically, efficiency is critiqued for the decision to ignore issues of equity by reducing such social concerns to assumptions of "other things being equal" (Dietz and Atkinson 2010, Copes 1997, Bromley 1977), when in fact, they are not. Assuming "other things being equal," as used in efficiency analyses, may omit consideration of interdependencies that may be important for their distributional effects (Copes 1997:65). That other things are *not* equal, precisely reflects those components of the human environment that are at the center of equity considerations. Further, from the social perspective, willingness-to-pay studies measure perceptions and ideology of respondents more than actual behavior (Hausman 2012), overestimating any potential net benefits.

Although efficiency and fairness are often presented as a trade-off in environmental policy, research has shown that the public does not support prioritizing efficiency at the expense of equity (Dietz and Atkinson 2010:440), and that allocation fairness in the distribution of fishing rights is just as important as efficiency for making policy decisions (Bromley 1977). Ultimately, it is not possible to determine the expected net economic outcome resulting from the proposed sector reallocations, because inferences about economic efficiency are erroneous when each sector's quota is not efficiently allocated within the sector (Section 4.1.4

According to a review of all allocation decisions made by regional fishery management councils around the country (Plummer et al. 2012), nearly all allocation decisions have been based on

historical or current landings ratios. Following initial establishment of a sector allocation, seven stocks were identified as having undergone a revision to the original allocation; five of these examples are in the Gulf. One, vermilion snapper, had its sector allocation removed entirely. Of the remaining four Gulf examples, two stocks had their allocations shifted in favor of the recreational sector: greater amberjack (Amendment 30A, GMFMC 2008a) and red grouper (Amendment 30B, GMFMC 2008b). However, in both cases, an interim allocation was adopted and the selection of a new allocation was postponed until after the Council developed an allocation policy.

For greater amberjack, the action addressing sector allocation was moved to the considered but rejected section of the amendment; no reallocation was formally adopted. An interim allocation was agreed upon and the Council selected other management measures to reduce fishing effort by both sectors. For red grouper, the initial allocation decision in Amendment 1 (GMFMC 1989) set an aggregate grouper sector allocation, but did not establish allocations for individual grouper species. In 2004, a commercial red grouper quota was created, but the amendment specifically stated that no allocation decision was being made; the commercial quota represented 81% of the total allowable catch (GMFMC 2004b). As with greater amberjack, in 2008, the Council agreed upon an interim sector allocation and delayed further action until the Council could develop an allocation policy and consider the issue further. Thus, the two actions affected the distribution of access to the resource while postponing the formal establishment of a new sector allocation.

The other two Gulf examples concern species for which management is shared between the Gulf and South Atlantic Councils: king and Spanish mackerel. Since it was first established in 1987, the allocation for the Atlantic stock of Spanish mackerel has been changed twice, once toward the recreational sector and once toward the commercial sector. Initially established at 76% commercial and 24% recreational, the allocation was changed in 1989 to 50%:50%, due to a determination that the allocation was based on a time period of overfishing and low recreational participation. In 1998, the commercial allocation was increased because the recreational sector was not harvesting its quota. The 2% change in the king mackerel allocation towards the commercial sector was an adjustment to account for the sale of recreational catches that counted against the commercial quota. The allocations of both these species are scheduled to be reviewed in Coastal Migratory Pelagics Amendment 24, currently under development.

Finally, the remaining two cases come from the Pacific Fishery Management Council's management of salmon, Amendments 7 (PFMC 1986) and 9 (PFMC 1988). In contrast to nearly all allocation decisions that have been based on landings ratios, the rationale for these two cases was to provide more stability to the recreational sector. For both stocks, the recreational component is a directed fishery while the commercial component is provided for bycatch. In both examples, the reallocation was based on the recommendations from a working group of commercial and recreational fishermen and is an example of negotiation-based allocation. Also in this case, the sector allocations shift depending on the size of the quota, similar in design to Alternatives 5 and 6 in this amendment.

Context of red snapper management in the Gulf

In the Gulf, the commercial and recreational sectors are managed differently and separately. The existing allocation for red snapper was implemented in 1990 alongside the establishment of a total allowable catch, and corresponding management measures intended to reduce landings by 20% for each sector (GMFMC 1989). Thus, at the time the allocation was established, there was already great demand for red snapper by both sectors. Since that time, the number of both recreational anglers and seafood consumers has increased, along with the volume of tourists and participation of other stakeholder groups in fishery management. The issue of reallocating red snapper is driven by competing visions of who should have access privileges to the resource: recreational, commercial, and/or others.

A minimum size limit of 13" was adopted for both sectors, alongside a recreational bag limit of 7 fish per angler per day, and a commercial quota of 3.1 mp. Since then, both sectors have been subject to additional measures to reduce harvests and effort (Figure 3.4.1) which have been insufficient to restrict harvests before reaching the quota for either sector (Figure 3.4.2).

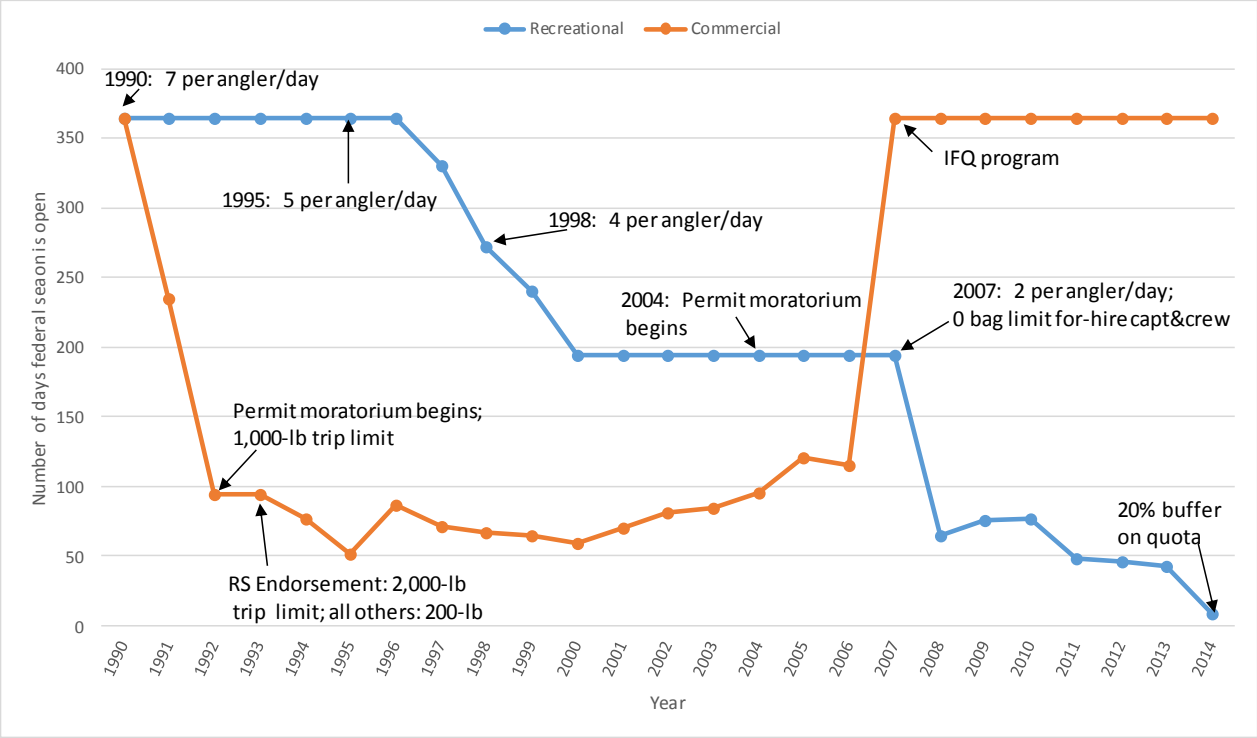

Figure 3.4.1. Length of fishing season in federal waters for commercial and recreational sectors (1990-2014), with changes in bag limits, trip limits, and implementation dates of limited access regulations. The timeline does not include minimum size limits or additional requirements such as use of a vessel monitoring system.

For the **commercial sector**, the year the allocation was established (1990) was the last year commercial fishing was open year round until implementation of the IFQ program in 2007 (Figure 3.4.1). Entry to the commercial sector was capped in 1992, when the commercial reef fish permit moratorium began. No additional commercial permits have been available since that

time, effectively capping sector participation. The following year, the system of red snapper endorsements for commercial permit holders was adopted. A red snapper endorsement allowed the holder a 2,000-lb trip limit, while all other commercial permit holders were allowed a 200-lb trip limit.

Despite the adoption of endorsements and trip limits to constrain harvests, from the early 1990's until implementation of the IFQ program, the commercial fishing seasons were best described as "derbies," where vessels raced to fish before each harvest closure. During this time, the commercial harvest was usually open only 10 days at a time. The IFQ program was implemented in 2007 to address two identified problems in commercial red snapper fishing: the derby fishing conditions and "overcapacity" in the commercial sector.

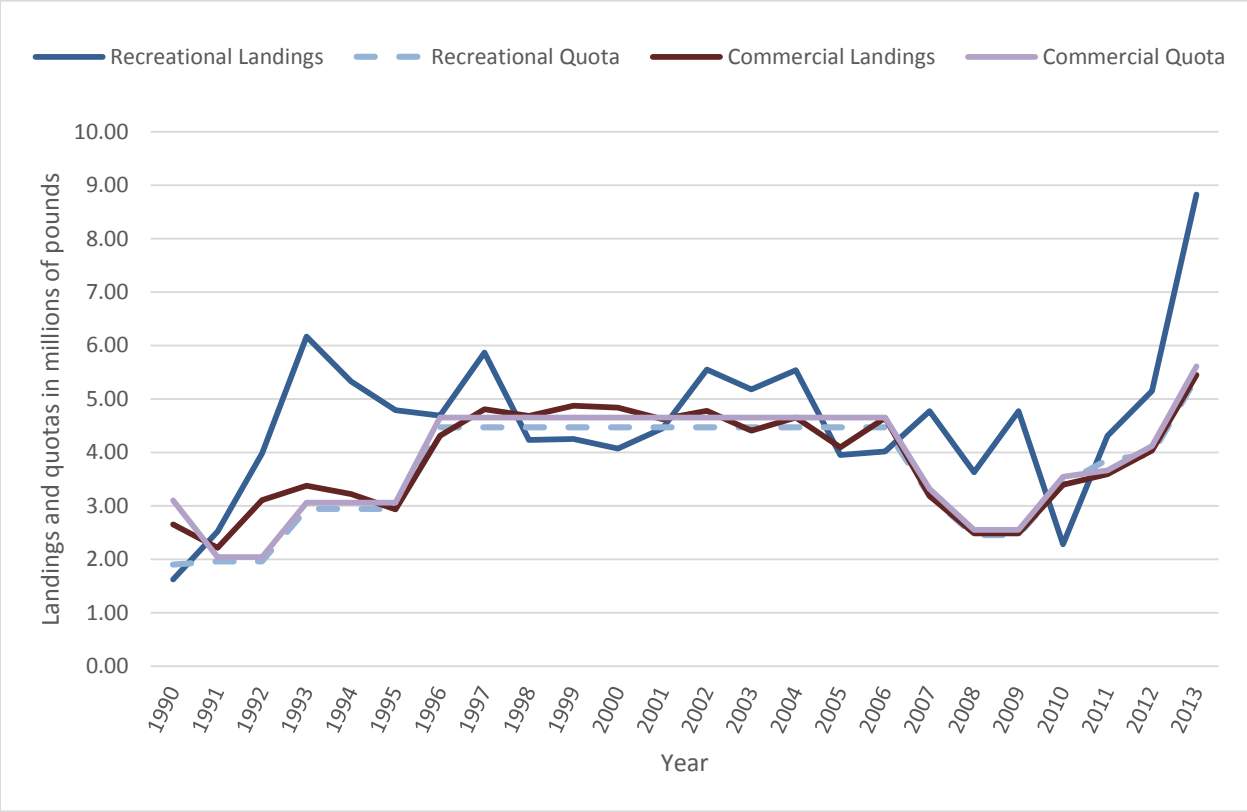

Figure 3.4.2. Recreational and commercial landings (solid lines) and quotas (dotted lines).

The IFQ program fundamentally restructured commercial fishing for red snapper. The opportunity for any permitted commercial vessel to harvest a trip limit of red snapper during a short open season was replaced by a system in which a reef fish permit holder must obtain allocation prior to landing red snapper. Thus, the system of attempting to constrain commercial harvest to a quota using trip limits and closed seasons was replaced by a system based on the distribution and exchange of portions of the red snapper commercial quota. This has effectively eliminated the occurrence of quota overages. From the sector-wide perspective, this has enabled the fishing season to remain open year round and for total landings to remain within the quota.

The implementation of the IFQ program has resolved both issues of subtractability and excludability, within the sector (see below). Though these controls appear to have improved the problems they were designed to address, the program has benefited some fishermen and been a detriment to others.

Although the **recreational sector** is often described as "open access," open entry is more accurate as a true open access resource lacks rules of usage (Feeny et al. 1990). For the recreational sector, harvest constraints are implemented primarily by reductions to the bag limit and shortening of the fishing season. The bag limit has been reduced from seven red snapper per angler per day in 1990 (when the sector allocation was established), to five fish in 1995, four fish in 1998, and two fish in 2007 (Figure 3.4.1). In 1997, the recreational season in federal waters was shortened for the first time from year round and has been getting shorter ever since. From 2008 through 2012, the recreational season in federal waters averaged 62 days in length. In 2014, the season lasted nine days in federal waters; additional fishing opportunities were provided by the Gulf States in respective state territorial waters.

The practice in recent years of projecting season length for a given quota based on past effort has not prevented the quota from being exceeded (Figure 3.4.2). Without attending measures to actually stop harvest when the quota is met, a quota does not on its own constitute an output control. There is a disjunction between management measures used to constrain the rate of recreational harvest, and attempts to estimate the rate of harvest under such measures, as anglers modify their fishing activity in response to new access restrictions. Even with additional quota, continuing to rely on existing management measures to slow harvest may allow two problems to continue. First, the harvest coming from the recreational sector will continue to face the problems of "subtractability" and "excludability," where the resource is open to anyone able to access it during a particular time. Without rules governing who has access to the resource (excludability), the effects of smaller returns are shared among all participants (subtractability; Feeny et al. 1990; McCay and Acheson 1987).

The second problem concerns the quota overages. Alongside the short seasons and lag time to calculate landings from MRIP, quota overages are likely to continue under the system of predicting season length based on past fishing effort. Faced with a shorter season for a desired target species, individual anglers rationally adjust their effort and fishing activity. With no restrictions on entry to the fishery (excludability), new participants join as well. This has resulted in an inverse relationship between season length and effort, where the shorter the length of the recreational fishing season, the more red snapper have been landed per day, as angler effort is consolidated into a shorter time. However, it cannot be assumed that the pattern would reverse, where an increase in the length of the season would correspond with a proportional reduction in effort. An increasing proportion of the total recreational quota has been landed outside of the federal season under less restrictive state regulations. Compounding this problem, the average weight of a red snapper has increased under the rebuilding plan meaning that each angler's bag limit weighs more. Thus, the rate at which the quota is caught accelerates. That recreational anglers as a sector are said to "exceed the quota" is not a reflection of individual angler compliance, but rather, reflects rational changes to fishing activity under situations of decreased access, and the inability of the existing management system to close harvest before the quota is met. To reduce the likelihood of further quota overages, the Council recently adopted

accountability measures that establish 1) a 20% buffer to the recreational quota, on which the season length would be projected; and 2) an overage adjustment which would decrease the recreational quota in the year following a quota overage by the amount of the overage (GMFMC 2014a). Preliminary landings for 2014 show that recreational landings remained well below the sector's quota.

Recreational anglers can access red snapper fishing by private vessels and for-hire vessels. Both modes share the same bag limit and fishing season; however, additional restrictions are placed on the for-hire fleet, to which private vessels are not subject. Since 2007, captain and crew of for-hire vessels have been prohibited from retaining a bag limit, and there are mandatory reporting requirements for headboats to report all landings and discards. In 2004, a moratorium was put in place on the issuance of federal for-hire permits. As with commercial permits, no new federal for-hire permits may be issued, but existing permits may be transferred. There is no mechanism to limit entry by private recreational vessels. Also, since 2009, federally permitted for-hire vessels are prohibited from landing red snapper outside of the federal season, such as during extended state water seasons.

Thus, the issue of excludability described above reflects private recreational vessels only. During the open season, participation is limited to a finite number of for-hire vessels, but there is no restriction to the number of private vessels that may harvest red snapper. Since the permit moratorium became effective, the number of federally permitted for-hire vessels has decreased, while the number of private fishing licenses has increased. The proportion of red snapper landed by each component of the recreational sector has shifted toward private vessel landings representing a greater proportion of the recreational quota (Figure 3.4.3). For the years 1991-2011, private-angler landings of red snapper represent 45.5% of recreational landings, but represent 56% for just the last six years. For-hire vessel landings of red snapper have decreased proportionally for these same years, from 54.5% to 44% of the recreational landings.

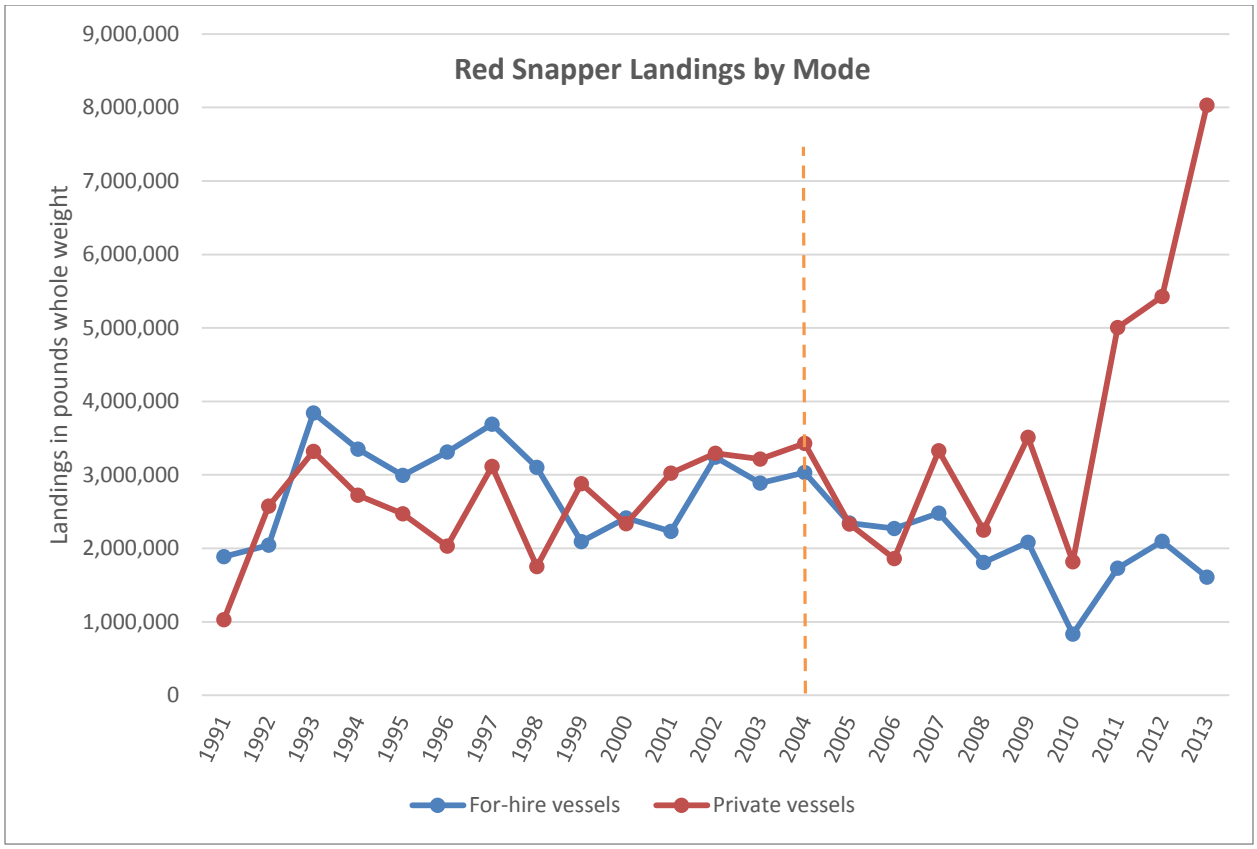

Figure 3.4.3. Red snapper recreational landings by private vessels and for-hire vessels (includes charter boats and headboats). Source: Calibrated MRIP landings, SEFSC Recreational ACL database.

In part as a response to this trend, separate allocations were recently established for the private angling component and the federal for-hire component of the recreational sector (GMFMC 2014b). These component allocations will be the basis for projecting the season lengths in federal waters for anglers utilizing private vessels and state-licensed guideboats (private angling component) and those fishing from federally permitted for-hire vessels (for-hire component). The component allocations and seasons will be in place for the years 2015-2017, unless otherwise modified by the Council.

3.4.1 Fishing Communities

This section provides a description of where recreational and commercial fishing for red snapper occurs. The description is based on the geographical distribution of landings and the relative importance of red snapper for commercial and recreational communities. This spatial approach enables discussion of fishing communities and the importance of fishery resources to those communities, as required by National Standard 8.

Commercial Fishing Communities

To identify commercial reliance, a regional quotient (RQ) measure was used. The RQ measures the relative importance of a given species across all communities in the region and represents the proportional distribution of commercial landings of a particular species. This proportional measure does not provide the number of pounds or the value of the catch; data that might be confidential at the community level for many places. The RQ is calculated by dividing the total pounds (or value) of a species landed in a given community, by the total pounds (or value) for that species for all communities in the region. The measure is a way to quantify the importance of red snapper to communities around the Gulf coast and suggest where impacts from management actions are more likely to be experienced. The data used for the RQ measure were assembled from the accumulated landings system (ALS), which includes commercial landings of all species from both state and federal waters and is based on dealers' reports. These data were converted to provide landings by (dealer's) address. Because of this, the address of a dealer may not be the coastal community where the dealer's facility is located. Furthermore, the most recent year of ALS data converted to provide commercial landings by community is 2012.

Commercial red snapper fishing is prosecuted throughout the Gulf region with the majority of landings occurring in the northern Gulf. Based on the RQ measure, the top 15 commercial red snapper fishing communities are identified in Figure 3.4.1.1. A community's proportion of total landings is not static and changes over time. Thus, the figure provides rankings by RQ value for four years: 2000, 2005, 2008, and 2011. The top three communities in terms of commercial landings are Galveston, Texas; Destin, Florida; and Golden Meadow, Louisiana (Figure 3.4.1.1). While in 2000, Panama City, Florida ranked first for commercial red snapper landings Gulf-wide, the community has since been replaced by Destin, Florida in terms of commercial landings of red snapper. Data are not available concerning location of red snapper consumers, such as the proportion of Gulf red snapper that is consumed within the region or elsewhere in the U.S.

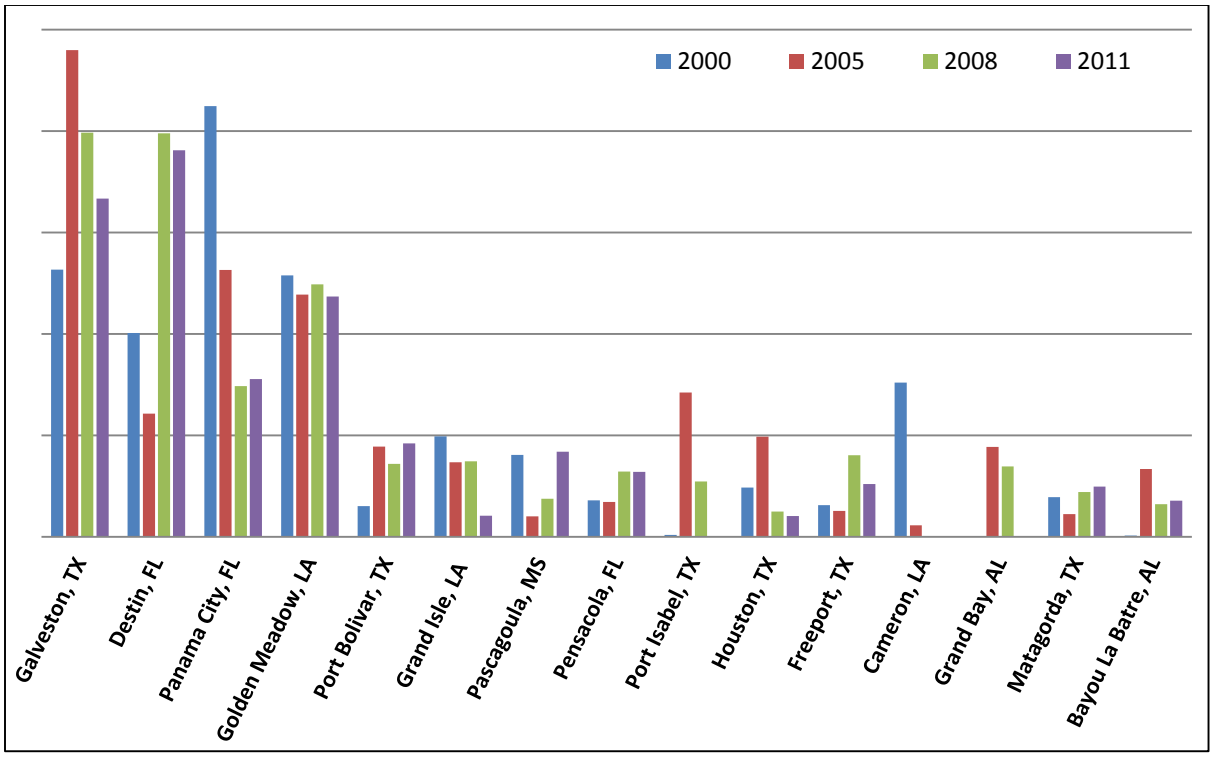

Figure 3.4.1.1. Top 15 commercial red snapper fishing communities by RQ value for four years. Source: Southeast Fisheries Science Center, accumulated landings system (2012).

To better understand how Gulf fishing communities are engaged and reliant on fishing, indices were created using secondary data from permit and landings information for the commercial and recreational sectors (Jepson and Colburn 2013; Jacob et al. 2012). Fishing engagement is primarily the absolute numbers of permits, landings, and value. Fishing reliance has many of the same variables as engagement divided by population to give an indication of the per capita impact of this activity.

Using a principal component and single solution factor analysis each community receives a factor score for each index to compare to other communities. With the selected communities from both sectors, factor scores of both engagement and reliance were plotted onto bar graphs. Factor scores are denoted by colored bars and are standardized, therefore the mean is zero. Two thresholds of one and ½ standard deviation above the mean are plotted onto the graphs to help determine a threshold for significance. Because the factor scores are standardized a score above 1 is also above one standard deviation. Using the thresholds of fishing dependence of ½ and one standard deviation, Figure 3.4.1.2 suggests that several communities are substantially engaged or reliant or both on commercial fishing.

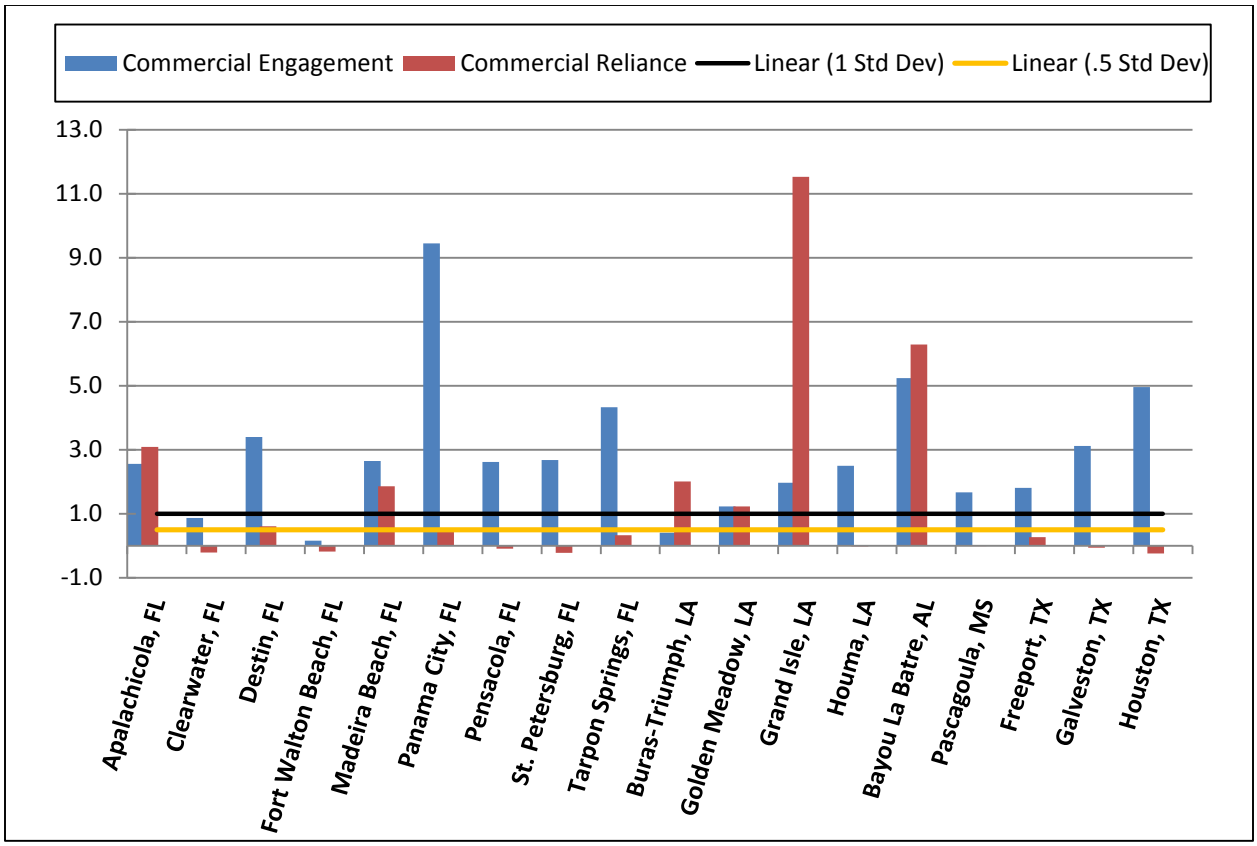

Figure 3.4.1.2. Top 18 red snapper fishing communities' commercial engagement and reliance. Source: Southeast Regional Office, social indicators database (2012).

Recreational Fishing Communities

Red snapper is harvested recreationally in all states in the Gulf. However, as the red snapper stock has continued to rebuild, 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). Most of the recreational catch is now landed in the eastern Gulf (Table 3.4.1.1). Fishermen in other Gulf States are also involved in recreational red snapper fishing, but these states represent a smaller percentage of the total recreational landings.

Table 3.4.1.1. Percentage of total recreational red snapper landings by state for 2013.

State	Landings
AL	43.9%
FL (Gulf Coast)	40.8%
LA	6.0%
MS	4.5%
TX	4.9%

Source: SERO Calibrated MRIP landings (Dec 2014).

Red snapper landings for the recreational sector are not available at the community level, making it difficult to identify communities as dependent on recreational fishing for red snapper. Data reflecting commercial landings of red snapper may or may not reflect areas of importance for recreational fishing of red snapper. It cannot be assumed that the proportion of commercial red snapper landings among other species in a community would be similar to its proportion among recreational landings within the same community because of sector differences in fishing practices and preferences.

While there are no landings data at the community level for the recreational sector, Table 3.4.1.2 offers a ranking of communities based upon the number of reef fish charter permits and reef fish charter permits divided by population. This is a crude measure of the reliance upon recreational reef fish fishing and is general in nature and not specific to red snapper. Ideally, additional variables quantifying the importance of recreational fishing to a community would be included (such as the amount of recreational landings in a community, availability of recreational fishing related businesses and infrastructure, etc.); however, these data are not available at this time. 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 list suggesting a greater importance for recreational fishing in that region. At this time it is impossible to examine the intensity of recreational fishing activity at the community level for a specific species. However, it is likely that those communities that have a higher rank in terms of charter activity and have a dynamic commercial fishery for red snapper will likely have a vigorous recreational red snapper fishery. The communities that meet those criteria are: Destin, Panama City, and Pensacola, Florida; Port Bolivar and Freeport, Texas; and Venice and Grand Isle, Louisiana.

Table 3.4.1.2. Average community rank by total number of reef fish charter permits and divided by community population (SERO 2012).

State	Community	Reef Fish charter permits	Permit Rank	Pop	Permit/Pop	Permit/Pop rank	Combined rank
AL	Orange Beach	105	2	5185	0.0203	3	5
LA	Venice	36	7	202	0.1782	1	8
FL	Destin	114	1	12307	0.0093	10	11
AL	Dauphin Island	19	12	1375	0.0138	5	17
TX	Port Aransas	33	9	3444	0.0096	9	18
LA	Grand Isle	14	17	597	0.0235	2	19
TX	Freeport	40	5	12183	0.0033	15	20
TX	Port O'Connor	15	15	1253	0.0120	7	22
FL	Panama City	60	3	36795	0.0016	20	23
FL	Steinhatchee	13	19	1047	0.0124	6	25
FL	Pensacola	43	4	52903	0.0008	22	26
FL	Panama City Beach	32	10	11364	0.0028	16	26
FL	Apalachicola	17	14	2357	0.0072	12	26
FL	Naples	35	8	20405	0.0017	19	27
LA	Chauvin	15	15	3220	0.0047	13	28
TX	Galveston	38	6	49990	0.0008	23	29
FL	Cedar Key	8	27	463	0.0173	4	31
TX	Matagorda	8	27	710	0.0113	8	35
MS	Biloxi	26	11	43921	0.0006	25	36
FL	Mexico Beach	9	25	1181	0.0076	11	36
FL	Carrabelle	10	23	2612	0.0038	14	37
FL	Sarasota	18	13	52877	0.0003	26	39
FL	Madeira Beach	11	21	4335	0.0025	18	39
FL	Port St Joe	10	23	3560	0.0028	17	40
FL	Tarpon Springs	14	17	23071	0.0006	24	41
FL	St Petersburg	12	20	245715	0.0000	27	47
FL	Treasure Island	8	27	6847	0.0012	21	48
TX	Houston	11	21	2068026	0.0000	29	50
TX	Corpus Christi	9	26	299324	0.0000	28	54

Destin and Panama City are likely more reliant with regard to recreational fishing as they have numerous charter operations. When visiting charter service websites from these two communities photos of red snapper are very prominent and advertised as a key target species (http://www.fishdestin.com/fishinggallery.html; and http://www.jubileefishing.com/). Panacea is less reliant upon red snapper and located in a more rural area than the other communities. In terms of occupation it has the lowest percentage working in farming, forestry, and fishing, yet it does have the largest percentage class of worker in that category. All of these communities are considered to be primarily involved in fishing based upon their community profiles (Impact Assessment, Inc. 2005).

The Orange Beach Red Snapper World Championship Tournament, billed as "Alabama's state celebration of recreational saltwater fishing,"[15] was an annual event in March. Dauphin Island, Alabama also has a number of charter services that specialize in bottom fishing, especially for red snapper[16]. All three Alabama communities are considered primarily involved in fishing as noted in their fishing communities' profiles (Impact Assessment, Inc. 2006). Red snapper fishing is featured at Pascagoula charter websites[17] and the community is regarded as primarily involved in fishing according to its community profile (Impact Assessment, Inc. 2006).

Venice and Grand Isle, Louisiana, are also ranked among the top recreational fishing communities. A sampling of charter service websites from these communities indicates they do feature red snapper as a target species but not as prominently as charter services from other states.

Red snapper are also an important species for charter fishing in Galveston and Freeport, Texas. Many of the charter services include photos of red snapper catches on their website and note that this species is one of their prime target species.[18] Although, many inshore species like trout and redfish are more prominently displayed. Matagorda and Freeport are noted as being primarily involved in fishing while Galveston is secondarily involved.

The following figure was produced from the indicator database as described above for the commercial sector. Figure 3.4.1.3 identifies recreational communities engaged and reliant upon fishing in general. Using thresholds of fishing dependence of ½ standard deviation and one standard deviation, Figure 3.4.1.3 suggests that several communities are substantially engaged in recreational fishing.

[15] http://www.cityoforangebeach.com/pages_2007/pdfs/events/2009/2009_Snapper_Tournament.pdf
[16] http://gulfinfo.com/fishing.htm
[17] http://www.jkocharters.com/1938863.html
[18] http://www.texassaltwaterfishingguide.com/ or http://www.matagordabay.com/

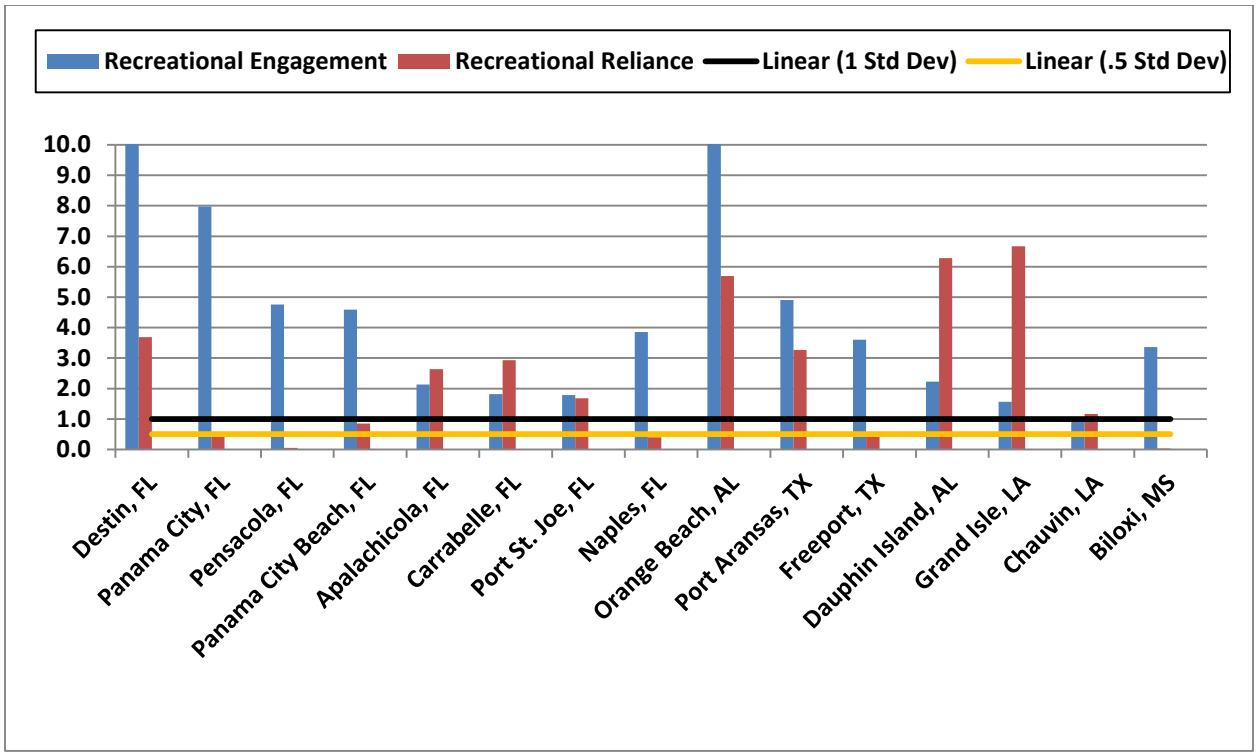

Figure 3.4.1.3. Top 15 recreational fishing communities' engagement and reliance.
Source: Southeast Regional Office, social indicators database (2012).

3.4.2 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, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The main focus of 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 red snapper fishermen and associated businesses and communities along the coast are likely to be impacted by this proposed action. However, information on race, ethnicity, and income status for groups at the different participation levels and roles is not available, because these types of data are not collected by NMFS or other agencies. To identify potential areas of EJ concern, this analysis uses a suite of indices created to examine the social vulnerability of coastal communities (Jepson and Colburn 2013). 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. Communities that exceed the threshold for one or more of the indices would be expected to exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

The commercial communities most engaged and reliant on red snapper fishing are identified in Figure 3.4.1.2, including each community's score for the three social vulnerability indices. The communities of Apalachicola and Panama City, Florida; Golden Meadow, Grand Isle, and Houma, Louisiana; Bayou La Batre, Alabama; Pascagoula, Mississippi; and Freeport, Galveston, and Houston, Texas exceed the threshold of ½ standard deviation above the mean for at least one of the social vulnerability indices. It would be expected that these communities may exhibit vulnerabilities to social or economic disruption because of regulatory change, and would be the communities most likely subject to EJ concerns. Those communities that exhibit several index scores exceeding the threshold would be the most vulnerable. These include Apalachicola, Florida; Golden Meadow, Louisiana; Bayou La Batre, Alabama; Pascagoula, Mississippi; and Freeport, Galveston, and Houston, Texas. Five communities exceed the threshold of ½ standard deviation for all three indices (Bayou La Batre, Alabama; Pascagoula, Mississippi; and Freeport, Galveston, and Houston, Texas). Social effects resulting from action taken in this plan amendment are likely to be greatest in these communities.

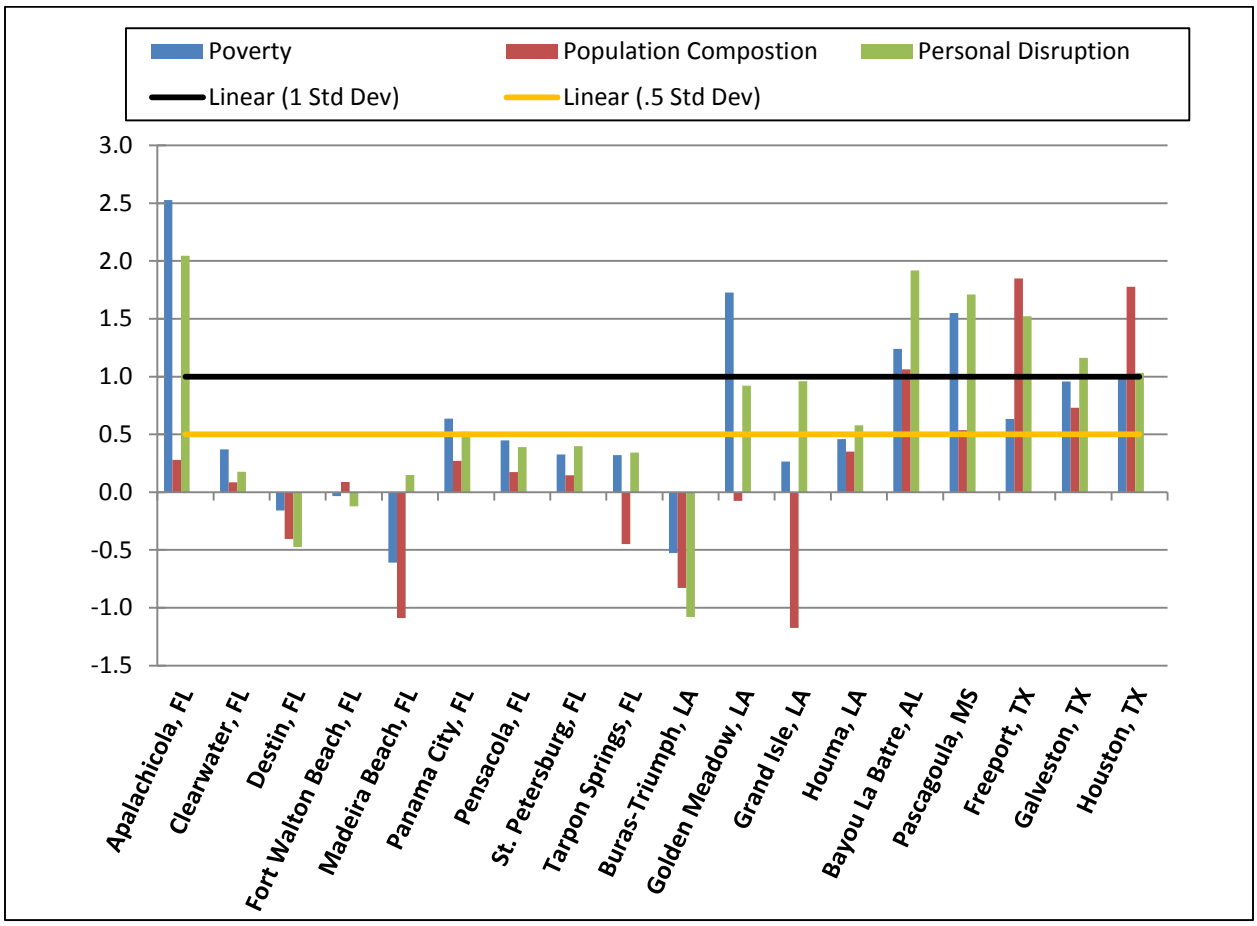

Figure 3.4.2.1. Social vulnerability indices for red snapper commercial fishing communities

Source: Southeast Regional Office, social indicators database (2012).

Recreational red snapper fishermen and associated businesses and communities along the coast are expected to benefit from this proposed action. Thus, no EJ concerns are expected for participants in the recreational sector. Figure 3.4.2.2 provides the scores of the social vulnerability indices for the top recreational fishing communities identified in Figure 3.4.1.3. Communities that exceed the threshold for one or more indices would be expected to exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change, and greater vulnerability is suggested by exceeding the thresholds for multiple indices. However, regulatory change that would impact recreational participants in these communities is not expected.

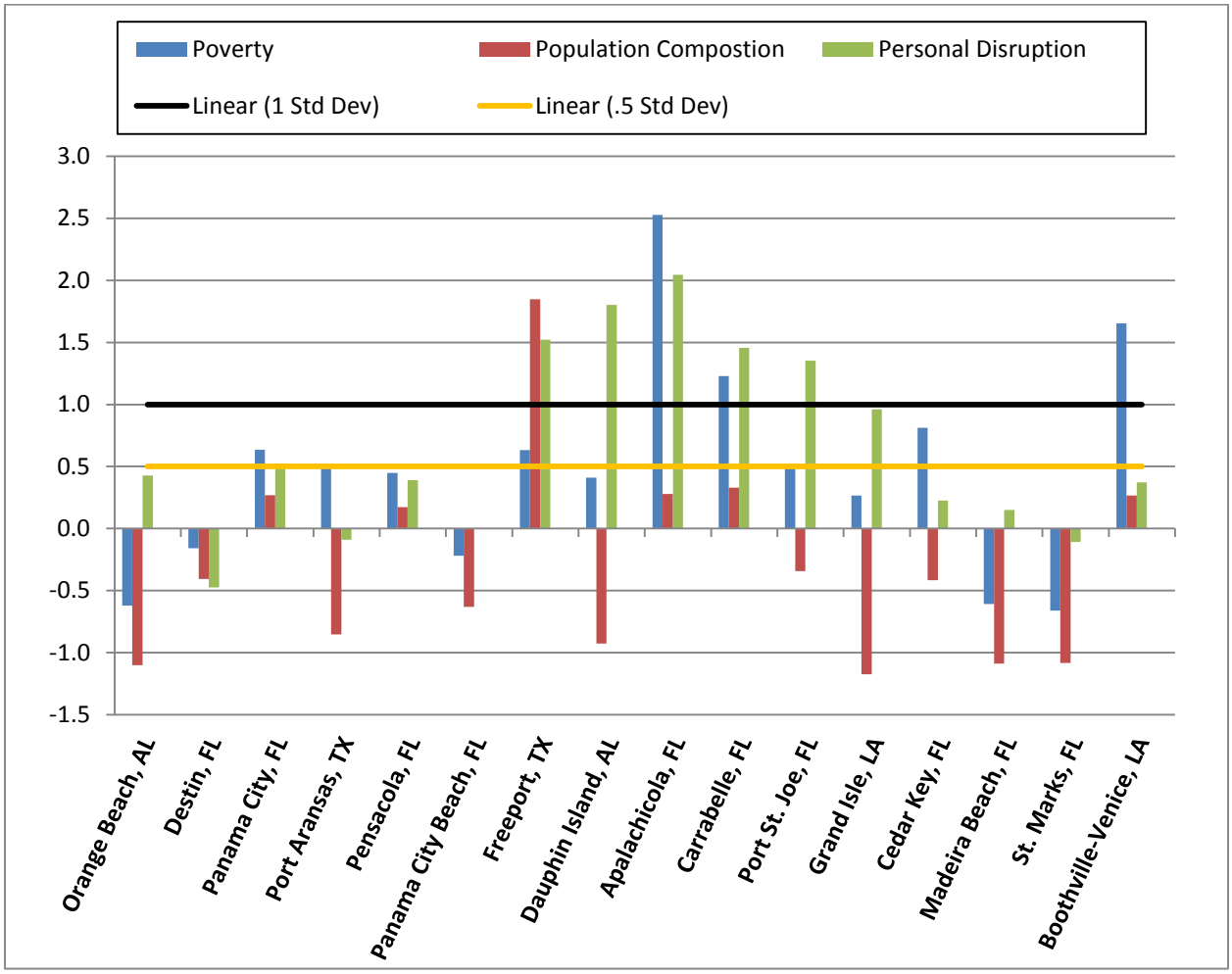

Figure 3.4.2.2. Social vulnerability indices for recreational fishing communities.
Source: Southeast Regional Office, social indicators database (2012).

These indicators of vulnerability have been developed using secondary data at the community level because it does not exist for fishermen individually and is not collected through permit application or other programs that might be vehicles for this type of data. Because these types of data are not collected at the individual level by NMFS or other agencies, it is difficult to

understand the social vulnerabilities that might exist on either a household or individual basis. Therefore, it is hard to recognize or attribute impacts that will directly affect individuals who are fishermen or work in a related business because we do not know what those specific vulnerabilities may be. Therefore, our measure of vulnerability is a broader measure at the community level and not specific to fishermen or the related businesses and their employees. Finally, there are no known claims for customary usage or subsistence consumption of Gulf red snapper by any population including tribes or indigenous groups.

3.5 Description of the Economic Environment

3.5.1 Commercial Sector

3.5.1.1 Vessel Activity

A description of the red snapper individual fishing quota (IFQ) program is contained in NMFS (2014) and is available at: http://sero.nmfs.noaa.gov/sustainable_fisheries/lapp_dm/index.html. This description is incorporated herein by reference and is summarized below. Tables 3.5.1.1.1 and 3.5.1.1.2 contain summary vessel and trip counts, landings, and revenue information from vessels landing at least one pound of red snapper from 2008 through 2014. Data for 2014 is preliminary and data from years prior to the implementation of the IFQ program are not representative of current conditions.

The tables contain vessel counts from the NMFS Southeast Fisheries Science Center (SEFSC) logbook (logbook) data (vessel count, trips, and landings) and the NMFS Southeast Regional Office (SERO) Limited Access Privilege Program (LAPP) data (vessel count). Dockside values were generated using landings information from logbook data and price information from the NMFS SEFSC Accumulated Landings System (ALS) data. The logbook and LAPP data programs serve different purposes and use different data collection methods. Consequently, comparative analysis of data from these programs may produce different results, as evidenced by the vessel counts provided in Table 3.5.1.1.1. However, this assessment utilizes logbook data because the logbook program collects data on all species harvested on trips on which red snapper are harvested, as well as harvests by these vessels on trips without red snapper.

On average, 3545 vessels per year landed red snapper (Table 3.5.1.1.1). These vessels, combined, averaged 2,773 trips per year on which red snapper was landed and 1,848 trips without red snapper (Table 3.5.1.1.1). The average annual total dockside revenue (2014 dollars) was approximately $12.04 million from red snapper, approximately $13.13 million from other species co-harvested with red snapper (on the same trip), and approximately $10.57 million from other species harvested on trips on which no red snapper were harvested (Table 3.5.1.1.2). Total average annual revenues were approximately $35.733 million, or approximately $102,000 per vessel (Table 3.5.1.1.2).

Table 3.5.1.1.1. Summary of vessel counts, trips, and logbook landings (pounds gutted weight (lbs gw)) or vessels landing at least one pound of red snapper, 2008-2014.

Year	Number of Vessels, Logbook Data	Number of Vessels, LAPPs Data	Number of Trips that Caught Red Snapper, Logbook Data	Red Snapper Landings (lbs gw)	"Other Species" Landings Jointly Caught with Red Snapper (lbs gw)	Number of Trips that Only Landed "Other Species"	"Other Species" Landings on Trips without Red Snapper (lbs gw)
2008	308	297	2,274	2,163,312	3,755,670	2,552	4,085,616
2009	296	294	2,329	2,163,632	3,883,389	2,425	4,430,510
2010	375	384	2,970	2,939,254	4,040,460	1,717	3,106,308
2011	368	362	3,389	3,073,697	5,539,520	1,959	4,422,791
2012	365	371	3,432	3,469,118	5,525,735	2,026	4,818,703
2013	359	368	3,389	4,424,324	5,257,821	1,699	3,632,756
2014	410	401	1,628	2,735,798	2,217,577	560	1,008,224
Average	354	354	2,773	2,995,591	4,317,167	1,848	3,643,558

Source: NMFS SEFSC Logbook and NMFS SERO LAPPs data.

Table 3.5.1.1.2. Summary of vessel counts and revenue (thousand 2014 dollars) for vessels landing at least one pound of red snapper, 2008-2014.

Year	Number of Vessels, Logbook Data	Dockside Revenue from Red Snapper	Dockside Revenue from "Other Species" Jointly Caught with Red Snapper	Dockside Revenue from "Other Species" Caught on Trips without Red Snapper	Total Dockside Revenue	Average Total Dockside Revenue per Vessel
2008	308	$8,769	$10,415	$11,132	$30,317	$98
2009	296	$8,500	$10,382	$11,559	$30,441	$103
2010	375	$11,054	$12,045	$8,599	$31,699	$85
2011	368	$11,530	$16,698	$12,707	$40,935	$111
2012	365	$13,785	$17,140	$14,443	$45,368	$124
2013	359	$19,261	$17,538	$12,295	$49,095	$137
2014	410	$11,356	$7,681	$3,239	$22,276	$54
Average	354	$12,036	$13,128	$10,568	$35,733	$102

Source: NMFS SEFSC Logbook and ALS data.

As can be gleaned from Tables 3.5.1.1.1 and 3.5.1.1.2, commercial fishing for red snapper in 2010 appeared to be unaffected, from a landings and revenue perspective, by conditions associated with the Deepwater Horizon MC252 oil spill. This was not the case for the recreational sector as will be shown below.

Share, Allocation, and Ex-vessel Prices

Price information is an important component for evaluating the performance of a catch share program. Economic theory states that as fishermen no longer have to out-compete other fishermen for a share of the catch, the profits will increase as fishermen adjust the scale and scope of their operations to take advantage of market conditions. This results in increased market stability and value for shares and allocations, as more efficient fishermen are willing to pay higher prices to purchase additional shares and/or allocation from less efficient operators. Theoretically, allocation prices should reflect the expected annual net profit from harvesting one unit of quota, whereas share prices should reflect the present value of the flow of expected net returns from harvesting one unit of quota. Dockside or ex-vessel prices are the price the vessel receives at the first sale of harvest. In 2013, the median share price per pound of red snapper was $40.00 (average price $36.24), the median allocation price per pound was $3.00 (average price $2.98), and the median ex-vessel price per pound was $4.75 (average price $4.46). Similar final data for 2014 are not currently available and data from previous years can be found in NMFS (2014).

3.5.1.2 Commercial Sector Business Activity

Estimates of the business activity (economic impacts) in the U.S. associated with the Gulf red snapper commercial harvests were derived using the model developed for and applied in NMFS (2011b) and are provided in Table 3.5.1.2.1. Business activity for the commercial sector is characterized in the form of full-time equivalent (FTE) jobs, income impacts (wages, salaries, and self-employed income), and output (sales) impacts (gross business sales). 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).

Table 3.5.1.2.1. Average annual business activity associated with the harvests of vessels that harvest red snapper, 2008-2014.

Species	Average Annual Dockside Revenue (thousands)[1]	Total Jobs	Harvester Jobs	Output (Sales) Impacts (thousands)[1]	Income Impacts (thousands)[1]
Red snapper	$12,036	2,127	277	$158,475	$67,540
All species[2]	$35,733	6,315	824	$470,470	$200,510

[1]2014 dollars.
[2]Includes dockside revenues and economic activity associated with the average annual harvests of all species, including red snapper, harvested by vessels that harvested red snapper.

In addition to red snapper harvests, as discussed above, vessels that harvested red snapper also harvested other species on trips where red snapper were harvested. These vessels also took trips during the year where only species other than red snapper were caught. All revenues from all species on all these trips contributed towards making these vessels economically viable and contribute to the economic activity associated with these vessels. The average annual total ex-vessel revenues from all species (including red snapper) harvested during this period (2008-2014) by vessels that harvested red snapper was approximately $35.73 million (2014 dollars). In terms of business activity, these revenues are estimated to support 6,315 FTE jobs (824 in the harvesting sector) and are associated with approximately $470.47 million in output (sales) impacts and approximately $200.51 million in income impacts.

3.5.1.3 Dealers

Commercial vessels landing red snapper can only sell their catch to federally permitted fish dealers. On February 5, 2015, 69 dealers possessed the necessary federal dealer permit and the IFQ endorsement necessary to receive Gulf LAPP species (LAPP data). Because there are no income or sales requirements to acquire a federal dealer permit or IFQ endorsement, the total number of dealers can vary over the course of the year and from year to year. In addition to red snapper, grouper and tilefish are Gulf LAPP species and not all dealers authorized to receive Gulf LAPP species purchase red snapper. The following results are based on assessment of ALS data. In 2012, 92 dealers reported red snapper purchases. Seventy-three of these dealers were in Florida, six in Texas, six in Louisiana, four in Alabama, and three in Mississippi. Total red snapper purchased by these dealers in 2011 had an ex-vessel value of approximately $13.89 million (2014 dollars), or approximately 12.84% of the total revenues, approximately $108.20 million (2014 dollars), from all marine resource purchases by these dealers. Dependency on red snapper sales varies by dealer, with the percentage of red snapper purchases (value, not pounds) to total purchases varying from less than 1% to 100%. Red snapper purchases in 2012 comprised 10% or more of total purchases for 40 of these dealers, 50% or more for 11 dealers, and 5% or less for 38 dealers. Average red snapper dependency (measured as the percentage of red snapper ex-vessel value relative to the total value of all seafood purchases) was highest for Mississippi and Texas dealers, approximately 34% and 28%, respectively, followed by Alabama (approximately 21%), Florida (approximately 10%), and Louisiana (approximately 8%).

3.5.1.4 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 2012, imports of all snapper and grouper species (fresh and frozen) were approximately 44.51 million pounds valued at approximately $132.19 million (2014 dollars). These amounts are contrasted with the domestic harvest of all snapper and grouper in the U.S. in 2012 of approximately 19.60 mp valued at approximately $62.41 million (2014 dollars; data available at: http://www.st.nmfs.noaa.gov/commercial-fisheries/publications/index). Although the levels of domestic production and imports are not totally 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 amount of domestic harvest is

indicative of the dominance of imports in the domestic market. Final comparable data for more recent years is not currently available.

3.5.2 Recreational Sector

3.5.2.1 Angler Effort

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

1. 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 second primary target for the trip. The species did not have to be caught.

2. 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.

3. 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 the number of harvest trips (the number of individual angler trips that harvest a particular species regardless of target intent), and directed trips (the number of individual angler trips that either targeted or caught a particular species), among other measures, but the three measures of effort listed above are used in this assessment. Estimates of the average annual red snapper effort (in terms of individual angler trips) for the charter and private/rental boat modes in the Gulf for 2008-2014 are provided in Table 3.5.2.1.1 for target trips and Table 3.5.2.1.2 for catch trips. Estimates of red snapper target effort for additional years, and other measures of directed effort, are available at http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/queries/index.

Because of the Deepwater Horizon MC252 oil spill, 2010 was not a typical year for recreational fishing due to the extensive closures and associated decline in fishing in much of the Gulf. For information on the Deepwater Horizon MC252 oil spill and associated closures, see: http://sero.nmfs.noaa.gov/deepwater_horizon_oil_spill.htm. Recreational effort for Alabama and Louisiana was affected by the 2010 oil spill incident more than that for Florida. This holds true for both the charter (target and catch effort) and private modes (target and catch effort).

Table 3.5.2.1.1. Number of red snapper recreational target trips, by mode, 2008-2014*.

	Alabama	West Florida	Louisiana	Mississippi	Total
	Charter Mode				
2008	14,330	29,166	8,270	0	51,766
2009	14,894	30,987	7,916	0	53,797
2010	2,789	16,466	0	208	19,463
2011	19,010	29,642	1,424	0	50,076
2012	16,609	24,653	7,204	74	48,540
2013	23,638	32,689	7,191	38	63,556
2014	9,050	7,358	0	0	16,408
Average	14,331	24,423	4,572	46	43,372
	Private/Rental Mode				
2008	24,995	131,300	23,594	8,877	188,766
2009	60,689	191,048	34,196	7,622	293,555
2010	20,759	129,748	3,338	5,451	159,296
2011	116,886	113,021	19,900	16,790	266,597
2012	72,030	136,594	43,547	13,515	265,686
2013	222,245	461,349	24,691	21,586	729,871
2014	56,918	165,498	0	7,555	229,971
Average	82,075	189,794	21,324	11,628	304,820
	All Modes				
2008	39,325	160,466	31,864	8,877	240,532
2009	75,583	222,035	42,112	7,622	347,352
2010	23,548	146,214	3,338	5,659	178,759
2011	135,896	142,663	21,324	16,790	316,673
2012	88,640	161,247	50,751	13,589	314,227
2013	245,883	494,038	31,882	21,624	793,427
2014	65,968	172,856	0	7,555	246,379
Average	96,406	214,217	25,896	11,674	348,193

* Texas information unavailable. Source: MRIP database, NMFS, SERO.
Note: These effort estimates have not been re-calibrated. Re-calibrated effort data are currently unavailable.
Note: There were no target trips recorded from the shore mode.

Table 3.5.2.1.2. Number of red snapper recreational catch trips, by mode, 2008-2014*.

	Alabama	West Florida	Louisiana	Mississippi	Total
	Charter Mode				
2008	33752	136059	16238	343	186392
2009	30692	122842	14284	0	167818
2010	12,495	57,662	205	261	70,623
2011	43,550	101,500	3,066	221	148,337
2012	25,252	105,385	10,501	74	141,212
2013	52,331	107,466	12,321	38	172,156
2014	36,340	66,559	0	0	102,899
Average	33,487	99,639	8,088	134	141,348
	Private/Rental Mode				
2008	52,430	338,514	46,264	11,499	448,707
2009	77,838	343,635	59,071	17,685	498,229
2010	46,017	252,300	5,764	6,964	311,045
2011	130,500	203,567	31,957	6,169	372,193
2012	83,783	282,332	51,377	13,515	431,007
2013	227,889	537,469	55,679	29,250	850,287
2014	110,593	233,265	0	10,254	354112
Average	104,150	313,012	35,730	13,619	466,511
	All Modes				
2008	86,182	474,573	62,502	11,842	635,099
2009	108,530	466,477	73,355	17,685	666,047
2010	58,512	309,962	5,969	7,225	381,668
2011	174,050	305,067	35,023	6,390	520,530
2012	109,035	387,717	61,878	13,589	572,219
2013	280,221	644,935	68,000	29,288	1,022,444
2014	146,933	299,824	0	10,254	457,011
Average	137,637	412,651	43,818	13,753	607,860

* Texas information unavailable. Source: MRIP database, NMFS, SERO.
Note: These effort estimates have not been re-calibrated. Re-calibrated effort data are currently unavailable.
Note: There were no catch trips recorded from the shore mode.

Headboat data do not support the estimation of target or catch effort because target intent is not collected and the harvest data (the data reflect only harvest information and not total catch) are collected on a vessel basis and not by individual angler. Table 3.5.2.1.3 contains estimates of the number of headboat angler days for all Gulf States for 2008-2014. As with charter boats, headboats were also affected by the Deepwater Horizon MC252 oil spill in 2010, particularly in

Alabama/West Florida and Louisiana. The oil spill's impacts on Texas headboats appear to be relatively small.

Table 3.5.2.1.3. Headboat angler days, 2008-2014.

Year	W Florida/Alabama	Louisiana	Mississippi	Texas	Total
2008	130,176	2,945	0	41,188	174,309
2009	142,438	3,268	0	50,737	196,443
2010	111,018	217	*	47,154	158,389
2011	157,025	1,886	1,771	47,284	207,966
2012	161,973	1,839	1,840	51,771	217,423
2013	174,800	1,579	1,827	55,749	233,955
2014	191,365	1,634	1,623	51,231	245,853
Average	152,685	1,910	1,177	49,302	204,905

*Confidential. Source: NMFS Southeast Region Headboat Survey (HBS).

3.5.2.2 Permits

The for-hire sector is comprised of charter boats and headboats (party boats). Although charter boats tend to be smaller, on average, than headboats, the key distinction between the two types of operations is how the fee is determined. On a charter boat trip, the fee charged is for the entire vessel, regardless of how many passengers are carried, whereas the fee charged for a headboat trip is paid per individual angler.

A federal for-hire vessel permit has been required for reef fish since 1996 and the sector currently operates under a limited access system. On April 25, 2015, there were 1,159 valid (non-expired) or renewable Gulf of Mexico Charter/Headboat Reef Fish Permits. A renewable permit is an expired permit that may not be actively fished, but is renewable for up to one year after expiration. Although the for-hire permit application collects information on the primary method of operation, the resultant permit itself does not identify the permitted vessel as either a headboat or a charter boat, operation as either a headboat or charter boat is not restricted by the permitting regulations, and vessels may operate in both capacities. However, only federally permitted headboats are required to submit harvest and effort information to the NMFS Southeast Region Headboat Survey (HBS). Participation in the HBS is based on determination by the SEFSC that the vessel primarily operates as a headboat. Sixty-nine vessels were registered in the SHRS as of April 24, 2015 (K. Fitzpatrick, NMFS SEFSC, pers. comm.). The majority of these headboats were located in Florida (37), followed by Texas (16), Alabama (9), and Mississippi/Louisiana (7).

Information on Gulf charter boat and headboat operating characteristics, including average fees and net operating revenues, is included in Savolainen et al. (2012) and is incorporated herein by reference.

There are no specific federal permitting requirements for recreational anglers to fish for or harvest reef fish. Instead, anglers are required to possess either a state recreational fishing permit

that authorizes saltwater fishing in general, or be registered in the federal National Saltwater Angler Registry system, subject to appropriate exemptions. As a result, it is not possible to identify with available data how many individual anglers would be expected to be affected by this proposed amendment. (Note: although it is not a federal permit, Louisiana has developed an offshore angler permit. Tabulation of these permits would be expected to provide an estimate of only a small portion of the total number of individual anglers expected to be affected by this proposed amendment.)

3.5.2.3 Economic Value

Economic value can be measured in the form of consumer surplus (CS) per additional red snapper 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 estimated value of the CS per fish for a second red snapper kept on a trip is approximately $81 (Carter and Liese 2012; values updated to 2014 dollars[19]).

With regards to for-hire businesses, economic value can be measured by producer surplus (PS) per passenger trip (the amount of money that a vessel owner earns in excess of the cost of providing the trip). Estimates of the PS per for-hire passenger trip are not available. Instead, net operating revenue (NOR), which is the return used to pay all labor wages, returns to capital, and owner profits, is used as a proxy for PS. The estimated NOR value is $153.45 (2014 dollars) per charter angler trip (Liese and Carter 2012). The estimated NOR value per headboat angler trip is $52.97 (2014 dollars) (C. Liese, NMFS SEFSC, pers. comm.). Estimates of NOR per red snapper target trip are not available.

3.5.2.4 Recreational Sector Business Activity

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 MRFSS to collect economic expenditure information, as described and utilized in NMFS (2011a). Estimates of these coefficients for target or catch behavior for individual species are not available. Estimates of the average expenditures by recreational anglers are also provided in NMFS (2011a) and are incorporated herein by reference.

Business activity for the recreational sector is characterized in the form of fulltime equivalent (FTE) jobs, output (sales) impacts (gross business sales), and value-added impacts (difference between the value of goods and the cost of materials or supplies). Job and output (sales) impacts are equivalent metrics across both the commercial and recreational sectors. Income impacts (commercial sector) and value-added impacts (recreational sector) are not equivalent, though similarity in the magnitude of multipliers generated and used for the two metrics may result in roughly equivalent values. Similar to income impacts, value-added impacts should not be added to output (sales) impacts because this would result in double counting.

[19] Converted to 2014 dollars using the 2014 annual Consumer Price Index (CPI) for all US urban consumers provided by the Bureau of Labor and Statistics (BLS).

Estimates of the average red snapper effort (2008-2014) and associated business activity (2014 dollars) are provided in Table 3.5.2.4.1. Red snapper target effort (trips) was selected as the measure of red snapper effort. More individual angler trips catch red snapper than target red snapper, however, as shown in Tables 3.5.2.1.1 and 3.5.2.1.2. Estimates of the business activity associated with red snapper catch trips can be calculated using the ratio of catch trips to target trips because the available estimates of the average impacts per trip are not differentiated by trip intent or catch success. For example, if the estimated number of catch trips is three times the number of target trips for a particular state and mode, the estimate of the business activity associated with these catch trips would equal three times the estimated impacts of target trips.

Table 3.5.2.4.1. Summary of red snapper target trips (2008-2014 average) and associated business activity (2014 dollars). Output and value added impacts are not additive.

	Alabama	West Florida	Louisiana	Mississippi	Texas
	Private/Rental Mode				
Target Trips	86,379	199,748	22,442	12,238	*
Output Impact	$4,507,527	$10,429,860	$1,637,848	$415,894	*
Value Added Impact	$2,439,327	$5,905,958	$787,050	$211,537	*
Jobs	50	93	13	4	*
	Charter Mode				
Target Trips	15,083	25,704	4,812	48	*
Output Impact	$9,306,752	$18,200,595	$2,247,124	$18,932	*
Value Added Impact	$6,369,045	$12,168,075	$1,545,170	$13,337	*
Jobs	94	166	18	0	*
	All Modes				
Target Trips	101,462	225,452	27,254	12,286	*
Output Impact	$13,814,279	$28,630,455	$3,884,972	$434,827	*
Value Added Impact	$8,808,372	$18,074,032	$2,332,219	$224,874	*
Jobs	144	260	31	4	*

*Because target information is unavailable, associated business activity cannot be calculated.
Note: There were no target trips recorded from the shore mode.
Source: effort data from the MRIP, economic impact results calculated by NMFS SERO using the model developed for NMFS (2011b).

The estimates of the business activity associated with red snapper recreational trips are only available at the state level. Addition of the state-level estimates to produce a regional or national total will underestimate the actual amount of total business activity because summing the state estimates will not capture business activity that leaks outside the individual states. A state estimate only reflects activities that occur within that state and not related activity that occurs in another state. For example, if a good is produced in Alabama but sold in Florida, the measure of business activity in Florida associated with the its sale in Florida does not include the production

process in Alabama. Assessment of business activity at the national (or regional) level would capture activity in both states and include all activity except that which leaks into other nations.

It is noted that these estimates do not, and should not be expected to, represent the total business activity associated with a specific recreational harvest sector in a given state or in total. For example, these results do not state, or should be interpreted to imply, that there are only 154 jobs associated with the charter sector in Alabama. Instead, as previously stated, these results relate only to the business activity associated with target trips for red snapper. Because of the seasonal nature of red snapper fishing, few, if any businesses or jobs, would be expected to be devoted solely to red snapper fishing. The existence of these businesses and jobs, in total, is supported by the fishing for, and expenditures on, the variety of marine species available to anglers throughout the year.

Estimates of the business activity (impacts) associated with headboat red snapper effort are not available. The headboat sector in the Southeast is not covered in the MRFSS/MRIP, so estimation of the appropriate impact coefficients for the headboat sector has not been conducted. While appropriate impact coefficients are available for the charter sector, potential differences in certain factors, such as the for-hire fee, rates of tourist versus local participation, and expenditure patterns, may result in significant differences in the business impacts of the headboat sector relative to the charter sector.

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 exclusive economic zone, an area extending 200 nautical miles from the seaward boundary of each of the coastal states, and authority over U.S. anadromous species and continental shelf resources that occur beyond the exclusive economic zone.

Responsibility for federal fishery management is shared by 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 A. In most cases, the Secretary has delegated this authority to NMFS.

The Council is responsible for fishery resources in federal waters of the Gulf. These waters extend to 200 nautical miles offshore from the nine-mile seaward boundary of the states of Florida and Texas, and the three-mile seaward boundary of the states of Alabama, Mississippi, and Louisiana. The length of the Gulf coastline is approximately 1,631 miles. Florida has the longest coastline of 770 miles along its Gulf coast, followed by Louisiana (397 miles), Texas (361 miles), Alabama (53 miles), and Mississippi (44 miles).

The 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 through participation on advisory panels and through Council meetings that, with few exceptions for discussing personnel matters, are open to the public. The regulatory process is also in accordance with the Administrative Procedures Act, in the form of "notice and comment" rulemaking, which provides extensive opportunity for public scrutiny and comment, and requires consideration of and response to those comments.

Regulations contained within FMPs are enforced through actions of the National Oceanic and Atmospheric Administration's Office of Law Enforcement, the United States Coast Guard, and various state authorities. To better coordinate enforcement activities, federal and state enforcement agencies have developed cooperative agreements to enforce the Magnuson-Stevens Act. These activities are being coordinated by the Council's Law Enforcement Advisory Panel and the Gulf States Marine Fisheries Commission's Law Enforcement Committee, which have developed joint enforcement agreements and cooperative enforcement programs (www.gsmfc.org).

The red snapper stock in the Gulf is classified as overfished, but no longer undergoing overfishing. A rebuilding plan for red snapper was first implemented under Amendment 1 (GMFMC 1989), and has undergone several revisions. The current rebuilding plan was established in Reef Fish Amendment 27/Shrimp Amendment 14 (GMFMC 2007), and calls for rebuilding the stock to a level capable of supporting maximum sustainable yield on a continuing basis by 2032. Periodic adjustments to the ACL and other management measures needed to affect rebuilding are implemented through regulatory amendments.

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 respective state's 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 in Amendment 22 (GMFMC 2004b).

CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

4.1 Action – Allocation of Red Snapper

4.1.1 Direct and Indirect Effects on the Physical Environment

Sections 3.1, 3.2, and GMFMC (2004a, 2004c, and 2007) describe the physical environment and habitat used by red snapper. In summary, adult red snapper are found around low relief bottom structure, hard bottom, and artificial structures; eggs and larvae are pelagic; and juveniles are found associated with bottom inter-shelf habitat (Szedlmayer and Conti 1998) and prefer shell habitat over sand (Szedlmayer and Howe 1997). Adult red snapper are closely associated with artificial structures in the northern Gulf of Mexico (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 terms of red snapper fishing, most commercial red snapper fishermen use handlines (mostly bandit rigs and electric reels, occasionally rod-and-reel) with a small percentage (generally <5% annually) caught with bottom longlines (see section 3.1). Recreational red snapper fishing almost exclusively uses vertical-line gear, most frequently rod-and-reel (See section 3.1). The following describes the effects of common fishing gear on the physical environment.

Handline gear (bandit gear, rod-and-reel, and electric reels) used in fishing for reef fish is generally suspended over hard bottom because many managed reef fish species occur higher over this type of substrate than over sand or mud bottoms (GMFMC 2004a). Handline gear is less likely to contact the bottom than longlines, but still has the potential to snag and entangle bottom structures and cause tear-offs or abrasions (Barnette 2001). In using bandit gear, a weighted line is lowered to the bottom, and then the lead is raised slightly off the bottom (Siebenaler and Brady 1952). The gear is in direct contact with the bottom for only a short period of time. Barnette (2001) suggests that physical impacts may include entanglement and minor degradation of benthic species from line abrasion and the use of weights (sinkers). Commercial or recreational fishing with rod-and-reel also lays gear on the bottom. The terminal part of the gear is either lifted off the bottom like fishing with bandit gear, or left contacting the bottom. Sometimes the fishing line can become entangled on coral and hard bottom outcroppings. The subsequent algal growth can foul and eventually kill the underlying coral (Barnette 2001). Researchers conducting studies in the restricted fishing area at Madison-Swanson reported seeing lost fishing line on the bottom, much of which appeared to be fairly old and covered with growth (A. David, Southeast Fisheries Science Center, pers. comm.), a clear indication that bottom fishing has had an impact on the physical environment prior to fishing being prohibited in the area (GMFMC 2003).

Anchor damage is also associated with handline fishing vessels, particularly by the recreational sector where fishermen may repeatedly visit well marked fishing locations. Hamilton (2000) points out that "favorite" fishing areas such as reefs are targeted and revisited multiple times, particularly with the advent of global positioning technology. The cumulative effects of repeated anchoring could damage the hard bottom areas where fishing for red snapper occurs.

Bottom longline gear is deployed over hard bottom habitats using weights to keep the gear in direct contact with the bottom. Its potential for adverse impact is dependent on the type of habitat it is set on, the presence or absence of currents, and the behavior of fish after being hooked. In addition, this gear upon retrieval can abrade, snag, and dislodge smaller rocks, corals, and sessile invertebrates (Hamilton 2000; Barnette 2001). Direct underwater observations of longline gear in the Pacific halibut fishery by High (1998) noted that the gear could sweep across the bottom. Some halibut were observed pulling portions of longlines 15 to 20 feet over the bottom. Although the gear was observed in contact with or snagged on a variety of objects including coral, sturdy soft corals (e.g., gorgonians) usually appeared unharmed while stony corals often had portions broken off. However, in a different study where deployed bottom longline gear was directly observed (Atlantic tilefish fishery), no evidence of gear movement was documented, even when placed in strong currents (Grimes et al. 1982). This was attributed to anchors set at either end of the bottom longline as well as sash weights along the line to prevent movement. Based on these direct observations, it is logical to assume that bottom longline gear would have a minor impact on sandy or muddy habitat areas. However, due to the vertical relief that hardbottom and coral reef habitats provide, it would be expected that bottom longline gear may become entangled, resulting in potential negative impacts to habitat (Barnette 2001). Because bottom longlines are a minor gear type used in harvesting red snapper by the commercial sector, any effects to the physical environment by this gear as a result of this action would likely be minor.

The action would have no direct effect on the physical environment. This action could indirectly affect the physical environment if changes in allocation result in an increase or decrease in the amount of fishing gear used to harvest the respective commercial and recreational quotas. However, any effects under **Alternatives 2-9** would likely be minimal. One reason is the overall red snapper combined quota would not be effected by this action. Thus any beneficial effects from reducing the commercial quota (reduced fishing effort) would likely be offset by adverse effects from increasing the recreational quota (increased fishing effort). Additionally, changes in overall commercial and recreational fishing effort is likely to be small because fishermen target other species besides red snapper. Thus, for example, an angler who could schedule additional red snapper fishing trips under an alternative that increases the recreational quota (more red snapper fishing days), could still take those fishing trips under a smaller quota, but the fishing trips would target some other species besides red snapper (e.g., gag). Likewise, a commercial fisherman who might not take a trip targeting red snapper because of less IFQ allocation based on a lower commercial quota, might schedule another trip targeting some other species such as vermilion snapper, which is not managed under an IFQ program.

The no action (**Alternative 1**) would continue the current allocation. **Alternatives 2-9** would reduce the commercial red snapper allocation and increase the recreational red snapper allocation. Assuming that commercial vessels in general are more efficient at catching red snapper due to vessel type, experience, and equipment, then a likely result of having greater recreational allocation could be an increase in overall red snapper effort as a result of lower recreational efficiency. Thus, **Alternative 6** that increases the recreational allocation the most (by >17% totaling 66.1-67.5%), would have the greatest indirect effect on the physical environment compared to **Alternative 1**, no action (49%). Moving this logic forward, then

Alternative 4 (59%) would have the next greatest effect, followed by **Alternative 5** (57.7-58.4%), **Alternative 9** (57.3-57.7%), **Alternative 7** (56.1-56.8%), **Alternative 3** (54%), **Alternative 2** (52%), and **Preferred Alternative 8** (51.4-51.6%) when compared to **Alternative 1**.

4.1.2 Direct and Indirect Effects on the Biological Environment

Direct and indirect effects from fishery management actions have been discussed in detail in Reef Fish Amendment 22 and Reef Fish Amendment 27/Shrimp Amendment 14 (GMFMC 2004b and 2007) and in several red snapper framework actions (GMFMC 2010, 2012a, 2013a) and are incorporated here by reference. Potential impacts of the 2010 Deepwater Horizon MC252 oil spill on the biological/ecological environment are discussed in Section 3.3 and the January 2011 Framework Action (GMFMC 2011c) and are also incorporated here by reference. These impacts may include recruitment failure and reduced fish health. Management actions that affect this environment mostly relate to the impacts of fishing on a species' population size, life history, and the role of the species within its habitat. Removal of fish from the population through fishing reduces the overall population size. Fishing gears have different selectivity patterns which refer to a fishing method's ability to target and capture organisms by size and species. This would include the size distribution of fish caught by the gear as well as the number of discards, mostly sublegal fish or fish caught during seasonal closures, and the mortality associated with releasing these fish.

Fishing can affect life history characteristics of reef fish such as growth and maturation rates. For example, Fischer et al. (2004) and Nieland et al. (2007) found that the average size-at-age of red snapper had declined and associated this trend with fishing pressure. Woods (2003) found that the size at maturity for Gulf red snapper had also declined and speculated this change may also have been due to increases in fishing effort. The reef fish fishery can also affect species outside the reef fish complex. Specifically, sea turtles have been observed to be directly affected by the longline component of the Gulf reef fish fishery. These effects occur when sea turtles interact with fishing gear and result in an incidental capture injury or mortality and are summarized in GMFMC (2009). However, for sea turtles and other listed species, the most recent biological/ecological opinion for the Reef Fish Fishery Management Plan concluded authorization of the Gulf reef fish fishery managed in the reef fish plan is not likely to jeopardize the continued existence of sea turtles, smalltooth sawfish, or table coral species (NMFS 2011a). In addition, longlines only catch a minimal amount of commercial red snapper landings (~5%), minimizing the effects of this action on sea turtles (Appendix B). The primary gear used by the commercial and recreational sector (hook-and-line), as well as the less commonly used commercial longlines, were classified in the 2015 List of Fisheries (79 FR 77919) as a Category III fishery with regard to marine mammal species, indicating this gear has little effect on these populations (see Section 3.3 for more information).

The action in this amendment is not expected to have any direct effects on the biological environment because the Council is not considering changes to the total quota or fishing gear. Therefore, any biological effects from these alternatives are expected to be indirect. Indirect effects from this action on the biological environment could occur if there are changes in the overall size frequency of fish caught by the reef fish fishery, total number of red snapper killed

(landed or discarded dead) by either sector, any changes to the frequency or magnitude of any quota overages due to modifications to the red snapper allocation, or reductions in the stock's spawning potential ratio (SPR) from differential fishing effort. Gear types used by the commercial and recreational sectors and their expected effects are discussed in Sections 3.1 and 4.1.1 of this document.

Selectivity
As mentioned in Sections 1.1 and 3.3, updated Marine Resource Information Program showed a shift in selectivity to larger, older fish by recreational fisherman (SEDAR 31 Update 2015[20]). Because **Alternatives 2-9** would increase the recreational allocation, this could increase the number of larger fish contributing to the overall catch. Older and larger females are the biggest egg producers (SEDAR 31 2013), so removal of these fish through fishing could negatively affect the stock recovery. However, this would also result in fewer fish being caught by this sector to reach its annual catch limit, thus somewhat mitigating any negative effects of catching larger fish unless this selectivity change is due to highgrading. At this time it is unclear what the effect of this change in recreational selectivity would have on the stock and SEDAR 31 Update (2015) indicated this will likely be examined in more detail in the next stock assessment.

Discards
Discards and discard mortality rates are described in Section 3.3. Overall, discard mortality rates are higher in the commercial sector than the recreational sector, in part because of depths fished and gear used to harvest red snapper. By shifting allocation from the commercial sector to the recreational sector (**Alternatives 2-9**), the number of recreational red snapper dead discards is likely to decrease because fish that would have been discarded would be kept under higher annual catch limits. However, even with a higher recreational quota from a higher recreational allocation is not expected to extend the federal season by many days. Using the 2014 daily federal catch rate of approximately 230,000 lbs whole weight (NMFS 2015), **Alternative 6**, which would shift the allocation the most, would only yield a maximum of an additional 10-11 days to the federal season. Thus, the number of regulatory discards and their associated discard mortality from the closed season is not expected to substantially change.

For the commercial sector, the overall rates of dead discards by the commercial sector have been reduced since the implementation of the red snapper IFQ program (GMFMC 2013b). However, SEDAR 31 (2013) reported that in the western Gulf where commercial landings are higher, the discard mortality rate for vessels using handline gear without IFQ shares was greater than the discard mortality rate for handline vessels with IFQ shares (Table 3.1.1). Thus, in the western Gulf, a decrease in allocation could result in more trips without red snapper allocation and more dead discards. In the eastern Gulf, there did not seem to be a different discard mortality rate between commercial vessels with IFQ shares and those without (Table 3.1.1). However, if allocation is shifted away from the commercial sector under **Alternatives 2-9**, it is likely that the number of dead discards would increase as fish that might have been kept, must be discarded due

[20]A PowerPoint presentation describing the 2014 update assessment was presented to the Council at its January 2015 meeting, and is available at the January 2015 briefing materials on the Council website (http://www.gulfcouncil.org) or by going directly to:
http://www.gulfcouncil.org/council_meetings/Briefing%20Materials/BB-01-2015/B%20-%2014%20Red%20Snapper%202014%20Update%20Presentation.pdf.

to less IFQ allocation. As the red snapper stock expands into the eastern Gulf, the incidence of red snapper being encountered should increase as catch rates increase (Boen and Keithly 2012). But because of the reduced commercial allocation and subsequent quota reduction from **Alternatives 2** through **9**, fewer red snapper could be kept and more fish would need to be discarded.

It should be noted that for both the commercial and recreational sectors, the reef fish fishery is a multispecies fishery. Therefore, if red snapper are not available for harvest due to season closures or lack of IFQ allocation, fishing effort will likely shift to other species rather than decline. Therefore, red snapper regulatory discards and associated discard mortality will likely continue regardless of which alternative is selected as preferred.

Quota overages

Quota overages can adversely affect red snapper by slowing the stock recovery. Changing allocations could increase the likelihood of overages if it becomes harder to monitor and control harvests. With the introduction of the IFQ program, no overages of the commercial annual catch limit have occurred and are not likely to occur in the near future. For the recreational sector, annual catch limit overages have occurred frequently in recent years and could adversely affect the stock's recovery if they continue (NMFS 2013d; SEDAR 31 2013). Recreational quota overages have occurred because of difficulties assessing past fishing patterns and projecting them into the future to estimate season length (NMFS 2013). However, to reduce the likelihood of quota overages, the projected recreational season is now based on the annual catch target (ACT) set 20% below the quota (GMFMC 2014b, NMFS2014). Harvest information for 2014 (Table 3.1.2) indicates the recreational annual catch limit was not exceeded; therefore, it is unlikely changing the red snapper allocation would result in overages[21].

Spawning potential ratio

As described in Section 3.3, analyses examining the effect of increasing the recreational allocation (Appendix H) could allow the OFL, and consequently the ABC, to be increased[22]. However, the effects of increasing the ABC as a result of reallocating to the recreational sector would be to reduce the SPR of the eastern portion of the stock even further. The analyses indicated that under the current allocation (51:49 commercial:recreational under **Alternative 1**, no action), the SPR of the eastern part of the stock could decrease to as low as 7% (Appendix H). With an increase in recreational allocation to 70%, the eastern portion of the stock's SPR would decline to 4.6%. For the western stock, declines in the eastern stock's SPR are matched with modest gains in SPR. The reason for the declining eastern stock SPR with a higher recreational allocation has to do with where recreational fishing effort is concentrated. Because a higher fishing effort occurs in the east, raising the quota as a result of reallocation would lead to an increased fraction of the eastern population being removed by fishing. Thus the eastern SPR declines further under reallocation when compared to maintaining the current allocation.

[21] National Marine Fisheries Service, Southeast Regional Office, 2014 Gulf of Mexico Recreational Landings and Annual Catch Limits. http://sero.nmfs.noaa.gov/sustainable_fisheries/acl_monitoring/recreational_historical/gulf_recreational_historical/2014/index.html

[22] Gulf of Mexico Fishery Management Council Standing and Special Scientific and Statistical Meeting Summary. May 20, 2015.

Conclusions
Given the discussion above, increasing the recreational allocation would likely increase the number of larger fish being caught, decrease recreational discards, increase commercial discards, have little effect on the likelihood of annual catch limit overages, and decrease the SPR for the eastern portion of the red snapper stock. Based on the information discussed above, **Alternative 6**, which results in the largest shift in allocation to the recreational sector (66.7% for 2016 and 66.1% for 2017), would be expected to have the greatest adverse effect on the biological environment compared to **Alternative 1** (**no action**)). **Alternative 4** (59%) and **Alternative 5** (58.0% for 2016 and 57.7% for 2017) would be expected to have the next greatest effects (either beneficial or adverse) on the biological environment. **Alternative 9** (57.5%)**, Alternative 7** (56.4% for 2016 and 56.1% for 2017)**, Alternative 3** (54%), and **Alternative 2** (52%) are expected to have intermediate impacts. The allocation under **Preferred Alternative 8** (51.5%) is closest to the **Alternative 1** and so would have the least effect of **Alternatives 2-9**.

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. The most recent red snapper stock assessment (SEDAR 31 2013) indicated the stock is rebuilding. Consequently, it is possible that forage species and competitor species could decrease in abundance in response to an increase in red snapper abundance. This action, regardless of the alternative, should not affect the red snapper recovery, thus any effects on forage species and competitor species would not likely be different from no action. Changes in the bycatch of red snapper are not expected to directly affect other species in the ecosystem. Although birds, dolphins, and other predators may feed on red snapper discards, there is no evidence that any of these species rely on red snapper discards for food. Changes in the prosecution of the reef fish fishery are not expected from this action, so no additional effects to protected resources (see Section 3.3.1) are anticipated.

4.1.3 Direct and Indirect Effects on the Social Environment

Alternative 1 (**no action**) would retain the current sector allocations for red snapper and would have no impact upon the commercial sector as their allocation would remain the same. The shortened recreational fishing seasons over the past few years have been exacerbated by differential management between some states and their adjoining federal waters. This varied management has allowed for continued harvest, including when federal waters are closed, which then translates into shortened seasons because season length is based on total harvest in state and federal waters.

A direct result of the shortened seasons has been dissatisfaction with current management for the recreational sector. This dissatisfaction has, in part, prompted the Council to revisit the red snapper allocation to potentially provide some relief to the shortening seasons, which in turn has increased tension among the recreational and commercial sectors. While the red snapper stock has rebounded, the appearance of good year classes has resulted in an abundance of larger fish which has allowed the recreational quota to be caught faster, as each angler's bag limit weighs more and thus represents more of the quota. Without addressing the problem of shortened seasons, there will continue to be dissatisfaction with management and continued quota overages

by the recreational sector, although new accountability measures have recently been adopted to reduce the likelihood of quota overages. Modifying the red snapper allocation could potentially provide some temporary relief to the shortened recreational fishing seasons. However, with the 2014 federal season only nine days long, allocating the total red snapper quota to the recreational sector would still allow less than one month of red snapper harvest in federal waters.

Because **Alternatives 2-9** all transfer a certain amount of quota from the commercial sector to the recreational sector, the types of effects on the social environment would be similar among the alternatives. The effects would vary in scope and strength relative to the amount of quota that is reallocated. It is difficult to quantify social effects because a quantitative social benefits model is not available. As a result, the discussion that follows will be qualitative in its approach and identify possible direct and indirect effects that might accrue from reallocation under the different alternatives. Most generally, the quality of social impacts differs between the sectors, in that a loss of commercial access to red snapper could affect the livelihoods of commercial fishermen, especially small-scale owner-operators, hired captains and crew who do not own red snapper shares, and the well-being of commercial communities. In addition, some negative effects would be expected for red snapper consumers if decreased commercial access is associated with decreased availability. For the recreational sector, the gains in recreational quota would provide additional recreational opportunities to retain red snapper.

Red snapper is an iconic Gulf species, and the issue of red snapper reallocation is affected by the conflict between the commercial and recreational sectors over rights to the resource. The commercial sector currently retains the majority share of the resource (51%), although for most years, the majority of landings have been made by the recreational sector. Compared with no action, under all the **Alternatives 2-9**, the recreational sector will assume the majority share, a benefit sought after by the recreational sector, regardless of the poundage corresponding to the selected reallocation. This is a primary and repeated theme in public comments submitted by private recreational anglers. A sector allocation is a policy designation of the rights to access, but the reallocation of red snapper also has socio-cultural significance as a symbol of the struggle over a highly sought after resource with the recreational sector now in the majority.

From a social perspective, the potential economic gains estimated in an economic efficiency analysis assume certain aspects of the economy are equal, which may not be the case. The distributional effects of how dollars lost and gained from reallocation move through the various value chains and other targeted fisheries, including fishing communities and the larger Gulf coast economy, should be taken into consideration. While it might be expected that any net benefits from a purely economic efficiency standpoint should continue to provide net gains, there is concern that gains and losses may be experienced differently and appear with other types of analysis (Copes 1997). This point was made by the SEFSC as there are other aspects within the current economic and social climate that are not taken into consideration in the analysis. Some of the factors that might contribute to resulting impacts and how impacts are distributed through the economy include differential value chains, a sluggish economy, a high unemployment rate, the recovery from the recent Deepwater Horizon MC252 oil spill, different property rights structures, and the general differences in community well-being that currently exist.

Further, the net benefits estimated by the economic efficiency analysis ignore distributional impacts (Bromley 1977). Should net gains in economic efficiency be realized as a result of reallocation, there is no reason to expect that the gains or losses would be equally distributed among fishing communities. Jacob et al. (2013) found that when shifting allocation between recreational and commercial fishing communities, highly dependent fishing communities experienced greater positive or negative effects on well-being than those communities that were less dependent. Although this research was not specific to red snapper or the Gulf coast, it did look at reallocation and reinforces the idea that any shift may have unintended consequences not accounted for in an economic efficiency analysis (Appendix G).

Current measures of community well-being (Section 3.3) also suggest that commercial dependent fishing communities exhibit greater vulnerability than recreational-dependent fishing communities, in that more index thresholds are exceeded for commercially dependent communities than recreationally dependent communities (Figures 3.4.2.1 & 3.4.2.2). Of the commercially dependent communities discussed in Section 3.3, five exceed the social vulnerability threshold on all three measures and three exceed the thresholds for two social vulnerability measures. For the recreationally dependent communities discussed in Section 3.3, only one community exceeds the social vulnerability threshold for all three measures and three communities exceed at least two measures of social vulnerability. Again, these social vulnerability measures are not specific to red snapper but suggest the nature of differences among other parts of the economy outside of red snapper fishing. The communities that are experiencing higher social vulnerabilities may be less able to absorb negative social effects from a change in resource access resulting from reallocation due to having higher levels of poverty, unemployment, and a higher proportion of vulnerable populations. The losses to commercial fishing communities may be compounded because of increased vulnerabilities that are not captured in the economic efficiency analysis, as discussed above.

Reallocating 3% of the red snapper quota to the recreational sector (**Alternative 2**) would provide the recreational sector with a limited number of additional fishing days. With a larger shift in allocation of 10% (**Alternative 4**), the projected fishing season could possibly be extended further. However, these additional fishing opportunities for recreational fishing communities would not extend the season near the six months advocated by many anglers.[23] Furthermore, assuming the daily rate of harvest will increase as the season becomes shorter (Figure 3.4.3), and the increasing proportion of the recreational quota caught during extended state water seasons, estimations of additional fishing days may be over generous, as changes in effort or participation are likely for an open entry sector.

Conversely, the increase in fishing opportunities provided to the recreational sector from reallocation would correspond with negative impacts to the commercial sector by reducing their access to the red snapper resource. **Alternatives 2-9** will not increase the stability of red snapper fishing for the recreational sector but, these alternatives would be expected to trigger some instability in the IFQ market as a result of restructuring existing fishing privileges. Although the commercial harvest of red snapper has been open year round since inception of the IFQ program,

[23] See comments available at: https://docs.google.com/spreadsheet/ccc?key=0Atgbk2rxQkqhdHByby1ad0F0THZiMGtoVTdIVDJ6cWc#gid=0

a commercial fisherman's ability to harvest red snapper depends on the ability to acquire quota. The commercial sector consists of numerous participation roles that may incur differential impacts from this management action. For example, some captains own and fish from their own vessel, and other captains work vessels for owners, including dealers. Commercial red snapper allocation can cost upwards of 75% of ex-vessel price (GMFMC 2013b; Appendix G) for those who must purchase allocation from others. Although IFQ shares were initially distributed based on historical landings, since implementation of the program, red snapper IFQ shares have been bought by fishermen who did not initially receive them representing direct economic investment in the IFQ program. Because frustration has been expressed in public testimony by those opposed to the sale of red snapper quota allocation in the IFQ program, it must be noted that for every pound of allocation sold, another commercial fisherman paid to land that red snapper.[24]

One concern about reallocation under current management is that the quota has been increasing, but may not continue to do so in the future. If the quota decreases, the losses and benefits that accrue would be much different and could shift the direction of how those benefits accrue. Even with a stable quota, net benefits could change over time as other factors related to either sector or other parts of the economy can change. The concerns discussed above highlight many of the issues that might be raised with this choice of reallocation alternatives.

Another aspect of reallocation is the effect on perceptions of management. Existing management has led to considerable dissatisfaction among the recreational sector. However, with a reallocation of quota from the commercial sector, considerable dissatisfaction and instability in commercial participants' confidence in the IFQ market would be expected to result, because there would be no mitigation to the commercial sector for the loss of access to red snapper quota. Although the efficiency analysis suggests potential net gains from a shift in allocation, all losses accrue to the commercial sector. Prior to implementation of the IFQ program for the commercial sector, there were many years during which commercial fishermen experienced similar dissatisfaction with management due to trip limits and shortened seasons that led to derby fishing (Figure 3.4.1). Doubtless, painful social impacts accompanied the transition to the incentive-based management regime, including reductions in participation; however, seven years later, commercial red snapper fishing has stabilized, both in terms of the season length (year round), prices, and avoiding quota overages. Nevertheless, the commercial red snapper IFQ program is still considered overcapitalized (GMFMC 2013b). A reallocation from the commercial quota would be expected to negatively affect the stability of the commercial sector in terms of long-term access to red snapper allocation and confidence in the IFQ program. These effects are different than would be expected from a quota decrease deemed necessary for biological concerns, which would also result in less quota availability, but would not be expected to negatively affect participants' confidence in the IFQ market and their ability to continue participating. Given the history of the commercial sector's derby seasons prior to the IFQ program's implementation, reallocating commercial quota to the recreational sector may be seen as unfair and create new tensions with management, as quota overages and shortened seasons would be expected to continue in the recreational sector.

[24] In the IFQ program, 'shares' refer to a percentage of the entire commercial quota; shares may be bought and sold by any U.S. citizen. 'Allocation' refers to the pounds of red snapper represented by those shares, based on the current year's quota. Allocation may only be purchased and landed by a permitted commercial vessel.

Although the allocation is currently set at 51% commercial, 49% recreational, the proportion of actual landings by each sector has consistently departed from the established allocation (Tables 2.1.1 and 2.1.2). That is, since the allocation was established in 1990, in all but five years the recreational sector's annual landings have represented a larger proportion of total landings than their allocation. With a 3% reallocation, **Alternative 2** would be expected to result in the second least negative direct or indirect effects upon the commercial sector while providing fewer additional opportunities for the recreational sector to retain red snapper among **Alternatives 2-9** (the least effects would be expected under **Preferred Alternative 8**). With a 5% reallocation, **Alternative 3** would result in slightly more negative direct and indirect social effects upon the commercial sector compared with **Alternative 2**, assuming that any gains and losses move through all sectors proportionately in strength and scope. With a 10% reallocation, **Alternative 4** would provide greater fishing opportunities to the recreational sector, but also result in the greater negative direct and indirect social effects on the commercial sector.

Given the progress of red snapper rebuilding, as evidenced by larger fish and recent quota increases, the preceding discussion largely focused on impacts assuming a stable or increasing quota. However, it is possible the quota may decrease in future years, for example, if recruitment declines. Under **Alternatives 2-4**, quota decreases would compound the problems of the commercial sector's loss of access to red snapper from reallocation. **Alternatives 5-7** result in different sector allocations depending on the total amount of the red snapper quota. **Alternative 5** and **Alternative 6** propose reallocations only on any quota above 9.12 mp, and **Alternative 7** would reallocate only that portion of the quota above 10.0 mp. By limiting reallocation of 75% of any quota over 9.12 mp to the recreational sector (**Alternative 5)**, no negative social effects on the commercial sector would occur when the quota is at or below 9.12 mp, because the sectors' proportions of the quota would remain the same as under **Alternative 1**. However, with a current 2016 quota of 13.96 mp, the potential increased benefits associated with the increased quota under **Alternative 5** to the recreational sector could be appreciable compared to **Alternative 1**. In turn, the commercial quota would be decreased by the same amount, and attending adverse impacts would result from decreased access to the red snapper resource. Yet, if the red snapper stock continues to rebuild, quota increases could benefit both sectors, but provide more additional quota to the recreational sector.

By allocating 100% of all quota above 9.12 mp to the recreational sector (**Alternative 6)**, the negative social effects to the commercial sector would be greater than under **Alternative 5**, but remain the same as **Alternative 1** when the quota is equal or less than 9.12 mp. Setting the baseline above which to reallocate at 10.0 mp, **Alternative 7** would reallocate a lesser amount of quota compared with **Alternative 5. Alternative 7** would therefore be expected to provide less potential benefits to the recreational sector relative to **Alternative 5.** However, the baseline is lower than the current quota (**Alternative 1**), meaning that adverse impacts would still be expected for the commercial sector. Thus, compared with **Alternatives 2-4**, **Alternatives 5-7** would provide greater protection for the commercial sector's access to red snapper, by applying the allocation under **Alternative 1** in the event the quota decreases to below 9.12 mp (**Alternatives 5** and **6**) or 10.0 mp (**Alternative 7**).

Alternative 6 would result in the greatest quota increase for the recreational sector under the current quota, and consequently, the greatest decrease in red snapper access for the commercial

sector. **Alternative 6** has the potential to provide the greatest benefits to the recreational sector and the most adverse effects to the commercial sector, including social aspects of the IFQ program, among **Alternatives 1-9**. These expected effects would increase as the red snapper quota increases.

Preferred Alternative 8 and **Alternative 9** would reallocate portions of the quota based upon calibration of the MRIP catch estimates for historical recreational landings and changes in size selectivity that were factored into the new stock assessment which resulted in higher estimates for the stock ACL. As a result, these alternatives use changes to historical recreational landings and the preference for and availability of larger fish by the recreational sector to establish a new allocation. The resulting increase to the stock ACL from the calibration would be added to the recreational sector's quota in its entirety under **Preferred Alternative 8**. The change in allocation is averaged over the time periods from 2015 to 2017 which results in 51.5% of the annual catch limit attributed to the recreational sector and 48.5% to the commercial sector. This reallocation scenario would shift the least amount away from the commercial sector except for **Alternative 1** and therefore, have the least negative social effects to that sector compared to **Alternatives 2-9**. By taking the changes in recreational selectivity and adding those gains to the increases from the calibration to the recreational sector in **Alternative 9**, the percentage shift of the ACL to the recreational sector is greater than unders **Alternatives 1, 2, 3, 7 and 8**. Therefore, the negative social effects which would be expected to accrue to the commercial sector from **Alternative 9** would also be expected to be greater than the negative effects resulting from those alternatives.

This section has primarily addressed the recreational sector as a whole; however, fishing opportunities are not distributed evenly Gulf-wide. Prior to 2014, three of the five Gulf States allowed some additional harvest of red snapper in their state waters when the retention of red snapper from federal waters was prohibited. In 2014, all five Gulf States allowed additional fishing days for red snapper in state waters, and have continued to do so in 2015. The result is fewer red snapper fishing opportunities for 1) all anglers in federal waters during the federal season, 2) all anglers in states with compatible regulations, and 3) federal for-hire vessels operating from states with incompatible regulations. It is unknown whether a reallocation decision will affect the practice of states adopting incompatible regulations, by either increasing compliance, or resulting in greater state regulatory inconsistency. Nevertheless, those states with incompatible regulations provide additional fishing opportunities for anglers in their state waters, which shortens the recreational fishing season for other anglers. For the 2014 red snapper fishing season, an estimated 2.04 mp of the recreational red snapper quota was expected to be harvested in state waters outside of the federal season. This is approximately half of the 4.312 mp ACT implemented by emergency rule for the 2014 recreational red snapper season (NMFS 2014). Thus, it cannot be assumed that additional fishing opportunities provided through reallocation would benefit all recreational anglers through a longer federal season, as some portion of the quota would be expected to be landed in state waters outside of the federal season.

4.1.4 Direct and Indirect Effects on the Economic Environment

This action considers alternative reallocations of the red snapper quota between the recreational and the commercial sectors. The current partition of the resource grants 49 percent of the quota

to the recreational sector and 51 percent to the commercial sector. Reallocation alternatives considered in this action vary the recreational share of the quota from 49 percent (**Alternative 1**) to 59 percent in **Alternative 4**. Conversely, the commercial share of the red snapper quota ranges from a minimum of 41 percent to a maximum of 51 percent for **Alternative 4** and **Alternative 1**, respectively. The commercial and recreational red snapper allocations, in pounds and percentage of the quota, are provided in Table 3.1.2.

Alternative 1 (no action) would maintain the current split of the red snapper quota between the commercial and recreational sectors (51% commercial and 49% recreational[25]). Therefore, direct economic effects are not expected to result from **Alternative 1** because changes to harvests or other customary uses of red snapper are not expected to result from the no action alternative. However, in a study evaluating the economic efficiency of red snapper allocation between the commercial and recreational sectors, Agar and Carter (2013, Appendix G) concluded that the existing allocation was not economically efficient. Based on this finding, the continued apportionment of red snapper resources according to the status quo allocation between the sectors could potentially be expected to result in indirect adverse economic effects that would stem from forgone opportunities to enhance economic efficiency and thus generate more economic benefits. Improvements in economic efficiency would increase the economic value derived from the red snapper resources if the current allocation is moved closer to the optimal allocation, which is unknown.

All remaining alternatives (**Alternatives 2-9**) considered in this amendment would increase the percentage of the red snapper quota allocated to the recreational sector (and decrease the commercial sector's share by an equivalent percentage). Therefore, the implementation of any one of these alternatives would be expected to result in economic losses to the commercial sector and potentially generate economic benefits for the recreational sector. For each reallocation alternative, the relative magnitude of the expected losses to the commercial sector and potential gains to the recreational sector would determine the net economic effects.

Alternatives 2, **3,** and **4** would add 3%, 5%, and 10% of the red snapper quota to the recreational allocation, respectively. Adjustments proposed in **Alternative 5** and **Alternative 6** would only reapportion quota amounts in excess of 9.12 mp and would either grant 75% of the amounts in excess of 9.12 mp (**Alternative 5**) or 100% of the amount in excess of 9.12 mp (**Alternative 6**) to the recreational sector. The status quo allocation ratio would apply if the quota were 9.12 mp or lower. **Alternative 7** would allocate 75% of quota amounts in excess of 10.0 mp to the recreational sector, and the remaining 25% to the commercial sector. The status quo allocation ratio would apply if the quota were 10.0 mp or lower. **Preferred Alternative 8** would allocate quota amounts attributable to the recalibration of MRIP catch estimates to the recreational sector. **Alternative 9** would allocate the quota amounts attributable to the recalibration of MRIP catch estimates and to the change in size selectivity to the recreational sector. Based on the red snapper quotas between 2015 and 2017, of all the alternatives considered in this amendment, **Alternative 6** would allocate the greatest percentage of the red snapper quota to the recreational sector (ranging from 66.1% in 2017 to 67.5% in 2015). For each alternative, red snapper

[25] The status quo allocation was established in Amendment 1 (GMFMC, 1989) and was based on historical landings during the base period 1979-1987.

allocations to the commercial and recreational sector (in pounds and in percentage of the quota) between 2015 and 2017 are provided in Table 2.1.3.

Resulting percentages allocated to each sector would be fixed in **Alternatives 2-4** but would fluctuate in **Alternative 5** and **Alternatives 6-7** based on the magnitude of the red snapper quota. **Alternative 5** and **Alternatives 6-7** could potentially result in the reallocation of large portions of the red snapper quota as the red snapper stock recovers and red snapper quotas are increased.

To account for changes due to MRIP recalibration or to the to the changes in size selectivity in the recreational sector, percentages of the red snapper quota allocated to each sector on an annual basis would fluctuate based on the quota and on the amounts attributed to the recalibration and to the selectivity changes. However, for **Preferred Alternative 8,** and **Alternative 9** the Council based the commercial and recreational allocations on the average percentages of the red snapper quota that would be allocated to each sector between 2015 and 2017.

Estimates for mean net economic benefit per pound of red snapper are provided by Agar and Carter (2013, Appendix G). Aggregate net benefits estimates are also provided in Appendix G. In general, for commercial fisheries managed under an IFQ program, e.g., red snapper, changes in economic value in the commercial sector could be evaluated using IFQ allocation prices because for well-functioning IFQ markets, allocation prices can be used to measure net economic benefits. The estimates of economic value to the commercial sector provided in Appendix G were derived following the approach suggested in Newell et al. (2005a and 2005b), which provide discussions on IFQ markets and on the determinants of allocation prices in individual fishing quota markets. For commercial red snapper harvesters, the mean net benefit per pound of red snapper is estimated to range from $2.75 to $2.95, for a commercial red snapper quota of 5.06 mp and 4.06 mp, respectively (Agar and Carter, 2013, Appendix G). These net benefit estimates are limited to red snapper IFQ participants, including harvesters and individuals/ entities who elect to lease their annual allocation. Producer surplus received by economic agents operating between the harvest and the final consumption of red snapper, e.g., dealers and retailers, were not included. The consumer surplus enjoyed by red snapper consumers was also not included in the estimates provided. However, if there are many substitutes for red snapper (e.g., other domestic or imported reef fish), then the surplus to the retail consumer would be expected to be small. For a discussion on substitution between red snapper and imports, see, for example, Norman-López (2009).

In the recreational sector, due to the absence of market transactions for recreationally-caught fish, the evaluation of economic benefits typically relies on non-market valuation techniques such as revealed preference methods or stated preference approaches. Following Carter and Liese (2012), estimates of economic value cited in this analysis were derived based on a 2003 stated preference choice experiment survey administered by the SEFSC. For recreational anglers who prefer to fish for red snapper, the estimated benefit of keeping 2 red snapper per trip instead of keeping 2 of the next preferred species is $142.11 (in 2012 dollars). On a per pound basis, this estimate corresponds to a mean net benefit of $11.21 per pound (based on an average weight of 6.34 lbs per red snapper). This estimate does not include producer surplus to the for-hire entities (charter and headboat owners and operators).

The economic effects expected to result from reallocations of the red snapper quota between the recreational and commercial sectors are usually evaluated based on aggregate (sum of recreational and commercial) changes in economic benefit relative to a baseline allocation (51% commercial and 49% recreational). Although it logically follows that the allocation of greater proportions of the red snapper quota to a given sector would be expected to result in greater economic benefits for that sector and lower economic benefits for the other sector, inferences about overall changes in economic efficiency are not provided here because it cannot be assumed that the resource allocation within each sector is efficient. The resource allocation within the commercial sector, which is managed under an IFQ system, would constitute a reasonable approximation for an efficient resource allocation (despite the limitations to the transfer of IFQ shares and allocation due, for example, to ownership caps). However, the open access management approach in the recreational sector cannot be conducive to an efficient allocation of red snapper within the recreational sector. As suggested by Holzer and McConnell (2014), by Abbott (2015) and in a recent report (OECD 2014), changes in net benefit estimates based on the generally accepted application of the equimarginal principle (as done in previous allocation studies including the 2013 Agar and Carter study in Appendix G) and associated inferences about economic efficiency are erroneous when each sector's quota is not efficiently allocated within the sector (i.e., quota is not assigned to those participants that have the highest willingness to pay for the resource). As a result, policy prescriptions based on such inferences would not be valid, and therefore, not useful. Therefore, it is not possible to provide policy-relevant rankings of the reallocation alternatives in this amendment based on the expected net benefits to the nation, i.e., the sum of the change in economic benefits to the recreational and commercial sectors. It can only be stated that greater percentages of the red snapper quota allocated to the recreational sector would be expected to increase economic benefits to the recreational sector and decrease benefits to the commercial sector.

In addition to the preceding discussion relative to the economic changes of the proposed alternatives, several other factors should be considered in the evaluation of the potential economic effects that would be expected to result. These factors include the Magnuson-Stevens Act mandates, discrepancies between Council-determined allocations and actual percentages of total red snapper landings attributed to each sector, potential impacts of the reduced availability of IFQ allocation, and considerations relative to which sectors may be better or worse off following a reallocation.

Provisions of the Magnuson-Stevens Act prohibit management measures, including allocation decisions, from having economic efficiency as their sole purpose (National Standard 5). Other factors that must be considered include the promotion of conservation, the prevention from acquiring an excessive share, and the fairness and equity of the measure (National Standard 4). Relative to fairness and equity considerations, the Magnuson-Stevens Act also stipulates that, should the reallocation maximize overall benefits, fairness and equity does not mean that the status quo allocation should be maintained. A concise summary of the Magnuson-Stevens Act considerations as they relate to allocation is provided by Plummer et al (2012). The purpose and need for this proposed action indicates that economic efficiency does not constitute the sole purpose for this amendment. It would not be expected that the range of allocation shifts considered would grant any one sector, entity, or individual an excessive share of the resource. However, it is not clear that the proposed reallocation alternatives would promote conservation,

in light of the repeated and sizeable harvest overages recorded for the recreational sector. It is noted that recently implemented accountability measures for the recreational sector, i.e., annual catch target (ACT) are expected to mitigate the occurrence and size of overages (GMFMC, 2014). Fairness and equity considerations are discussed in the social sections (Sections 3 4.1.3).

The frequency and magnitude of recorded overages have resulted in sizeable discrepancies between the Council-mandated allocation (51% commercial and 49% recreational) and the percentages of red snapper landings attributed to each sector (Figure 2.1.2). Given the Council's limited success in constraining landings to the mandated allocation, the relevance of reallocation efforts may be improved by management measures ensuring that a mandated apportionment would be reached and, as stated by the Socioeconomic SSC[26], by giving more consideration to management approaches that would strengthen the property rights structure within the recreational sector and foster the use of rights-based instruments.

The decrease in the amount of IFQ allocation available to IFQ participants following a reallocation could be expected to put upward pressure on the price of allocation. The model explaining the variability of allocation prices as a function of the commercial quota and other explanatory variables presented in Appendix G suggests that a one million pound drop in commercial red snapper quota would result in approximately a $0.20 increase in the per pound price of allocation. However, the extent to which the decreased availability of red snapper IFQ annual allocation would impact the behavior of participants in the market for IFQ allocation is not known. For example, the willingness to sell allocation could be reduced, especially in the Eastern gulf, possibly contributing to increased discards. Additional challenges to small IFQ shareholders who typically purchase allocation during the year and to potential new entrants could also result from the limited availability. All of the proposed alternatives to the status quo (**Alternative 1**) consider increases in the recreational red snapper quota. However, because none of the proposed alternatives would allow or require actual compensation to the commercial sector, recreational anglers would be better off and commercial fishermen worse off.

4.1.5 Direct and Indirect Effects on the Administrative Environment

The setting of an allocation is an administrative action and it will have direct effects on the administrative environment through additional rulemaking. Because **Alternative 1** (no-action) would not require rulemaking, it would have no effect on the administrative environment. The act of setting the allocation under **Alternatives 2-4** and **Preferred Alternative 8** and **Alternative 9** is a one-time event, and thus these alternatives would have an equivalent burden though the minor direct administrative impacts associated with rulemaking to implement the new allocations. **Alternatives 5 - 7** would require the allocations to be changed each time the red snapper allowable biological catch (ABC) is changed. Therefore, it will trigger an additional administrative burden to the Council and NMFS to set the revised allocations and associated quotas. Under these conditions, **Alternatives 5 - 7** would have the greatest negative direct effect on the administrative environment, followed by **Alternatives 2, 3, 4, Preferred Alternative 8** and **Alternative 9**, which would have similar effects. **Alternative 1** would have no effect.

[26] For example, during its November 2013 meeting, the SESSC unanimously approved a motion to encourage the Council to look at first best i.e., incentive based mechanisms vs. second best, i.e. regulatory actions when making allocation decisions away from the current allocation.

Indirect effects of setting allocations require monitoring of the resultant quotas, enforcement of the quotas. However, regardless of which alternative is selected, these management and enforcement activities need to continue. Therefore, the indirect effects from each alternative should be similar.

4.2. Cumulative Effects Analysis (CEA)

As directed by NEPA, federal agencies are mandated to assess not only the indirect and direct impacts, but cumulative impacts of actions as well. NEPA defines a cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 C.F.R. 1508.7). Cumulative effects can either be additive or synergistic. A synergistic effect is when the combined effects are greater than the sum of the individual effects.

This section uses an approach for assessing cumulative effects that was initially used in Amendment 26 to the Reef Fish FMP and is based upon guidance offered in CEQ (1997). The report outlines 11 items for consideration in drafting a CEA for a proposed action.

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.
2. Establish the geographic scope of the analysis.
3. Establish the timeframe for the analysis.
4. Identify the other actions affecting the resources, ecosystems, and human communities of concern.
5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stress.
6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.
7. Define a baseline condition for the resources, ecosystems, and human communities.
8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.
9. Determine the magnitude and significance of cumulative effects.
10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.
11. Monitor the cumulative effects of the selected alternative and adapt management.

Cumulative effects on the biophysical environment, socio-economic environment, and administrative environments are analyzed below.

1. Identify the significant cumulative effects issues associated with the proposed actions and define the assessment goals.

The CEQ cumulative effects guidance states this step is accomplished through three activities as follows:

I. The direct and indirect effects of the proposed actions (Section 4.1);
II. Which resources, ecosystems, and human communities are affected (Section 3 and Appendix C); and
III. Which effects are important from a cumulative effects perspective (information revealed in this CEA).

2. Establish the geographic scope of the analysis.

The primary effects of the actions in this amendment would affect the social, economic, and administrative environments of the Gulf. The physical and biological/ecological environments would be less affected as described in Section 4.1.

The geographic scope affected by these actions is described in detail in Reef Fish Amendments 22 and 27 (GMFMC 2004c and 2007) and pertains directly to the Gulf. Red snapper are one of the most sought after species in the reef fish fishery. This species occurs on the continental shelves of the Gulf and the U. S. Atlantic coast to Cape Hatteras, N. C. (Moran 1988). Eggs and larvae are pelagic and juveniles are found associated with bottom features or bare bottom. In the Gulf, adults are found in submarine gullies and depressions; natural vertical relief structures such as coral reefs, rock outcroppings, and gravel bottoms; and artificial structures such as oilrigs and artificial reefs (GMFMC 2004c).

Commercial reef fish vessels and dealers are primarily found in Gulf States (GMFMC 2008b, 2013b). Based on mailing addresses or home ports given to the Southeast Regional Office (SERO) as of January 6, 2014,[27] 100% of historical charter captain reef fish, 97% of for-hire reef fish, 98.5% of commercial reef fish permitted vessels, and 100% of vessels with reef fish longline endorsements are found in Gulf States. For permitted reef fish dealers, 94.5 percent are found in Gulf States. All dealers who are able to process IFQ transactions are located in Gulf States (Section 3.5.1.3). With respect to eligible red snapper individual fishing quota shareholders actually holding red snapper shares, 98% have mailing addresses in Gulf States (GMFMC 2013b). According to NMFS (2013b), the Gulf accounted for approximately 35% of trips and 42% of the catch in 2012 for U. S. marine recreational fishing trips by approximately 3.1 million Gulf anglers catching, with visitors, 161 million fish.

3. Establish the timeframe for the analysis

The timeframe for this analysis is 1984 through 2017. Red snapper have been managed in the Gulf since the implementation of the Reef Fish Fishery Management Plan in **1984** which put in place a 13-inch minimum size limit total length (TL). The red snapper stock has been periodically assessed since 1988. The 2013 SEDAR 31 red snapper stock assessment was the last benchmark assessment and this assessment was updated in 2014. The 2014 assessment update used the same methodology as the 2013 SEDAR 31 assessment and included reconstructed data for analysis for the commercial sector from 1872 through 1962 (Porch et al. 2004), data from 1963-2011 for commercial landings, and data from 1981-2013 for recreational landings (calibrated MRIP) with provisional 2014 landings. In addition, catch effort for the Gulf

[27]http://sero.nmfs.noaa.gov/operations_management_information_services/constituency_services_branch/freedom_of_information_act/common_foia/index.html

shrimp fishery (SEDAR 31 2013), including reconstructed data from 1948-1972 (Porch and Turner 2004), was used to estimate juvenile red snapper discards from this fishery. Based on projected harvests from the assessment, the Council set red snapper quotas through **2017**.

The following is a list of reasonably foreseeable future management actions. These are described in more detail in Step 4.

- The next assessment for red snapper through SEDAR is an update scheduled to occur in **2017** as a standard assessment. Other reef fish species scheduled for assessments include: red grouper, vermilion snapper, mutton snapper, gray triggerfish, goliath grouper, and black grouper in 2015; and gag, greater amberjack, and data poor stocks in 2016; and gray snapper, scamp, yellowedge grouper, red snapper, and yellowtail snapper in 2017.

- The Council is currently developing several actions that will affect the reef fish fishery. Actions affecting red snapper include: Amendment 36 (IFQ program revision), Amendment 39 (red snapper regional management), and a generic minimum stock size threshold for low natural mortality stocks amendment. In addition, the Council is working on reef fish actions that update ACLs with new MRIP numbers, look at gag regional management, and require electronic reporting for charter boats. These actions are described in more detail in Step 4 of this CEA.

4. Identify the other actions affecting the resources, ecosystems, and human communities of concern.

a. Past actions affecting red snapper fishing are summarized in Sections 1.4 and 3.1. The following list identifies more recent actions (Note actions taken prior to Amendment 32, the last EIS done for the Reef Fish FMP are described in detail in that amendment (GMFMC 2011b) and are incorporated here by reference).

- The following are past actions are specific to red snapper:
- In January 2011, the Council submitted a framework action (GMFMC 2011c) to NMFS to increase the red snapper total allowable catch to 7.185 mp, with a 3.521 mp recreational quota and a 3.664 mp commercial quota. The final rule from this action established a 48-day recreational red snapper season was June 1 through July 18.
- On August 12, 2011, NMFS published an emergency rule that, in part, increased the recreational red snapper quota by 345,000 pounds for the 2011 fishing year and provided the agency with the authority to reopen the recreational red snapper season later in the year, if the recreational quota had not been filled by the July 19 closing date. However, in August of that year, based on headboat data plus charter boat and private recreational landings through June, NMFS calculated that 80% of the recreational quota had been caught. With the addition of July landings data plus Texas survey data, NMFS estimated that 4.4 to 4.8 mp were caught, well above the 3.865 mp quota. Thus, no unused quota was available to reopen the recreational fishing season.
- On May 30, 2012, NMFS published a final rule to implement a framework action submitted by the Council to increase the commercial and recreational quotas and

establish the 2012 recreational red snapper fishing season (GMFMC 2012a). The recreational season opened on June 1 through July 11. However, the north-central Gulf experienced extended severe weather during the first 26 days of the 2012 recreational red snapper fishing season, including Tropical Storm Debby. Because of the severe tropical weather, the season was extended by six days and closed on July 17.

- On May 29, 2013, NMFS published a final rule to implement a framework action submitted by the Council to increase the commercial and recreational quotas (GMFMC 2013c). The combined quotas were raised from 8.080 million pounds whole weight to 8.460 lbs whole weight. The recreational fishing season was set differently for waters off different states because of non-compatible regulations. However, a federal court ruled against different seasons, so the season for federal waters was from June 1 through July 5. Later in 2013, NMFS approved a framework action (GMFMC 2013a) to increase the combined quotas from 8.46 mp to 11 mp. This allowed an additional recreational fishing season from October 1 through October 15.
- An exempted fishing permit was given to the Gulf of Mexico Headboat Collaborative Pilot program that began on January 1, 2014. NMFS authorized the 2-year pilot program to assess the viability of an allocation-based management strategy for achieving conservation and economic goals more effectively than current management. The Headboat Collaborative was allocated a portion of the red snapper and gag recreational quotas based on historical landings data and participating headboats are able to use the allotted quota to harvest red snapper and gag outside the normal recreational fishing seasons.
- In response to a decision by the U.S. District Court for the District of Columbia (Court) in Guindon v. Pritzker, 2014 WL 1274076 (D.D.C. Mar. 26, 2014), NMFS took emergency action May 15, 2014 (79 FR 27768) to address recent recreational red snapper quota overages. At their April 2014 meeting, the Council requested an emergency rule to implement an in-season accountability measure for the recreational harvest of red snapper in the Gulf that would apply to the 2014 season that opened on June 1, 2014. The action set an ACT equal to 80% of the 5.390 mp quota (ACT = 4.312 mp). The resultant 9-day season was based on the ACT and has only a 15% probability of exceeding the quota.
- A framework action (GMFMC 2014b)was submitted by the Council to establish a recreational red snapper ACT and overage adjustment as accountability measures for the recreational sector. A final rule was published on March 19,2015.
- On April 22, 2015, the final rule for Amendment 40 was published. Amendment 40 (GMFMC 2014a) contained measures to establish two components within the recreational sector (federal for-hire and private angling) with a three-year sunset provision; allocated the recreational red snapper quota between the components; and established separate season closure provisions for the federal for-hire component and the private angling component.
- On April 22, 2015, a final rule for a framework action that sets the recreational and commercial quotas was published. The purpose of the action was to revise the quotas for commercial and recreational harvest of red snapper in the Gulf consistent with the red snapper rebuilding plan and allow each sector to harvest the additional quota.

b. The following are recent reef fish actions not summarized in Section 1.4 or 3.1 but are important to the reef fish fishery in general (Note actions taken prior to Amendment 32 are described in detail in that amendment (GMFMC 2011b) and incorporated here by reference).

- A rule effective April 2, 2012, that adjusted the 2012 commercial quota for greater amberjack, based on final 2011 landings data. For 2011, the commercial quota was exceeded by 265,562 pounds. Therefore, NMFS adjust the 2012 commercial quota to account for the overage resulting in a quota of 237,438 pounds.
- A temporary rule effective May 14, 2012, reduced the gray triggerfish annual catch limits and commercial and recreational annual catch targets. The temporary rule was put in place to reduce overfishing while the Council worked on long-term measures to end overfishing and rebuild the stock in Amendment 37.
- A framework action effective on November 19, 2012, eliminated the earned income qualification requirement for the renewal of Gulf commercial reef fish permits and increased the maximum number of crew members for dual-permitted (commercial and charter) vessels. The Council determined the existing earned income requirement in the reef fish fishery is no longer necessary and relaxing the number of crew on dual-permitted vessels increased the safety on commercial trips, particularly for commercial spear fishermen.
- Amendment 38 (GMFMC 2012c), effective March 1, 2013, allows NMFS to shorten the season for gag and red grouper if landings exceeded the catch limit in the previous year. The amendment also changed the trigger method for recreational accountability measures to an annual comparison of landings to the catch limit rather than using a three-year moving average. Finally, the amendment allows the establishment or modification of accountability measures through the faster framework procedure rather than through slower plan amendments.
- Amendment 37 (GMFMC 2012b), rulemaking effective June 10, 2013, was developed to end overfishing of gray triggerfish and rebuild the gray triggerfish stock. The amendment adjusted the commercial and recreational gray triggerfish annual catch limits and annual catch targets, established a 12-fish commercial gray triggerfish trip limit and a 2-fish recreational daily bag limit, established an annual fishing season closure from June 1 through July 31 for the commercial and recreational sectors, and established an overage adjustment for the recreational sector.
- A framework action effective July 5, 2013, adjusted the recreational gag season to July 1 through December 3, 2013, the time projected to harvest the recreational annual catch target of 1.287 mp. The framework action also restricted the geographical extent of the fixed February 1 through March 31 shallow-water grouper closed season to apply only to waters seaward of the 20-fathom boundary. This allows grouper fishing to occur year-round while providing some protection to species that spawn during February and March.
- A framework action effective September 3, 2013, set a 10-vermilion snapper bag limit within the 20-fish aggregate reef fish bag limit as a precautionary measure to reduce the chance of overfishing for this species. The action also increased the Gulf yellowtail snapper annual catch limit from 725,000 pounds to 901,125 pounds based on a recent stock assessment. Finally, the action eliminated the requirement to use venting tools

when fishing for reef fish as 1) some scientific studies have questioned the usefulness of venting tools in preventing barotrauma in fish and 2) the action would give more flexibility to fishermen on when to vent or to use some other device like fish descenders.

- A framework action effective August 30, 2013, simplified for-hire permit renewals and transfers as well as allow more flexibility to the for-hire industry in how they use their vessels.
- Accountability measures for red grouper and gray triggerfish were implemented. For red grouper recreational fishing, the bag limit was reduced from four to three fish on May 5, 2014, and a season closure was projected for September 16, 2014. For gray triggerfish, the recreational season was closed on May 1, 2014.

c. The following are reasonably foreseeable future actions (RFFA) important to red snapper and the reef fish fishery in general[28].

- The Council is currently developing the following actions for red snapper.
    - Amendment 36 would revise the IFQ program based on recommendations from the red snapper IFQ program. These recommendations would be based on a review of the program completed in 2013 (GMFMC 2013b).
    - Amendment 39 would allow regional management of red snapper for the recreational sector. This regional management could be set at the state level or be based on broader regions (e.g., eastern and western Gulf).
    - A reef fish amendment (unnumbered) addressing the minimum stock size threshold (MSST) for stocks with low natural mortality rates. The purpose of the amendment is to set MSST for reef fish stocks taking into consideration natural mortality rates, and to establish MSST for all stocks in the reef fish fishery management unit.
    - A framework action to withhold a portion of the red snapper 2016 commercial quota equivalent to the difference between the current 2016 quota and the 2016 quota that would result from Amendment 28. This action would allow the disbursement of 2016 IFQ allocation to IFQ shareholders as well as allow the 2016 commercial quota reduction from Amendment 28 to be implemented.
- The Council is working on other reef fish actions. These are as follow:
    - A framework action to update ACLs with new MRIP numbers for grouper and tilefish stocks managed under IFQ programs. The action proposes to update ACLs developed in the Generic ACL/AM Amendment that used MRFSS landings data with the new MRIP landing estimates.
    - An abbreviated framework action for definition & intent of for-hire fishing in the EEZ.
    - An amendment for regional management for the recreational harvest of gag to provide greater flexibility in regionally managing this species.
    - An amendment to require electronic reporting for charter boats to improve the quality and timeliness of landings data for this sector.

d. The following are non-FMP actions which can influence the reef fish fishery.

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

In addition, Amendment 32 (GMFMC 2011a) discussed in detail a 2005 red tide event on the west-Florida shelf and the resultant oil spill from the explosion on the Deepwater Horizon MC252 oil rig. The red tide event may have affected reef fish, including red snapper populations. It has only been in the last 10 years that mortalities of higher vertebrates have been indisputably demonstrated to be due to acute red tide blooms and their brevetoxins (Landsberg et al. 2009). The extent of this event and possible effects of fish community structure has been described in Gannon et al. (2009).

Millions of barrels of oil were released into the Gulf from the Deepwater Horizon MC252 event (see http://response.restoration.noaa.gov/deepwaterhorizon; also see Section 3.3). The effects on the environment on reef fish and the reef fish fisheries may not be known for several years when affected year classes of larval and juvenile fish enter the adult spawning population or fishery. For red snapper, this occurs at approximately 3 years of age, so a year class failure in 2010 may not be detected in the spawning populations or by harvesters of red snapper until 2013 at the earliest. The results of the studies detecting these impacts on recruitment should be available soon and will be taken into consideration in the next SEDAR assessment. In addition to impacts on recruitment, adult reef fish may also have been negatively affected by the oil spill. For example, Weisberg et al. (2014) suggested the hydrocarbons associated with Deepwater Horizon MC252 oil spill did transit onto the Florida shelf and may be associated with the occurrences of reef fish (including red snapper) with lesions and other deformities. The overall impact of the oil spill may not be realized for quite some time and study results are just now becoming available.

There is a large and growing body of literature on past, present, and future impacts of global climate change induced by human activities (Kennedy et al. 2002). Some of the likely effects commonly mentioned in relation to marine resources are sea level rise, ocean acidification, coral bleaching, increased frequency of severe weather events, and change in air and water temperatures (Kennedy et al. 2002; Osgood 2008). 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 its assessments of climate change (http://www.ipcc.ch/publications_and_data/publications_and_data.shtml). Additional reports are provided on the Global Climate Change website http://climate.nasa.gov/scientific-consensus. NOAA's Climate Change Web Portal (http://www.esrl.noaa.gov/psd/ipcc/ocn/) indicates the average sea surface temperature in the Gulf will increase by 1.2-1.4ºC for 2006-2055 compared to the average over the years 1956-2005.

Global climate changes could affect 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; Osgood 2008). An area of low oxygen, known as the dead zone, forms in the northern Gulf each summer, and has been increasing in recent years (see Section 3.3). Climate change may contribute to this spread

by increasing rainfall that brings allochthonous materials and runoff from agricultural lands by rivers to the Gulf increasing nutrient inputs. This increased nutrient load causes algal blooms that, when decomposing, reduce oxygen in the water (Needham et al. 2012; Kennedy et al. 2002). It is unclear how climate change would affect reef fishes 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. 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 OceanAdapt model (http://oceanadapt.rutgers.edu/regional_data/) shows that for red snapper, although there is little change in latitudinal distribution from 1985-2013, there does appear to be a distributional trend towards deeper water later in the 1985-2013 time series. 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. 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. Climate change may significantly affect Gulf reef fish species in the future, but the level and time frame of these effects cannot be quantified at this time. Actions from this amendment are not expected to significantly contribute to climate change through the increase or decrease in the carbon footprint from fishing.

5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stress.

This step should identify the trends, existing conditions, and the ability to withstand stresses of the environmental components. According to the CEQ guidance describing stress factors, there are two types of information needed. The first are the socioeconomic driving variables identifying the types, distribution, and intensity of key social and economic activities within the region. The second are the indicators of stress on specific resources, ecosystems, and communities.

Reef Fish Fishery

Data used to monitor commercial reef fish effort includes the number of vessels with landings, the number of trips taken, and trip duration. Declines in effort may be a signal of stress within the fishery. For the red snapper component of the commercial sector, the number of vessels and trips did decline after the red snapper IFQ program was first implemented. However, the number of vessels and trips with red snapper landings have increased from 2007 to 2012 (GMFMC 2013b). These trends are described in Sections 3.1, 5.0, 6.0 and in GMFMC (2013b). The commercial IFQ program recently underwent a 5-year review (GMFMC 2013b). The stated goals of this program, implemented through Amendment 26 (GMFMC 2006) were to reduce overcapacity and eliminate problems associated with overcapacity. The review found the program was moderately to highly successful in meeting the program goals; however, further improvements were identified regarding overcapacity, discard mortality price reporting, and social and community impacts. Therefore, the red snapper component of the commercial sector does not seem to be stressed.

Within the commercial reef fish sector as a whole, the number of commercial vessels has been declining as evidenced by the number of permits (Table 4.2.1). The number of permits has declined from 1,099 in 2008 to 882 in 2014 and the number landing at least one pound of reef fish has declined from 681 to 406 over the same time period. Although this could be an indicator of stress in the fishery, the commercial sector has undergone several changes in the past few years with the IFQ programs for red snapper, grouper, and tilefish. Given that a primary goal of these programs is to reduce overcapacity, the reduction in permits may just reflect this expected change.

Table 4.2.1. Number of Gulf of Mexico reef fish commercial (landing at least one pound of reef fish), for-hire, and historical captain permits by year.*

Sector	Year						
	2008	2009	2010	2011	2012	2013	2014*
Commercial	1099 (681)	998 (696)	969 (579)	952 (561)	917 (558)	895(523)	882(406)
For-hire	1458	1417	1385	1353	1336	1323	1310
Historical captain	61	56	47	43	42	40	35

Source: Southeast Regional Office, Limited Access Permit Program Branch.
*Preliminary 2014 landings

Table 4.2.2. Number of Gulf of Mexico reef fish commercial trips catching at least one pound of reef fish and the number of offshore angler trips for the charter and private angler components of the reef fish recreational sector* for the years 2008-2013.

Sector	Year					
	2008	2009	2010	2011	2012	2013
Commercial	8,081	8,177	5,991	6,541	6,647	6,180
Charter	351,098	304,258	212,358	286,263	347,126	412,325
Private angler	1,310,025	1,025,917	658,068	598,386	769,437	1,622,302

Sources: Commercial trip data from the Southeast Regional Office, Limited Access Permit Program Branch and recreational angler trip data from NOAA Office of Science and Technology's Recreational Fisheries Statistics web page at https://www.st.nmfs.noaa.gov/recreational-fisheries/index.
*Includes all trips where reef fish species were harvested or released. Texas information unavailable.

Social and economic characteristics of recreational anglers are collected periodically as an add-on survey to MRIP. Data used to monitor recreational reef fish effort in the sector primarily comes from MRIP and includes the number of trips and number of catch trips. Declines in effort may be a signal of stress within the sector. Private and charter fishing modes accounted for most of red snapper target trips, with the private angler mode the most common mode (Table 3.5.2.1.2), and Florida has the highest landings among the states (Table 3.5.2.1.1). For red snapper, changes in angler trips across states between 2010 and 2013 do not appear to show this segment of the fishery is stressed. Both targeted angler trips and trips that caught red snapper by the sector were high in 2008 and 2009 before declining in 2010 and 2011 (Table 4.2.2). The low harvest in 2010 was likely due to the Deepwater Horizon MC252 oil spill when large areas of the northern Gulf were closed to fishing. Since 2010 and 2011, the number of annual angler trips

has increased for the charter and private angler modes such that the number of trips in 2013 has exceeded 2008 and 2009 levels (Table 4.2.2).

For the reef fish recreational sector, the number of angler trips in offshore waters (Table 4.2.2; used as a proxy for recreational reef fish fishing) and on headboats (Table 3.5.2.1.3) show a similar trend as noted above for recreational red snapper fishing with a low in 2010 followed by an increase in trips in 2012 - 2014. This suggests the sector is recovering from the 2010 Deepwater Horizon MC252 oil spill. Within the for-hire component, the number of for-hire and historical captain permitted vessels has declined from 2008 to 2014 (Table 4.2.1; 1458 to 1310 permits and 61 to 35 permits, respectively) and could be viewed as an indicator of stress. However, the number of offshore trips by the charter component has increased above 2008 and 2009 values suggesting economic conditions for this component are improving. In addition, the establishment of a federal for-hire component (Amendment 40) is expected to benefit for-hire fishermen with federally permitted reef fish vessels as they will be fishing under their own quota rather than the recreational quota as a whole.

At this time, climate change does not appear to be a stressor on the reef fish fishery. However, it could be in the future. The National Ocean Service (2011) indicated that 59% of the Gulf coast shoreline is vulnerable to sea level rise. This means coastal communities that support this fishery could be impacted in the future from higher storm surges and other factors associated with sea level rise. These communities do appear to be somewhat resilient given their ability to recover after the 2004 and 2005 hurricane seasons as well as from the Deepwater Horizon MC252 oil spill (see step 4).

Red Snapper

Major stresses to the red snapper stock have primarily come from overfishing, which has been occurring at least since the first stock assessment in 1988 and overfishing only recently ended. It is likely that quota overruns by both commercial and recreational sectors have slowed the recovery of the stock. Trends in landings and the status of red snapper stock are based on NMFS and SEDAR stock assessments (summarized in Sections 3.1 and 3.3) and incorporated here by reference. The most recent stock assessment indicates the stock is continuing to rebuild. It is likely the red snapper stock was adversely affected by the Deepwater Horizon MC252 oil spill in 2010; however, these effects are only just being realized (see step 4d). A recommendation in the 2013 stock assessment (SEDAR 31 2013) is that future assessments of Gulf red snapper should be conducted with the explicit goal of attempting to model any enduring oil spill effects and their effect on the stock. At this point, it is unclear if and how climate change is affecting red snapper stocks. 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 in Gulf fish stocks, but changes to such patterns have not been observed for red snapper.

Ecosystem

With respect to stresses to the ecosystem from actions in this amendment, changes in the red snapper allocation are not likely to create additional stress. Handline gear, the primary gear used by the fishery, and longlines can damage habitat through snagging or entanglement; however, as described in Section 4.1.1, these impacts are minimal. Changes in the population size structure as a result of shifting red snapper fishing selectivities and increases in stock abundance could

lead to changes in the abundance of other reef fish species that compete with red snapper for shelter and food. Predators of red snapper could increase if red snapper abundance is increased, while species competing for similar resources as red snapper could potentially decrease in abundance if food and/or shelter are less available. Efforts to model these interactions are still ongoing [e.g., Ecopath (Walters et al. 2006) and Atlantis), and so predicting possible stresses on the ecosystem in a meaningful way is not possible at this time. As described in Part 4d of this cumulative effects analysis, the Deepwater Horizon MC252 incident has affected more than one-third of the Gulf area from western Louisiana east to the panhandle of Florida and south to the Campeche Bank in Mexico. The impacts of the oil spill on the physical and biological environments are expected to be significant and may be long-term. Stressors to the ecosystem could include such factors as year-class failures and damage to reef fish EFH. Climate change may also be a stressor to the ecosystem, but is poorly understood. Hollowed et al. (2013) outlined the difficulties in understanding the effects of climate change and developed a conceptual pathway of direct and indirect effects of climate change and other anthropogenic factors on marine ecosystems. They suggest integrated interdisciplinary research teams be used better understand the effects.

Administrative Environment

The stresses to the administrative environment from these actions would likely focus on the setting of annual quotas, ACTs, as well as monitoring landings to determine if AMs have been triggered. However, these stresses are not expected to significantly differ from the current stresses. In 2013, several states established recreational red snapper regulations that were inconsistent with federal regulations and by 2014, all Gulf states had extended their seasons beyond the federal season in state waters. This caused additional stress on the administrative environment requiring additional regulations, analysis, presence of law enforcement, and increased confusion among the fishing public. The actions in this amendment would allow regions to adjust regulations to meet their regional needs while maintaining consistency with the FMP and likely reduce stress in this environment. It is unknown whether the regions would be able to constrain harvest to the quota. However, with the current federal management, the recreational sector has exceeded the allocation in 14 of 22 years in which an allocation was specified. The stock could likely withstand some overages without jeopardizing the rebuilding plan; however, continuous overages could result in a change of the stock status. However, the regions have indicated they intend to establish new monitoring procedures, which could improve the estimations for landings, but the SEFSC would need to review the sampling designs and data to insure compatibility with the current methods.

6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.

This section examines whether resources, ecosystems, and human communities are approaching conditions where additional stresses could have an important cumulative effect beyond any current plan, regulatory, or sustainability threshold (CEQ 1997). Sustainability thresholds can be identified for some resources, which are levels of impact beyond which the resources cannot be sustained in a stable state. Other thresholds are established through numerical standards, qualitative standards, or management goals. The CEA should address whether thresholds could

be exceeded because of the contribution of the proposed actions to other cumulative activities affecting resources.

Reef Fish Fishery

As indicated above, both commercial and for-hire fisheries are subject to stress as a result of increases in fishing costs, increases in harvesting efficiency, more restrictive regulations (particularly for red snapper), and changes in the stock status of certain species (effort shifting). Reductions in dollars generated by these entities would likely be felt in the fishery infrastructure. For the reef fish fishery, an indicator of stress would be a decline in the number of permitted vessels. For the commercial sector, the number of vessels and trips landing red snapper initially declined after the IFQ program went into effect in 2007 (419 vessels and 4,714 trips in 2006 compared to 319 vessels and 2,578 trips in 2007; GMFMC 2013b). However, the number of vessels and trips landing red snapper has increased in recent years (368 vessels and 3,389 trips in 2011) demonstrating that conditions in commercial red snapper sector are improving. GMFMC (2013b) also cites other factors such as pricing, fleet and effort consolidation, and market conditions that also support an improved socioeconomic environment. As mentioned in Step 5 of this CEA, the number of vessels in the commercial sector has declined (Table 4.2.1); however, with the shift towards IFQ management, it is difficult to determine if this reflects stress in the sector or is a result of overcapacity reduction - an expected result of IFQ management. Five-year reviews similar to the one conducted for red snapper are planned for the grouper and tilefish IFQ programs after the 2014 fishing year (year 5 of the) is complete.

Analyses conducted on the effects of a limited access program for for-hire vessels indicated operations were generally profitable (GMFMC 2005a). However, testimony from for-hire operators in light of recent red snapper regulations have suggested some for-hire operators may go out of business, particularly in the northeastern Gulf. This may be reflected in the declines in the numbers of permitted vessels shown in Table 4.2.2. However, the proposed Action would increase the recreational allocation and support more red snapper fishing days. As a result, more red snapper trips would likely be booked unless any gains derived from shifting the allocation are minimized through the use of ACTs (20% less than the quota) to estimate the red snapper season length. This is particularly true with the proposed federal for-hire component quota that would likely increase the season length for federally permitted reef fish for-hire operators. Other reasonably foreseeable actions listed in Step 4c of this analysis are not expected to adversely affect the for-hire component and so should not place additional stress to the recreational sector. Non-FMP actions (see Step 4d) may place added stress on the for-hire component of the recreational sector (e.g., hurricanes and higher fuel costs). However, timing and magnitude of the potential negative cumulative the effects from these events are difficult to predict.

Little information is available on the stresses on the private angler sector. Because private angling is an optional activity, likely factors that affect a person's involvement are likely economic. Therefore, costs such as fuel, marina fees, and boat upkeep are likely to affect a person's decision to go red snapper fishing or not, particularly within the current short recreational red snapper season. As a result, more red snapper trips in federal waters could be taken if there are gains in pounds for this component depending on how states manage recreational red snapper fishing in state waters. Other reasonably foreseeable actions listed in Step 4c of this analysis are not expected to adversely affect the private angling component and so

should not place additional stress to the recreational sector as a whole. Non-FMP actions (see Step 4d) may place added stress on the private angling component (e.g., hurricanes, higher fuel costs, and climate change). However, timing and magnitude of the potential negative cumulative the effects from these events are difficult to predict (see steps 4 and 6).

Red Snapper

Amendment 1 to the Reef Fish FMP (GMFMC 1989), implemented in 1990 before the Sustainable Fisheries Act (SFA) was passed, established the minimum spawning stock biomass at 20 percent SPR for all reef fish species. A 1991 regulatory amendment (GMFMC 1991) established a commercial quota and a 1997 regulatory amendment established a recreational quota. The quotas were set based on the 51:49 commercial:recreational allocation being applied to the total allowable catch. The Generic Sustainable Fisheries Act (SFA) Amendment (GMFMC 1999) proposed SFA definitions for optimum yield, minimum stock size threshold and maximum fishing mortality threshold for three reef fish species and generic definitions for all other reef fish. The definition of maximum fishing mortality threshold for red snapper, $F_{26\%SPR}$, was approved and implemented. Definitions for optimum yield and minimum stock size threshold were disapproved because they were not biomass-based. ACLs were not implemented for red snapper as the commercial and recreational quotas were considered functional equivalents; however, ACLs are currently being developed by the Council in a Generic Status Determination Criteria Amendment (see 4c of this CEA).

A benchmark assessment was conducted for red snapper in 2013 with an update in 2014 under the SEDAR stock assessment process (see Section 3.3 for a summary of the assessment). Based on the parameter estimates through 2014 (using provisional landings), the red snapper stock was found to be overfished, but that overfishing had ended. A brief description of the stock and its status can be found in Section 3.3 and step 5 of this CEA. Measures proposed in this amendment are not likely to adversely affect the red snapper stock status as long as landings do not exceed the OFL. This is because the actions would affect the allocation of red snapper between sectors and not how many red snapper can be caught. At this time, it is unclear how climate change may affect these regulatory thresholds (see steps 4 and 5).

Ecosystem

The stresses associated with the proposed actions in relation to regulatory thresholds are not likely to cause beneficial or adverse effects on the ecosystem. The actions would not change the way the reef fish fishery as a whole is prosecuted. Actions in the amendment would affect red snapper recreational fishing and not fishing for the other 30 reef fish species. Thus, significant effects on the ecosystem are not expected. The overall Gulf-wide fishing effort would remain constrained by the recreational quotas and annual catch limits. Climate change is likely to affect the Gulf ecosystem; however, as described in steps 4 and 5, these effects are poorly understood.

Administrative Environment

The stresses associated with the proposed actions in relation to regulatory thresholds are not likely to cause beneficial or adverse effects on the administrative environments. Activities such as monitoring landings, setting quotas, and enforcing fisheries regulations will continue as before. If the creating reallocating red snapper between sectors results in more satisfying management measures for each sector, this should reduce stresses on managers to respond

complaints by stakeholders on red snapper management. However, given the allocation for the commercial sector would be reduced, dissatisfaction by the sector could result and place more stress on fishery managers.

7. Define a baseline condition for the resources, ecosystems, and human communities.

The purpose of defining a baseline condition for the resource and ecosystems in the area of the proposed actions is to establish a point of reference for evaluating the extent and significance of expected cumulative effects.

Reef Fish Fishery

As noted in Section 3.1, a description of the fishery and affected environment relative to red snapper was last fully discussed in joint Reef Fish Amendment 27/Shrimp Amendment 14 (GMFMC 2007). Red snapper landings for the recreational sector are not available at the community level, making it difficult to identify communities as dependent on recreational fishing for red snapper. Data reflecting commercial landings of red snapper may or may not reflect areas of importance for recreational fishing of red snapper. It cannot be assumed that the proportion of commercial red snapper landings among other species in a community would be similar to its proportion among recreational landings within the same community because of sector differences in fishing practices and preferences. Thus, in addition to communities with the greatest commercial red snapper landings, the referenced analysis identifies communities with the greatest recreational fishing engagement, based on numbers of: 1) federal for-hire permits, 2) vessels designated recreational by owner address, and 3) vessels designated recreational by homeport, plus availability of recreational fishing infrastructure. The Gulf communities to score highest for recreational fishing engagement based on the described analysis are listed in Figures 3.4.1.1 and 3.4.1.2, and Table 3.4.1.2. 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 30 list suggesting a greater importance for recreational fishing in that region.

Information is lacking on the social environment of these fisheries, although some economic data are available, although primarily for the commercial sector. Fishery-wide ex-vessel revenues are available dating to the early 1960s, and individual vessel ex-vessel revenues are available from 1993 when the logbook program was implemented for all commercial vessels.

Red Snapper

The first stock assessment of red snapper was conducted in 1986 and has been assessed periodically since then (see Section 3.1). The most recent assessment (see Section 3.3 for a summary) occurred in 2013 through the SEDAR process and included data through 2011. The assessment shows trends in biomass, fishing mortality, fish weight, and fish length dating to the earliest periods of data collection. For this assessment, reliable commercial landings data were estimated back to 1963 and projected landings were estimated back to 1872 (Porch et al. 2004). Recreational data were available since 1981. Beginning with the 1988 assessment (Goodyear 1988), red snapper have been considered overfished and undergoing overfishing. However, the most recent assessment (SEDAR 31 2013) showed that overfishing had ended and that the stock condition, although still overfished, was improving. At this time, it is unknown what affects

non-FMP actions (beneficial or adverse) such as the Deepwater Horizon MC252 oil spill or climate change may have on the health of red snapper stocks. Long-term monitoring of reef fish stocks relative to the Deepwater Horizon MC252 oil spill are ongoing.

Ecosystem

A baseline for analysis of the physical environment, as discussed in Section 3.2, was conducted in the EIS for the Generic EFH Amendment (GMFMC 2004a). Detailed information pertaining to the closures and preserves is provided in the February 2010 Regulatory Amendment (GMFMC 2010). In the Gulf, fish habitat for adult red snapper consists of submarine gullies and depressions; natural vertical relief structures such as coral reefs, rock outcroppings, and gravel bottoms; and artificial structures such as oilrigs and artificial reefs (GMFMC 2004a). Many of these vertical relief areas are identified as protected areas.

Other species in the ecosystem are discussed in Section 3.3. The Reef Fish FMP currently encompasses 31 species (Table 3.3.2). Eleven other species were removed from the FMP in 2012 through the Generic ACL/AM Amendment (GMFMC 2011a). Stock assessments and stock assessment reviews have been conducted for 13 species and can be found on the Council (www.gulfcouncil.org) and SEDAR (www.sefsc.noaa.gov/sedar) websites.

Administrative Environment

The administrative environment is described in Section 3.6. Responsibility for federal fishery management is shared by the Secretary of Commerce (Secretary) and the Council for the federal waters of the Gulf. These waters extend to 200 nautical miles offshore from the nine-mile seaward boundary of the states of Florida and Texas, and the three-mile seaward boundary of the states of Alabama, Mississippi, and Louisiana. 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 exercise legislative and regulatory authority over their respective state's 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.

Regulations contained within FMPs are enforced through actions of NOAA's Office of Law Enforcement, the United States Coast Guard, and various state authorities. To better coordinate enforcement activities, federal and state enforcement agencies have developed cooperative agreements to enforce the Magnuson-Stevens Act. These activities are being coordinated by the Council's Law Enforcement Advisory Panel and the Gulf States Marine Fisheries Commission's Law Enforcement Committee, which have developed a 5-year "Gulf of Mexico Cooperative Law Enforcement Strategic Plan – 2008-2012."

The ability of the regions to constrain harvest causes uncertainty surrounding the effects of implementing regional management. The federal management has experienced overages of the quota or allocation in 14 of the last 22 years. However, the methods for estimating landings and projecting the season have improved consistently over time. The question remains if regions could constrain the harvest within the regional quotas; however, the regions have indicated they intend to improve monitoring for their specific regions under this plan, which should ameliorate any concerns about overages being worse. Nevertheless, NMFS would need to continue analyzing the catch rates and landings to determine whether the regional management measures constrain the harvest. If the quota is exceeded for Gulf recreational red snapper harvest, then NMFS would be required to prohibit harvest in the EEZ regardless of the regional management plans.

8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.

Cause-and–effect relationships are presented in Tables 4.2.3.

Table 4.2.3. The cause and effect relationship of fishing and regulatory actions for red snapper within the time period of the CEA.

Time periods	Cause	Observed and/or expected effects
1800-2016	Climate change	Changes ocean acidity and temperature modifies fish and prey distributions and productivity; threaten fishing communities through sea level rise and changing weather patterns
1962-1983	Growth and recruitment overfishing	Declines in mean size and weight
1984	13-inch minimum size limit for the recreational and commercial fisheries	Slowed rate of overfishing
1990	3.1 mp quota for commercial fishery and 7 fish bag limit	Further slow rate of overfishing
1991-1992	2.04 mp commercial quota	Continue to slow rate of overfishing
1992	Establish red snapper Class 1 and 2 endorsements and respective trip limits	Begin derby fishery
1993-1998	3.06 mp commercial quota	Continue to slow rate of overfishing
1994	Increase minimum size to 14 inches in the commercial and recreational fisheries	Increase yield per recruit, increase the chance for spawning, and slow rate of overfishing
1995-1997	Increase minimum size to 15 inches in the commercial and recreational fisheries and reduce the bag limit to 5 fish	Increase yield per recruit, increase the chance for spawning, and slow rate of overfishing
1997-2005	Reduce recreational season length	Constrain harvest in recreational fishery
1998	Shrimp trawls in the EEZ required to use NMFS-certified BRDs west of Cape San Blas	Reduce fishing mortality rate on age 0 and age 1 red snapper
1998-2005	Reduce bag limit to 4 fish	Reduce fishing mortality rate in recreational fishery
1999-2005	Raise total quota to 9.12 mp	Reduce rebuilding rate for fishery
2000-2016	Raise recreational minimum size limit to 16 inches	Increase yield per recruit, increase the chance for spawning, slow rate of overfishing
2004	Shrimp trawls in the EEZ required to use NMFS-certified BRDs east of Cape San Blas	Further reduce fishing mortality rate on age 0 and age 1 red snapper
2004	Implement red snapper rebuilding plan	Provide mechanism to monitor harvest for rebuilding
2007-2016	Commercial- Established Individual Fishing Quota Program (IFQ)	Constrain commercial harvests within the limits set by the rebuilding plan; IFQ to further control commercial sector to prevent overages; increase in administrative work to manage the IFQ.
2007-2016	Recreational - Reduction of bag limit to 2 fish and adjustment of season length	Constrain recreational harvest to the quota. Progressively shorter seasons as average size of landed fish increases.
2013-2016	Overfishing has ended, but the stock remains overfished.	Continue stock rebuilding

9. Determine the magnitude and significance of cumulative effects.

The primary objectives of this amendment and associated EIS is to reallocate red snapper resources between the commercial and recreational sectors as well as add accountability measures to reduce the probability of exceeding the recreational quota with the intent to increase the net benefits from red snapper fishing as well as increase the stability of the red snapper component. The short- and long-term direct and indirect effects of each these actions are provided in Section 4.1.

To examine the magnitude and significance of the cumulative effects, important valued environmental components (VECs) were identified for the overall actions to be taken with this amendment. VECs are "any part of the environment that is considered important by the proponent, public, scientists and government involved in the assessment process. Importance may be determined on the basis of cultural values or scientific concern" (EIP 1998). For purposes of this analysis, an initial 22 VECs were identified, and the consequences of each alternative proposed in this amendment on each VEC were evaluated. Some of these VECs were combined into a revised VEC because many of the past, current, and reasonably foreseeable future actions (RFFA) were similar. Based on this analysis, seven VECs were determined to be the most important for further consideration. These are shown in Table 4.2.4.

VECs not included for further analysis were sharks and protected resources. Many longline vessels that target reef fish also target sharks. However, sharks were not considered as an important VEC because, as shark stocks have declined, the shark fishery has become more and more regulated, limiting the effects of this fishery and the stock on reef fish stocks. There may be some effort shifting from the shark fishery to the reef fish fishery due to increased restrictions, however, this effect will likely be minor because only a minority of vessels have dual federal reef fish and shark permits. Protected resources were also eliminated from further analyses in this section. As described in Section 3.3, biological opinions have concluded the primary reef fish gear (longline and hook-and-line) were not likely to jeopardize sea turtles or small tooth sawfish. Because actions considered in this amendment are not expected to change how reef fish fishing gear is used in the prosecution of the reef fish fishery, any take associated with reef fish fishing should not exceed that considered in biological opinions. All other Endangered Species Act (ESA)-listed species heave been found not likely to be adversely affected or not affected by the reef fish fishery. For marine mammals, gear used in the reef fish fishery were classified in the as Category III fisheries (see Section 3.3). This means this fishery has minimal impacts on marine mammals.

Table 4.2.4. VECs considered, consolidated, or not included for further evaluation.

VECs considered for further evaluation	VECs consolidated for further evaluation	VECs not included for further evaluation
Habitat	Hard bottom EFH	
Managed resources - red snapper - other reef fish species	Red snapper Other reef fish Prey species Competitors Predators	Sharks Protected species
Vessel owner, captain and crew - Commercial - For-hire	Vessel owner Captain Crew	
Wholesale/retail	Dealers Consumers	
Anglers		
Infrastructure	Fishing Communities Fishing support businesses (ice and gear suppliers, marinas, fuel docks)	
Administration	Federal Rulemaking Federal Permitting Federal Education State Rulemaking/Framework State Education	

The following discussion refers to the effects of past, present, and RFFAs on the various VECs.

Habitat

In the past, some fishing practices have had detrimental effects on the physical environment. Gears such as roller trawls and fish traps damaged habitats while harvesting fish species. As a result of these effects, the Council developed stressed areas to reduce these impacts. Further protections have been developed, primarily by either prohibiting fishing or limiting fishing activities that can occur within certain areas. Detailed information on the closures and preserves is provided in the February 2010 Regulatory Amendment (GMFMC 2010). In addition, regulatory changes through Generic EFH Amendment 3 (GMFMC 2005b; implemented in 2006) prohibited bottom anchoring and the use of trawling gear, bottom longlines, buoy gear, and all traps/pots to protect coral reefs in several HAPCs, and required a weak link in the tickler chain of bottom trawls on all habitats throughout the Gulf EEZ to minimize damage done to habitats should the chain get hung up on natural bottom structures.

Current allowable gear types can adversely affect hard bottom areas; however, these impacts are not considered great (See Section 4.1.1). Handline gear and longlines used in the reef fish fishery can damage habitat through snagging or entanglement. Longlines can also damage hard bottom structures during retrieval as the line sweeps across the seafloor. Additionally, anchoring over hard-bottom areas can also affect benthic habitat by breaking or destroying hard bottom structures. However, these gears are not believed to have much negative impact on bottom

structures and are considerably less destructive than other commercial gears, such as traps and trawls, which are not allowed for reef fish fishing.

Damage caused from reef fish fishing, although minor, is associated with the level of fishing effort (see Section 4.1.1). Therefore, actions reducing levels of effort would result in greater benefits to the physical environment because fishing related interactions with habitat would be reduced. Thus, actions described in steps 3 and 4 of this CEA which have reduced fishing effort for some species, and possibly the fishery on the whole, have had a positive effect on hard bottom habitats. RFFAs, such as Amendments 28 and 39, should also benefit these habitats as they would also reduce or limit fishing effort. As described in Sections 4.1.1, 4.2.1, and 4.3.1, effects on the physical environment from the proposed actions would likely be minimal because prosecution of the fishery should not be changed.

Reef fish EFH, particularly coral reefs and SAVs, are particularly susceptible to non-fishing activities (GMFMC 2004a). The greatest threat comes from dredge-and-fill activities (ship channels, waterways, canals, and coastal development). Oil and gas activities as well as changes in freshwater inflows can also adversely affect these habitats. As described in Step 4d of this cumulative effects analysis, the potential harm to reef fish habitat was highlighted by the Deepwater Horizon MC252 incident (http://response.restoration.noaa.gov/deepwaterhorizon). Essential fish habitat and HAPC designations cited in Section 3.2, GMFMC (2005b), and GMFMC (2010) and are intended to promote careful review of proposed activities that may affect these important habitats to assure that the minimum practicable adverse impacts occur on EFH. However, NMFS has no direct control over final decisions on such projects. The cumulative effects of these alternatives depend on decisions made by agencies other than NMFS, as NMFS and the Gulf Council have only a consultative role in non-fishing activities. Decisions made by other agencies that permit destruction of EFH in a manner that does not allow recovery, such as bulkheads on former mangrove or marine vegetated habitats, would constitute irreversible commitments. However, irreversible commitments should occur less frequently as a result of EFH and HAPC designations. Accidental or inadvertent activities such as ship groundings on coral reefs or propeller scars on seagrass could also cause irreversible loss.

At this time, it is unclear what effects climate change will have on red snapper EFH. Factors associated with climate change such as ocean acidification could negatively affect important biotic components of red snapper EFH such as corals (IPCC 2014). Hollowed et al. (2013) has identified important ecosystem paths that deserve future study to determine climate change cause and effects.

Managed Resources

There are 31 species of reef fish managed in the Gulf EEZ, and of the species where the stock status is known, four of the eleven species are considered overfished (gag, greater amberjack, gray triggerfish, and red snapper; see Section 3.3). Recent actions for these overfished stocks were intended to end overfishing and set or continued rebuilding plans (e.g., Amendments 27, 32, 35, and 37).

In the past, the lack of management of reef fish allowed many stocks to undergo both growth and recruitment overfishing. This has allowed some stocks to decline as indicated in numerous stock assessments (Section 3.3). Red snapper have been considered overfished since the first stock assessment in 1986. For red snapper, management measures including a minimum size limit, commercial quota, and aggregate bag limit were put in place as part of the initial Reef Fish FMP or Amendment 1 (Section 3.1). None of these measures halted increases in landings (Table 3.1.2). However, over time, management measures have become more restrictive and held landings more closely to the quotas.

The present harvest levels are based on a rebuilding plan put in place by Amendment 27 which shifted the plan from a constant catch to a constant fishing mortality plan. The current plan, after an initial reduction in the total allowable catch from 9.12 mp to 5 mp, has allowed harvests to increase as the stock rebuilds. These measures have also limited the red snapper harvest sufficiently to end overfishing on the stock. In addition, the red snapper IFQ program has successfully held landings by the commercial sector below its quota. However, these measures, along with other IFQ programs for grouper and tilefish (Amendment 29) may have, at least for the commercial sector, redirected effort towards other non-IFQ managed reef fish species such as gray triggerfish and greater amberjack by fishermen without IFQ shares or allocation. Landings of these non-IFQ managed species are closely managed to prevent them from exceeding their ACLs and protects them from overharvest. In fact, measures for gray triggerfish and greater amberjack allow the fishery to be closed if the harvest is projected to meet their respective commercial and recreational quotas.

Fishery management RFFAs are expected to benefit managed species. These actions are expected to manage the stocks at OY per National Standard 1 and are described in steps 3 and 4 of this CEA. Although this amendment and Amendments 36, 39, and 40 do not specifically address overfishing of red snapper, they are intended to improve the management of the commercial and recreational sectors in ways that are likely to better keep harvests within the quotas. Other RFFAs described in steps 3 and 4 similarly do not specifically address overfishing but are intended to improve the management of reef fish stocks either through revising ACLs, improving data reporting, or allowing more flexibility in management.

Non-fishing activities are likely to adversely affect reef fish stocks as listed in Step 4d. For example, LNG facilities are being proposed in the western and northern Gulf. As described in Step 4d, these facilities can have a negative effect on species with pelagic larvae, like most reef fish species. To mitigate the effects of these facilities, closed- rather than open-loop systems are being called for. At this time, the effect of LNG facilities is unknown and is likely to be less for reef fish species than other more coastal species such as red drum. Other factors such as climate change, hurricanes, and oil and gas extraction could have detrimental effects on reef fish species.

<u>Vessel Owner, Captain, and Crew (Commercial and For Hire)</u>

Adverse or beneficial effects of actions on vessel owners, captains, and crew are tied to the ability of a vessel to make money. In commercial fisheries, these benefits are usually derived from shares awarded after fishing expenses are accounted for. The greater the difference between expenses and payment (revenue) for harvested fish, the more profit is generated by the

fishing vessel. For-hire businesses generate revenue by selling either at the vessel level (charter businesses) or passenger level (headboats)

The commercial fishery has benefited from past actions in the reef fish fishery relative to this action. Prior to 1990, entry into the reef fish fishery was unhindered by regulation. To constrain harvest in order to prevent overexploitation of reef fish in general and red snapper specifically, the Council implemented size limits, quotas, seasonal closures, and a permit moratorium. These measures have produced limited success. For red snapper, the commercial quota was overrun 10 times until the IFQ program established in 2007 (Table 3.1.2).

Current management measures have had an overall positive, short-term impact on the red snapper component of the commercial sector. Landing restrictions were needed to keep the commercial red snapper harvest within its quota and primarily took the form of short mini-seasons (Hood et al. 2007). The mini-seasons kept many commercial vessels from taking more fishing trips during these years limiting fishing effort. With the advent of the IFQ program, fishermen with red snapper allocation were able to have flexibility in when and where they could fish. It also stopped the commercial quota from being exceeded. However, this program adversely affected fishermen who did not qualify for the initial distribution of IFQ shares. These fishermen have been required to purchase IFQ shares or allocation if they wished to harvest red snapper.

For other overfished reef fish stocks other than red snapper, rebuilding measures required to end this condition and rebuild stocks have constrained the harvest for these species over the short-term and likely increased competition within the commercial sector to harvest other stocks. However, by using constant fishing mortality rebuilding plans, harvests have been allowed to increase as the stocks recover.

Non-FMP factors have adversely affected the reef fish commercial and for-hire fleets. Imports can cause fishermen to lose markets when fishery closures occur as dealers and processors use imports to meet consumer demand. Consumer comfort with imports can then limit the price fishermen receive when harvest is allowed. Other factors that have had an adverse effect on the commercial fishery include hurricanes and increases in fishing costs, such as fuel, which may have pushed marginal fishing operations out of business (see step 4d). Hurricanes are unpredictable and localized in their effects. Increases in fishing costs, unless accompanied by an increase in prices or harvest quantity, decrease the profitability of fishing.

The for-hire component has benefited from past actions in the reef fish fishery relative to this action. This increase has been fueled by increased interest by the public to go fishing (i.e., more trips sold) as evidenced by an almost three-fold increase in recreational fishing effort since 1986 (SEDAR 12 2007). To constrain harvest in order to prevent overexploitation of reef fish in general and red snapper specifically, NMFS, through the Council, implemented minimum size and bag limits for most species prior to 2000. In addition, a recreational red snapper quota was implemented in 1997 and a permit moratorium to constrain the recreational effort from the for-hire industry in 2003. These measures have met with limited success toward ending overfishing.

Current management measures may have had a negative, short-term impact on the for-hire component of the reef fish fishery. Landing restrictions have been needed to keep the recreational red snapper harvest within its quota. These restrictions include a reduced bag limit and seasonal closures. These measures may have reduced interest by the public to take for-hire fishing trips and possibly resulted in a reduction in the number of trips taken, as shown in Table 4.4.2 (although the Deepwater Horizon MC252 oil spill may also be partly responsible for the decrease in trips). In addition, the restriction requiring a person aboard a federally-permitted Gulf for-hire reef fish vessel to comply with federal regulations for reef fish species regardless of where the fish are harvested (GMFMC 2008b), may have reduced the ability of federally permitted for-hire operators to sell trips because of longer non-compliant state fishing seasons. However, as discussed in Sections 4.1.3 and 4.1.4, the creation of the two recreational components through Amendment 40 may allow for more federal fishing days for the federal for-hire component. Other factors that have had an adverse effect on the for-hire component of the reef fish fishery include increases in fishing costs, such as fuel, and hurricanes which may have pushed marginal fishing operations out of business (see step 4d). But these factors may be less important than may seem apparent. For the red snapper for-hire component, reductions in charter fishing from more restrictive regulations, increased costs, and effects from hurricanes were claimed by the industry (GMFMC 2007). But red snapper data for 2007 found only lingering effects of the 2005 hurricanes; annual average effort for 2004 through 2005 were only slightly greater than in 2007. Although the available data cannot address claims of severe economic losses by individual entities, this data does not support contentions of widespread industry harm. This in part may be due to effort shifting to other species or other charter businesses.

Magnuson-Stevens Act §407(d)(1) requires recreational or commercial red snapper fishing to end when a sector catches its quota. The recreational sector includes both the federal for-hire and private angling components. Thus, if the private angling component exceeds its allocation of the recreational quota to such an extent that the overall recreational quota is projected to be met, the federal for-hire component would also be prohibited from retaining red snapper regardless of whether there is remaining quota available for that component. Reduced season lengths in the following year for the federal for-hire components could be further exacerbated by overage adjustments from exceeding the quota and non-compatible state fishing seasons. However, the likelihood of overages is reduced because each component's season will be based on the lower recreational ACT rather than the recreational quota.

Many RFFAs are likely to have a short-term negative impact on the for-hire component. Red snapper, gray triggerfish, greater amberjack, and gag have experienced overfishing, are considered overfished, and are being managed under stock rebuilding plans. Measures required to end overfishing and rebuild these stocks have constrained the harvest for these species. If these measures result in less interest by the fishing public to take fishing trips on for-hire vessels, then this will adversely affect this sector. However, as mentioned above, this effect has not been apparent for red snapper because the for-hire component has the ability to shift to other species. The ability to shift to other species would be expected to continue in response to subsequent RFFAs, though the flexibility would be reduced the more species that become subject to increased restrictions. Some short-term beneficial actions include an increase in TAC and

relaxation of management measures for red grouper and vermilion snapper, as these stocks have recovered from overfishing and harvest restrictions have been relaxed.

Because many management RFFAs are designed to manage stocks at OY, these actions should be beneficial to the for-hire component. Stocks would be harvested at a sustainable level, and at higher levels for those stocks being rebuilt. If allocation between components, as proposed in this amendment, favors the for-hire component, this could provide additional red snapper fishing days and allow for more trips for this component. Specific to red snapper fishing, Amendment 39 evaluates implementing some type of regional management of the recreational sector, respectively. Regional management would affect the recreational sector only in Amendment 39. Depending on how the recreational quota is allocated among states and the management measures implemented by the states, the effects on the federal for-hire component could be beneficial or adverse depending on where a vessel operator fishes.

Non-management-related RFFAs that could affect the for-hire component include hurricanes, oil and gas extraction, and increases in fishing costs. Hurricanes are unpredictable and localized in their effects. Oil spills, which are also unpredictable, can have extensive adverse impacts over large areas as evidenced by the Deepwater Horizon MC252 spill. Increases in fishing costs, unless accompanied by an increase in the price charged per trip or the number of trips, decrease the profitability of fishing.

Wholesale/retail

Reef fish dealers are primarily found in Gulf States (step 2). As of January 6, 2014, there were 202 reef fish dealer permits. In 2012, there were 82 dealers involved in buying and selling red snapper through the IFQ program (NMFS 2013c). These dealers may hold multiple types of permits. Average employment information per reef fish dealer is unavailable. The profit profile for dealers or processors is not known.

Relative to past actions, dealers have benefitted from actions that have allowed the commercial fishery to expand, as described above. However, the effect of measures constraining commercial landings both in the past, present, and RFFAs may not have negative effects on dealers. As described in step 4d, the amount of snapper and grouper imports have doubled between 1994 and 2005. In terms of pounds, 2012 imports (44.5 mp) were more than twice domestic annual Gulf snapper and grouper landings (19.6 mp; see Section 3.5.1.4). This means dealers have some ability to substitute domestic product with imports. In addition, dealers also have the ability to substitute other domestic seafood products for red snapper in order to satisfy public demand for seafood. Therefore, the negative effects from management actions for the fishery may not necessarily translate into significant negative effects for dealers, though it is recognized that foreign product is less desirable because, if not, dealers would be substituting imports instead of domestic harvest when domestic harvest is available. As domestic fish stocks are rebuilt and management programs like IFQs are instituted, a more stable supply of domestic reef fish will be available to dealers. This should improve their ability to market these products and improve the profit they receive from selling these fish. However, if a consequence of these actions is a reduction in the amount of domestically harvested red snapper, this would reduce any improvements in their ability to market red snapper.

In general, consumers of seafood may be somewhat sheltered from fluctuations in the domestic seafood supply by the availability of imported seafood. Therefore, if harvest is restricted for specific species of reef fish due to management change, there is likely some imported product that can be substituted for that species. However, the higher prices that domestically harvested reef fish generally receive compared to imports demonstrates the preference many consumers have for domestic harvest. This preference and the importance of red snapper to consumers is also supported by comments submitted during scoping. Here, they voiced their concern about the availability of red snapper in markets and restaurants if the commercial sector's allocation is decreased (https://docs.google.com/spreadsheet/ccc?key=0Atgbk2rxQkqhdHByby1ad0F0THZiMGtoVTdIVDJ6cWc#gid=0).

Anglers

It is estimated that 3.1 million residents of Gulf States participated in marine recreational fishing (NMFS 2013b). Red drum and spotted sea trout are the species most commonly reported as target species by these anglers, with approximately 35% and 33% of interviewed anglers reporting targeting these species, respectively. The most commonly caught non-bait species across all waters of the Gulf were spotted seatrout, red drum, sand seatrout, Atlantic croaker, and gray snapper. In federal waters, the most commonly harvested species are white grunt, red grouper, red snapper, gag, and yellowtail snapper. As summarized in Holiman (2000), the typical angler in the Gulf is 44 years old, male (80%), white (90%), and employed full-time (92%). They have a mean income of $42,700, and have fished in the state for an average of 16 years. The average number of trips taken in the 12 months preceding the interview was about 38 and these were mostly (75%) one-day trips with average expenditure of less than $50. Seventy-five percent of interviewed anglers reported that they held salt-water licenses, and 59 percent owned boats used for recreational saltwater fishing. More recent comparable statistics are not available.

The effects of various past, present, and RFFAs on anglers are measured through levels of participation in the fishery. Measures that reduce participation are negative and measures that increase participation are positive. However, it is difficult to assess what affects past and present management measures have had on anglers because available data indicates the amount of effort by the private sector has increased. This increase has been from approximately 6.8 million trips in 1981 to over 14 million trips from in 2003 to 2009 (Rios 2013). The number of angler trips declined from 14,356,523 angler trips in 2009, to 13,548,899 in 2010, and 13,874,314 in 2011. The decline in 2010 and 2011 is likely due to the Deepwater Horizon MC252 oil spill. The effects of various management measures on the participation by anglers is likely similar to the effects on the for-hire industry discussed above with the exception that private anglers are not subject to permit restrictions on where they can fish that federally permitted for-hire vessel operators are (see above section). However, as discussed in Sections 4.1.3 and 4.1.4, the creation of the two recreational components may further restrict the number of federal fishing days for the private angling component due to non-compatible state season lengths. Factors unrelated to management, such as hurricanes and increasing fuel and other costs, likely affect private anglers similar to for-hire fishermen. It should be noted that a possible effect of the proposed action

could be constraining most of the private angling to state waters if state non-compatible seasons continue. If the private angling allocation is too low, then a greater proportion of private angling fish would be caught in state waters, reducing the days available to fish in federal waters.

As mentioned above in the discussion of the vessel owner, captain, and crew above, Magnuson-Stevens Act §407(d)(1) requires recreational or commercial red snapper fishing to end when a sector catches its quota. The recreational sector includes both the federal for-hire and private angling components. Thus, if the federal for-hire component exceeds its allocation of the recreational quota to such an extent that the overall recreational quota is projected to be met, the private angling component would also be prohibited from retaining red snapper regardless of whether there is remaining quota available for that component. Reduced federal season lengths for the private angling component in the following year could be further exacerbated by overage adjustments if the quota is exceeded and non-compatible state fishing seasons. However, the likelihood of this occurring is reduced because each component's season will be based on the lower recreational ACT rather than the recreational quota.

One RFFAs specific to red snapper fishing, Amendment 39 evaluates implementing some type of regional management of the recreational sector. Regional management would affect the recreational sector only in Amendment 39. Depending on how the recreational quota is allocated among states and the management measures implemented by the states, the effects on the private angling component could be beneficial or adverse depending on where anglers fish.

Non-management-related RFFAs that could affect anglers include hurricanes, oil and gas extraction, and increases in fishing costs. Hurricanes are unpredictable and localized in their effects. Oil spills, which are also unpredictable, can have extensive adverse impacts over large areas as evidenced by the Deepwater Horizon MC252 spill. Increases in fishing costs as well as lost fishing opportunities would likely reduce the amount of angler effort.

Infrastructure

Infrastructure refers to fishing-related businesses and includes marinas, rentals, snorkel and dive shops, boat dockage and repair facilities, tackle and bait shops, fish houses, and lodgings related to recreational fisheries industry. This infrastructure is tied to the commercial and recreational fisheries and can be affected by changes in those fisheries. Therefore, the effects of past, present, and RFFAs should reflect responses by the fisheries to these actions. Past actions allowing the recreational and commercial fisheries to expand have had a beneficial effect by providing business opportunities to service the needs of these industries. Present actions which have constrained the commercial fisheries likely have had a negative effect because lower revenues generated from the fishery would be available to support the infrastructure. However, as conditions improve for the fishery, as described above, through RFFAs, benefits should be accrued by the businesses comprising the infrastructure. For the recreational sector, as stated above, it is difficult to assess the impact of present and RFFAs because angler participation has increased until recently. Actions enhancing this participation should be beneficial to the infrastructure. However, it should be noted the Council has been receiving public testimony that participation may be declining due to fuel price increases and this decline may be reflected in the decline in the number of angler trips taken. Non-FMP factors, such as the Deepwater Horizon

MC252 oil spill (IAI 2012) and climate change (http://www.nefsc.noaa.gov/ecosys/climate_change/implications.html) may adversely affect fishing communities, particularly those communities considered more vulnerable.

Administration

Administration of fisheries is conducted by federal (including the Council) and state agencies that develop and enforce regulations, collect data on various fishing entities, and assess the health of various stocks. As more regulations are required to constrain stock exploitation to sustainable levels, greater administration of the resource is needed. The NMFS Office of Law Enforcement, in cooperation with state agencies, would continue to monitor regulatory compliance with existing regulations and NMFS would continue to monitor both recreational and commercial landings to determine if landings are meeting or exceeding specified quota levels. Further, stock status needs to be periodically assessed to ensure stocks are being maintained at proper levels. Some present actions have assisted the administration of fisheries in the Gulf. In 2007, an IFQ program was implemented for the commercial red snapper fishery, requiring NMFS to monitor the sale of red snapper IFQ shares. The recordkeeping requirements of the IFQ programs have improved commercial quota monitoring and prevented or limited overages from occurring. A vessel monitoring system was also implemented for all commercial reef fish vessels in 2007 and is helping enforcement identify vessels violating various fishing closures. The recent implementation of ACLs and AMs for most federally managed species has required close monitoring of landings. For some species, harvest is closed if landings are projected to exceed the ACL within the season. For others, quotas or ACLs need to be adjusted during the following season to account for any ACL overages that occur in the preceding year.

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.

The cumulative effects of allocation for red snapper on the biophysical environment is likely neutral because it should not have much effect on overall fishing effort. For the socioeconomic environment, depending on the sector, some effects would be likely be positive and some negative. However, short-term negative impacts on the fisheries' socioeconomic environment may occur due to the need to limit directed harvest and reduce bycatch mortality. These negative impacts can be minimized for the recreational sector by using combinations of bag limits, size limits and closed seasons and for the commercial sector through individual fishing quota programs, size limits, and season-area closures.

11. Monitor the cumulative effects of the selected alternative and modify management as necessary.

The effects of the proposed actions are, and will continue to be, monitored through collection of landings data by NMFS, stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations. Landings data for the recreational sector in the Gulf is collected through MRIP, NMFS' Headboat Survey, and the Texas Marine Recreational Fishing Survey. MRIP replaced the previous MRFSS program. Commercial data is collected through trip ticket programs, port samplers, and logbook programs.

Currently, SEDAR assessments of Gulf red snapper are scheduled for 2014 and 2015 (see step 3).

Unavoidable Adverse Effects

Unavoidable adverse effects are described in detail in the cumulative effects analysis of Amendment 30B (GMFMC 2008b) and 32 (GMFMC 2011b) and is incorporated here by reference. Catch quotas, minimum size limits, bag limits, and seasonal closures, are generally effective in limiting total fishing mortality, the type of fish targeted, the number of targeted fishing trips, and/or the time spent pursuing a species. However, these management tools have the unavoidable adverse effect of creating regulatory discards. Discard mortality must be accounted for in a stock assessment as part of the allowable biological catch, and thus restricts total allowable catches.

Many of the current participants in the reef fish fishery may never recuperate losses incurred from the more restrictive management actions imposed in the short-term to end overfishing of red snapper. Because red snapper is but one of the reef fish species managed in the Reef Fish FMP, short-term losses are not expected to be significant, and other species may be substituted to make up for losses to the fishery. With the anticipated recovery of the stock, future participants in the reef fish fishery will benefit. Overall, short-term impacts of actions would be offset with much higher allowable catch levels as the stock recovers and is rebuilt.

The actions considered in this amendment should not have an adverse effect on public health or safety because these measures should not alter actual fishing practices, just 1) which sector can harvest what percentage of the overall allowable harvest and 2) reduce the probability of the recreational sector exceeding its allocation. Unique characteristics of the geographic area are highlighted in Section 3. Adverse effects of fishing activities on the physical environment are described in detail in Section 4.1. This section concludes the impact on the physical environment should be minor from actions proposed in this document. Uncertainty and risk associated with the measures are described in detail in the same sections as well as assumptions underlying the analyses.

Relationship between Short-term Uses and Long-term Productivity

The primary objectives of this amendment and associated EIS are to 1) reallocate red snapper resources between the commercial and recreational sectors with the intent to increase the net benefits from red snapper fishing as well as increase the stability of the red snapper component, and 2) establish buffers and payback provisions as additional accountability measures for the recreational red snapper sector to support management efforts to maintain landings within the recreational quota and mitigate quota overages should they occur . The relationship between short-term economic uses and long-term economic productivity are discussed in the preceding section. However, because red snapper is but one species in the reef fish complex, these effects may be mitigated through effort shifting to other species and may not be significant.

No alternatives are being considered that would avoid these short-term negative effects because they are a necessary cost associated with rebuilding and protecting the red snapper stock. The range of alternatives has varying degrees of economic costs and administrative burdens. Some alternatives have relatively small short-term economic costs and administrative burdens, but would also provide smaller and more delayed long-term benefits. Other alternatives have greater short-term costs, but provide larger and more immediate long-term benefits.

Mitigation, Monitoring, and Enforcement Measures

Mitigation, monitoring and enforcement measures are described in detail in the cumulative effects analysis of Amendment 30B (GMFMC 2008b) and is incorporated here by reference. The process of reallocating the red snapper resource between sectors in favor of the recreational sector is expected to have a negative short-term effect on the social and economic environment for the commercial sector, and will create a burden on the administrative environment. Given the negative effects described in Sections 4.1 and 4.2, it is difficult to mitigate these measures and managers must balance the costs and benefits when choosing management alternatives for the reef fish fishery.

To ensure the red snapper stock recovers to a level that supports harvests at the optimum yield, periodic reviews of stock status are needed. These reviews are designed to incorporate new information and to address unanticipated developments in the respective fisheries and would be used to make appropriate adjustments in the reef fish regulations should harvest not achieve optimum yield objectives. The details for how assessments are developed, reviewed, and applied are described in Amendment 30B, as are the rule-making options the Council and NMFS have for taking corrective actions (GMFMC 2007).

Current reef fish regulations are labor intensive for law enforcement officials. NMFS law enforcement officials work cooperatively with other federal and state agencies to keep illegal activity to a minimum. Violators are penalized, and for reef fish commercial and reef fish for-hire operators, permits required to operate in their respective fisheries can be sanctioned.

Reef fish management measures include a number of area-specific regulations where reef fish fishing is restricted or prohibited in order to protect habitat or spawning aggregations of fish, or to reduce fishing pressure in areas that are heavily fished. To improve enforceability of these

areas, the Council has established a vessel monitoring system program for the commercial reef fish sector to improve enforcement. Vessel monitoring systems allows NMFS enforcement personnel to monitor compliance with these area-specific regulations, and track and prosecute violations.

Irreversible and Irretrievable Commitments of Resources

There are no irreversible or irretrievable commitments of resources proposed herein. The actions to change the red snapper allocation and accountability measures are readily changeable by the Council in the future. There may be some loss of immediate income (irretrievable in the context of an individual not being able to benefit from compounded value over time) to some sectors from the restricted fishing seasons.

Any Other Disclosures

CEQ guidance on environmental consequences (40 CFR §1502.16) indicates the following elements should be considered for the scientific and analytic basis for comparisons of alternatives. These are:

a) Direct effects and their significance.
b) Indirect effects and their significance.
c) Possible conflicts between the proposed actions and the objectives of federal, regional, state, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned.
d) The environmental effects of alternatives including the proposed action.
e) Energy requirements and conservation potential of various alternatives and mitigation measures.
f) Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.
g) Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures.
h) Means to mitigate adverse environmental impacts.

Items a, b, d, e, f, and h are addressed in Sections 2, 3, 4, and 5. Items a, b, and d are directly discussed in Sections 2 and 4. Item e is discussed in economic analyses (Sections 4.1.3, 4.2.3, and 4.3.3). Alternatives that encourage fewer fishing trips would result in energy conservation. Item f is discussed throughout the document as fish stocks are a natural and depletable resource. A goal of this amendment is to make this stock a sustainable resource for the nation. Mitigation measures are discussed in Section 4.4. Item h is discussed in Section 4, with particular mention in Section 4.4.

The other elements are not applicable to the actions taken in this document. Because this amendment concerns the management of a marine fish stock, it is not in conflict with the objectives of federal, regional, state, or local land use plans, policies, and controls (Item c). Urban quality, historic and cultural resources, and the design of the built environment, including

the reuse and conservation potential of various alternatives and mitigation measures (Item g) is not a factor in this amendment. The actions taken in this amendment will affect a marine stock and its fishery, and should not affect land-based, urban environments. The exception would be the *U.S.S. Hatteras*, located in federal waters off Texas, which is listed in the National Register of Historic Places. The proposed actions are not likely to increase fishing activity and so no additional impacts to the *U.S.S. Hatteras* would be expected.

With regards to the Endangered Species Act (ESA), the most recent biological opinion for the Reef Fish Fishery Management Plan, completed on September 30, 2011, concluded authorization of the Gulf reef fish fishery managed under this management plan is not likely to jeopardize the continued existence of sea turtles (loggerhead, Kemp's ridley, green, hawksbill, and leatherback) or smalltooth sawfish (See Section 3.2 for more information on ESA species). An incidental take statement was issued specifying the amount 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. Other listed species and designated critical habitat in the Gulf were determined not likely to be adversely affected. NMFS also determined that the reef fish fishery was not likely to adversely affect *Acropora* because of where the fishery operates, the types of gear used in the fishery, and that other regulations protect *Acropora* where they are most likely to occur.

With regards to the Marine Mammal Protection Act, fishing activities under the Reef Fish Fishery Management Plan should have no adverse impact on marine mammals (See Section 3.2). The proposed actions are not expected to substantially change the way the fishery is currently prosecuted (e.g., types of methods, gear used, etc.). Gear used by the reef fish fishery was still classified in the 2014 List of Fisheries as a Category III fishery (79 FR 14418, April 14, 2014) because it is prosecuted primarily with longline and hook-and-line gear. This classification indicates the annual mortality and serious injury of a marine mammal stock resulting from any fishery is less than or equal to one percent of the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock, while allowing that stock to reach or maintain its optimum sustainable population.

CHAPTER 5. REGULATORY IMPACT REVIEW

5.1 Introduction

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

5.2 Problems and Objectives

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

5.3 Description of Fisheries

A description of the red snapper component of the Gulf reef fish fishery is provided in Section 3.3.

5.4 Impacts of Management Measures

5.4.1 Action: Retain a Portion of the 2016 Commercial Red Snapper Quota

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

Preferred Alternative 8 would reallocate 2.5% of the red snapper quota to the recreational sector (and decrease the commercial sector's share by an equivalent percentage). Therefore, compared to **Alternative 1**, **Preferred Alternative 8** would be expected to result in economic losses to the commercial sector and generate economic benefits for the recreational sector. The economic effects expected to result from reallocations of the red snapper quota between the recreational and commercial sectors are usually evaluated based on aggregate (sum of recreational and commercial) changes in economic benefit relative to a baseline allocation (51% commercial and 49% recreational). Although it logically follows that the allocation of greater proportions of the red snapper quota to a given sector would be expected to result in greater economic benefits for that sector and lower economic benefits for the other sector, inferences

about overall changes in economic efficiency are not provided here because it cannot be assumed that the resource allocation within each sector is efficient. The resource allocation within the commercial sector, which is managed under an IFQ system, would constitute a reasonable approximation for an efficient resource allocation. However, the open access management approach in the recreational sector cannot be conducive to an efficient allocation of red snapper within the recreational sector. As suggested in Holzer and McConnell (2014) an in Abbott (2015), changes in net benefit estimates based on the traditionally accepted application of the equimarginal principle and associated inferences about economic efficiency are not valid when each sector's quota is not efficiently allocated within the sector. Therefore, it is not possible to provide policy-relevant rankings of the reallocation alternatives in this amendment based on the expected net economic outcome, i.e., the sum of the change in economic benefits to the recreational and commercial sectors. It can only be stated that greater percentages of the red snapper quota allocated to the recreational sector would be expected to increase economic benefits to the recreational sector and decrease benefits to the commercial sector.

5.5 Public and Private Costs of Regulations

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

Council costs of document preparation, meetings, public hearings, and information dissemination……$275,000

NMFS administrative costs of document preparation, meetings and review $200,000

TOTAL ….....$475,000

The estimate provided above does not include any law enforcement costs. Any enforcement duties associated with this action would be expected to be covered under routine enforcement costs rather than an expenditure of new funds. It is noted that it will be more difficult and, therefore, more costly, to monitor closure periods that vary by fishing mode.

5.6 Determination of Significant Regulatory Action

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

CHAPTER 6. REGULATORY FLEXIBILITY ACT ANALYSIS

6.1 Introduction

The purpose of the Regulatory Flexibility Act Analysis (RFAA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure such proposals are given serious consideration. The RFAA does not contain any decision criteria; instead the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of various alternatives contained in the fishery management plan (FMP) or amendment (including framework management measures and other regulatory actions) and to ensure the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the FMP and applicable statutes.

The RFA requires agencies to conduct an RFAA for each proposed rule. The RFAA is designed to assess the impacts various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those impacts. An RFAA is conducted to primarily determine whether the proposed action would have a "significant economic impact on a substantial number of small entities." The RFAA provides: 1) A description of the reasons why action by the agency is being considered; 2) a succinct statement of the objectives of, and legal basis for, the proposed rule; 3) a description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply; 4) a description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirements of the report or record; 5) an identification, to the extent practicable, of all relevant federal rules, which may duplicate, overlap, or conflict with the proposed rule; 6) a description and estimate of the expected economic impacts on small entities; and 7) an explanation of the criteria used to evaluate whether the rule would impose "significant economic impacts".

6.2 Statement of the need for, objective of, and legal basis for the proposed action

The problems and objective of this proposed action are provided in Chapter 1. This regulatory action addresses red snapper allocation. Specifically, the purpose of this action is to reallocate the red snapper harvest consistent with the 2014 red snapper assessment update to ensure the allowable catch and recovery benefits are fairly and equitably allocated between the commercial and recreational sectors to achieve optimum yield. The need is to base sector allocations on the best scientific information available and use the most appropriate allocation method to determine sector allocations, while achieving optimum yield, particularly with respect to food production and recreational fishing opportunities, and rebuilding the red snapper stock. The Magnuson-

Stevens Fishery Conservation and Management Act provides the statutory basis for this proposed action.

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

This proposed rule is expected to directly affect federally permitted commercial fishermen that harvest red snapper in the Gulf. Commercial harvest of red snapper in the Gulf is currently managed under an IFQ program. From 2010 through 2014, an annual average of 375 vessels landed at least 1 lb of red snapper. Each vessel generated annual average dockside revenues of approximately $102,000 (2014 dollars), of which $36,000 were from red snapper, $38,000 from other species jointly landed with red snapper, and $28,000 from other species on trips without red snapper. Vessels that caught and landed red snapper may also operate in other fisheries, the revenues of which are not known and are not reflected in these totals. It is noted that 2014 data are preliminary.

With respect to the proposed changes in the red snapper recreational allocation, generally, only recreational anglers are allowed to recreationally harvest red snapper in federal waters in the Gulf and would be directly affected by changes in the allowable harvest. However, recreational anglers are not small entities under the Regulatory Flexibility Act (RFA). Although for-hire businesses (charter vessels and headboats) operate in the recreational sector, these businesses only sell fishing services to recreational anglers and do not have harvest privileges to the red snapper recreational quota. For-hire vessels provide a platform for the opportunity to fish and not a guarantee to catch or harvest any species, though expectations of successful fishing, however defined, likely factor into the decision by anglers to purchase these services. Changing the red snapper recreational quota only defines how much red snapper can be harvested and the quota is a factor in the determination of the length of the red snapper season. Changing the quota does not explicitly prevent the continued offer or sale of for-hire fishing services. In the event of a closed season (zero bag limit), precipitated by a quota reduction, fishing for other species can continue. In the event of a quota increase and associated increase in the open season, the basic service offered remains the same, though the list of species that may be retained is expanded. Because the proposed change in the red snapper quota would not directly alter the basic service sold by for-hire vessels, in general, this proposed action would not directly apply to or regulate their operations. Any change in vessel business would be a result of changes in angler demand for these fishing services that occurs as a result of the behavioral decision by anglers, i.e., to fish or not. This behavioral decision would be a consequence of how anglers determine the change in allowable harvest will affect them. Therefore, any effects on the associated for-hire vessels would be one step removed from the anglers' decision and an indirect effect of the proposed action. Because the effects on for-hire vessels would be indirect, they fall outside the scope of the RFA.

NMFS has not identified any other small entities that would be expected to be directly affected by this proposed action.

The Small Business Administration has established size criteria for all major industry sectors in the U.S., including fish harvesters. A business involved in fish harvesting is classified as a small

business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual receipts not in excess of $20.5 million (North American Industry Classification System -NAICS code 114111, finfish fishing) for all its affiliated operations worldwide. The revenue threshold for a business involved in the for-hire fishing industry is $7.5 million (NAICS code 487210, fishing boat charter operation).

Based on revenue information, all commercial vessels affected by the rule can be considered small entities.

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

This proposed action would not establish any new reporting, record-keeping, or other compliance requirements.

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

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

6.6 Significance of economic impacts on a substantial number of small entities

Substantial number criterion

This proposed action would be expected to directly affect an estimated 375 commercial fishing vessels that harvest red snapper in the Gulf. Because this number of vessels includes all commercial vessels that harvest red snapper, the substantial number criterion would be met.

Significant economic impacts

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

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

All entities expected to be directly affected by the measures in this proposed action are determined for the purpose of this analysis to be small business entities, so the issue of disproportionality does not arise in the present case.

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

The proposed action would change the commercial and recreational sector allocation of the red snapper ACL (quota) from 51 percent for the commercial sector and 49 percent for the recreational sector to 48.5 percent and 51.5 percent for the commercial and recreational sector, respectively. The total red snapper ACL would be 13.960 million pounds (mp) whole weight (ww) in 2016 and 13.740 mp ww in 2017. The proposed re-allocation would reduce the commercial sector allocation by 0.352 mp ww in 2016 and 0.343 mp ww in 2017, or a total of 0.695 mp ww over two years. Based on 2013 median ex-vessel price per pound for red snapper of $4.83 when adjusted to 2014 prices ($4.75 at 2013 dollars), these quota reductions would be expected to reduce total gross revenue (ex-vessel revenue minus the 3% cost recovery fee) of vessels that harvest red snapper by approximately $1.48 million (2014 dollars) in 2016 and $1.45 million in 2017 for all vessels. Over two years, total revenue reductions would be $2.93 million, or an average of approximately $1.46 million per year for all vessels. This average revenue reduction may be taken to approximate the annual revenue reduction of affected commercial vessels over a number of years for which the quota is held at about the same levels as in 2016 and 2017. Based on the 2010-2014 average of 375 vessels that harvested red snapper, the revenue reduction per vessel would be approximately $3,893 annually. This amount is relatively substantial when compared to per vessel revenues from red snapper but relatively less substantial when compared to per vessel revenues from all species.

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

Nine alternatives, including the preferred alternative, were considered for reallocating the red snapper ACL between the commercial and recreational sectors. The first alternative, the no action alternative, would maintain the commercial and recreational allocation of the red snapper ACL. This alternative would maintain the same economic benefits to commercial vessels at levels higher than those afforded by the preferred alternative. The second alternative would increase the recreational sector's allocation by 3 percent, resulting in a 48 percent commercial and 52 percent recreational sector allocation. The third alternative would increase the recreational sector's allocation by 5 percent, resulting in a 46 percent commercial and 54 percent recreational sector allocation. The fourth alternative would increase the recreational sector's allocation by 10 percent, resulting in a 41 percent commercial and 59 percent recreational sector allocation. The fifth alternative would allocate to the recreational sector 75 percent of the red snapper ACL increases beyond 9.12 mp, resulting in a 42 percent commercial and 58 percent recreational sector allocation in 2016 and 42.3 percent commercial and 57.7 percent recreational sector allocation in 2017. The sixth alternative would allocate to the recreational sector all red snapper ACL increases beyond 9.12 mp, resulting in a 33.3 percent commercial and 66.7 percent recreational sector allocation in 2016 and 33.9 percent commercial and 66.1 percent recreational sector allocation in 2017. The seventh alternative would allocate to the recreational sector 75 percent of the red snapper ACL increases beyond 10.0 mp, resulting in a 43.6 percent commercial and 56.4 percent recreational sector allocation in 2016 and 43.9 percent commercial

and 56.1 percent recreational sector allocation in 2017. The eighth alternative would allocate increases in the red snapper ACL due to the recalibration of MRIP catch estimates and to the change in size selectivity to the recreational sector, resulting in a 42.5 percent commercial and 57.5 percent recreational sector allocation in 2016 and 2017. All these other alternatives, except the no action alternative, would result in larger quota and revenue reductions for the commercial vessels that harvest red snapper.

CHAPTER 7. LIST OF PREPARERS

PREPARERS

Name	Expertise	Responsibility	Agency
Assane Diagne	Economist	Co-Team Lead – Amendment development, economic analyses	GMFMC
Peter Hood	Fishery biologist	Co-Team Lead – Amendment development, biological analyses, cumulative effects analysis	SERO
Stephen Holiman	Economist	Economic analyses	SERO
Tony Lamberte	Economist	Economic analyses	SERO
Mike Jepson	Anthropologist	Social analyses	SERO
Ava Lasseter	Anthropologist	Social analyses	GMFMC
Carrie Simmons	Fishery biologist	Biological analyses	GMFMC

REVIEWERS (Preparers also serve as reviewers)

Name	Expertise	Responsibility	Agency
Noah Silverman	Natural resource management specialist	National Environmental Policy Act review	SERO
Mara Levy	Attorney	Legal review	NOAA GC
Steve Branstetter	Biologist	Review	SERO
Scott Sandorf	Technical writer and editor	Regulatory writer	SERO
Adam Brame	Biologist	Protected Resources review	SERO
David Dale	Biologist	Essential Fish Habitat review	SERO
Neil Baertlein	Biologist	Review	SEFSC
Juan Agar	Economist	Review	SEFSC
David Carter	Economist	Review	SEFSC

GMFMC = Gulf of Mexico Fishery Management Council; NOAA GC = National Oceanic and Atmospheric Administration General Counsel; SEFSC = Southeast Fisheries Science Center; SERO = Southeast Regional Office of the National Marine Fisheries Service.

CHAPTER 8. LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM A COPY OF THE FEIS WAS SENT

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

NOAA General Counsel

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

CHAPTER 9. REFERENCES

Abbott, J.K. 2015. Fighting Over a Red Herring: The Role of Economics in Recreational-Commercial Allocation Disputes. Marine Resource Economics 30(1)1-20

Agar, J. Stephen, A. Strelcheck, and A. Diagne. 2014. The Gulf of Mexico Red Snapper IFQ Program: The First Five Years. Marine Resource Economics. 29(2): 177-198.

American Fisheries Society. 2013. Common and Scientific Names of Fishes from the United States, Canada, and Mexico. Seventh Edition. Special Publication 34. Bethesda, MD.

Anderes Alvarez, B. L., and I. Uchida. 1994. Study of hawksbill turtle (*Eretmochelys imbricata*) stomach content in Cuban waters. Pages 27-40 *in* Study of the Hawksbill Turtle in Cuba (I). Ministry of Fishing Industry, CUBA. Ministry of Fishing Industry, Cuba.

Ault, J. S., S. G. Smith, G. A. Diaz, and E. Franklin. 2003. Florida hogfish fishery stock assessment. University of Miami, Rosenstiel School of Marine Science. Contract No. 7701 617573 for Florida Marine Research Institute, St. Petersburg, Florida.

Barnette, M. C. 2001. A review of the fishing gear utilized within the Southeast Region and their potential impacts on essential fish habitat. NOAA Technical. Memorandum. NMFS-SEFSC-449. National Marine Fisheries Service. St. Petersburg, Florida.

Baustian, M. M. and N. N. Rabalais. 2009. Seasonal composition of benthic macroinfauna exposed to hypoxia in the northern Gulf of Mexico. Estuaries and Coasts, 32:975–983.

Bigelow, H.B., and W.C. Schroeder. 1953. Sawfishes, guitarfishes, skates and rays, pp. 1-514. *In:* Tee-Van, J., C.M Breder, A.E. Parr, W.C. Schroeder and L.P. Schultz (eds). Fishes of the Western North Atlantic, Part Two. Mem. Sears Found. Mar. Res. I.

Bjorndal, K. A. 1997. Foraging ecology and nutrition of sea turtles. P. L. Lutz, and J. A. Musick, editors. The Biology of Sea Turtles. CRC Press, Boca Raton.

Bjorndal, K. A. 1980. Nutrition and grazing behavior of the green turtle, Chelonia mydas. Marine Biology 56:147-154.

Boen, C. and W. Keithly. 2012. Gulf of Mexico Red Snapper IFQ Program: Survey Results and Analysis.

Bolten, A. B., and G. H. Balazs. 1995. Biology of the early pelagic stage - the 'lost year'. Pages 579-581 *in* K. A. Bjorndal, editor. Biology and Conservation of Sea Turtles. Smithsonian Institution Press, Washington, DC.

Bromley, Daniel W. 1977 “Distributional implications of the extended economic zone,” American Journal of Agricultural Economics. 59:887-8921.

Bromley, Daniel W. 1990. The Ideology of Efficiency: Searching for a Theory of Policy Analysis, Journal of Environmental Economics and Management 19:86-107.
Burton, M. 2008. Southeast U.S. Continental Shelf, Gulf of Mexico, and U.S. Caribbean. *In* Osgood, K. E. (ed). Climate Impacts on U.S. Living Marine Resources: National Marine Fisheries Service Concerns, Activities and Needs. U.S. Dep. Commerce, NOAA Tech. Memo. NMFSF/ SPO-89, pp 31-43.

Carr, A. F. 1986. RIPS, FADS, and little loggerheads. BioScience 36(2):92-100.

Carr, A. 1987. New perspectives on the pelagic stage of sea turtle development. Conservation Biology 1(2):103-121.

Carter, D. W., and C. Liese. 2012. The Economic Value of Catching and Keeping or Releasing Saltwater Sport Fish in the Southeast USA. North American Journal of Fisheries Management, 32:4, 613-625. Available at: http://dx.doi.org/10.1080/02755947.2012.675943

Cass-Calay, S. L., and M. Bahnick. 2002. Status of the yellowedge grouper fishery in the Gulf of Mexico. Contribution SFD 02/03 – 172. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center. Miami, Florida.

CEQ. 1997. Considering cumulative effects under the National Environmental Policy Act. Council on Environmental Policy, Executive Office of the President. 64 pp. + appendices. Available at http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm.

Chester, W. 2001. Full box! One hundred years of fishing and boat building in Bay County. Fire in the Water Publishing Company, South port, Florida. 314 p.

Cooper, W., A.Collins, J. O'Hop, and D. Addis. 2013. The 2013 Stock Assessment Report for Hogfish in the South Atlantic and Gulf of Mexico. Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, St. Petersburg, FL. 295 p. with App.

Copes, Parzival. 1997. Social impacts of fisheries management regimes based on individual quotas. In Social Implications of Quota Systems in Fisheries. Gisli Palsson and Gudrun Petursdottir, editors. Nordic Council of Ministers, Copenhagen.

Courtney, J. M., A. C. Courtney, and M. W. Courtney. 2013. Nutrient loading increases red snapper production in the Gulf of Mexico. Hypotheses in the Life Sciences, 3:7-14.

Craig, J. K. 2012. Aggregation on the edge: effects of hypoxia avoidance on the spatial distribution of brown shrimp and demersal fishes in the Northern Gulf of Mexico. Mar. Ecol. Prog. Ser., 445: 75–95.

Dietz, Simon and Giles Atkinson. 2010. The Equity-Efficiency Trade-off in Environmental Policy: Evidence from Stated Preferences. Land Economics 86(3):423-443.

Edwards, S.F. 1990. An Economics Guide to Allocation of Fish Stocks between the Commercial and Recreational Fisheries. U.S. Dept. of Commer. NOAA Tech. Memo. NMFS 94, 29 p.

Eckert, S. A., K. L. Eckert, P. Ponganis, and G. L. Kooyman. 1989. Diving and foraging behavior of leatherback sea turtles (*Dermochelys coriacea*). Canadian Journal of Zoology 67(11):2834-2840.

Eckert, S. A., D. W. Nellis, K. L. Eckert, and G. L. Kooyman. 1986. Diving patterns of two leatherback sea turtles (*Dermochelys coriacea*) during internesting intervals at Sandy Point, St. Croix, U.S. Virgin Islands. Herpetologica 42(3):381-388.

Feeny, David, Fikret Berkes, Bonnie J. McCay, and James M. Acheson. 1990. The Tragedy of the Commons: Twenty-Two Years Later, Human Ecology 18:1-19.

Fischer, A. J., M. S. Baker, Jr., and C. A. Wilson. 2004. Red snapper (*Lutjanus campechanus*) demographic structure in the northern Gulf of Mexico based on spatial patterns in growth rates and morphometrics. Fishery Bulletin 102:593–603.

Frick, J. 1976. Orientation and behavior of hatchling green turtles *Chelonia mydas* in the sea. Animal Behavior 24(4):849-857.

Gannon, D. P., E. J. Berens McCabe, S. A. Camilleri, J. G., Gannon, M. K. Brueggen, A. A. Barleycorn, V. I. Palubok, G. J. Kirkpatrick, and R. S. Wells. 2009. Effects of *Karenia brevis* harmful algal blooms on nearshore fish communities in southwest Florida. Mar. Ecol. Prog. Ser. 378:171–186.

Gislason, Gordon. 2006. Commercial vs Recreational Fisheries Allocation in Canada: Pacific Herring, Salmon and Halibut. Sharing the Fish Conference, Freemantle, Western Australia. February 26-March 2, 2006.

GMFMC. 1981. Environmental impact statement and fishery management plan for the reef fish resources of the Gulf of Mexico and environmental impact statement. Gulf of Mexico Fishery Management Council, Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/RF%20FMP%20and%20EIS%201981-08.pdf

GMFMC. 1989. Amendment 1 to the reef fish fishery management plan including environmental assessment, regulatory impact review, and regulatory flexibility analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/RF%20Amend-01%20Final%201989-08-rescan.pdf

GMFMC. 1991. Regulatory amendment to the reef fish fishery management plan for setting the 1991 red snapper total allowable catch. Gulf of Mexico Fishery Management Council, Tampa, Florida. 46 p.

http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Reef%20Fish%20Reg%20Amend%20-%201991-03.pdf

GMFMC. 1995. Regulatory amendment to the reef fish fishery management plan to set 1996 red snapper total allowable catch. Gulf of Mexico Fishery Management Council, Tampa, Florida. 49 p.
http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/RF%20RegAmend%20-%201995-12.pdf

GMFMC. 1997. Amendment 15 to the fishery management plan for the reef fish resources of the Gulf of Mexico, includes regulatory impact review, initial regulatory flexibility analysis, and environmental assessment. Gulf of Mexico Fishery Management Council. Tampa, Florida.
http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/AMEND15.pdf
GMFMC. 1999. Generic Sustainable Fisheries Act Amendment to the Following FMPS: Gulf Coral and Coral Reef Resources, Coastal Migratory Pelagics, Red Drum, Reef Fish, Shrimp, Spiny Lobster, and Stone Crab. Gulf of Mexico Fishery Management Council. Tampa, Florida.

GMFMC. 2003. Amendment 21 to the reef fish fishery management plan, environmental assessment, regulatory impact review, and initial regulatory flexibility analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida.
http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Amend21-draft%203.pdf

GMFMC. 2004a. Final environmental impact statement for the generic essential fish habitat amendment to the following fishery management plans of the Gulf of Mexico: shrimp fishery of the Gulf of Mexico, red drum fishery of the Gulf of Mexico, reef fish fishery of the Gulf of Mexico, stone crab fishery of the Gulf of Mexico, coral and coral reef fishery of the Gulf of Mexico, spiny lobster fishery of the Gulf of Mexico and South Atlantic, coastal migratory pelagic resources of the Gulf of Mexico and South Atlantic. Gulf of Mexico Fishery Management Council. Tampa, Florida.
http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20EFH%20EIS.pdf

GMFMC. 2004b. Secretarial amendment 1 to the reef fish management plan to set a 10-year rebuilding plan for red grouper, with associated impacts on gag and other groupers includes environmental assessment, regulatory impact review and final regulatory flexibility analyses. Gulf of Mexico Fishery Management Council. Tampa, Florida.
http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Secretarial-Amendment-1-RF.pdf

GMFMC. 2004c. Amendment 22 to the fishery management plan for the reef fish fishery of the Gulf of Mexico, U.S. waters, with supplemental environmental impact statement, regulatory impact review, initial regulatory flexibility analysis, and social impact assessment. Gulf of Mexico Fishery Management Council. Tampa, Florida.
http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Amend%2022%20Final%2070204.pdf

GMFMC. 2005a. Final amendment 18A to the fishery management plan for the reef fish resources of the Gulf of Mexico, including environmental assessment, regulatory impact review,

and initial regulatory flexibility analyses. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Amendment_18A_Final.pdf

GMFMC. 2005b. Generic Amendment Number 3 for Addressing Essential Fish Habitat Requirements, Habitat Areas of Particular Concern, and Adverse Effects of Fishing in the following Fishery Management Plans of the Gulf of Mexico: Shrimp Fishery of the Gulf of Mexico, United States Waters, Red Drum Fishery of the Gulf of Mexico, Reef Fish Fishery of the Gulf of Mexico, Coastal Migratory Pelagic Resources (Mackerels) in the Gulf of Mexico, and South Atlantic, Stone Crab Fishery of the Gulf of Mexico, Spiny Lobster in the Gulf of Mexico and South Atlantic, and Coral and Coral Reefs of the Gulf of Mexico.

GMFMC. 2006. Final amendment 26 to the Gulf of Mexico reef fish fishery management plan to establish a red snapper individual fishing quota program, including supplemental environmental impact statement, initial regulatory flexibility analysis, and regulatory impact review. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Amend26031606FINAL.pdf

GMFMC. 2007. Final amendment 27 to the reef fish fishery management plan and amendment 14 to the shrimp fishery management plan including supplemental environmental impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. 490 pp with appendices. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20RF%20Amend%2027-%20Shrimp%20Amend%2014.pdf

GMFMC. 2008a. Final reef fish amendment 30A: greater amberjack – revised rebuilding plan, accountability measures; gray triggerfish – establish rebuilding plan, end overfishing, accountability measures, regional management, management thresholds and benchmarks including supplemental environmental impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Amend-30A-Final%20208.pdf

GMFMC. 2008b. Final Amendment 30B: gag – end overfishing and set management thresholds and targets. Red grouper – set optimum yield, TAC, and management measures, time/area closures, and federal regulatory compliance including environmental impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20Amendment%2030B%2010_10_08.pdf

GMFMC. 2009. Final amendment 31 to the fishery management plan for reef fish resources in the Gulf of Mexico addresses bycatch of sea turtles in the bottom longline component of the Gulf of Mexico reef fish fishery, includes draft environmental impact statement and regulatory impact review. Gulf of Mexico Fishery Management Council. Tampa, Florida. 261 pp with appendices. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20Draft%20RF%20Amend%2031%206-11-09.pdf

GMFMC. 2010. Final regulatory amendment the reef fish fishery management plan to set total allowable catch for red snapper including revised environmental assessment, regulatory impact review, and regulatory flexibility analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Final%20Red%20Snapper%20Regulatory%20Amendment%203_26_10.pdf

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

GMFMC. 2011b. Final reef fish amendment 32 – gag grouper – rebuilding plan, annual catch limits, management measures, red grouper – annual catch limits, management measures, and grouper accountability measures. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Final%20RF32_EIS_October_21_2011%5b2%5d.pdf

GMFMC. 2011c. Regulatory amendment to the reef fish fishery management plan to set 2011 total allowable catch for red snapper. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Red%20Snapper%202011%20Regulatory%20Amendment%20-%201-11.pdf

GMFMC. 2012a. Final regulatory amendment to the fishery management plan for the reef fish resources of the Gulf of Mexico, revise fall recreational fixed closed season and set 2012 and 2013 quotas for red snapper. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20Red%20Snapper%20Fall%20Season%20and%20Quota%20RegAmend%20-%2003-20-2012.pdf

GMFMC. 2012b. Final amendment 37 to the reef fish fishery management plan for the reef fish resources of the Gulf of Mexico – Modifications to the gray triggerfish rebuilding plan including adjustments to the annual catch limits and annual catch targets for the commercial and recreational sectors. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Final_Reef_Fish_Amend_37_Gray_Triggerfish_12_06_12[1].pdf

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

GMFMC. 2013a. Red snapper 2013 quota increase and supplemental recreational season, including environmental assessment, regulatory impact review, and regulatory flexibility act analysis. Framework action to the fishery management plan for the reef fish resources of the Gulf of Mexico. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Final%20Red%20Snapper%20Framework%20Action%20Set%202013%20Quotas%2008-01-13.pdf

GMFMC. 2013b. Red snapper individual fishing quota program 5-year review. Jointly prepared by Gulf of Mexico Fishery Management Council and NMFS Southeast Regional Office. Tampa and St. Petersburg, FL. http://www.gulfcouncil.org/docs/amendments/Red%20Snapper%205-year%20Review%20FINAL.pdf

GMFMC. 2013c. Framework action to set the annual catch limit and bag limit for vermilion snapper, set annual catch limit for yellowtail snapper, and modify the venting tool requirement. Gulf of Mexico Fishery Management Council, Tampa, Florida. 171 p. http://www.gulfcouncil.org/docs/amendments/2013%20Vermilion-Yellowtail-Venting%20Tool%20Framework%20Action.pdf

GMFMC. 2013d. Framework action to set the 2013 red snapper commercial and recreational quotas and modify the recreational bag limit, including environmental assessment, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://gulfcouncil.org/docs/amendments/Red%20Snapper%20Framework%20Action%20to%20Set%202013%20Quotas.pdf

GMFMC. 2014. Recreational Accountability Measures for Red snapper, including environmental assessment, regulatory impact review, and regulatory flexibility act analysis. Framework action to the fishery management plan for the reef fish resources of the Gulf of Mexico. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Final%20Recreational%20AMs%20for%20Red%20Snapper%2010-6-2014.pdf

GMFMC. 2014a. Amendment 40 to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico - Recreational Red Snapper Sector Separation. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/fishery_management_plans/reef_fish_management.php

GMFMC. 2014b. Recreational Accountability Measures for Red snapper, including environmental assessment, regulatory impact review, and regulatory flexibility act analysis. Framework action to the fishery management plan for the reef fish resources of the Gulf of Mexico. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Final%20Recreational%20AMs%20for%20Red%20Snapper%2010-6-2014.pdf

GMFMC. 2014c. Amendment 39 to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico – Regional Management. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/council_meetings/Briefing%20Materials/BB-03-2015/B-10(b)%20PPH%20Draft%20RF39%20Reg%20Man.pdf

GMFMC. 2015. Red snapper quotas for 2015-2017+: Framework Action to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico. Gulf of Mexico Fishery Management Council. Tampa, Florida.

GMFMC and SAFMC. 1982. Fishery management plan final environmental impact statement for coral and coral reefs. Gulf of Mexico Fishery Management Council. Tampa, Florida; and South Atlantic Fishery Management Council. Charleston, South Carolina. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Coral%20FMP.pdf

Goodyear, C. P. 1988. The Gulf of Mexico fishery for reef fish species, a descriptive profile. Unpublished report. National Marine Fisheries Service, Southeast Fisheries Center, Miami Laboratory, CRD 87/88-19. https://grunt.sefsc.noaa.gov/P_QryLDS/DisplayDocuments.jsp?min_series_code=CR&min_record_id=935&direction=next&total_rows=2955&description=SEFSC%20Technical%20Memorandum#

Gore, R. H. 1992. The Gulf of Mexico: A treasury of resources in the American Mediterranean. Pineapple Press. Sarasota, Florida.

Grimes, C. B., K. W. Able, and S. C. Turner. 1982. Direct observation from a submersible vessel of commercial longlines for tilefish. Transactions of the American Fisheries Society 111:94-98.
Hamilton, A. N., Jr. 2000. Gear impacts on essential fish habitat in the Southeastern Region. , National Marine Fisheries Service, Southeast Fisheries Science Center. Pascagoula, Mississippi.

Hausman, Jerry. 2012. Contingent valuation: from dubious to hopeless. Journal of Economic Perspectives. 26(4)43-56.

High, W. L. 1998. Observations of a scientist/dicer on fishing technology and fisheries biology. AFSC Processed Report 98-01. National Marine Fisheries Service, Alaska Fisheries Science Center. Seattle, Washington.

Hollowed, A. B., Barange, M., Beamish, R., Brander, K., Cochrane, K., Drinkwater, K., Foreman, M., Hare, J., Holt, J., Ito, S-I., Kim, S., King, J., Loeng, H., MacKenzie, B., Mueter, F., Okey, T., Peck, M. A., Radchenko, V., Rice, J., Schirripa, M., Yatsu, A., and Yamanaka, Y. 2013. Projected impacts of climate change on marine fish and fisheries. ICES Journal of Marine Science 70: 1023–1037.

Holzer, J. and K. McConnell. 2014. Harvest Allocation without Property Rights. Journal of the Association of Environmental and Resource Economics 1(1):209-232

Hood, P. B., A. J. Strelcheck, and P. Steele. 2007. A history of red snapper management in the Gulf of Mexico. Pages 267-284. in W. F. Patterson, III, J. H. Cowan, G. R. Fitzhugh, and D. L. Nieland, editors. Red snapper ecology and fisheries in the U.S. Gulf of Mexico. AFS, Symp 60, Bethesda, MD.

Hughes, G. R. 1974. Is a sea turtle no more than an armored stomach? Bulletin of the South African Association for Marine Biological Research 11:12-14.

Impact Assessment, Inc. 2005. Identifying Communities Associated with the Fishing Industry Along the Florida Gulf Coast. Impact Assessment, Inc. La Jolla, CA. Volumes 1-3 646 pp.

Impact Assessment, Inc. 2005. Identifying Communities Associated with the Fishing Industry Along the Florida Gulf Coast. Impact Assessment, Inc. La Jolla, CA. Volumes 1-3 646 pp.

Impact Assessment, Inc. 2006. Identifying Communities Associated with the Fishing Industry in Alabama and Mississippi -Final Report. Prepared under Contract WC133F-03-SE-0603. http://sero.nmfs.noaa.gov/sf/socialsci/pdfs/AlaMiss_PublicReleaseVersion_pdf_Feb06.pdf

Impact Assessment, Inc. 2012. Small Business Impacts Associated with the 2010 Oil Spill and Drilling Moratorium in the Gulf of Mexico - Final Technical Report. Prepared for the U.S. Small Business Administration, Office of Advocacy. La Jolla, CA. 134 p.

IPCC. 2014. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Jacob, S., P. Weeks, B. Blount, and M. Jepson. 2012. Development and Evaluation of Social Indicators of Vulnerability and Resiliency for Fishing Communities in the Gulf of Mexico. Marine Policy 26(10): 16-22.

Jacob, S., J. Landau, B. Blount, H. McIlvaine-Newsdad, and P. Weeks. 2013. Social Impacts of the Allocation/Reallocation of Marine Fisheries Resources on Communities in the Gulf of Mexico and South Atlantic: Development of an Empirical Predictive Model NOAA/NMFS MARFIN Grant Number NA09NMF4330149. Gulf and South Atlantic Fisheries Foundation, Tampa, FL. p.158

Jepson, M. and L.L. Colburn. 2013. Development of Social Indicators of Fishing Community Vulnerability and Resilience in the U.S. Southeast and Northeast Regions. U.S. Dept. of Commerce, NOAA Technical Memorandum NMFS-F/SPO-129, 64 p.

Keinath, J. A., and J. A. Musick. 1993. Movements and diving behavior of leatherback turtle. Copeia 1993(4):1010-1017.

Keithly, W. R. and A. Martin. 1997. Southeast finfish processing activities of federally managed species, particularly reef fish, and potential impacts of regulations. MARFIN Project No. NA47FD0290, May 1997.

Kennedy, V. S., R. R. Twilley, J. A. Kleypas, J. H. Cowan, Jr., S. R. Hare. 2002. Coastal and Marine Ecosystems and Global Climate Change: Potential Effects on U.S. Resources. Pew Center on Global Climate Change.

Landsberg, J.H., L.J. Flewelling, and J. Naar. 2009. *Karenia brevis* red tides, brevetoxins in the food web, and impacts on natural resources: Decadal advancements. Harmful Algae 8:598–607.

Lanyon, J.M., C.J. Limpus, and H., Marsh. 1989. Dugongs and turtles: grazers in the seagrass system. *In:* Larkum, A.W.D, A.J., McComb and S.A., Shepard (eds.) Biology of Seagrasses. Elsevier, Amsterdam, 610.

Limpus, C.J., and N., Nichols. 1988. The southern oscillation regulates the annual numbers of green turtles (*Chelonia mydas*) breeding around northern Australia. Australian Journal of Wildlife Research 15:157.

Limpus, C.J., and N., Nichols. 1994. Progress report on the study of the interaction of El Niño Southern Oscillation on annual *Chelonia mydas* numbers at the southern Great Barrier Reef rookeries. *In:* Proceedings of the Australian Marine Turtle Conservation Workshop, Queensland Australia.

Lutz, P. L., and J. A. Musick, editors. 1997. The biology of sea turtles. CRC Press, Boca Raton, Florida.

Lutz, P. L., J. A. Musick, and J. Wyneken. 2003. The Biology of Sea Turtles. Volume II. CRC Press, Inc., Washington, D.C.

Márquez M, R. 1994. Synopsis of biological data on the Kemp's ridley turtle, *Lepidochelys kempii* (Garman 1880). U. S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Miami, Florida.

McCay, Bonnie J., and James M. Acheson. 1987. Human Ecology of the Commons In The Question of the Commons: The Culture and Ecology of Communal Resources. B.J. McCay and J.M. Acheson, eds. Pp. 1-34. Tucson: The University of Arizona Press.

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

Mendonca, M. T., and P. C. H. Pritchard. 1986. Offshore movements of post-nesting Kemp's ridley sea turtles (*Lepidochelys kempii*). Herpetologica 42:373-380.

Methot, R. D. 2010. User manual for stock synthesis, model version 3.10b. Seattle, Washington The most recent version of this manual and software is available at http://nft.nefsc.noaa.gov/Download.html .

Meylan, A. 1988. Spongivory in hawksbill turtles: a diet of glass. Science 239:393-395.

Meylan, A. B., and M. Donnelly. 1999. Status justification for listing the hawksbill turtle (Eretmochelys imbricata) as critically endangered on the 1996 IUCN Red List of Threatened Animals. Chelonian Conservation and Biology 3(2):200-204.

Moran, D. 1988. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Gulf of Mexico) -- Red Snapper. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Gulf of Mexico), U.S. Army Corps of Engineers. U.S. Fish and Wildlife Service Biological Report 82(11.83): 19.

Mortimer, J. A. 1981. The feeding ecology of the west Caribbean green turtle (*Chelonia mydas*) in Nicaragua. Biotropica 13(1):49-58.

Mortimer, J. A. 1982. Feeding ecology of sea turtles. Pages 103-109 *in* K. A. Bjorndal, editor. Biology and Conservation of Sea Turtles. Smithsonian Institution Press, Washington D.C.

Murawski, S, A., W. T. Hogarth, E. B. Peebles, and L. Barbeiri. 2014. Prevalence of External Skin Lesions and Polycyclic Aromatic Hydrocarbon Concentrations in Gulf of Mexico Fishes, Post-Deepwater Horizon, Trans. Amer. Fish. Soc., 143(4):1084-1097.

Muller, R. G., M. D. Murphy, J. de Silva, and L. R. Barbieri. 2003. Final report submitted to the national marine fisheries service, the Gulf of Mexico fishery management council, and the South Atlantic fishery management council as part of the southeast data, assessment, and review (SEDAR) iii. Florida Fish and Wildlife Conservation Commission, FWC-FMRI Report: IHR 2003-10. Florida Fish and Wildlife Research Institute. St. Petersburg, Florida.

National Commission. 2010. The use of surface and subsea dispersants during the BP Deepwater Horizon oil spill. National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling (National Commission). Staff Working Paper No. 4. http://www.oilspillcommission.gov/sites/default/files/documents/Updated%20Dispersants%20Working%20Paper.pdf

Needham, H., D. Brown, L. Carter. 2012. Impacts and adaptation options in the Gulf coast. Center for Climate and Energy Solutions, Arlington, VA. 38 p.

Newell, R.G., J.N. Sanchirico and S. Kerr. 2005a. Fishing Quotas Markets. Journal of Environmental Economics and Management 4:437-462.

Newell, R.G., KL. Papps and J.N. Sanchirico. 2005b. Asset Pricing in Created Markets for Fishing Quotas. Resources for the Future. RFF DP 05-46. 30pp.

Nieland, D. L., C. A. Wilson III, and A. J. Fischer. 2007. Declining size-at-age among red snapper in the Northern Gulf of Mexico off Louisiana, USA: recovery or collapse? Pages 329-336 in W. F. Patterson, III, J. H. Cowan, Jr., G. R. Fitzhugh and D. L. Nieland, editors. Red snapper ecology and fisheries in the U.S. Gulf of Mexico. American Fisheries Society, Symposium 60, Bethesda, Maryland.

NMFS. 2002. Status of red grouper in United States waters of the Gulf of Mexico during 1986-2001, revised. Contribution No. SFD-01/02-175rev. National Marine Fisheries Service, Southeast Fisheries Science Center. Miami, Florida.

NMFS. 2005. Endangered Species Act – Section 7 consultation on the continued authorization of reef fish fishing under the Gulf of Mexico reef fish fishery management plan and proposed amendment 23. February 15, 2005. National Marine Fisheries Service. St. Petersburg, Florida.

NMFS. 2009. Biological Opinion - the continued authorization of reef fish fishing under the Gulf of Mexico reef fish fishery management plan, including Amendment 31, and a rulemaking to reduce sea turtle bycatch in the Eastern Gulf bottom longline component of the fishery. October 13, 2009. National Marine Fisheries Service. St. Petersburg, Florida. Available at: http://sero.nmfs.noaa.gov/pr/esa/Fishery%20Biops/2009%20GOM%20Reef%20Fish%20Re-in%20BO.pdf

NMFS. 2011a. Biological opinion on the continued authorization of Reef Fish fishing under the Gulf of Mexico Reef Fish Fishery Management Plan. September 30, 2011. Available at: http://sero.nmfs.noaa.gov/pr/esa/Fishery%20Biops/03584%20GOM%20Reef%20Fish%20BiOp%202011%20final.pdf

NMFS. 2011b. Fisheries Economics of the United States, 2009. U.S. Department of Commerce, NOAA Technical Memorandum. National Marine Fisheries Service-F/SPO-118. Available at: http://www.st.nmfs.noaa.gov/st5/publication/fisheries_economics_2009.html

NMFS. 2012a. 2013 Recreational Red Snapper Quota Closure Analysis. SERO-LAPP-2012-10. Southeast Regional Office, St. Petersburg, FL. http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/red_snapper/documents/pdfs/gulf_red_snapper_quota_closure.pdf

NMFS. 2012b. Five year projections of the recreational red snapper fishing season length. SERO-LAPP-2012-12. Southeast Regional Office, St. Petersburg, FL.

NMFS. 2012c. Gulf of Mexico 2011 red snapper individual fishing quota annual report. SERO-LAPP-2012-04. Southeast Regional Office, National Marine Fisheries Service, 263 13th Avenue South, St. Petersburg, FL 33701. 42 pp. http://sero.nmfs.noaa.gov/sf/ifq/2011_RS_AnnualReport_Final.pdf.

NMFS. 2013a. Updated 2013 Gulf of Mexico Red Snapper Recreational Season Length Estimates. SERO-LAPP-20913-02-Addendum. Southeast Regional Office, National Marine Fisheries Service, 263 13th Avenue South, St. Petersburg, FL 33701.

http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/red_snapper/documents/pdfs/2013_red_snapper_emergency_regs.pdf

NMFS. 2013b. Fisheries of the United States 2012. National Marine Fisheries Service, Silver Spring, MD. 124 pp.

NMFS. 2013c. 2012 Gulf of Mexico Red Snapper Individual fishing quota annual report. SERO-LAPP-2013-6. Southeast Regional Office, National Marine Fisheries Service, 263 13th Avenue South, St. Petersburg, FL 33701. http://sero.nmfs.noaa.gov/sustainable_fisheries/lapp_dm/documents/pdfs/2013/2012_rs_annualreport.pdf

NMFS. 2013d. 2014 Gulf of Mexico red snapper recreational season length estimates. SERO-LAPP-2013-10. Southeast Regional Office, National Marine Fisheries Service, 263 13th Avenue South, St. Petersburg, FL 33701. 15 pp. http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/red_snapper/index.html

NMFS. 2014. Emergency action to set red snapper accountability measures for the recreational sector of the Gulf of Mexico reef fish fishery. Southeast Regional Office, National Marine Fisheries Service, 263 13th Avenue South, St. Petersburg, FL 33701.

NMFS. 2015. 2015 Gulf of Mexico red snapper recreational season length estimates. SERO-LAPP-2015-04. Southeast Regional Office, National Marine Fisheries Service, 263 13th Avenue South, St. Petersburg, FL 33701. 15 pp. http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/reef_fish/2015/rs_framework_quota/index.html

NOAA. 2010. Deepwater Horizon Oil: Characteristics and Concerns. NOAA Office of Response and Restoration, Emergency Response Division. 2 pp. http://www.noaa.gov/deepwaterhorizon/publications_factsheets/documents/OilCharacteristics.pdf

Norman, J. R., and F. C.. Fraser. 1938. Giant Fishes, Whales and Dolphins. W. W. Norton and Company, Inc., New York, NY. 361 pp.

Norman-Lopez, A. 2009. Competition between Different Farmed and Wild Species: The US Tilapia Market. Marine Resource Economics 24:237-251.

Ogren, L. H. 1989. Distribution of juvenile and subadult Kemp's ridley sea turtles: preliminary results from 1984-1987 surveys. Pages 116-123 *in* C. W. Caillouet Jr., and J. A.M. Landry, editors. Proceedings of the First International Symposium on Kemp's Ridley Sea Turtle Biology, Conservation, and Management. Texas A&M University Sea Grant College, Galveston, Texas.

OECD. 2014. Integrating Recreational Fisheries into Fisheries Management: Challenges and Opportunities – Report prepared for the Organization for Economic Cooperation and Development by Joshua Abbott. TAD/FI(2014)5, 39 pp.

O'Hop, J., M. Murphy, and D. Chagaris. 2012. The 2012 stock assessment report for yellowtail snapper in the south Atlantic and Gulf of Mexico. Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute. St. Petersburg, Florida.

Osgood, K. E. (editor). 2008. Climate Impacts on U.S. Living Marine Resources: National Marine Fisheries Service Concerns, Activities and Needs. U.S. Dep. Commerce, NOAA Tech. Memo. NMFSF/SPO-89, 118 pp.

Paredes, R.P. 1969. Introduccion al Estudio Biologico de *Chelonia mydas agassizi* en el Perfil de Pisco, Master's thesis, Universidad Nacional Federico Villareal, Lima, Peru.

Parrack, N.C. and D.B. McClellan. 1986. Trends in Gulf of Mexico red snapper population dynamics, 1979-85. National Marine Fisheries Service, Southeast Fisheries Center, Miami, Florida. Coastal Resources Division Contribution No. CRD-86/87-4. 116 pp.

PFMC. 1986. Seventh Amendment to the Fishery Management Plan for Commercial and Recreational Salmon Fisheries off the Coasts of Washington, Oregon, and California Commencing in 1978. Pacific Fishery Management Council. Portland, Oregon.

PFMC. 1988. Ninth Amendment to the Fishery Management Plan for Commercial and Recreational Salmon Fisheries off the Coasts of Washington, Oregon, and California Commencing in 1978. Pacific Fishery Management Council. Portland, Oregon.

Plummer, M.L., W. Morrison, and E. Steiner. 2012. Allocation of fishery harvests under the Magnuson-Stevens Fishery Conservation and Management Act: Principles and practice. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-NWFSC-115, 84 pp.

Porch, C. E., and S. L. Cass-Calay. 2001. Status of the vermilion snapper fishery in the Gulf of Mexico – assessment 5.0. Sustainable Fisheries Division Contribution No. SFD-01/01-129. National Marine Fisheries Service, Southeast Fisheries Science Center. Miami, Florida.

Porch, C. E., A. M. Eklund, and G. P. Scott. 2003. An assessment of rebuilding times for goliath grouper. Contribution: SFD 2003-0018. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center. Miami, Florida.

Porch, C. E. and S. C. Turner. 2004. Reconstructed time series of shrimp trawl effort in the Gulf of Mexico and the associated bycatch of red snapper from 1948 to 1972. Southeast Fisheries Science Center, Miami, FL. SFD-2004-055. 13 pp.

Porch, C. E., S. C. Turner and M. J. Schirripa. 2004. The commercial landings of red snapper in the Gulf of Mexico from 1872 to 1962. Southeast Fisheries Science Center, Miami, FL. SFD-2004-054. 12 pp.

Rico-Martínez, R., T.W. Snell, and T.L. Shearer. 2013. Synergistic toxicity of Macondo crude oil and dispersant Corexit 9500A® to the *Brachionus plicatilis* species complex (Rotifera). Environmental Pollution 173:5-10.

Rios, A. 2013. Estimating historical recreational angler effort in the Gulf of Mexico for the private, charter, and headboat fishing modes. SEDAR31-AW11. SEDAR, North Charleston, SC. 11 pp.

Savolainen, M. A., R. H. Caffey, and R. F. Kazmierczak, Jr. 2012. Economic and Attitudinal Perspectives of the Recreational For-hire Fishing Industry in the U.S. Gulf of Mexico. Center for Natural Resource Economics and Policy, LSU AgCenter and Louisiana Sea Grant College Program, Department of Agricultural Economics and Agribusiness, Louisiana State University, Baton Rouge, LA. 171 p. Available at: http://www.laseagrant.org/pdfs/Gulf-RFH-Survey-Final-Report-2012.pdf

SEA (Strategic Environmental Assessment Division, NOS). 1998. Product overview: Products and services for the identification of essential fish habitat in the Gulf of Mexico. NOS, Page 7-62 DEIS for EFH for the Gulf of Mexico FMPs July 2003 Silver Spring MD; National Marine Fisheries Service, Galveston, Texas; and Gulf of Mexico Fishery Management Council. Tampa, Florida.

SEDAR 3. 2003. Complete stock assessment report of yellowtail snapper in the southeastern United States – SEDAR 3, Assessment report 1. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 6. 2004a. SEDAR report 1 the goliath grouper in southern Florida: Assessment review and advisory report. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 6. 2004b. SEDAR report 2 the hogfish in Florida: Assessment review and advisory report. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 7. 2005. Stock assessment report of SEDAR 7 Gulf of Mexico red snapper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 7 Update. 2009. Update stock assessment report of SEDAR 7 Gulf of Mexico red snapper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 9. 2006a. Stock assessment report 1 of SEDAR 9: Gulf of Mexico gray triggerfish. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 9. 2006b. Stock assessment report 2 of SEDAR 9: Gulf of Mexico greater amberjack. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 9. 2006c. Stock assessment report 3 of SEDAR 9: Gulf of Mexico vermilion snapper assessment report 3. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 9 Update. 2010. SEDAR 9 stock assessment update report, Gulf of Mexico greater amberjack. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 9 Update. 2011a. SEDAR update stock assessment of vermilion snapper in the Gulf of Mexico. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 9 Update. 2011b. SEDAR update stock assessment of gray triggerfish in the Gulf of Mexico. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 10. 2006. Gulf of Mexico Gag Grouper Stock Assessment Report 2. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 10 Update. 2009. Stock assessment of gag in the Gulf of Mexico. – SEDAR update assessment. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 12. 2007. SEDAR12-Complete Stock Assessment Report 1: Gulf of Mexico Red Grouper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 12 Update. 2009. Stock assessment of red grouper in the Gulf of Mexico – SEDAR update assessment. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 15A. 2008. Stock assessment report 3 (SAR 3) South Atlantic and Gulf of Mexico mutton snapper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 19. 2010. Stock assessment report Gulf of Mexico and South Atlantic black grouper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 22. 2011a. Stock assessment report Gulf of Mexico tilefish. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 22. 2011b. Stock assessment report Gulf of Mexico yellowedge grouper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 23. 2011. Stock assessment report South Atlantic and Gulf of Mexico goliath grouper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 31. 2013. Stock assessment report Gulf of Mexico red snapper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 31 Update. 2015. Stock assessment of red snapper in the Gulf of Mexico 1872 – 2013 - with provisional 2014 landings. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 33. 2014a. Gulf of Mexico greater amberjack stock assessment report. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/

SEDAR 33. 2014b. Gulf of Mexico gag stock assessment report. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/

Shaver, D. J. 1991. Feeding Ecology of Wild and Head-Started Kemp's Ridley Sea Turtles in South Texas Waters. Journal of Herpetology 25(3):327-334.

Shipp, R.L. 2001. The snapper fishery in the Gulf of Mexico, an historical perspective, and management implications. PowerPoint presentation to the Gulf of Mexico Fishery Management Council, January 2001.

Shipp, R. L. and S. A. Bortone. 2009. A prospective of the importance of artificial habitat on the management of red snapper in the Gulf of Mexico. Reviews in Fisheries Science 17: 41-47.

Siebenaler, J. B. and Winfield Brady. 1952. A high speed annual commercial fishing reel. Technical series no. 4. University of Miami Marine Laboratory: Coral Gables, FL.

Simpfendorfer, CA. 2001. Essential habitat of the smalltooth sawfish, *Pristis pectinata*. Report to the National Fisheries Service‘s Protected Resources Division. Mote Marine Laboratory, Technical Report (786) 21pp.

Simpfendorfer, C.A., and T.R., Wiley. 2004. Determination of the distribution of Florida‘s remnant sawfish population, and identification of areas critical to their conservation. Mote Marine Laboratory, Technical Report July 2, 2004, 37 pp.

Soma, M. 1985. Radio biotelemetry system applied to migratory study of turtle. Journal of the Faculty of Marine Science and Technology, Tokai University, Japan, 21:47.

Standora, E. A., J. R. Spotila, J. A. Keinath, and C. R. Shoop. 1984. Body temperatures, diving cycles, and movement of a subadult leatherback turtle, *Dermochelys coriacea*. Herpetologica 40:169-176.

Sutton, S. G., R. B. Ditton, J. R. Stoll, and J. W. Milon. 1999. A cross-sectional study and longitudinal perspective on the social and economic characteristics of the charter and party boat fishing industry of Alabama, Mississippi, Louisiana, and Texas. Report by the Human Dimensions of Recreational Fisheries Research Laboratory, Texas A&M University, MARFIN program grant number NA77FF0551.

Szedlmayer, S. T. and R. L. Shipp. 1994. Movement and growth of red snapper, *Lutjanus campechanus*, from an artificial reef area in the northeastern Gulf of Mexico. Bulletin of Marine Science 55: 887-896.

Szedlmayer, S. T. and J. C. Howe. 1997. Substrate preference in age-0 red snapper, *Lutjanus campechanus*. Environmental biology of fishes 50: 203-207.

Szedlmayer, S. T. and J. Conti. 1998. Nursery habitat, growth rates, and seasonality of age-0 red snapper, *Lutjanus campechanus*, in the northeast Gulf of Mexico. Fishery Bulletin. 97:626-635.

Thayer, G.W., K.A., Bjorndal, J.C., Ogden, S.L., Williams, and J.C., Zieman. 1984. Role of large herbivores in seagrass communities. Estuaries 7:351.

Topping, D.T. and S.T. Szedlmayer. 2011. Home range and movement patterns of red snapper (*Lutjanus campechanus*) on artificial reefs. Fisheries Research. 112: 77-84.

Turner, S. C., N. J. Cummings, and C. P. Porch. 2000. Stock assessment of Gulf of Mexico greater amberjack using data through 1998. SFD-99/00-100. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center. Miami, Florida.

Turner, S. C., C. E. Porch, D. Heinemann, G. P. Scott, and M. Ortiz. 2001. Status of the gag stocks of the Gulf of Mexico: assessment 3.0. August 2001. Contribution: SFD-01/02-134. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center. Miami, Florida.

Valle, M., C. Legault, and M. Ortiz. 2001. A stock assessment for gray triggerfish, *Balistes capriscus*, in the Gulf of Mexico. Contribution: SFD-01/02-124. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center. Miami, Florida.

van Dam, R. P., and C. E. Díez. 1998. Home range of immature hawksbill turtles (Eretmochelys imbricata (Linnaeus) at two Caribbean islands. Journal of Experimental Marine Biology and Ecology 220(1):15-24.

Walker, B. M., R. F. Zales II, and B. W. Rockstall. 2006. Charter fleet in peril: losses to the Gulf of Mexico charter fleet from hurricane storms during 2005. National Association of Charterboat Operators. 208 pp.

Walker, T. 1994. Post-hatchling dispersal of sea turtles. Proceedings of the Australian Marine Turtle Conservation Workshop 1994:79-94.

Walters, C., S. J. D. Martell, and B. Mahmoudi. 2006. An Ecosim model for exploring ecosystem management options for the Gulf of Mexico: implications of including multistanza life history models for policy predictions. Mote Symp. #6.

Weisberg, R.H., Zheng, L., Liu, Y., Murawski, S., Hu, C., and Paul, J. 2014. Did Deepwater Horizon Hydrocarbons Transit to the West Florida Continental Shelf?, Deep Sea Research Part II: Topical Studies in Oceanography, Available online 17 February 2014, ISSN 0967-0645, http://dx.doi.org/10.1016/j.dsr2.2014.02.002.

Wilson, C.A. and D.L. Nieland. 2001. Age and growth of red snapper, *Lutjanus campechanus*, from the northern Gulf of Mexico off Louisiana. Fishery Bulletin 99:653-664. http://fishbull.noaa.gov/994/wil.pdf

Witzell, W. N. 2002. Immature Atlantic loggerhead turtles (*Caretta caretta*): suggested changes to the life history model. Herpetological Review 33(4):266-269.

Woods, M. K. 2003. Demographic differences in reproductive biology of female red snapper (*Lutjanus campechanus*) in the northern Gulf of Mexico. Master's thesis. University of South Alabama, Mobile, Alabama.

CHAPTER 10. INDEX

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APPENDIX A. 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 fishery management in federal waters of the exclusive economic zone. However, fishery 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 are summarized below.

Administrative Procedures Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (APA) (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the APA, 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 APA also establishes a 30-day waiting period from the time a final rule is published until it takes effect.

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 NMFS regulations at 15 C.F.R. 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, 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 (DQA) (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 DQA 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 fishery management plans (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 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.

Endangered Species Act

The Endangered Species Act (ESA) of 1973, as amended, (16 U.S.C. Section 1531 et seq.) requires federal agencies use their authorities to conserve endangered and threatened species. The ESA requires NMFS, when proposing a fishery action that "may affect" critical habitat or endangered or threatened species, to consult with the appropriate administrative agency (itself for most marine species, the U.S. Fish and Wildlife Service for all remaining species) to determine the potential impacts of the proposed action. Consultations are concluded informally when proposed actions may affect but are "not likely to adversely affect" endangered or threatened species or designated critical habitat. Formal consultations, including a biological opinion, are required when proposed actions may affect and are "likely to adversely affect" endangered or threatened species or adversely modify designated critical habitat. If jeopardy or adverse modification is found, the consulting agency is required to suggest reasonable and prudent alternatives.

On September 30, 2011, the Protected Resources Division released a biological opinion which, after analyzing best available data, the current status of the species, environmental baseline (including the impacts of the recent Deepwater Horizon MC 252 oil release event in the northern Gulf of Mexico), effects of the proposed action, and cumulative effects, concluded that the continued operation of the Gulf of Mexico reef fish fishery is also not likely to jeopardize the continued existence of green, hawksbill, Kemp's ridley, leatherback, or loggerhead sea turtles, nor the continued existence of smalltooth sawfish (NMFS 2011a). On December 7, 2012, NMFS published a proposed rule to list 66 coral species under the ESA and reclassify *Acropora* from threatened to endangered (77 FR 73220). In a memorandum dated February 13, 2013, NMFS determined the reef fish fishery was not likely to adversely affect *Acropora* because of where the fishery operates, the types of gear used in the fishery, and that other regulations protect *Acropora* where they are most likely to occur.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas, and on the importing of marine mammals and marine mammal products into the United States. Under the MMPA, the Secretary of Commerce (authority delegated to NMFS) is responsible for the conservation and management of cetaceans and pinnipeds (other than walruses). The Secretary of the Interior is responsible for walruses, sea and marine otters, polar bears, manatees, and dugongs.

Part of the responsibility that NMFS has under the MMPA involves monitoring populations of marine mammals to make sure that they stay at optimum levels. If a population falls below its optimum level, it is designated as "depleted," and a conservation plan is developed to guide research and management actions to restore the population to healthy levels.

In 1994, Congress amended the MMPA, to govern the taking of marine mammals incidental to commercial fishing operations. This amendment required the preparation of stock assessments for all marine mammal stocks in waters under U.S. jurisdiction, development and implementation of take-reduction plans for stocks that may be reduced or are being maintained below their optimum sustainable population levels due to interactions with commercial fisheries, and studies of pinniped-fishery interactions.

Under Section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries that places all U.S. commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishery. The categorization of a fishery in the List of Fisheries determines whether participants in that fishery may be required to comply with certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. The primary gears used in the Gulf of Mexico reef fish fishery are still classified in the proposed 2014 MMPA List of Fisheries as Category III fishery (December 6, 2013; 78 FR 73477). The conclusions of the most recent List of Fisheries for gear used by the reef fish fishery can be found in Section 3.3.

Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501 et seq.) regulates the collection of public information by federal agencies to ensure the public is not overburdened with information requests, the federal government's information collection procedures are efficient, and federal agencies adhere to appropriate rules governing the confidentiality of such information. The PRA requires NMFS to obtain approval from the Office of Management and Budget before requesting most types of fishery information from the public. Setting red snapper allocation would likely not have PRA consequences.

Executive Orders

E.O. 12630: Takings

The Executive Order 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 National Oceanic and Atmospheric Administration Office of General Counsel will determine whether a Taking Implication Assessment is necessary for this amendment.

E.O. 12866: Regulatory Planning and Review

Executive Order 12866: Regulatory Planning and Review, signed in 1993, requires federal agencies to assess the costs and benefits of their proposed regulations, including distributional impacts, and to select alternatives that maximize net benefits to society. To comply with E.O. 12866, NMFS prepares a Regulatory Impact Review (RIR) for all fishery regulatory actions that either implement a new fishery management plan or significantly amend an existing plan (See Chapter 5). RIRs provide a comprehensive analysis of the costs and benefits to society of proposed regulatory actions, the problems and policy objectives prompting the regulatory proposals, and the major alternatives that could be used to solve the problems. The reviews also serve as the basis for the agency's determinations as to whether proposed regulations are a "significant regulatory action" under the criteria provided in E.O. 12866 and whether proposed regulations will have a significant economic impact on a substantial number of small entities in compliance with the Regulatory Flexibility Analysis. A regulation is significant if it a) has an annual effect on the economy of $100 million or more or adversely affects in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments and communities; b) creates a serious inconsistency or otherwise interferes with an action taken or planned by another agency; c) materially alters the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or d) raises novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

E.O. 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations

This Executive Order mandates that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, 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 and possessions. The Executive Order is described in more detail relative to fisheries actions in Section 3.5.1.

E.O. 12962: Recreational Fisheries

This Executive Order 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 (Council) 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 Council 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 Order requires NMFS and the U.S. Fish and Wildlife Service to develop a joint agency policy for administering the ESA.

E.O. 13132: Federalism

The Executive Order on Federalism requires agencies in formulating and implementing policies, to be guided by the fundamental Federalism principles. The Order 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 Order 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).

E.O. 13158: Marine Protected Areas

This Executive Order 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, habitat areas of particular concern, and gear-restricted areas in the eastern and northwestern Gulf of Mexico.

Essential Fish Habitat

The amended Magnuson-Stevens Act included a new habitat conservation provision known as essential fish habitat (EFH) that requires each existing and any new FMPs to describe and identify EFH for each federally managed species, minimize to the extent practicable impacts from fishing activities on EFH that are more than minimal and not temporary in nature, and identify other actions to encourage the conservation and enhancement of that EFH. To address these requirements the Council has, under separate action, approved an Environmental Impact Statement (GMFMC 2004a) to address the new EFH requirements contained within the Magnuson-Stevens Act. Section 305(b)(2) requires federal agencies to obtain a consultation for any action that may adversely affect EFH. An EFH consultation will be conducted for this action.

References

GMFMC. 2004. Final environmental impact statement for the generic essential fish habitat amendment to the following fishery management plans of the Gulf of Mexico: shrimp fishery of the Gulf of Mexico, red drum fishery of the Gulf of Mexico, reef fish fishery of the Gulf of Mexico, stone crab fishery of the Gulf of Mexico, coral and coral reef fishery of the Gulf of Mexico, spiny lobster fishery of the Gulf of Mexico and South Atlantic, coastal migratory pelagic resources of the Gulf of Mexico and South Atlantic. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20EFH%20EIS.pdf

NMFS. 2011. Biological opinion on the continued authorization of Reef Fish fishing under the Gulf of Mexico Reef Fish Fishery Management Plan. September 30, 2011. Available at: http://sero.nmfs.noaa.gov/pr/esa/Fishery%20Biops/03584%20GOM%20Reef%20Fish%20BiOp%202011%20final.pdf

APPENDIX B. BYCATCH PRACTICABILITY ANALYSIS

Introduction

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.

Agency guidance provided at 50 CFR 600.350(d)(3) identifies ten factors to consider in determining whether a management measure minimizes bycatch or bycatch mortality to the extent practicable. These are:

1. Population effects for the bycatch species;
2. Ecological effects due to changes in the bycatch of that species (effects on other species in the ecosystem);
3. Changes in the bycatch of other species of fish and the resulting population and ecosystem effects;
4. Effects on marine mammals and birds;
5. Changes in fishing, processing, disposal, and marketing costs;
6. Changes in fishing practices and behavior of fishermen;
7. Changes in research, administration, and enforcement costs and management effectiveness;
8. Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources;
9. Changes in the distribution of benefits and costs; and
10. Social effects.

The Regional Fishery Management Councils are encouraged to adhere to the precautionary approach outlined in Article 6.5 of the Food and Agriculture Organization of the United Nations Code of Conduct for Responsible Fisheries when uncertain about these factors.

Bycatch practicability analyses of the reef fish fishery have been provided in several reef fish amendments and focused to some degree on the component of the fishery affected by the actions covered in the amendment. For red snapper, bycatch practicability analyses were completed for Amendments 22, 27, and 40 to the Fishery Management Plan (FMP) for the Reef Fish Resources of the Gulf of Mexico (GMFMC 2004a, 2007, 2014a). Other bycatch practicability analyses were conducted in the following amendments (component of the fishery affected by the actions): Amendment 23 (vermilion snapper; GMFMC 2004b), Amendment 30A (greater amberjack and gray triggerfish; GMFMC 2008a), Amendment 30B (gag, red grouper, and other shallow-water grouper; GMFMC 2008b), Amendment 31 (longline sector; GMFMC 2009), Amendment 32 (gag and red grouper; GMFMC 2011a), Amendment 35 (greater amberjack; GMFMC 2012a); Amendment 37 (gray triggerfish; GMFMC 2012b), and Amendment 38 (shallow-water grouper;

GMFMC 2012c). In addition, a bycatch practicability analysis was conducted for the Generic Annual Catch Limits/Accountability Measures Amendment (GMFMC 2011b) that covered the Reef Fish, Coastal Migratory Pelagics, Red Drum, and Coral FMPs. In general, these analyses found that reducing bycatch provides biological benefits to managed species as well as benefits to the fishery through less waste, higher yields, and less forgone yield. However, in some cases, actions are approved that can increase bycatch through regulatory discards such as increased minimum sizes and closed seasons. In these cases, there is some biological benefit to the managed species that outweighs any increases in discards.

Red Snapper Bycatch

The Gulf of Mexico (Gulf) reef fish fishery directed at red snapper has been regulated to limit harvest in order for the stock to recover from an overfished condition. Regulations for the recreational sector include catch quotas, minimum size limits, bag limits, and seasonal closures. These are used to limit the harvest to levels allowed under the rebuilding plan. For the commercial sector, regulations previously included quotas, minimum size limits, seasonal closures, and trip limits. Now the sector is managed under an individual fishing quota (IFQ) program that was established in 2007. The program eliminates the need for seasonal closures and trip limits. Red snapper regulations have been generally effective in limiting fishing mortality, the size of fish targeted, the number of targeted fishing trips, and/or the time fishermen spend pursuing a species. However, these management tools have the unavoidable adverse effect of creating regulatory discards, which makes reducing bycatch challenging, particularly in the recreational sector.

An important aspect to red snapper bycatch is the penaeid shrimp fishery as previously described in Amendment 27/14 (GMFMC 2007). The shrimp fishery catches primarily 0-2 year old red snapper. To reduce red snapper bycatch, the Gulf of Mexico Fishery Management Council (Council) implemented regulations requiring the use of bycatch reduction devices (GMFMC 2002) and setting bycatch reduction targets (currently a 67% reduction from the baseline years 2001-2003; GMFMC 2007). Between the use of bycatch reduction devices and reductions in shrimp effort due to economic factors (Figure 1), the target reductions have been met.

Although red snapper bycatch in the shrimp fishery is an important source of mortality for this stock, this bycatch practicability analysis will focus on the directed reef fish fishery managed under the FMP for Reef Fish Resources of the Gulf of Mexico. Bycatch from the shrimp fishery has been and will be analyzed in the FMP for the Shrimp Fishery of the Gulf of Mexico, U.S. Waters.

Figures 2 and 3 show the relative number of discards for the recreational and commercial sectors as estimated by SEDAR 31 (2013). For the recreational sector, open season discards estimated through the Marine Recreational Information Program (MRIP) (charter and private angler) declined around 2007 as the recreational season got shorter due lower quotas. This trend is also apparent in the headboat data for the western Gulf. However, with shorter seasons of the past few years, the number of discards during the longer closed seasons increased (Figure 2). For the commercial sector, discards in the eastern handline and longline sectors have increased since the implementation of the IFQ program relative to the western Gulf (Figure 3). This may reflect a

shift in fishing effort that has resulted in the program. Note that for the commercial sector, closed season discards after the IFQ program was implemented refers to vessels with little or no red snapper allocation (see SEDAR 31 2013).

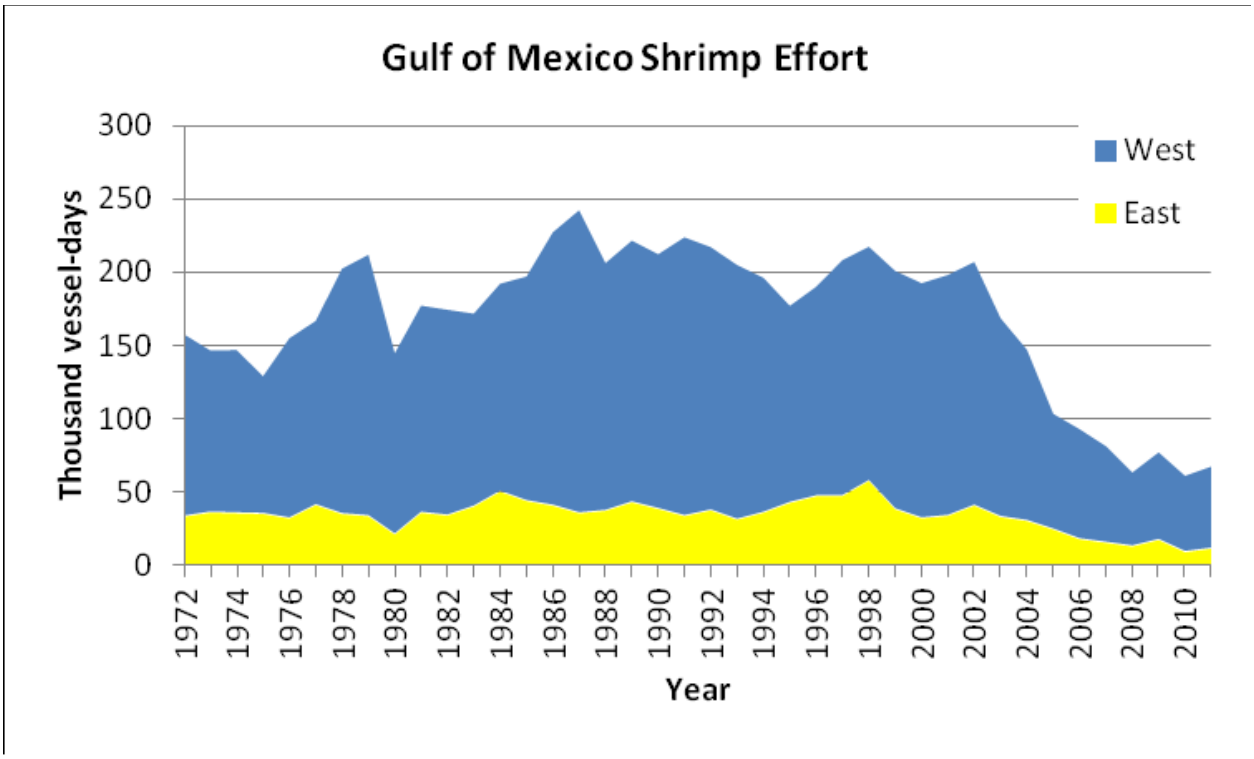

Figure 1. Gulf shrimp fishery effort (thousand vessel-days) provided by the National Marine Fisheries Service Galveston Lab. The reported effort does not include the average effort values used to fill empty cells. Source: Linton 2012.

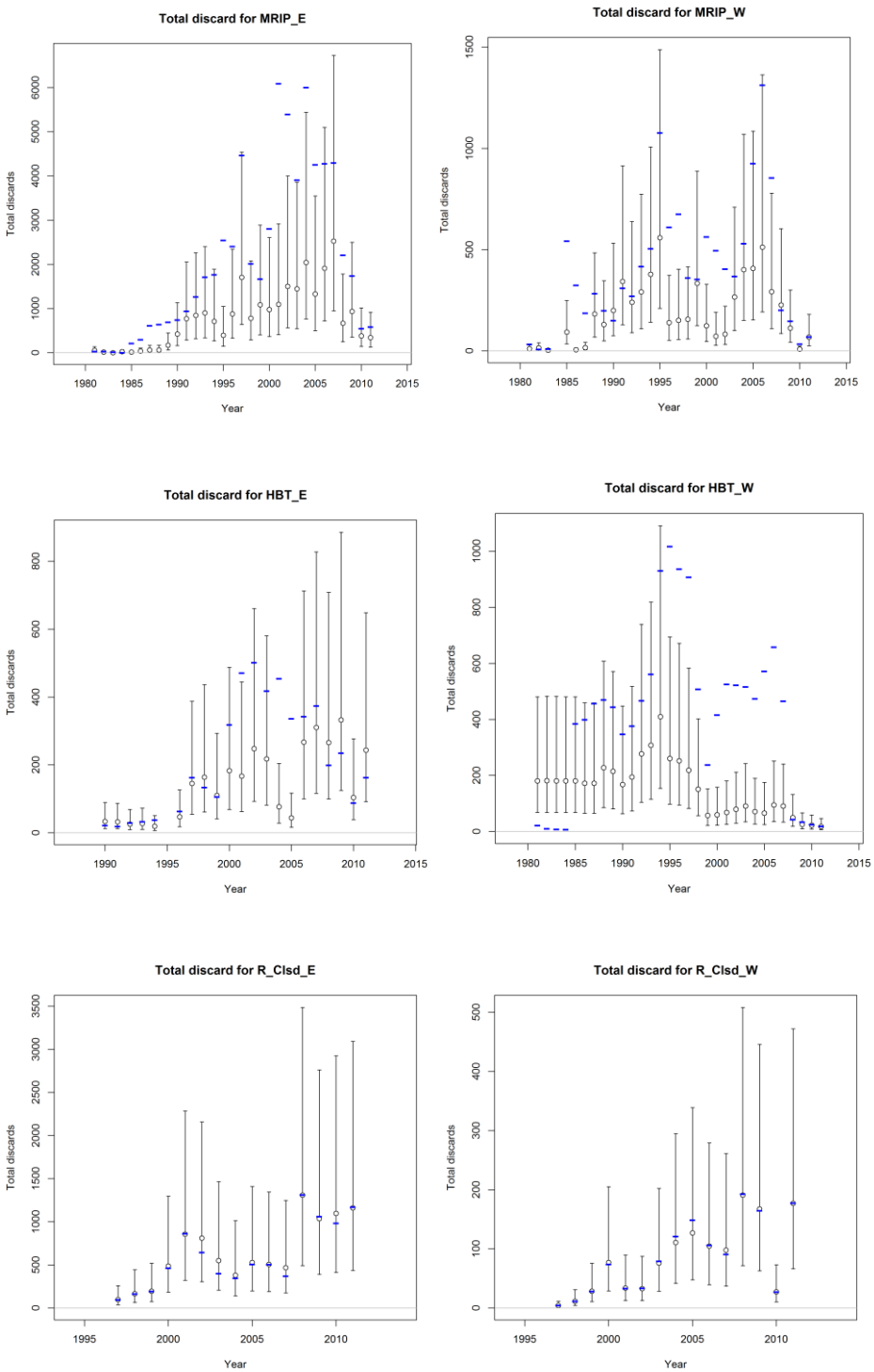

Figure 2. Observed (open circles) and predicted total discards (blue dashes) of red snapper from the private angler open season (top; 1981-2011), headboat open season (middle; east for years 1990-2011 and west for years 1981-2011), and recreational closed season in the eastern (left) and western (right) Gulf, 1997-2011. If not stated in the y-axis, values are in 1,000s of fish. Source: SEDAR 31 2013.

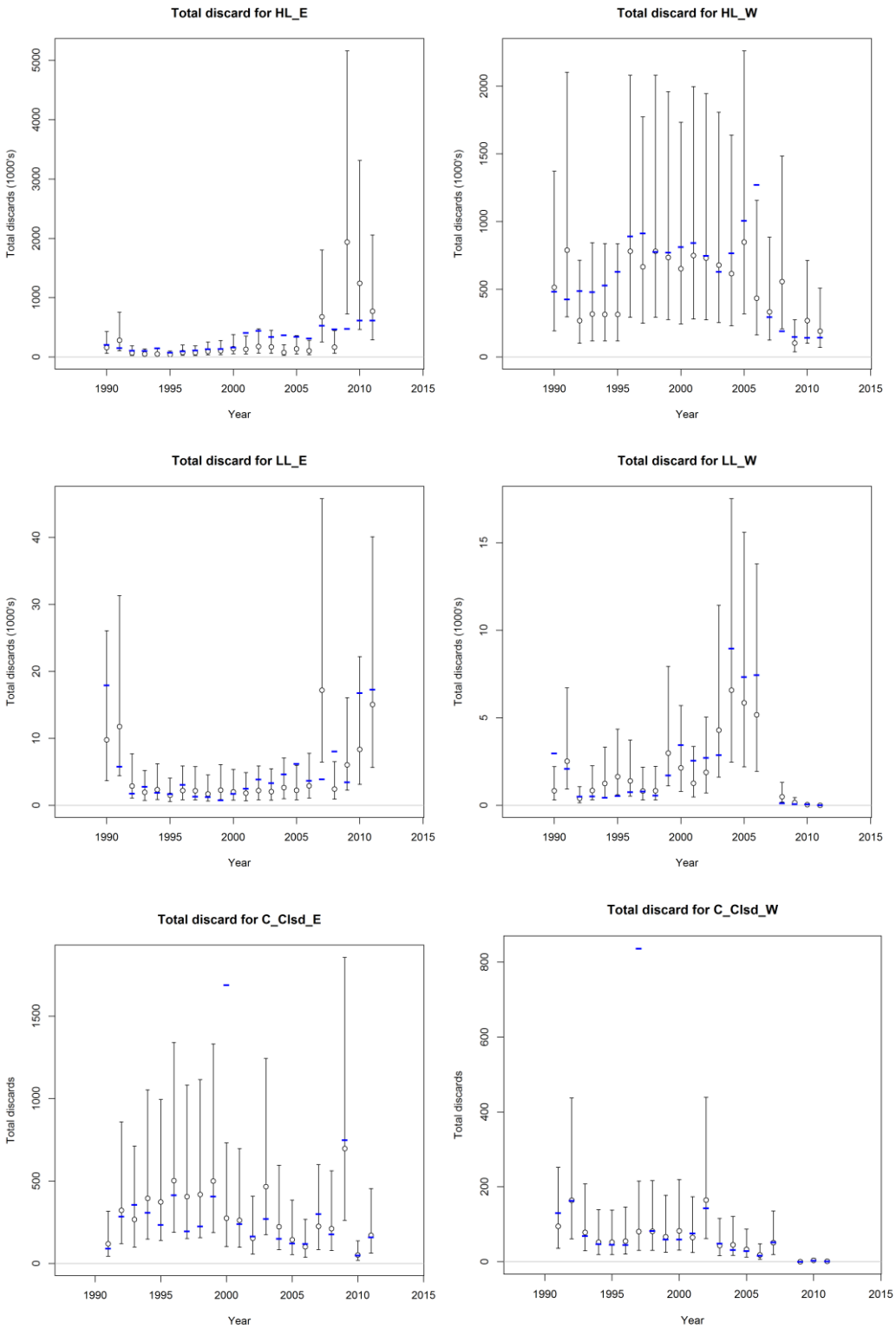

Figure 3. Observed (open circles) and predicted total discards (blue dashes) of red snapper from the commercial handline open season (top; 1990-2011), longline open season (middle; 1990-

2011), and commercial closed season in the eastern (left) and western (right) Gulf, 1991-2011. If not stated in the y-axis, values are in 1,000s of fish. Source: SEDAR 31 2013.

Campbell et al. (2012) identified several causes of red snapper discard mortality in their review of discard mortality in the directed reef fish fishery. These included hooking injuries, thermal stress, and barotrauma. Campbell et al. (2012) reviewed 11 studies that listed discard (release) mortality rates ranging from 0 to 79%. They reported that mortality tended to increase with capture depth, increasing water temperature, or from some compounding effect of these two factors. Burns et al. (2004) and Burns and Froeschke (2012) examined the feeding behavior of red snapper and found red snapper quickly chew and swallow their prey. As a result, there is less time to set a hook while fishing, resulting in greater probability of hooking related injuries. Burns et al. (2004) concluded hook-related trauma accounted for a greater portion of discard mortality than depth, despite catching red snapper at depths ranging from 90 to 140 feet.

Although Campbell et al. (2012) did not specifically address surface interval and predation, these factors were identified in GMFMC (2007) as contributing to discard mortality. Burns et al. (2002) found survival of red snapper increased the faster red snapper were returned to the water, thus they considered any reductions in surface interval/handling time an important way to reduce discard mortality. Several studies have documented predation on released red snapper. Dolphins and pelicans are the two most commonly observed predators and are known to pursue released fish, as well as fish before they are landed (SEDAR 7 2005). Several studies, which assessed discard mortality through surface observations, accounted for predation when estimating discard mortality (Patterson et al. 2001; Burns et al. 2004; Wilson et al. 2004).

A variety of discard mortality rates have been used in different stock assessment. The 1999 red snapper stock assessment (Schirripa and Legault 1999) assumed discard mortality rates of 33 percent for the commercial fishery and 20 percent for the recreational fishery. These discard mortality rates were derived from the literature and were determined by the Council's Reef Fish Stock Assessment Panel to be the best available estimates at the time (RFSAP 1999). During development of the 2005 red snapper stock assessment, the SEDAR 7 data workshop panel (SEDAR 7 2005) reviewed available information on depth of fishing and discard mortality by depth to produce fishery specific discard mortality rates by region (eastern and western Gulf), season (open and closed), and by sector (commercial and recreational). Applied estimates of discard mortality rates ranged 15% for recreationally caught and released red snapper in the eastern Gulf to 88% for commercially caught and released red snapper in the western Gulf caught during a season closure (Table 1).

Table 1. Mean/median depth of fishing and corresponding discard mortality rates for red snapper by fishery, region, and season.

Fishery	Region	Season	Depth of Capture	Release Mortality
Commercial	East	Open	180 ft (55 m)	71%
	East	Closed	180 ft (55 m)	71%
	West	Open	190 ft (58 m)	82%
	West	Closed	272 ft (83 m)	88%
Recreational	East	Open	65-131 ft (20-40 m)	15%
	East	Closed	65-131 ft (20-40 m)	15%
	West	Open	131 ft (40 m)	40%
	West	Closed	131 ft (40 m)	40%

Source: SEDAR 7 2005.

In the most recent benchmark stock assessment (SEDAR 31, 2013), a meta-analysis was used to estimate red snapper discard mortality using the 11 studies reviewed by Campbell et al. (2012). A venting/no venting component was added to account for the requirement to vent reef fish put in place through Amendment 27 (GMFMC 2007) as well as a gear component. For the commercial sector, average depths at which discards occurred for each gear (handline or long line), region (eastern or western Gulf), and season (open or closed) were calculated using commercial observer program data. Consistent with how commercial discards have been treated in other parts of the assessment, discards from trips with IFQ allocation were considered open season discards, while discards from trips with no IFQ allocation were considered closed season discards. For the recreational sector, average depths at which discards occurred for each region (eastern or western Gulf) and season (open or closed) were calculated using self-reported data from the iSnapper program. Estimated discard mortality rates ranged from 10 to 95% with commercial discard mortality rates greater than recreational discard mortality rates (Tables 2 and 3).

SEDAR 31 (2013) estimated the total number of fish killed (landed and discarded dead) by the commercial and recreational sectors from 1983 to 2011 (Table 4). For the recreational sector, the percentage of dead discards to total fish killed has declined since a peak in 2001. However, it was not until 2007 that the number of dead discards was consistently less than the number of landed fish. For the commercial sector, the percentage of dead discards peaked in 2000, but it was not until 2010 that the number of dead discards declined to less than 40% of the total fish killed.

Since 1996, more red snapper have been landed in the eastern Gulf than the western Gulf by the recreational sector (Table 5). A drop in the percentage of dead discards relative to the total number of fish killed occurred in both regions in 2008. The percentage of dead discards fell from 49.4% to 36.7% between 2007 and 2008 for the eastern Gulf and from 50.0% to 20.3% between 2007 and 2008 in the western Gulf. For the commercial sector, in the eastern Gulf the number of dead discards has generally been above 50% indicating that there are more discards were killed than landed (Table 5). In contrast, in the western Gulf there has been a falling off in the percentage of dead discards relative to the total number of killed fish since 2006 to well below 50%.

Table 2. Average depths and associated discard mortality rates for commercial discards of red snapper in the Gulf.

Gear	Handline				Longline			
Region	**East**		**West**		**East**		**West**	
Season	**Closed**	**Open**	**Closed**	**Open**	**Closed**	**Open**	**Closed**	**Open**
Average Depth (m)	24	45	84	53	66	62	132	104
Disc Mort - no venting	0.74	0.75	0.87	0.78	0.82	0.81	0.95	0.91
Disc Mort - venting	0.55	0.56	0.74	0.60	0.66	0.64	0.88	0.81

Source: SEDAR 31 2013.

Table 3. Average depths and associated discard mortality rates for recreational discards of red snapper in the Gulf.

Gear	Recreational			
Region	**East**		**West**	
Season	**Open**	**Closed**	**Open**	**Closed**
Average Depth (m)	33	34	36	35
Disc Mort - no venting	0.21	0.21	0.22	0.22
Disc Mort - venting	0.10	0.10	0.11	0.10

Source: SEDAR 31 2013.

Table 4. Estimates of the total number of red snapper landed, the number of dead discards, and percent dead discards for all killed fish for the recreational and commercial sectors by year in the Gulf.

	Recreational			Commercial		
Year	Landed	Dead Discards	Percent dead discards	Landed	Dead Discard	Percent dead discards
1983	3,314,185	8,599	0.3%	4,559,794	80,758	1.7%
1984	1,232,024	2,699	0.2%	2,775,042	33,579	1.2%
1985	1,427,026	255,716	15.2%	1,234,986	351,105	22.1%
1986	1,265,955	223,079	15.0%	875,494	304,026	25.8%
1987	1,022,844	271,426	21.0%	661,469	277,787	29.6%
1988	1,241,859	302,800	19.6%	950,904	366,876	27.8%
1989	1,060,456	289,201	21.4%	742,388	296,024	28.5%
1990	625,933	270,824	30.2%	703,020	549,250	43.9%
1991	1,060,610	353,327	25.0%	691,943	635,961	47.9%
1992	1,609,040	434,448	21.3%	995,013	817,581	45.1%
1993	2,202,931	581,455	20.9%	1,011,914	781,941	43.6%
1994	1,615,241	695,102	30.1%	869,075	796,390	47.8%
1995	1,384,049	1,008,873	42.2%	698,404	767,187	52.3%
1996	1,180,361	859,431	42.1%	1,011,328	1,120,205	52.6%
1997	1,547,317	1,342,121	46.4%	1,122,447	1,674,115	59.9%
1998	1,235,683	679,689	35.5%	1,167,877	949,481	44.8%
1999	1,031,284	549,708	34.8%	1,190,580	1,063,684	47.2%
2000	1,002,899	985,281	49.6%	1,088,667	2,065,579	65.5%
2001	1,075,115	1,792,155	62.5%	1,030,580	1,214,566	54.1%
2002	1,372,415	1,586,095	53.6%	1,145,169	1,171,069	50.6%
2003	1,224,547	1,204,754	49.6%	1,080,662	996,171	48.0%
2004	1,365,946	1,677,071	55.1%	1,036,860	1,027,510	49.8%
2005	1,024,641	1,433,508	58.3%	973,109	1,170,293	54.6%
2006	1,196,183	1,533,800	56.2%	1,193,134	1,343,644	53.0%
2007	1,397,237	1,370,519	49.5%	851,537	903,242	51.5%
2008	821,804	417,509	33.7%	671,979	481,599	41.7%
2009	979,945	339,988	25.8%	656,148	772,463	54.1%
2010	447,991	170,959	27.6%	833,253	472,930	36.2%
2011	670,910	220,515	24.7%	808,582	533,198	39.7%

Source: Recreational data is from MRIP; headboat and commercial data is from the logbook and SEDAR 31 2013; Jacob Tetzlaff, pers. comm. Southeast Fisheries Science Center, Miami, Florida.

Table 5. Estimates of the total number of red snapper landed the number of dead discards, and percent dead discards for all killed fish for the recreational and commercial sectors by year and region of the Gulf.

	Recreational						Commercial					
	East			West			East			West		
Year	Landed	Dead Discard	Percent dead discards	Landed	Dead Discard	Percent dead discards	Landed	Dead Discard	Percent dead discards	Landed	Dead Discard	Percent dead discards
1983	1,055,691	4,455	0.4%	2,258,494	4,144	0.2%	1,851,965	23,983	1.3%	2,707,829	56,775	2.1%
1984	192,098	332	0.2%	1,039,926	2,367	0.2%	1,077,487	5,872	0.5%	1,697,555	27,707	1.6%
1985	482,587	51,497	9.6%	944,439	204,219	17.8%	575,540	109,179	15.9%	659,446	241,926	26.8%
1986	574,495	63,839	10.0%	691,460	159,240	18.7%	237,499	31,193	11.6%	637,996	272,833	30.0%
1987	548,813	129,871	19.1%	474,031	141,555	23.0%	179,088	35,679	16.6%	482,381	242,108	33.4%
1988	524,591	137,182	20.7%	717,268	165,618	18.8%	197,784	72,004	26.7%	753,120	294,872	28.1%
1989	474,670	147,657	23.7%	585,786	141,544	19.5%	166,355	59,518	26.4%	576,033	236,506	29.1%
1990	314,036	161,286	33.9%	311,897	109,538	26.0%	208,799	169,101	44.7%	494,221	380,150	43.5%
1991	548,912	202,238	26.9%	511,698	151,089	22.8%	156,339	187,293	54.5%	535,604	448,669	45.6%
1992	886,594	272,181	23.5%	722,446	162,267	18.3%	155,044	294,315	65.5%	839,969	523,266	38.4%
1993	1,336,961	366,226	21.5%	865,970	215,229	19.9%	160,428	346,349	68.3%	851,486	435,592	33.8%
1994	819,900	379,092	31.6%	795,341	316,010	28.4%	161,842	341,927	67.9%	707,233	454,464	39.1%
1995	664,786	547,997	45.2%	719,263	460,876	39.1%	47,994	234,693	83.0%	650,411	532,493	45.0%
1996	608,817	519,005	46.0%	571,544	340,426	37.3%	66,458	384,466	85.3%	944,870	735,739	43.8%
1997	966,914	992,702	50.7%	580,403	349,419	37.6%	52,616	231,911	81.5%	1,069,832	1,442,204	57.4%
1998	814,811	485,790	37.4%	420,872	193,899	31.5%	112,125	271,377	70.8%	1,055,751	678,104	39.1%
1999	788,097	413,395	34.4%	243,187	136,313	35.9%	148,788	407,417	73.2%	1,041,792	656,267	38.6%
2000	741,378	753,560	50.4%	261,521	231,721	47.0%	169,886	1,375,667	89.0%	918,781	689,912	42.9%
2001	858,210	1,559,948	64.5%	216,905	232,208	51.7%	209,036	487,449	70.0%	821,544	727,118	47.0%
2002	1,137,262	1,374,869	54.7%	235,153	211,226	47.3%	300,706	459,631	60.5%	844,463	711,438	45.7%
2003	956,693	992,640	50.9%	267,854	212,113	44.2%	281,921	459,040	62.0%	798,741	537,130	40.2%
2004	1,128,710	1,429,531	55.9%	237,236	247,540	51.1%	251,425	392,841	61.0%	785,435	634,669	44.7%
2005	759,036	1,071,240	58.5%	265,605	362,268	57.7%	220,412	352,853	61.6%	752,697	817,440	52.1%

2006	839,855	1,076,677	56.2%	356,328	457,123	56.2%		212,766	329,879	60.8%	980,368	1,013,764	50.8%
2007	1,087,060	1,059,975	49.4%	310,177	310,544	50.0%		311,729	626,004	66.8%	539,808	277,238	33.9%
2008	642,570	371,930	36.7%	179,233	45,579	20.3%		284,937	366,341	56.2%	387,042	115,258	22.9%
2009	773,394	303,722	28.2%	206,551	36,266	14.9%		302,568	682,585	69.3%	353,579	89,878	20.3%
2010	360,404	162,119	31.0%	87,587	8,840	9.2%		413,808	384,519	48.2%	419,445	88,411	17.4%
2011	552,878	192,184	25.8%	118,032	28,331	19.4%		423,809	445,771	51.3%	384,773	87,427	18.5%

Source: Recreational data is from MRIP; headboat and commercial data is from the logbook and SEDAR 31 2013; Jacob Tetzlaff, pers. comm. Southeast Fisheries Science Center, Miami, Florida.

Other Bycatch

Species incidentally encountered by the directed red snapper fishery include sea turtles, sea birds, and reef fishes. The primary gears of the Gulf reef fish fishery (longline and handline) are classified in the List of Fisheries for 2014 (79 FR 14418, April 14, 2014) as Category III gear. This classification indicates the annual mortality and serious injury of a marine mammal stock resulting from any fishery is less than or equal to one percent of the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock, while allowing that stock to reach or maintain its optimum sustainable population.

The most recent biological opinion for the Reef Fish FMP was completed on September 30, 2011 (NMFS 2011). The opinion determined the continued authorization of the Gulf reef fish fishery managed under this FMP is not likely to adversely affect Endangered Species Act-listed marine mammals or coral, and would not likely jeopardize the continued existence of sea turtles (loggerhead, Kemp's ridley, green, hawksbill, and leatherback), or smalltooth sawfish. However, in the past, actions have been taken by the Council and NMFS to increase the survival of incidentally caught sea turtles and smalltooth sawfish by the commercial and recreational sectors of the fishery. These include the requirements for permitted vessels to carry specific gear and protocols for the safe release in incidentally caught endangered sea turtle species and smalltooth sawfish (GMFMC 2005) as well as restrictions on the longline portion of the commercial sector. Restrictions for longlines in the reef fish fishery include a season-area closure, an endorsement to use longline gear, and a restriction on the total number of hooks that can be carried on a vessel (GMFMC 2009).

Three primary orders of seabirds are represented in the Gulf, Procellariiformes (petrels, albatrosses, and shearwaters), Pelecaniformes (pelicans, gannets and boobies, cormorants, tropic birds, and frigate birds), and Charadriiformes (phalaropes, gulls, terns, noddies, and skimmers) (Clapp et al., 1982; Harrison, 1983) and several species, including: piping plover, least tern, roseate tern, bald eagle, and brown pelican (the brown pelican is endangered in Mississippi and Louisiana and delisted in Florida and Alabama) are listed by the U.S. Fish and Wildlife Service as either endangered or threatened. Human disturbance of nesting colonies and mortalities from birds being caught on fishhooks and subsequently entangled in monofilament line are primary factors affecting sea birds. Oil or chemical spills, erosion, plant succession, hurricanes, storms, heavy tick infestations, and unpredictable food availability are other threats. There is no evidence that the directed red snapper fishery is adversely affecting seabirds. However, interactions, especially with brown pelicans consuming red snapper discards and fish before they are landed, are known to occur (SEDAR 7 2005).

Other species of reef fish are also incidentally caught when targeting red snapper. In the western Gulf, vermilion snapper and some deep-water groupers are incidentally caught as bycatch when harvesting red snapper. In the eastern Gulf, various species of shallow-water grouper and vermilion snapper are the primary species caught as bycatch when targeting red snapper. Vermilion snapper are not overfished or undergoing overfishing (SEDAR 9 Update 2011) and bycatch is not expected to jeopardize the status of this stock. Deep-water groupers are caught both in the eastern and western Gulf primarily with longline gear (> 80 percent). The deep-water grouper fishery was managed with a 1.02 million pound quota. From 2004 until the

implementation of the grouper/tilefish IFQ program in 2010 (SERO 2012a), the fishery met their quota and closed no later than July 15 each year. Deep-water grouper closures during this time period may have resulted in some additional discards of grouper by longliners targeting red snapper. Since the IFQ program was implemented, deep-water grouper species are landed year-round by holders of IFQ allocation and the quota has not been exceeded. Longliners account for approximately 5% of the annual commercial red snapper landings since 2000 (SEDAR 31 2013). It is unknown how increases in closed season discards might have affected the status of deep-water grouper stocks or the change to an IFQ managed sector. An updated assessment for yellowedge grouper found the stock was not overfished or undergoing overfishing (SEDAR 22 2011).

Red grouper and gag are the two most abundant shallow-water grouper species in the Gulf and primarily occur on the west Florida shelf. Both species have been found to be not overfished or undergoing overfishing (SEDAR 33 2014 for gag and SEDAR 12 Update 2009 for red grouper). Gag had been in a rebuilding plan that took into account gag dead discards and this plan was implemented through Amendment 32 (GMFMC 2011a). Within the reef fish fishery, discards represent a large and significant portion of mortality for gag and red grouper. In the past, these species were managed under a shallow-water grouper quota which was met prior to the end of the 2004 and 2005 fishing years. For the recreational sector, shallow-water grouper including gag and red grouper are managed with size limits, bag limits, and season and area closures. The recreational gag season begins July 1 and extends until the catch target is projected to be caught. Since 2010, the commercial harvest of gag, red grouper, and other shallow-water grouper are managed under an IFQ program and the commercial sector has not exceeded its quota under the program. Prior to the IFQ program, quota closures at the end of the year have likely resulted in some additional commercial discards when the red snapper fishery is open. However, most commercial landings of red snapper occur in the western Gulf where gag and red grouper are less abundant or infrequently caught.

Practicability of current management measures in the directed red snapper fishery relative to their impact on bycatch and bycatch mortality.

The bycatch practicability analysis in Amendment 27 (GMFMC 2007) indicated directed fishery bycatch was believed to have a greater effect on red snapper stock recovery than the shrimp fishery. Although shrimp bycatch still accounts for a majority of bycatch, bycatch from the directed fishery is now known to have a greater effect on stock recovery. A quota, 16-inch total length (TL) minimum size limit, 2-fish bag limit, closed season, and gear restrictions are presently used to manage the recreational fishery. The commercial fishery is managed with an IFQ program, a quota, a 13-inch TL minimum size limit, and gear restrictions. Prior to 2007 when the red snapper IFQ program was implemented, the commercial fishery was also managed with closed seasons and trip limits. The following discusses current and historic management measures with respect to their relative impacts on bycatch.

Closed Seasons

Prior to 1997, the recreational sector was able to fish for red snapper year round. To prevent the recreational quota from being exceeded, recreational fishing for red snapper was closed on November 27, 1997, September 30, 1998, and August 29, 1999. In 2000, an April 21 through October 31 red snapper season was established. This was modified to a June 1 through October 31 season in 2008 by Amendment 27 (GMFMC 2007). Currently, the recreational directed red snapper fishery is closed in the exclusive economic zone from January 1 through May 31 each year through a 2012 framework action. However, since 2008, the sector has been closed early when the quota is projected to be caught. In addition, since 2008, the length of time red snapper fishing has been open has become increasingly shorter such that for 2011, 2012, and 2013, the season length has shrunk to 48, 46, and 42 days, respectively. With these shorter seasons, the number of released fish has decreased during the open season, but the number of releases during the closed season has increased (Figure 2; SEDAR 31 2013). Reflected in this trend is that although the estimated number of dead discards has decreased during the fishing season, the number of dead discards has increased during the longer closed periods (Figure 4). For 2014, the season length was decreased to 9 days. This was in response to a decision by the U.S. District Court for the District of Columbia (Court) in Guindon v. Pritzker, 2014 WL 1274076 (D.D.C. Mar. 26, 2014). NMFS, at the request of the Council, took emergency action to implement an in-season accountability measure for the recreational harvest of red snapper in the Gulf. The action set an annual catch target (ACT) equal to 80% of the 5.390 mp quota (ACT = 4.312 mp). The resultant 9-day season was based on the ACT and has only a 15% probability of exceeding the quota.

With the implementation of the IFQ program, there is no closed season for the commercial sector. However, commercial vessels with little or no red snapper allocation cannot land red snapper on most or all their trips. Thus, they effectively operate under closed season conditions. GMFMC (2013) indicated most discards were likely due to insufficient allocation, rather than the minimum size limit, especially in the longline fleet. Most of these discards were recorded as released alive.

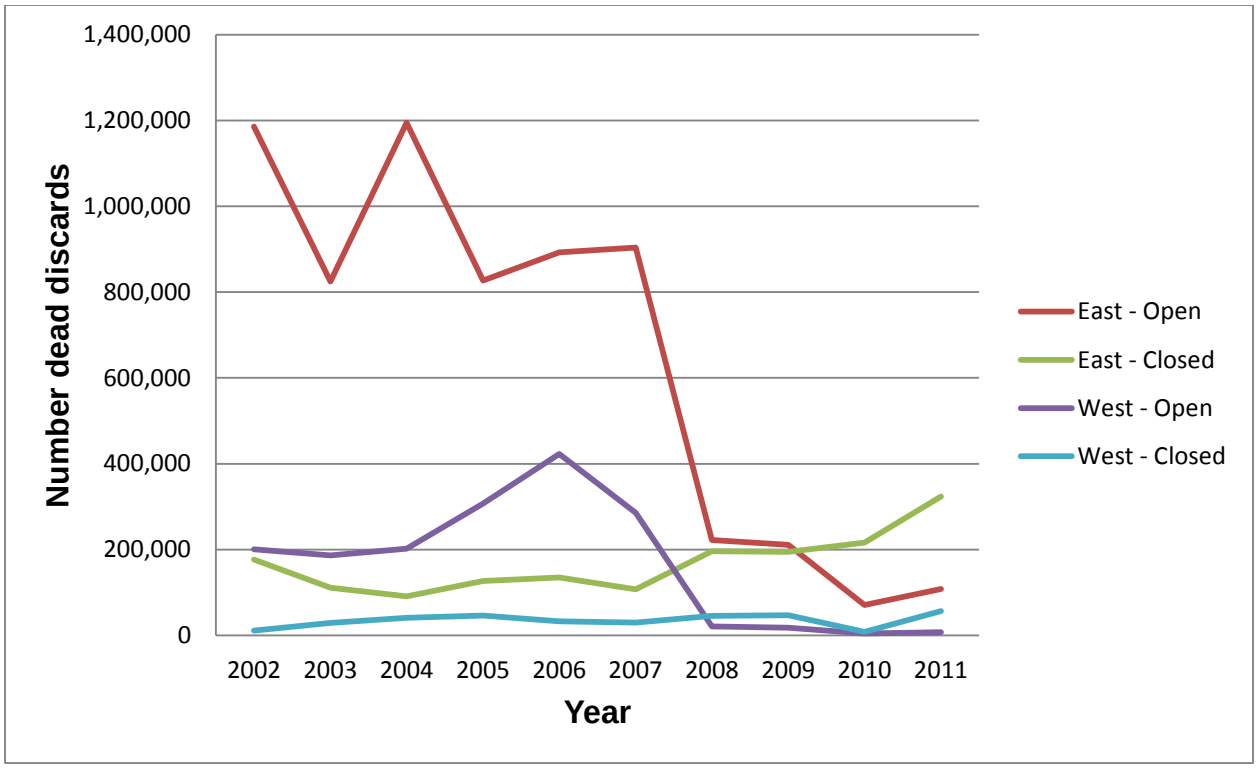

Figure 4. The number of Gulf red snapper dead discards from the recreational sector by year and by area. Source: Jakob Tetzlaff., pers. comm. Southeast Fisheries Science Center, Miami, Florida.

Bag Limits

The recreational fishery is regulated by a 2-red snapper daily bag limit per person. Red snapper discards while harvesting the daily bag limit are a result of incidental capture of undersized fish prior to reaching the bag limit and targeting of other reef fish residing in similar habitat as red snapper after bag limits have been reached. SERO (2012b) reported anglers on for-hire vessels, on average, landed 1.23 red snapper per trip and anglers on private vessels landed 1.58 red snapper per trip when the season is open. Based on average catch rates, the current two red snapper bag limit is not a limiting factor for some trips, but likely occurs on others. Therefore, the release of undersized fish while harvesting the bag limit is still an important factor contributing to discards in addition to the release of legal-sized red snapper after the bag limit is reached.

Size limits

The 16-inch recreational and 13-inch commercial TL minimum size limits are important factors when considering bycatch in the directed fishery. Size limits are intended to protect immature fish and reduce fishing mortality. The recreational minimum size limit is above the size at 50% maturity and the commercial size limit is near the size at 50% maturity. Size-at-maturity varies by region, with 75% of eastern Gulf female red snapper mature by 12-inches TL and 50% of western Gulf red snapper mature by 13-14-inches TL (Fitzhugh et al. 2004).

Several yield-per-recruit (YPR) analyses have previously been conducted to identify the size that balances the benefits of harvesting fish at larger sizes against losses due to natural mortality. Goodyear (1995) concluded YPR was maximized in the red snapper fishery between 18 and 21-inches TL, assuming 20 and 33% discard mortality in the recreational and commercial red snapper fisheries, respectively. A subsequent YPR analysis by Schirripa and Legault (1997) indicated increasing the minimum size limit above 15-inches TL would result in no gains in yield. Analyses of minimum size limits conducted for Amendment 27 (GMFMC 2007) indicated red snapper projected recovery rates are slightly faster if the commercial minimum size limit is reduced or eliminated, but increasingly slowed by smaller recreational minimum size limits (Porch 2005). Decreasing the recreational and commercial minimum size limits was projected to increase stock recovery slightly over the short term, but stock recovery would be increasingly slowed if the recreational size limit were lowered over the long term (Porch 2005). However, as discussed in Amendment 27, changes in spawning potential and the rate of stock recovery were found to be negligible for recreational size limits ranging from 13 to 15-inches TL. An YPR analysis conducted by SERO (2006), using current fishery selectivities and discard mortality rates from SEDAR 7 (2005) supported Porch's (2005) findings. SERO (2006) examined four commercial minimum size limits (12-, 13-, 14-, and 15-inches TL) and five recreational minimum size limits (6-, 13-, 14-, 15-, and 16-inches TL). Based on the range of size limits analyzed, YPR was maximized at 16-inches TL in both the eastern and western Gulf recreational fisheries, 12-inches TL in the western Gulf commercial fishery, and 15-inches TL in the eastern Gulf commercial fishery. However, there was virtually no difference in maximum YPR (< 0.3 percent) for any of the eastern Gulf commercial size limits analyzed. In a study by Wilson et al. (2004) aboard commercial vessels using bandit rigs, 61% of red snapper released were greater than 13 inches and 86% were greater than 12 inches.

For Amendment 39 (still under development; GMFMC 2014b), an YPR analysis was applied to the recreational sector (SERO 2013). This analysis indicates the Gulf-wide YPR is maximized at a recreational size limit of 15-inches TL. However, there was not much of a change in YPR between lengths of 13- and 18-inches TL. Thus, if the minimum size limit were changed from 16- to 15-inches TL, any gain in YPR would be minimal. SERO (2013) also showed than any increase in the minimum size limit would reduce the number of fish landed. This would probably result in more regulatory discards and an increase in the number of dead discards.

Given the above discussion, a larger recreational minimum size limit is considered to be more effective than a similar sized commercial minimum size limit because of lower discard mortality rates in the recreational fishery (Tables 2 and 3). High discard mortality rates in the commercial fishery provide little, if any, protection to the stock because the released fish mostly die rather than contribute to filling the quota. In contrast, the current 16-inch TL minimum recreational size limit was found to afford some protection to the stock, because a greater percentage of discarded fish will survive to spawn and later contribute to the quota as larger animals.

Area closures

Although the Council has not developed area closures specifically for red snapper, the Council has created areas to protect other species. For example, two restricted fishing areas were

developed to specifically protect spawning aggregations of gag in 2000 (GMFMC 1999). The Madison-Swanson and Steamboat Lumps marine restricted fishing areas are located in the northeastern Gulf at a depth of 40 to 60 fathoms. Both areas prohibit bottom fishing. Bottom fishing is also prohibited in the Tortugas North and South marine reserves in the southern Gulf near the Dry Tortugas. Marine reserves and time/area closures benefit fish residing within reserve boundaries by prohibiting their capture during part or all of the year. Within marine reserves, fish that are undersized potentially have an opportunity to grow to legal size and are no longer caught as bycatch. If these fish emigrate from the marine reserve (i.e., spillover effect), then they may be caught as legal fish outside the reserve, thereby reducing bycatch. However, anglers and commercial fishermen may redistribute their effort to areas surrounding the area closure. If fishing pressure in these areas is increased, then any benefits of reduced bycatch of fish in the marine reserve will likely be offset by increases in bycatch of fish residing outside the marine reserve. Within restricted fishing areas or time/area closures, fishing is allowed under restrictions that are intended to protect certain components of the populations within the area (e.g., prohibitions on bottom fishing gear), or to protect populations during a critical phase of their life history, such as during spawning.

The Council did develop a season area closure to reduce bycatch of sea turtles for the longline component of the commercial sector. The use of longlines had been prohibited from waters less than 20 fathoms east of Cape San Blas, Florida, and 50 fathoms west of Cape San Blas; however, due to higher estimates of sea turtles caught in longline gear, measures were put in place through Amendment 31 (GMFMC 2009) to reduce this bycatch. One of these measures was the prohibition of the use of bottom longline gear in the Gulf reef fish fishery, shoreward of a line approximating the 35-fathom contour east of Cape San Blas, Florida from June through August. Most sea turtle takes by longline occur during the summer months.

Allowable gear

Vertical hook-and-line gear (bandit rigs, manual handlines) is the primary gear used in the commercial fishery fishing for red snapper (> 96% of annual landings). Longlines, spears, and fish traps account for a small portion of the commercial harvest (< 5%). Longlines account for only a small fraction of red snapper dead discards as most of the landings come from handline-caught fish (Table 6). In addition, longlines are fished in deeper water, particularly in the west, and select for larger, legal-sized red snapper. Longline vessels east of Cape San Blas, Florida are also restricted to carrying 1,000 hooks onboard (only 750 rigged for fishing at any given time) as part of a suite of measures put in place through Amendment 31 (GMFMC 2009) to reduce sea turtle bycatch.

Rod-and-reel is the primary gear used in the recreational fishery. Recreational anglers also use spears to capture red snapper. Spearfishing does not affect discard mortality since all fish caught are killed. Only undersized red snapper mistakenly killed while spearfishing would contribute to discard mortality. During the red snapper recreational fishing season, discards are primarily due to the recreational size limit; however, allowable gears can affect discard mortality rates.

Fishermen in both the commercial and recreational sectors are required to use non-stainless steel circle hooks, if using natural baits, to reduce discard mortality. The size of circle hooks used in

the fishery varies by manufacturer, gear type, and species targeted (i.e., if targeting vermilion snapper, smaller circle hooks may be used). Although circle hooks may not work as well to reduce red snapper discard mortality, they are effective in reducing mortality in other species such as red grouper (Burns and Froeschke 2012).

In addition to the circle hook requirement, Amendment 27 (GMFMC 2007) also put in place requirements for both commercial and recreational fishermen in the reef fish fishery to carry onboard dehooking devices. These gears are all intended to reduce bycatch and discard mortality. A dehooking device is a tool intended to remove a hook embedded in a fish. It reduces the handling time releasing a fish from a hook and allows a fish to be released with minimum damage.

IFQ program

The commercial sector was previously regulated by 2,000-lb and 200-lb trip limits. With the establishment of the red snapper IFQ program, red snapper discards after a trip limit was reached are no longer a factor. However, reef fish observer data since the IFQ program was implemented indicate a large proportion of legal-sized red snapper continue to be discarded by both the handline and longline fleets (GMFMC 2013). Discard rates do vary by gear. In 2011, 3.5 red snapper were landed for every fish released in the vertical line fleet compared to a 0.5 red snapper landed for each fish released in the longline fleet (SERO 2012b). Discard rates greatly varied by region. In 2011, 87% of observed red snapper caught in the Florida Panhandle were landed, compared to 79% off Louisiana and Texas, and 47% off the Florida Peninsula. There was also a noticeable difference in the size of red snapper caught, with red snapper along the Florida Peninsula (mostly19-24-inches TL) generally larger than fish caught in other areas of the Gulf (mostly 15-21-inches TL). Most discards were estimated to be released alive, regardless of gear type used. Discards were likely due to insufficient allocation, rather than the minimum size limit, especially in the longline fleet. In a study by Wilson et al. (2004) aboard commercial vessels using bandit rigs, 61% of red snapper released were greater than 13-inches TL, the minimum size limit.

Table 6. Commercial red snapper landings and dead discards in the Gulf by year and area.

	Eastern Gulf				Western Gulf			
	Landings		Dead discards		Landings		Dead discards	
Year	Handline	Longline	Handline	Longline	Handline	Longline	Handline	Longline
1983	1,646,550	205,415	1,587	1,237	2,698,740	9,089	56,690	85
1984	949,341	128,146	309	388	1,625,800	71,755	27,160	547
1985	550,063	25,477	79,906	2,239	608,624	50,822	233,753	8,173
1986	222,738	14,761	21,314	646	564,277	73,719	261,093	11,740
1987	168,788	10,300	20,091	743	412,668	69,713	229,400	12,708
1988	186,924	10,860	51,433	738	686,680	66,440	285,429	9,443
1989	156,071	10,284	32,961	1,714	531,066	44,967	230,318	6,188
1990	198,778	10,021	94,242	4,552	482,224	11,997	377,444	2,706
1991	152,971	3,368	79,800	1,647	527,667	7,937	332,927	1,905
1992	153,940	1,104	54,930	484	837,699	2,270	380,571	460
1993	157,367	3,061	57,447	843	849,065	2,421	375,085	471
1994	160,369	1,473	87,448	568	705,354	1,879	412,546	407
1995	46,528	1,466	54,453	658	648,399	2,012	491,941	501
1996	65,129	1,329	62,736	925	941,768	3,102	695,812	699
1997	51,767	849	79,005	515	1,066,360	3,472	713,290	729
1998	111,068	1,057	99,004	494	1,052,750	3,001	605,570	522
1999	147,499	1,289	102,825	340	1,032,070	9,722	602,380	1,564
2000	168,301	1,585	107,368	556	899,899	18,882	634,841	3,146
2001	207,257	1,779	278,236	894	809,218	12,326	658,252	2,334
2002	297,471	3,235	319,910	1,555	830,146	14,317	584,024	2,481
2003	279,295	2,626	235,502	1,190	782,006	16,735	492,094	2,618
2004	247,833	3,592	251,909	1,633	741,737	43,698	598,933	8,157
2005	216,596	3,816	230,654	2,081	725,819	26,878	785,721	6,686
2006	209,704	3,062	221,631	1,394	955,637	24,731	992,193	6,781
2007	308,237	3,492	949,770	14,520	521,931	17,877	231,164	443
2008	277,716	7,221	660,738	24,096	381,349	5,693	115,150	108
2009	299,480	3,088	748,261	10,548	347,913	5,666	89,641	68
2010	398,806	15,002	1,111,727	53,620	415,081	4,364	85,851	56
2011	408,346	15,463	1,274,735	60,252	382,630	2,143	86,460	18

Source: SEDAR 31 2013; Jacob Tetzlaff, pers. comm. Southeast Fisheries Science Center, Miami, Florida)

Alternatives being considered and bycatch minimization

The proposed allocations and accountability measures discussed in Amendment 28 (GMFMC 2014c) can indirectly affect bycatch in the Gulf reef fish fishery. These actions are primarily administrative. They would change the apportionment of fish between the commercial and recreational sector as well as affect how the recreational season is calculated. Depending on which alternatives are selected for each action, they could either reduce or increase bycatch in the reef fish fishery.

Practicability Analysis

Criterion 1: Population effects for the bycatch species

This action would revise the current red snapper allocation between the recreational and commercial sectors and so would not directly affect bycatch minimization. As discussed in Section 4.1.2 of Amendment 28 (GMFMC 2014c), the number of dead discards is estimated to be lower as a result of more recreational allocation because some fish caught could be retained rather than discarded under an increased quota. For the commercial sector, a decrease in the allocation would likely lead to more discards as a result of a reduced quota. Thus, any benefit to the red snapper stock from increasing the recreational allocation in Alternatives 2-9 would likely be offset by increases in dead discards as a result of a reduced commercial quota. As a result, it is difficult to assess whether this action, in terms of dead discards, would be beneficial, adverse, or have no effect on the red snapper stock.

As described earlier in this bycatch practicability analysis, the Council and NMFS have developed a variety of management measures to reduce red snapper bycatch and these measures are thought to benefit the status of the stock. These include bycatch reduction devices and effort targets in the shrimp fishery, size limit reductions and the IFQ program for the commercial sector, and gear requirements, such as dehooking devices and the use of circle hooks by the reef fish fishery. In addition, any increases in bycatch resulting from proposed management actions are accounted for when reducing directed fishing mortality. Any reductions in bycatch not achieved must be accounted for when setting the annual catch limits; the less bycatch is reduced, the more the annual catch limits must be reduced.

Criterion 2: Ecological effects due to changes in the bycatch of red snapper (effects on other species in the ecosystem)

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. The most recent red snapper stock assessment (SEDAR 31 2013) indicated the stock is rebuilding. Consequently, it is possible that forage species and competitor species could decrease in abundance in response to an increase in red snapper abundance. Changes in the bycatch of red snapper are not expected to directly affect other species in the ecosystem. Although birds, dolphins, and other predators may feed on red snapper discards, there is no evidence that any of these species rely on red snapper discards for food.

Criterion 3: Changes in the bycatch of other species of fish and invertebrates and the resulting population and ecosystem effects

Population and ecosystem effects resulting from changes in the bycatch of other species of fish and invertebrates are difficult to predict. As discussed in Amendment 27 (GMFMC 2007) and 40 (GMFMC 2014a), groupers, snappers, greater amberjack, gray triggerfish and other reef fishes are commonly caught in association with red snapper. Many of these species are in rebuilding plans (gag, gray triggerfish, and greater amberjack) with the stocks improving. Regulatory discards significantly contribute to fishing mortality for all of these reef fish species, with the exceptions of gray triggerfish and vermilion snapper.

No measures are proposed in this amendment to directly reduce the bycatch of other reef fish species. Bycatch minimization measures implemented through Amendment 18A (GMFMC 2005), Amendment 27 (GMFMC 2007), and Amendment 31 (GMFMC 2009) are expected to benefit reef fish stocks, sea turtles, and smalltooth sawfish. As mentioned, this action would revise the red snapper allocation between the commercial and recreational sectors. For species with quotas (greater amberjack, gray triggerfish, and recreational red snapper), this could lead to a shift in fishing effort during red snapper season closures and negatively impact reef fish stocks not currently constrained by annual quotas or IFQ programs. The magnitude of this impact would depend on the size of the resultant quotas, the length of the red snapper closure, and the amount of effort shifting that occurs. Annual catch limits and accountability measures are now in effect for species not considered undergoing overfishing or overfished, thus potential for effort shifting and changes in bycatch may be lessened for these species.

Criterion 4: Effects on marine mammals and birds

The effects of current management measures on marine mammals and birds are described above. Bycatch minimization measures evaluated in this amendment are not expected to significantly affect marine mammals and birds. There is no information to indicate marine mammals and birds rely on red snapper for food, and the measure in this amendment is not anticipated to alter the existing prosecution of the fishery, and thus interactions with marine mammals or birds.

Criterion 5: Changes in fishing, processing, disposal, and marketing costs

Reducing the commercial allocation in Alternatives 2-9 would result in fewer fish being landed and certainly affect fishing, processing, disposal, and marketing costs. However, because red snapper is a part of a multispecies fishery, other species could be targeted to fill any loses from reduced red snapper quotas. This action would not be expected to result in any changes in fishing, processing, disposal, or marketing costs of recreationally harvested red snapper because these fish may not be sold.

Criterion 6: Changes in fishing practices and behavior of fishermen

It is not possible to determine whether bycatch, including the amount of regulatory discards, will be affected following implementation of these actions. For the recreational sector, Alternatives 2-9 are expected to increase the season length, albeit only a few days, and thus reduce discards. However, reef fish fishing will occur when recreational fishing for red snapper is closed, so regulatory discards red snapper will occur. Thus, it is possible that the amount of recreational regulatory discards remains more or less the same with the proposed shift in allocation. For the commercial sector, individual fishing quota shareholders will need to determine if their red snapper allocation is sufficient to target red snapper, or to use the allocation to keep incidentally caught red snapper while targeting other species.

Criterion 7: Changes in research, administration, and enforcement costs and management effectiveness

The proposed management measures are not expected to significantly impact administrative costs. Quotas and ACTs based on stock allocation measures are currently used to regulate the commercial and recreational sectors harvesting red snapper. None of the resultant quotas from this action are expected to diminish regulatory effectiveness. All of these measures will require additional research to determine the magnitude and extent of impacts to bycatch and bycatch mortality. Administrative activities such as quota monitoring and enforcement should not be affected by the proposed management measures.

Criterion 8: Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources

Red snapper is a highly desirable target species and the proposed shift in allocation is intended to increase the percentage of the red snapper quota allocated to the recreational sector (and decrease the commercial sector's share by an equivalent percentage). This would be expected to improve fishing opportunities for the recreational sector, thereby increasing the economic and social benefits for recreational anglers and associated coastal businesses and communities as. However, this amendment would also decrease fishing opportunities for commercial fishermen, thereby adversely impacting associated businesses and communities. No effects would be expected on the non-consumptive uses of the fishery resources.

Criterion 9: Changes in the distribution of benefits and costs

The net effects of the proposed management measures in this amendment on bycatch are unknown because the resultant management measures could increase dead discards for the commercial sector and decrease dead discards for the recreational sector. The proposed management measures would not be expected to affect the overall amount of red snapper normally harvested by anglers and commercial fishermen. However, increases in the recreational red snapper quota and decreases in the commercial quota are expected to result in economic benefits for the recreational sector, and losses to the commercial sector.

Criterion 10: Social effects

Bycatch is considered wasteful by fishermen and it reduces overall yield obtained from the fishery. Minimizing bycatch to the extent practicable will increase efficiency, reduce waste, and benefit stock recovery, thereby resulting in net social benefits. It is expected that these actions would result in benefits for the recreational sector and adverse effects for the commercial sector.

Conclusion

Analysis of the ten bycatch practicability factors indicates there would be positive biological impacts associated with further reducing bycatch in the recreational sector. However, these benefits have to be balanced against the expected increases in bycatch in the commercial sector. The main benefits of reducing red snapper bycatch are less waste and increased yield in the directed fishery. Reducing discards and discard mortality rates would result in less forgone yield.

When determining reductions associated with various management measures, discard mortality is factored into the analyses to adjust the estimated reductions for losses due to dead discards. Changes in discards associated with each of these management measures are contingent on assumptions about how fishermen's behavior and fishing practices will adjust. In these actions, establishing a new red snapper allocation and adding recreational accountability measures would indirectly affect discards and bycatch. Discards and bycatch would be affected depending on the magnitude of allocation change allowed under the alternatives and how recreational harvest is constrained by recently implemented accountability measures (GMFMC 2014b).

The Council needed to consider the practicability of implementing the bycatch minimization measures discussed above with respect to the overall objectives of the Reef Fish FMP and Magnuson-Stevens Fishery Conservation and Management Act. Therefore, given actions in this amendment combined with previous actions, management measures, to the extent practicable, minimize bycatch and to the extent bycatch cannot be avoided, minimize the mortality of that bycatch.

References

Burns, K. M., C. C. Koenig, and F. C. Coleman. 2002. Evaluation of multiple factors involved in release mortality of undersized red grouper, gag, red snapper, and vermilion snapper. Mote Marine Laboratory Technical Report No. 814. (MARFIN grant #NA87FF0421). 53 pp.

Burns, K. M., N. F. Parnell, R. R. Wilson. 2004. Partitioning release mortality in the undersized red snapper bycatch: Comparison of depth vs. hooking effects. Final Report MARFIN Grant No. NA97FF0349 36 pp.

Burns, K. M., and J. T. Froeschke. 2012. Survival of red grouper (*Epinephalus morio*) and red snapper (*Lutjanus campechanus*) caught on J-hooks and circle hooks in the Florida recreational and recreational-for-hire fisheries. Bull. Mar. Sci. 88(3):633-646.

Campbell, M.D., W.B. Driggers, and B. Sauls. 2012. Release mortality in the red snapper fishery: a synopsis of three decades of research. SEDAR31-DW22. SEDAR, North Charleston, SC. 25 pp.

Clapp, R. B., R. C. Banks, D. Morgan-Jacobs, and W. A. Hoffman. 1982. Marine birds of the southeastern United States and Gulf of Mexico. U.S. Dept. of Interior, Fish and Wildlife Service, Office of Biological Services, Washington D.C. FWS/OBS-82/01. 3 vols.

Fitzhugh, G. R., M. S. Duncan, L. A. Collins, W. T. Walling, and D. W. Oliver. 2004. Characterization of red snapper (*Lutjanus campechanus*) reproduction: for the 2004 Gulf of Mexico SEDAR. NOAA, NMFS, SEFSC, 3500 Delwood Beach Road, Panama City, Florida 32409. Contribution 04-01. 29 pp + addendum.

GMFMC. 1999. Regulatory amendment to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico to set 1999 gag/black grouper management measures (revised), includes environmental assessment, regulatory impact review, and initial regulatory flexibility analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/RF%20RegAmend%20-%201999-08.pdf

GMFMC. 2002. Amendment number 10 to the Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico, U.S. Waters with environmental assessment, regulatory impact review, initial regulatory flexibility analysis, and social impact assessment. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/SHRIMP%20Amend-10%20Final%202002-07.pdf

GMFMC. 2004a. Amendment 22 to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico, U.S. waters, with supplemental environmental impact statement, regulatory impact review, initial regulatory flexibility analysis, and social impact assessment. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Amend%2022%20Final%2070204.pdf

GMFMC. 2004b. Final Amendment 23 to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico to set vermilion snapper sustainable fisheries act targets and thresholds and to establish a plan to end overfishing and rebuild the stock, including a final supplemental environmental impact statement and regulatory impact review. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/VS%2023%20Oct%20Final%2010-21-04%20with%20Appendix%20E.pdf

GMFMC. 2005. Final amendment 18A to the fishery management plan for the reef fish resources of the Gulf of Mexico, including environmental assessment, regulatory impact review, and initial regulatory flexibility analyses. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Amendment_18A_Final.pdf

GMFMC. 2007. Final Amendment 27 to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico and Amendment 14 to the Shrimp Fishery Management Plan including supplemental environmental impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. 490 pp with appendices. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20RF%20Amend%2027-%20Shrimp%20Amend%2014.pdf

GMFMC. 2008a. Final Amendment 30A Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico: greater amberjack – revised rebuilding plan, accountability measures; gray triggerfish – establish rebuilding plan, end overfishing, accountability measures, regional management, management thresholds and benchmarks including supplemental environmental impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Amend-30A-Final%20208.pdf

GMFMC. 2008b. Final Amendment 30B to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico: gag – end overfishing and set management thresholds and targets. Red grouper – set optimum yield, TAC, and management measures, time/area closures, and federal regulatory compliance. Gulf of Mexico Fishery Management Council, 2203 North Lois Avenue, Suite 1100, Tampa, FL. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20Amendment%2030B%2010_10_08.pdf

GMFMC. 2009. Final amendment 31 to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico addresses bycatch of sea turtles in the bottom longline component of the Gulf of Mexico reef fish fishery, includes draft environmental impact statement and regulatory impact review. Gulf of Mexico Fishery Management Council. Tampa, Florida. 261 pp with appendices. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20Draft%20RF%20Amend%2031%206-11-09.pdf

GMFMC. 2011a. Final Amendment 32 to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico – gag grouper – rebuilding plan, annual catch limits, management measures, red grouper – annual catch limits, management measures, and grouper accountability measures. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Final%20RF32_EIS_October_21_2011[2].pdf

GMFMC. 2011b. Final Generic Annual Catch Limits/Accountability Measures Amendment for the Gulf of Mexico Fishery Management Council's Red Drum, Reef Fish, Shrimp, Coral and Coral Reefs Fishery Management Plans, including environmental impact statement, regulatory impact review, regulatory flexibility analysis, and fishery impact statement. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Final%20Generic%20ACL_AM_Amendment-September%209%202011%20v.pdf

GMFMC. 2012a. Final amendment 35 to Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico – modifications to the greater amberjack rebuilding plan and adjustments to the recreational and commercial management measures, including an environmental assessment, fishery impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final_Amendment_35_Greater_Amberjack_Rebuilding_8_May_2012.pdf

GMFMC. 2012b. Final amendment 37 to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico – Modifications to the gray triggerfish rebuilding plan including adjustments to the annual catch limits and annual catch targets for the commercial and recreational sectors. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Final_Reef_Fish_Amend_37_Gray_Triggerfish_12_06_12[1].pdf

GMFMC. 2012c. Final Amendment 38 to the reef fish fishery management plan for the reef fish resources of the Gulf of Mexico – modifications to the shallow-water grouper accountability measures, including an environmental assessment, fishery impact statement, regulatory impact review, and regulatory flexibility act analysis. http://www.gulfcouncil.org/docs/amendments/Final%20Amendment%2038%2009-12-2012.pdf

GMFMC. 2013. Red snapper individual fishing quota program 5-year review. Jointly prepared by Gulf of Mexico Fishery Management Council and NMFS Southeast Regional Office. Tampa and St. Petersburg, FL. http://www.gulfcouncil.org/docs/amendments/Red%20Snapper%205-year%20Review%20FINAL.pdf

GMFMC. 2014a. Amendment 40 to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico - Recreational Red Snapper Sector Separation. Gulf of Mexico Fishery Management Council. Tampa, Florida. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/fishery_management_plans/reef_fish_management.php

GMFMC. 2014b. Regional Management of Recreational Red Snapper Amendment 39 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico, including a Draft Environmental Impact Statement. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/council_meetings/Briefing%20Materials/BB-03-2015/B-10(b)%20PPH%20Draft%20RF39%20Reg%20Man.pdf

GMFMC. 2014c. Red Snapper Allocation Amendment 28 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico, including a Draft Environmental Impact Statement. Gulf of Mexico Fishery Management Council. Tampa, Florida.

Goodyear, C. P. 1995. Red snapper in U.S. waters of the Gulf of Mexico. NOAA, NMFS, SEFSC, 75 Virginia Beach Drive, Miami, Florida 33149. Contribution: MIA 95/96-05. 171 pp.

Harrison, P. 1983. Seabirds: an identification guide. Houghton Mifflin Company, Boston, MA. Field Notes 48: 976-978.

Linton, B. 2012. Shrimp fishery bycatch estimates for Gulf of Mexico red snapper, 1972-2011. SEDAR31-DW30. SEDAR, North Charleston, SC. 11 pp.

NMFS. 2011. Biological opinion on the continued authorization of Reef Fish fishing under the Gulf of Mexico Reef Fish Fishery Management Plan. September 30, 2011. Available at: http://sero.nmfs.noaa.gov/pr/esa/Fishery%20Biops/03584%20GOM%20Reef%20Fish%20BiOp%202011%20final.pdf

Patterson, W. F. III, J. C. Watterson, R. L. Shipp, and J. H. Cowan, Jr. 2001. Movement of tagged red snapper in the northern Gulf of Mexico. Transactions of the American Fisheries Society 130: 533-545.

Porch, C. E. 2005. Projected effects of changes in minimum size regulations on the future status of the red snapper (*Lutjanus campechanus*) fishery in the U. S. Gulf of Mexico. NOAA, NMFS, SEFSC, 75 Virginia Beach Drive, Miami, Florida 33149. Contribution: SFD-2005-009. 7 pp.

RFSAP. 1999. September 1999 Report of the Reef Fish Stock Assessment Panel. Gulf of Mexico Fishery Management Council. Tampa, FL.

Schirripa, M. J. and C. M. Legault. 1997. Status of the red snapper in U.S. waters of the Gulf of Mexico: Executive summary updated through 1996. MIA-97/98-05. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center. Miami, Florida. 37 pp.

Schirripa, M. J., and C. M. Legault. 1999. Status of the red snapper fishery in the Gulf of Mexico: Updated through 1998. SFD-99/00-75. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center. Miami, Florida. 44pp. with appendices

SEDAR 7. 2005. Stock assessment report of SEDAR 7 Gulf of Mexico red snapper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 9 Update. 2011. SEDAR update stock assessment of vermilion snapper in the Gulf of Mexico. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 10 Update. 2009. Stock assessment of gag in the Gulf of Mexico. – SEDAR update assessment. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/

SEDAR 12 Update. 2009. Stock assessment of red grouper in the Gulf of Mexico – SEDAR update assessment. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 22. 2011. Stock assessment report Gulf of Mexico yellowedge grouper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 31. 2013. Stock assessment report Gulf of Mexico red snapper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SERO. 2006. Red snapper yield-per-recruit analyses. NOAA, NMFS, SERO, 263 13th Ave. South, St. Petersburg, Florida 33701. 13 pp.

SERO. 2012a. 2011 Gulf of Mexico grouper-tilefish individual fishing quota annual report. SERO-LAPP-2012-09. Southeast Regional Office. St. Petersburg, Florida. 49 p.

SERO. 2012b. Southeast Regional Office National Marine Fisheries Service. Estimated reduction in Gulf of Mexico recreational red snapper harvest associated with various bag limits. Southeast Regional Office, St. Petersburg, Florida.

SERO. 2013. Establishing Recreational Closure Authority Specific to Federal Waters off Individual States for the Red Snapper Component of the Gulf of Mexico Reef Fish Fishery. Emergency Action to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico. Southeast Regional Office, St. Petersburg, FL.

Wilson, C. A., D. L. Nieland, A. J. Fischer, and M. S. Baker, Jr. 2004. Red snapper *Lutjanus campechanus* in the northern Gulf of Mexico: Age and size composition of the commercial harvest and mortality of regulatory discards. NOAA, NMFS, SERO, 263 13th Ave. South, St. Petersburg, Florida 33701. MARFIN grant #NA17FF2007. 55 pp.

APPENDIX C. SUMMARY OF HABITAT UTILIZATION BY LIFE HISTORY STAGE FOR SPECIES IN THE REEF FISH FMP.

Common name	Eggs	Larvae	Early Juveniles	Late juveniles	Adults	Spawning adults
Red Snapper	Pelagic	Pelagic	Hard bottoms, Sand/ shell bottoms, Soft bottoms	Hard bottoms, Sand/ shell bottoms, Soft bottoms	Hard bottoms, Reefs	Sand/ shell bottoms
Queen Snapper	Pelagic	Pelagic	Unknown	Unknown	Hard bottoms	
Mutton Snapper	Reefs	Reefs	Mangroves, Reefs, SAV, Emergent marshes	Mangroves, Reefs, SAV, Emergent marshes	Reefs, SAV	Shoals/ Banks, Shelf edge/slope
Blackfin Snapper	Pelagic		Hard bottoms	Hard bottoms	Hard bottoms, Shelf edge/slope	Hard bottoms, Shelf edge/slope
Cubera Snapper	Pelagic		Mangroves, Emergent marshes, SAV	Mangroves, Emergent marshes, SAV	Mangroves, Reefs	Reefs
Gray Snapper	Pelagic, Reefs	Pelagic, Reefs	Mangroves, Emergent marshes, Seagrasses	Mangroves, Emergent marshes, SAV	Emergent marshes, Hard bottoms, Reefs, Sand/ shell bottoms, Soft bottoms	
Lane Snapper	Pelagic		Mangroves, Reefs, Sand/ shell bottoms, SAV, Soft bottoms	Mangroves, Reefs, Sand/ shell bottoms, SAV, Soft bottoms	Reefs, Sand/ shell bottoms, Shoals/ Banks	Shelf edge/slope
Silk Snapper	Unknown	Unknown	Unknown	Unknown	Shelf edge	
Yellowtail Snapper	Pelagic		Mangroves, SAV, Soft bottoms	Reefs	Hard bottoms, Reefs, Shoals/ Banks	

Common name	Eggs	Larvae	Early Juveniles	Late juveniles	Adults	Spawning adults
Wenchman	Pelagic	Pelagic			Hard bottoms, Shelf edge/slope	Shelf edge/slope
Vermilion Snapper	Pelagic		Hard bottoms, Reefs	Hard bottoms, Reefs	Hard bottoms, Reefs	
Gray Triggerfish	Reefs	Drift algae, *Sargassum*	Drift algae, *Sargassum*	Drift algae, Reefs, *Sargassum*	Reefs, Sand/ shell bottoms	Reefs, Sand/ shell bottoms
Greater Amberjack	Pelagic	Pelagic	Drift algae	Drift algae	Pelagic, Reefs	Pelagic
Lesser Amberjack			Drift algae	Drift algae	Hard bottoms	Hard bottoms
Almaco Jack	Pelagic		Drift algae	Drift algae	Pelagic	Pelagic
Banded Rudderfish		Pelagic	Drift algae	Drift algae	Pelagic	Pelagic
Hogfish			SAV	SAV	Hard bottoms, Reefs	Reefs
Blueline Tilefish	Pelagic	Pelagic			Hard bottoms, Sand/ shell bottoms, Shelf edge/slope, Soft bottoms	
Tilefish (golden)	Pelagic, Shelf edge/ Slope	Pelagic	Hard bottoms, Shelf edge/slope, Soft bottoms	Hard bottoms, Shelf edge/slope, Soft bottoms	Hard bottoms, Shelf edge/slope, Soft bottoms	
Goldface Tilefish	Unknown					
Speckled Hind	Pelagic	Pelagic			Hard bottoms, Reefs	Shelf edge/slope
Yellowedge Grouper	Pelagic	Pelagic		Hard bottoms	Hard bottoms	

Common name	Eggs	Larvae	Early Juveniles	Late juveniles	Adults	Spawning adults
Atlantic Goliath Grouper	Pelagic	Pelagic	Mangroves, Reefs, SAV	Hard bottoms, Mangroves, Reefs, SAV	Hard bottoms, Shoals/ Banks, Reefs	Reefs, Hard bottoms
Red Grouper	Pelagic	Pelagic	Hard bottoms, Reefs, SAV	Hard bottoms, Reefs	Hard bottoms, Reefs	
Warsaw Grouper	Pelagic	Pelagic		Reefs	Hard bottoms, Shelf edge/slope	
Snowy Grouper	Pelagic	Pelagic	Reefs	Reefs	Hard bottoms, Reefs, Shelf edge/slope	
Black Grouper	Pelagic	Pelagic	SAV	Hard bottoms, Reefs	Hard bottoms, Mangroves, Reefs	
Yellowmouth Grouper	Pelagic	Pelagic	Mangroves	Mangroves, Reefs	Hard bottoms, Reefs	
Gag	Pelagic	Pelagic	SAV	Hard bottoms, Reefs, SAV	Hard bottoms, Reefs	
Scamp	Pelagic	Pelagic	Hard bottoms, Mangroves, Reefs	Hard bottoms, Mangroves, Reefs	Hard bottoms, Reefs	Reefs, Shelf edge/slope
Yellowfin Grouper			SAV	Hard bottoms, SAV	Hard bottoms, Reefs	Hard bottoms

Source: Adapted from Table 3.2.7 in the final draft of the EIS from the Generic EFH Amendment (GMFMC 2004a) and consolidated in this document.

APPENDIX D. SUMMARIES OF PUBLIC COMMENTS RECEIVED AND RESPONSES TO COMMENTS ON THE DRAFT ENVIRIONMENTAL IMPACT STATEMENT (DEIS)

This section includes four sets of public comment summaries on Reef Fish Amendment 28, Red Snapper Allocation:

- Summary of written comments received between the October 2013 and February 2014 Council meetings.
- Summary of written comments received between the February and April 2014 Council meetings.

Both sets of comments can be viewed at:
http://www.gulfcouncil.org/fishery_management_plans/scoping-thru-implementation.php

- Summary of scoping comments received by NOAA Fisheries on the Notice of Intent to prepare an Environmental Impact Statement (November 7-December 9, 2013).
- Summaries of comments received at public hearings (March 10-20, 2014).

DEIS comments

- Comment Letter on the DEIS from the Environmental Protection Agency (July 16, 2015).
- Response to comments from the Environmental Protection Agency on the DEIS for Amendment 40.
- Response to Comments from the Public on the DEIS for Amendment 40 (DEIS comment period June 5- July 20, 2015).

I. Summary of written comments received between the October 2013 and February 2014 Council meetings

- Take no action/Status quo – commercial sector supplies red snapper to the majority of the population
- Shift 5% of the existing quota to the recreational sector
- Shift 10% (or more) of the existing quota to the recreational sector
- Increase recreational quota by 8%
- Allocate 100% of future quota increases to the recreational sector if the allowable red snapper quota is in excess of 9.12 million pounds.
- Allocate 75% of quota increases if the allowable red snapper quota is in excess of 9.12 million pounds.
- Allocate 60% of the quota to the recreational sector

- Allocate 65% recreational and 35% commercial
- Allocate 75% recreational and 25% commercial
- Allocate 50/50 plus 100% of any quota increases to the recreational sector
- Allocate 55% recreational and 45% commercial
- Allocate 90% recreational and 10% commercial
- Allocate 67% recreational and 33% commercial – with the charter for-hire classified as commercial
- Allocate 50/50 quota
- Please oppose Amendment 28 and focus on real solutions for recreational anglers that will extend the season over the long-term.
- A 10% increase in allocation for the recreational sector would not increase the season length by much – but it would reduce the commercial sector's ability to supply America with red snapper.
- Any change in allocation would have a negative effect on the commercial sector's ability to make a living.
- Amendment 28 would hurt the region's seafood industry by giving more allocation to a poorly managed recreational sector at the expense of commercial fishermen, restaurants, seafood markets, and the millions of Americans who don't have the means to catch their own fish.

Other suggestions

- Eliminate commercial fishing until the fishery is no longer overfished, then allow commercial fishing under the same bag/size/season/gear restrictions as recreational, and auction off any commercial fishing permits.
- 4-6 month season with 4-fish bag limit
- 3-5 fish with one fish under 16" and a May 1 – October 1 weekend and holiday season.
- Charter for-hire should get 50% of the quota and each permit should receive the same amount of allocation.
- Giving more quota to the recreational sector will not solve their overfishing problem.
- 3-day weekend only fishing season.
- Close the season every ten years for one full season.
- Would support a 5-fish bag limit and 12" minimum size limit – keep the first 5 fish.
- Keep the first 4 fish – no size limit.
- Increase recreational bag limit to 10 fish.
- Allocation of any wild fish species should be relative to the numbers of recreational and commercial fishermen.
- 12" size limit/4 per person bag limit with an open season of 30 fishing days throughout the year – anglers would have to login to a computer system to declare a fishing day.

II. Summary of written comments received between the February and April 2014 Council meetings

Comments include:

- Support for all of the Alternatives, including new Alternative 7
- Alternatives 1, 5, and 6 appear to be most popular
- Many offered support for some sort of reallocation in favor of the recreational sector, but did not specify an Alternative.

Others offered Alternatives not included in the document:

- A 50/50 split in allocation.
- 60% recreational allocation/30% commercial allocation, and a longer recreational season.
- 65% recreational allocation/35% commercial allocation.
- 65% recreational allocation/35% commercial allocation with a 4-fish bag limit and a longer recreational season.
- 75% recreational allocation/25% commercial allocation.
- 80% recreational allocation/20% commercial allocation.
- 95% recreational allocation/5% commercial allocation.

General Comments regarding the Amendment include:

- A shift in allocation in favor of the recreational sector, but not unless some sort of recreational accountability in put in place.
- Allocation of red snapper to the recreational fishery should be accompanied with accountability measures (AMs) to more effectively constrain the recreational sector to the prescribed annual catch limit (ACL).
- This amendment does not meet or address the stated purpose and need because increasing allocation on its own does not stabilize the fishery or prevent overfishing, nor is the amendment consistent with MSA (does not address AMs).
- Current allocation causes an increase in recreational fishing pressure.
- Reconsider the effects of removing the "30B permit provision", sector separation and other management strategies, as well as changes to the management goal for red snapper in conjunction with this amendment.

Other Red Snapper Comments Received:

- There is a need for better quality data, which can only come from improved funding, partnerships, and proper auditing.
- Current recreational regulations promote mortality by requiring fish to be thrown back only to die.
- Support Sector Separation.
- Make red snapper a sport fish.
- If the recreational season cannot be at least three months implement some type of days at sea program.
- Open amberjack and gray triggerfish during the same time as red snapper so there are other species to fish for, making the offshore trip more worthwhile.
- Captains should not be able to have a commercial license and a Charter-for-Hire license at the same time.
- Consider allowing the commercial sale of spear fishing catches.

- Recreational sector puts more money into the economy.
- Recreational sector loses a lot of days to bad weather.
- Louisiana is ready and able to manage snapper in federal and state waters off of Louisiana.
- More artificial reefs will provide more habitat and help the stock grow.
- A viable solution is to set a minimum distance (50-75 miles) from any shoreline for commercial fishing operations.
- Eliminate the size limit.
- Better way to manage – keep every snapper caught regardless of size and set a limit per angler.
- Allow anglers to keep a 5 gallon bucket of "first caught" reef fish.
- Close the fishery during spawning season.
- Develop a program that would allow private recreational anglers to pick and choose the days they can fish for red snapper.
- Implementing a tag program or a recreational red snapper license would help the recreational sector stay within its quota as well as contribute to data collection.
- Give recreational anglers six months to fish for red snapper.
- Decrease size limit to 13 or 14".
- Increase the red snapper bag limit.
- Increase the bag limit to 3-5 fish.
- Implement a 4-fish bag limit.
- Open red snapper season and leave it open.
- Adjust the season to accommodate the Friday before Memorial
- Day through Labor Day.
- Season should begin the first Friday in July and last through the last Saturday in July, but the five states should adopt the same seasons, with state waters abiding by a 2-fish bag limit while the federal bag limit increases to 4 fish.
- Implement a July – September season.
- Need separate seasons for different areas in the gulf by population.
- Implement a split, multi-season to accommodate more people.
- There should be no private "ownership" of red snapper (IFQ).
- Extend the season by 4 weeks.
- Delay the start of the season to July 1.
- Implement a 6 month season.
- If there cannot be a reasonable recreational season, there should be no commercial fishery.
- Unfair to reward the recreational sector that has consistently exceeded its quota.
- Allocating more fish to the recreational sector cannot increase the stability of the red snapper fishery, as stated in the purpose and need, because you are giving more fish to the sector that continues to exceed its quota.
- Allocation should be reviewed frequently.
- Amendment 28 is not a real solution. This amendment will only hurt more coastal businesses and commercial fishermen who depend on this fishery for a living.

- Recreational anglers should be able to keep a 2-day bag limit when on a trip in excess of 24 hours.
- Mid water trawlers should be using TEDs.

III. Summary of scoping comments received by NOAA Fisheries on the Notice of Intent to prepare an Environmental Impact Statement (EIS) for Reef Fish Amendment 28

The comment period was open from November 7 through December 9, 2013, and 159 comments were received. These comments may be viewed at http://www.regulations.gov/#!documentDetail;D=NOAA-NMFS-2013-0146-0001.

Comments in support of increasing the recreational sector's share of the annual catch limit often cited socioeconomic gains, reducing restrictions, and providing a better sense of fairness in setting the allocation. Comments in support of the status quo or increasing the commercial share of the annual catch limit often cited fairness because the commercial sector does not exceed their quota due to better accountability of catches, the importance of providing seafood to the non-fishing public, and protecting commercial sector investments in the fishery.

The following is a breakdown of the comments. Table 1 shows the number of comments supporting each of the alternatives in Amendment 28.

Table 1. The number of scoping comments recommending each Amendment 28 alternative.

Alternative	Number of comments recommending the alternative
1	29
2	1
3	0
4	3
5	2*
6	19

*Two commenters in support of Alternative 6 indicated they could also support Alternative 5

Other allocation alternatives were recommended by commenters and are shown Table 2.

Table 2. Other allocations recommended in scoping comments on Amendment 28.

Receational:commercial allocation	Number of comments in support of the allocation
10:90	1
50:50	3
60:40	3
75:25	1
100:0	6

Twenty-one comments recommended an alternative similar to Alternative 5 except that if the red snapper quota is greater than 9.12 million pounds (mp), allocate 90% rather than 75% of the amount in excess of 9.12 mp to the recreational sector and 10% rather than 25% to the commercial sector.

IV. Summaries of comments received at public hearings (March 10-20, 2014).

Orange Beach, Alabama
March 10, 2014

Council/Staff
Johnny Green
Assane Diagne
Charlotte Schiaffo

68 members of the public attended.

Gary Royal- Charter
Mr. Royal noted that he had been running a charterboat since 1997, and stated that the only sector being punished was the commercial sector. He did not support taking any commercial allocation away and suggested that the commercial sector be allocated on historical numbers. He supported Alternative 5. He added that the fishery needed to work under a system that allowed the recreational sector to fish year-round, maybe with tags, and that flexibility in regulations was needed so that everyone could catch more fish.

Randy Boggs- Charter
Mr. Boggs supported Alternative 1 and stated that the Council was pitting the sectors against each other and he could not support reallocation, or anything else, until the recreational sector was brought into compliance. He added that Alabama could not control compliance by other states and should not be punished because recreational fishers in other states were going over their quotas. He advocated making the recreational sector more accountable.

Troy Frady- Charter
Mr. Frady noted that he had been attending Council meetings for five years. He stated that all sectors needed to move towards a system that allowed flexibility. He said that the recreational harvest was running 54-56% each year even though their quota was 49%, and that about 140,000lbs of snapper were being fished across the Gulf daily. He believed that Amendment 28 was premature and suggested a fish tag system. He recommended tabling Amendment 28 until a better data collection plan was in place for about two years in order to get accurate data.

David Walker- Commercial
Mr. Walker supports Alternative 1 and stated that the amendment would cause instability in the commercial sector and rewarded the recreational sector for going over their allocation. He said that the IFQ program had been a success and that it should not be changed by the Council. He added that any allocation taken away from the commercial sector took fish away from the American consumer and that reallocation unfairly penalized the commercial sector, which followed the rules. He noted that the commercial sector had already taken a huge quota reduction while the recreational sector kept going over theirs. He believed that the commercial sector deserved to keep their historical quota and that the recreational sector needed to be held accountable. He indicated that SESSC votes are in question because one of the members may be

ineligible. He suggested that the SESSC needed to review all data on the Amendment, and that the Council should take no action until this was done.

Shawn Miller- Recreational
Mr. Miller felt that the amendment was good. He suggested that the fishery be shut down in June for a few years to allow the fish to spawn, and maybe even shut down for three months to all sectors, even though people would lose money in the short term. He believed such an action would allow longer seasons eventually due to more fish being spawned, thus benefitting all sectors.

Blakeley Ellis- Recreational
Mr. Blakely supported Preferred Alternative 5. He felt it was long overdue and was happy with any increase.

Ben Fairy- Charter
Mr. Fairy supported Alternative 1 (No Action). He noted that there was a commercial lawsuit against NMFS because of the recreational sector continuously going over their quota, and that the length of the season depended on the upcoming ruling. He did not support reallocation and stated that there needed to be three sectors: recreational, charter, and commercial.

Tom Ard- Charter
Mr. Ard supported Alternative 1. He stated that the amendment was a band aid, and that he supported dividing the charterboat industry from the recreational.

Bobby Kelly- Charter
Mr. Kelly supported Alternative 1 and the separation of the charterboat industry from recreational. He wanted better data collection methods and supports sector separation.

Joe Nash- Charter
Mr. Nash supported sector separation and believed the commercial and charterboat industries were penalized for the recreational fishers going over the allocation. He advocated more accountability in the recreational sector and noted that derby fishing was too hard on the charterboat industry.

Dale Woodruff- Charter
Mr. Woodruff advocated tabling Amendment 28 and expressed concern over there being no accountability in the recreational fishery. He stated that if the commercial sector had to give up some of its allocation, that it should be put in a program for everybody. He urged everyone to contact their representatives in Congress to have a plan applying only to Alabama, since other states were being non-compliant and punishing Alabama. He stated there needed to be a better reporting system.

Gary Malin- Recreational
Mr. Malin did not believe the recreational sector was going over its limit. He noted that bad weather had limited fishing days and advocated a tag system for all sectors.

Mike Rowell- Charter
Mr. Rowell expressed concern that the sectors were being pitted against one another. He supported Alternative 1. He felt that Alabama was being punished because of non-compliance by other states.

Scott Drummond- Founder of an outdoor trade organization
Mr. Drummond stated that the data the Council uses are not accurate, and that economic studies needed to be done for each amendment. He said that commercial fish landings had to be documented while recreational did not, and that estimates were used instead of hard data. He supported Alternative 1.

Jim Tinker- Recreational
Mr. Tinker agreed with other speakers that the sectors were being pitted against each other. He believed the Council was not dealing with issues or solving problems and that there were plenty of snapper in the Gulf. He stated that the season was too short, which was economically devastating and that the size limits caused too many fish to be thrown back, increasing mortality. He said the recreational industry supported the Gulf economy, and that the percentage of quota was not the problem, the counting of the fish was the problem. He did not support the amendment and believed the recreational fishery in Alabama was being destroyed. He also stated that red snapper were overwhelming other fisheries and the Council was practicing poor conservation.

Angelo Depaula- Recreational
Mr. Depaula stated that the problem was not the amount of fish being caught, but the counting method being used. He advocated a smaller limit, noting the mortality rate was over 50%. He supported an increased quota and a longer season (6 months).

Mobile, Alabama
March 11, 2014

Council/Staff
Kevin Anson
Assane Diagne
Charlotte Schiaffo

46 members of the public attended.

Ben Fairy- Charter
Mr. Fairy supported Alternative 1. He noted that there was a federal lawsuit by the commercial industry over the recreational overages, and that the outcome of that lawsuit could determine allocations. He urged the recreational sector to be accountable and advised against the sectors pitting themselves against each other.

George Null- Boat dealership
Mr. Null stated that his business' sales of offshore boats had decreased in the last 3-4 years causing an economic impact to his business.

Larry Huntley- Commercial
Mr. Huntley supported Alternative 1, noting that giving more fish to the recreational sector took fish away from consumers, and that increasing their allocation would reward them for going over their allocation.

David Walker- Commercial
Mr. Walker supported Alternative 1, stating that allocation was not the problem; it was the fishery management process that was the problem. He stated that the SESSC needed to review the amendment before the Council made a decision and said that the Council should reconvene the SESSC because one vote was cast by someone who may not be eligible to serve on the SESSC.

Donald Waters- Commercial
Mr. Waters said that numerous fish species were given to recreational fishers and that to give them more of the red snapper quota was unfair. He stated that the recreational fishery needed to be held accountable and supported Alternative 1.

Edwin Lamberth- Recreational
Mr. Lamberth supported Alternative 6, but would be satisfied with Alternative 5. He stated that the recreational fishery provided $10 billion in economic impacts. He emphasized that the Council needed to reallocate fairly based on the recreational industry's economic impact and that the data the Council was currently using to reach its allocation decisions was over thirty years old.

Charles Rodriguez- Boat dealer
Mr. Rodriguez did not have a preferred alternative, but suggested that there be a 3-month season with a 3-fish limit. He did not feel any of the sectors should have fish taken away from them and that the red snapper population had rebounded enough for everyone's allotment to be increased.

Scott Drummond- Outdoor trade organization
Mr. Drummond stated that the data the Council used are bad and that no one should have any fish taken from their sector. He advocated cancelling the amendment, saying it was not needed.

Charles Beach- Charter
Mr. Beach supported Alternative 1. He stated that the stock had recovered and that the Council was not taking into account that the commercial fishery was dealing in pounds and not numbers. He pointed out that the shrimping industry had collapsed so there was very little bycatch of juveniles which increased the stock. He added that a 40-day season was too short and that the Council needed to reassess its stock assessment methods and lower the commercial size limit since it was hurting the commercial industry.

Tom Steber- Alabama Charter Association
Mr. Steber supported Alternative 1 and stated that the Council was pitting the sectors against each other.

Avery Bates- Commercial
Mr. Bates advocated more reef building to increase stocks, noting that Alabama had a successful program. He stated that the commercial fishery was being pushed out by too much regulation, and that the fish count was incorrect. He wanted fair and equitable allocation and emphasized that the best scientific data needed to be used in Council decisions. He did not support the amendment.

Panama City, Florida
March 12, 2014

Council/Staff
Pam Dana
Assane Diagne
Charlotte Schiaffo

93 members of the public attended.

John Anderson- Commercial
Mr. Anderson supported Alternative 1 and stated that taking fish away from the commercial sector would punish the consumer and the industry that followed the rules.

BJ Burkett- Charter
Mr. Burkett supported Alternative 1 and stated that there were too many loopholes for the recreational industry. He advocated a 150-day recreational season.
Jack Melancon- Commercial
Mr. Melancon supported Alterative 1.

Pam Anderson- Charter
Ms. Anderson supported Alternative 5, stating it was the most fair to all sectors and would create more stability in the fishery. She noted that an economic study had been done showing that taking away fish from the commercial sector was equitable and would be best for the nation. She stated that the overages reported in the recreational sector were due to bad data from NOAA. She suggested a Gulf reef permit to give researchers more accurate data.

Ron Schoenfeld- Recreational
Mr. Schoenfled supported Alternative 4. He suggested an odd-even day season in order to double fishing days, and to have fish counted when boats come in to dock.

Bart Niquet- Commercial
Mr. Niquet supported Alternative 1 and stated that recreational anglers needed to be held accountable.

Bob Zales- Charter
Mr. Zales supported Alternative 5 and stated that sector separation would not work, and that separation would increase the commercial quota at the expense of the recreational. He added that data being used were not accurate.

Jackie Rinker- Media
Ms. Rinker supported Alternative 4 or 5, stating that money spent in the communities by recreational anglers was important to keep local communities viable.

Chuck Guilford- Charter
Mr. Guilford supported Alternative 6. He stated that allocation had put a lot of people out of business.

Kenyon Gandy- Charter
Mr. Gandy supported Alternative 1 and noted that there was too much discards in the industry because of size restrictions.

David Krebs- Dealer
Mr. Krebs supported Alternative 1. He advocated getting rid of the size limit. He stated that the current recreational management system was designed for failure.

Mike Whitfield- Charter
Mr. Whitfield supported Alternative 1. He stated that there were too many participants in the recreational fishery and that a count of them needed to be done.

Dewey Destin- Charter
Mr. Destin supported Alternative 1. He stated that the Council needed to change its management plan and get rid of kill and release. He stated that taking away fish from the commercial sector was not fair, and that while he did not object to an increase in the recreational quota, it should not be done at the expense of the commercial sector.

Curtis Culwell- Recreational
Mr. Culwell supported Alternative 5.

Russell Underwood- Commercial
Mr. Underwood supported Alternative 1. He stated that the commercial IFQ system was working well, and that the Council recreational management system was flawed. He suggested a tag system.

Candy Ansard- Recreational
Ms. Ansard did not support the amendment, saying none of the options solved the problem. She suggested building more artificial reefs and pursuing an aggressive program against lionfish.

Charlie Saleby- Charter
Mr. Saleby supported Alternatives 4, 5, and 6. He stated that the size limit needed to be smaller and that the season was too short, noting that smaller boats were put in danger by having to go far out in bad weather to fish.

Donald Whitecotton- Charter
Mr. Whitecotton supported Alternative 6, and agreed that bad weather limited fishing days.

Stewart Miller- Charter and commercial
Mr. Miller supported Alternative 1.

Billy Archer- Recreational, charter, and commercial
Mr. Archer supported Alternative 1 and suggested tabling the amendment. He also recommended a tag system for the recreational sector and sector separation.

Kerry Hurst- Commercial
Mr. Hurst supported Alternative 1. He recommended a national plan for both sectors and more accountability for the recreational sector.

Dean Preston- Recreational
Mr. Preston supported Alternative 6. He agreed that lionfish were a problem and stated that the amendment pitted the sectors against each other. He believed that the commercial sector had too large an allotment of a public resource.

Frank Gomez- Commercial
Mr. Gomez supported Alternative 1.

Ken Vandirzeyne- Recreational
Mr. Vandirzeyne supported Alternative 6.

Gary Jarvis- Charter and commercial
Mr. Jarvis supported Alternative 1 and advocated a management plan for the recreational sector. He encouraged Amendment 40 to be taken to public hearings and stated that Amendment 28 was the result of recreational lobbying.

Mike Guidry- Recreational
Mr. Guidry supported Alternative 4. He encouraged more accountability in his sector and also asked for more fishing days.

David Underwood- Commercial
Mr. Underwood supported Alternative 1.

Bruce Craul- Restaurant owner
Mr. Craul supported Alternative 1 and stated that better data were needed.

Chris Niquet- Commercial
Mr. Niquet supported Alternative 1 and urged the Council to get more accurate data. He stated that reallocation would cause instability in the fishery.

Ben Seltzer- Commercial
Mr. Seltzer supported Alternative 1.

Frank Bowling- Recreational
Mr. Bowling supported Alternative 5.

Jason Smith- Charter
Mr. Smith did not support the amendment, stating there was not enough data to make a choice.

Gulfport, Mississippi
March 12, 2014

Council/Staff
Corky Perret
Emily Muehlstein
Phyllis Miranda

45 members of the public attended.

Robert Cullimber-
Mr. Cullimber supports Alternative 4.

Tony Dees- Owner of retail fishing store
Mr. Dees supports Alternative 4 because in the last ten years he has seen an approximately 80% decrease in tackle sales and 90% decrease in SCUBA sales for spearfishing.

Donny Waters- Commercial
Mr. Waters said the ITQ program initiated 8 years ago is probably the most successful program initiated by Council; 40% less fish are killed to bring quota to the dock. He doesn't feel it's right to reallocate fish from a sector that has been accountable, and commercial fishermen should not be penalized for the Council's inability to create a good fishing plan for the recreational fishery. He feels that the recreational sector wants to be accountable. The commercial sector cannot take a fish home, and they are feeding 97% of the population that cannot go recreational fishing. He does not want to take anything away from anybody but feels that this allocation will wreak havoc in the commercial fishery. His money goes back into his business. The answer is not to take from one sector to give it to another. This amendment does not promote any conservation because of the bycatch in the recreational fishery and it will create bycatch in the commercial fishery.

FJ Eicke- Recreational
Mr. Eicke supports Alternative 5 because the commercial sector won't lose anything. The recreational sector has increased in numbers significantly since the initial allocation was set.

Recreational angling has a tremendous economic and social value. The initial allocation was set using the time period of 1979-1987 and there was no recreational data at that time so the initial allocation was flawed from the start. The recreational fishery has put up with limited seasons and limited bag limits, and he feels that now there is a chance to do something right. The Council should reallocate on a fair and equitable basis.

Jordan White- Recreational
Mr. White prefers Alternative 1 because he doesn't support taking any red snapper quota away from commercial fishermen.

David Walker- Commercial
Mr. Walker does not want to attack the recreational fishermen themselves; it's their management plan that is the problem. The seafood industry is not the problem. Less than 2% of anglers in the U.S. are recreational and most of the nation depends on the seafood supply chain to get seafood. The commercial management plan is working. A new management plan needs to be developed for the recreational fishery, and reallocation is not the answer. Recreational fishermen need to get proactive not just in developing a new management system for themselves. Robbing from Peter to pay Paul is not the answer. Commercial fishermen had to make sacrifices. Alternative 5 does not enhance the net benefits of fishing, it only increases fishing days in a minor way. You could reallocate 100% to the recreational sector and they would still continue to lose days. Economic value cannot be the sole purpose for allocation. He supports Alternative 1: no action, because the commercial sector should not be penalized for following the rules. Reallocation is not justified when it comes to conservation. Also, there should be an outreach program (like the RAP sessions) for the seafood supply chain.

JR Titnus- Recreational
Mr. Titnus said the recreational season lengths projections are dependent on estimated weights and catches. Commercial fishing harvest is not an estimation. He has only been asked about his harvest once. There needs to be reliable data to make any decisions.

Tom Becker- President of Mississippi Charter Boat Captains Association
Mr. Becker said the fishing season is too short and he has different feelings about when to fish throughout the year. He supports Alternative 5. He has seen that commercial fishermen will drive by while he's fishing, take his number, and then fish his spot and empty them out.

John Bullok- Recreational
Mr. Bullok supports Alternative 1. Before the Council decides where the fish go, there needs to be a better way to check the recreational fishermen to determine if they deserve more pounds. When he goes out to the rig under this 2-snapper per person limit, he sees dead discards all over. Recreational fishermen are hi-grading and not venting. Stability of the recreational fishing sector should not be measured in length of season or allocation, but in the quality of fish. Commercial fishermen are checked 100% of the time for both harvest and other regulatory compliance, but he as a recreational angler hasn't been checked in 5 years.

Johnny Marquez- Executive Director of CCA Mississippi
Mr. Marquez supports Alternative 5 because for many years the season has gotten shorter and shorter and something different needs to be done. The initial allocation is outdated, it didn't take into account the economic and social concerns for the fishery. There have been tremendous changes in the fishery since that initial split. Economics should play an important role in the allocation decision. As the species rebounds, Alternative 5 wouldn't take away from the commercial fishery; it only takes the excess. We're back at the high-water mark for the commercial fishery and it's fair and equitable to give more to the recreational sector.

Nathan Witonovich
Mr. Witonovich supports Alternative 5.

Phillip Horn- 3rd generation seafood dealer and former Council member
Mr. Horn has been involved in the red snapper war since it began. He was involved in the development of the IFQ program and supports Alternative 1. The commercial industry has a tough row to hoe. Texas has never closed their state waters; Florida left their fishery open one year for a rodeo; Louisiana is open on weekends and claiming 10 miles; yet, the states all receive money for enforcement. The commercial industry suffered when quotas began and snapper needed help. The industry was closed over and over, and the agencies and the charter captains used to say 'catch something else.' Alternative 5 would only increase the recreational season by 4 days. The year the 9.12 million pound quota was put in place, the recreational sector overfished their quota. Members of the commercial industry were forced out when the IFQ program was put in place and the same may need to happen in the recreational fishery to reduce effort. The biggest problem is stock assessments. We continue to increase quotas. The red snapper average size started at 2 pounds now we're catching bigger fish. We can't predict the weather with 8 different models, and the red snapper stock is managed under a single model; we need to argue about assessments not allocations.

Gary Smith- Recreational and AP member
Mr. Smith would like to correct some errors. Last year in a red snapper Advisory Panel meeting these issues came up: there needs to be a plan to let new people in. It needs to be addressed. He does not support any alternatives because none of them do anything to solve the recreational issues. The problem is the data and the people in charge. It's the NMFS's Council and the Council members just go along without doing anything. Dr. Crabtree is responsible because NMFS has openly said they want a catch and release fishery in the recreational sector. Mr. Smith wants accountability. He has asked for a boat permit and he only gets excuses as to why he can't do it. He does not believe it is possible that the recreational sector catches the number of fish that NMFS says they do. It is about shutting the Gulf down. He said we need to ban together and demand accountability.

Keith King- Owner of the largest boat dealer in Mississippi
Mr. King supports Alternative 5 because it's a compromise that doesn't impact the commercial sector in any way. Council needs to find a way to increase the accuracy of the data. The initial allocation split was determined long ago and was based on failed info. The data collection methodology is inaccurate. The economic benefits of the recreational sector are not being considered. The shortened season has impacted the sale of offshore boats and that needs to be

taken into consideration. He wants accurate data and feels decisions should not be made today based on the data we do have. The stocks are improving, and although there is a problem with the harvest count, it's obvious that effort is overstated.

David Floyd-
Mr. Floyd supports Alternative 1, do not reallocate red snapper.

Nicky Cvitanovich- Currently recreational; has done commercial and charter
Mr. Cvitanovich said this shouldn't be a commercial vs. recreational fight. The Council needs to fix the recreational management plan so that the season isn't so short. It's also a problem that you can't catch snapper and amberjack at the same time. The fishery service doesn't want you to catch fish. Most everyone has shifted to inshore speckled trout fishing now. He supports Alternative 5, but would rather the recreational management plan be fixed.

Dustin Trochesset- 3rd generation charter captain
Mr. Trochesset supports Alternative 5. He is displeased with the handling of the red snapper fishery in the MSA. The Act was created to be fair and equitable to all fishermen. How is it fair for the commercial guys to have more fish and the luxury under the IFQ program to fish when they want? The recreational guys are given condensed time and commercial fishermen can target the spots before recreational anglers are allowed to fish. There is nothing fair and equitable about that. The charter industry is negatively impacted by the short season. They were cut short last year and had to cancel trips. He doesn't believe that 200 boats are fishing every day and wonders if the weather is taken into account. He would like the Council to be fair and equitable and there is not much that is fair about the commercial fishermen getting more allocation. The other states open their seasons and that hurts Mississippi, because the stuff they're catching counts against the Gulf-wide quota.

Scott Drummond- President of an outdoor trade organization
Mr. Drummond supports Alternative 1, because we don't understand the economic impact of what we do.

Kenner, Louisiana
March 13, 2014

Council/Staff
Harlon Pearce
Emily Muehlstein
Phyllis Miranda

48 members of the public attended.

Pierre Villere-
Mr. Villere said the current recreational allocation was set in the 1970's based purely on catch history. Using only catch history is a bad way to determine allocation. There are fewer boats in the commercial fishery than ever, and they continue to have the most harvest. What is the

impact of shorter seasons on bait shops, marinas, and hotels? At such a high price per pound, red snapper is not protein for America. Pollock is a more accurate example; it's cheap and there's lots of it. Counting every fish is the wrong path and it's a waste of time and resources. Trying to manage 1 million recreational fishermen is unusual and can't be done. The Council should set a bag limit and a decent season of 2-fish for the summer months, especially if the stock keeps expanding like it is.

James Schere- Charter and commercial
Mr. Schere supports Alternative 1. Transferring quota to the recreational sector won't help anyone, especially if the season remains open during the hottest time of the year. No one goes fishing only for red snapper; they catch 100 trout then go out for snapper. It takes one stop and 30 minutes of fishing and makes up a fraction of what's being caught in a fishing day. Customers don't book charter trips based on red snapper. It doesn't affect his [charter] business at the busiest fishing time of the year. Adding a few days won't help him and won't hardly affect any charter folks. Also, he doesn't think it will help private recreational anglers that much, because they're not targeting just red snapper on their trips.

George Heuey- Recreational
Mr. Heuey supports Alternative 5. From his fish camp, he catches trout near shore and then he runs his bay boat out to catch his two fish. His big problem is the verification of the recreational catch. If there was a way to count the recreational catch like the commercial catch is counted, then it would solve problems. But, that will never happen because of the number of ports and boats that recreational fishermen are using. The recreational sector gets the short end of the stick, and he thinks the allocation should expand in their favor. He loves to eat red snapper and wants it to remain in restaurants, and he wants charter fishermen to continue to have their business.

Dax Nelson – Commercial
Amendment 28 is wrong and Mr. Nelson supports Alternative 1. We've built this fishery. He remembers when we didn't have any snapper at all. Adding allocation to the recreational fishery won't help the recreational sector. The recreational sector has gone over its allocation in 6 of the last 7 years. If we do this amendment, it will only add two days to fish.

Steve Loop- Recreational
Mr. Loop is in favor of reallocation since it hasn't happened for the last 20 years, and the recreational sector is in need of a greater share of the snapper in the Gulf. The recreational sector gives more income to the government with all the taxes and money they spend to fish. The recreational sector has never caught over their limit, the federal government overestimates. Commercial fishermen are sitting at home making money renting out their licenses; that's not right and it's not fair. The Council should do the right thing and reallocate to the recreational sector.

Louis Valet- Recreational
Mr. Valet supports reallocation. He has seen so many changes in the Gulf since he started fishing. He doesn't think the changes in stock abundance happen because of fishermen fishing. God intended to feed the world with fish; that's why a fish lays a million eggs. What needs to be

done to promote those million eggs to grow into a million fish? We need to focus on clean water, habitat, and food. Farmers understand how to plant and grow plants but the stupid people regulating fish in the Gulf don't. Fish need to eat, but we wipe out porgy so that the red snapper won't be able to eat and grow. These fish have to eat something and they'll eat little red snapper and trout. The bonita and triggerfish are gone because they have nothing to eat.

Thally Stone- Commercial
Mr. Stone supports Alternative 1. He is just now making a decent living as a commercial fisherman. He earned every pound of allocation he got and nothing was given to him.

Doug Hawkins-
Mr. Hawkings supports Alternative 1. The fish are coming back and the Council shouldn't change things. Giving the allocation to recreational fishermen won't solve the problems in the recreational fishery.

Russell Underwood – Commercial
Mr. Underwood supports Alternative 1. We have rebuilt the fishery both commercially and recreationally. It took seven years to get a true stock assessment before the quota was increased. The problem is not the average guy who wants to catch a red snapper in the afternoon; the problem is with the Council system itself and whether the use of all the tools in the toolbox has been considered. He is worried about the resource. Seven years ago, there were hardly any people at these meetings. There was hardly any fish either; now, we have brought the fishery back. It was overcapitalized commercially, and there used to be a lot more boats. But, the IFQ program reduced the fleet and brought the fishery back. Recently, the commercial sector got a quota increase, and now they want to take it back. 500,000 pounds of snapper will only give an extra 2-3 days for recreational fishing. Is it fair for Texas to fish year round and the rest [of the Gulf] has a 30 to 40-day season? The problem is not allocation, the problem is the Council system.

Charlie Capplinger - Recreational
Mr. Capplinger said the system doesn't work. Recreational fishermen spend a lot of money on fishing. He supports Alternative 5, because it does not take any fish from the commercial sector. If there is additional allocation, than everyone will get more fish. The allocation is based on old data from 20 years ago. The demographics in the Gulf have changed. The economic value of the recreational fishery is enormous, and the number of fishermen targeting red snapper commercially is small. The allocation should have been different a long time ago. No one targets only red snapper, and no fisherman can fish during the week. The season is not set up for a recreational fisherman at all. The Council should increase the recreational sector's allocation to achieve the greatest economic impact and social impact for the largest user group.

Daryl Prince- Commercial
Mr. Prince supports Alternative 1. When he first started, there was hardly any fish in the Gulf. All the regulations have allowed the stock to improve because commercial fishermen have stopped hammering them. There are plenty of fish. Taking them from the commercial guys will not solve a thing. Sports fishermen won't have a better fishery by taking away allocation from the commercial sector.

Christopher Gray - Commercial
He used to wonder where the fish were, and now they're starting to see lots of fish. If you take 500,000 pounds from him by selecting Alternative 5, you're throwing him in the back of the bus. He should be standing in the front, because he made the fishery better as a commercial fisherman, by making sacrifices to rebuild the stock. He supports Alternative 1.

Michelle Malony- Louisiana Wildlife Federation
Ms. Malony said that outdoor recreational public access is just as important as habitat, and she expects improvement in data collection to show a robust recovering stock. She supports Alternative 5.

Gunner Waldmann- Recreational
Mr. Waldmann supports Alternative 5 with some caveats. The data collection is antiquated and needs to be improved. Alternative 5 does not take anything away from commercial fishermen. If the quota is over 9.12 mp, then the commercial sector will still gain 25% more of the allocation. As a safety consultant, he won't work for a company that removes oil platforms. It shouldn't be okay for them to blow up platforms and kill thousands of pounds of fish without anything being allocated for that damage.

Chuck Laday- Recreational
Mr. Laday is a member of CCA and an avid inshore angler. He occasionally fishes for red snapper. He would like to fish more but due to the short season, weather, and fatherhood, he doesn't have as much opportunity as he wants. His sons would really like to fish if there is a longer season. He supports Alternative 5 and applauds the Council. It's a fair and modest change to the current allocation that is based on old data. Under Alternative 5, the commercial sector loses nothing.

Robert- Recreational
Robert believes Alternative 5 seems like the right thing to do, adding that we all agree that something needs to be done for the management of the resource for our kids and grandkids. We need to work with the Council to come up with a different way to manage. We all need to come together to solve the problem because the fish are here. We don't see the croakers and triggerfish like we used to and we need to use data that isn't 25 years old. The Council is managing for the whole Gulf, and Louisiana is different than the other states. We need to come up with a subcommittee to recommend to the Council how to manage Louisiana. CCA is a good group that cares about conservation, and everyone should ban together to come up with meaningful management and [supporting] studies.

Chris Marcusio-
Mr. Marcusio is in favor of Alternative 5. In the last year, he has worked with some recognizable and seasoned fishery managers, economists, and advocates across the country to develop a report to reflect the culture and needs of the saltwater fishing public. One recommendation that came from the report was to examine allocation. It is set based on old data. If we're not managing fish for the best socioeconomic value and for conservation, then why are we managing? All allocations need to be examined, not just red snapper.

Woody Cruse- Recreational
Mr. Cruse said commercial and recreational fishermen are being pitted against each other, and it's unfortunate that we can't manage the resource together. He is a private angler and time on the water with his family is being limited. He has an expensive boat and he targets red snapper. It is terrible that amberjack is closed when red snapper is open. He is not anti-commercial, he just wants more time to fish. He has little confidence in the recreational harvest numbers.

Steve Tomeny- Commercial
Mr. Tomeny supports the Alternative 1 -no action. At this time, taking fish away from the commercial sector to add an extra two days to the recreational season is a no win situation. The system the recreational anglers are fishing under is broken. Adding pounds won't fix it, and the allocation is always overrun. The recreational fishery is an unlimited user group and as the fishery has recovered, more and more people want to go. The numbers should be lower than they are and he advocates a tag system. Sector separation would create more accountability, and we're still pushing for alternative management ideas. The SESSC should review Amendment 28 before final action is taken.

Ed Petrey- Charter and commercial
Mr. Petrey is against reallocation and supports Alternative 1. Reallocation won't solve anything and the only way we will solve something for the recreational sector is using some type of tag system to figure out what they're catching. The population has increased a lot and we're doing a lot better charter-wise. We need to leave allocation the way it is.

James Bruce- Commercial
Mr. Bruce said that when the industry signed up and voted for the IFQ program, they got cut off. Now for the first time, people are here in the room saying they're not taking fish from the commercial guys that made sacrifices. The recreational fishermen need sector separation and a tag system. The pie is only so big, and not everyone can catch fish. That's what the commercial guys had to do; limit entry. It's time for the recreational sector to do something. Keep allocation at status quo and choose Alternative 1.

Bobby Jackson-
Mr. Jackson is in favor of Alternative 1. He feels that everything should be left as it is now. All the people should be glad they live in Louisiana where you can go out and catch trout and mangrove snapper, and the state is giving us extra days in state waters. He doesn't think that 2 or 3 more days of fishing is worth taking away from the commercial fishermen.

Brent Fay- Recreational
Mr. Fay thinks the population is healthy and that management is flawed. He supports Alternative 5. As a citizen of Louisiana, he thinks it's wrong if he can't fish but he can go to the grocery store and buy fish. He thinks he should be able to catch red snapper at any time.

Andy Leblanc- Recreational
Mr. Leblanc is more of an inshore fisherman and only has a 22 foot boat. The weather limits his red snapper fishing. He supports Alternative 5, because it's not doing any harm to the commercial guys. The restaurants and stores won't run out of fish.

Joe Macaluso-
Mr. Macaluso said the Council has driven a wedge between the commercial and recreational sectors. We have fish in Louisiana; Florida and Alabama don't. We have fish and we're fighting about who gets to catch more than the other guys. He has seen more than his share of mismanagement, but in this instance, there is a problem that won't be solved by Alternative 1 or 5. We have fish and we need to make sure that Louisiana has the right amount of red snapper they deserve (70% of the fish with 20% of the effort). This is a band-aid and we need the wound to heal.

Bill LaJune- Recreational
Mr. LaJune supports Alternative 5 with some changes. A recreational season should be on weekends, and the state does a good job of knowing how to best govern.

John Abair-
Mr. Abair supports Alternative 5 because it's a fair distribution of the resource. We all need to ban together and attack the administration that is removing rigs. We don't need to argue over the amendments as much as we need to stop rig removal.

John Cappell- Recreational
Mr. Cappell supports Alternative 5. He advocates for future generations. The fishery has improved and it's easy to wipe the snapper out. We need a bigger pot and we need habitat. We need to stop [removing] idle iron. The vertical reef structures hold fish and make fish. We also need better data collection. We don't need to fight each other; we need a bigger, better managed pot of fish.

Walter Heathcock- Commercial
Mr. Heathcock is against Amendment 28 and prefers Alternative 1. Changing the allocation won't solve anything. Red snapper is already a pricey fish, and he doesn't want to increase the price any more. All the fish commercial fishermen catch are going to the American public. This quota was set a long time ago and it has been fair for 24 years, but somehow it's a problem this year.

Andre Thomas-
Mr. Thomas supports Alternative 5. He feels it is a public resource and should not belong to the private sector. He said we need to address how fish are counted. He would like to divide the Gulf and manage fish separately.

Archie-
He is against any type of reallocation and supports Alternative 1 because it's a public resource. Not everyone that wants to eat fish has the opportunity to fish. The American public needs access to seafood. There are lots of fish that commercial fishermen can't catch, and it seems like the recreational fishermen always want more.

Dante Nelson-
Supports Alternative 1 because the commercial fishermen should still have fish. Fish are going to continue to be here until we're dead and gone.

Corpus Christi, Texas
March 17, 2014

Council/Staff
Robin Riechers
Emily Muehlstein
Karen Hoak

38 members of the public attended.

Charlie Alegria- Morgan Street Seafood owner
Mr. Alegria supports Alternative 1 because the commercial guys seem to give things up and never get them back. He thinks we should do nothing and leave businessmen alone.

Blaine Wise-
Mr. Wise supports Alternative 5 because it's a win-win situation for both sides.

Shane Cantrell- Charter
Mr. Cantrell supports Alternative 1. He opposes action because it gives a false promise to the recreational sector and won't increase their season at all. We will actually still be losing days because Florida is non-compliant. This isn't a sustainable fishery management plan. It violates National Standards 1 and 4, and is missing accountability measures to keep recreational anglers within their allocation.

Alan West- Recreational
Mr. West supports Alternative 5, as it would benefit recreational fishermen without cutting into commercial fishermen's allocation. He believes it makes good sense, because there are a substantial number of recreational fishermen in the state.

Ron Dollins- Recreational
Mr. Dollins supports Alternative 5. He supports the 400 commercial fishermen, but it's time to give fairness to thousands of recreational fishermen. Recreational fishing supports many varied industries, and they don't fish for profit; they fish for the love of it. The value of fishing is not measured by numbers at the dock. It's the time they [recreational anglers] spend on the water and building relationships, and the large number of people using the resource need the support of fisheries managers.

Don Wilkinson-
Mr. Wilkinson supports Alternative 5 because it offers the best economic benefit. The commercial harvest wouldn't be diminished, it would actually increase. He suggests the following: adopt an adaptive management plan that has demonstrated its effectiveness in other fisheries such as Atlantic striped bass. Stop all fishing during spawning and allow commercial fishing to be done after peak spawning in June-August. This would allow an increase in productivity because you're not removing the larger spawning fish from the resource, and this wouldn't cause any net loss for the commercial fisherman. Consider segmenting the Gulf

according to recruitment; he has heard and supports the idea of dividing the stock, perhaps at the Mississippi River.

CJ Garcia- Business owner, commercial red snapper fisherman
Mr. Garcia supports Alternative 1 and opposes reallocation because it won't solve the problems in the recreational fishery. Anglers consistently overharvest in the recreational fishery and if given more fish, will over harvest more. It will also cause instability in the commercial fishery. Increasing the amount of pounds won't decrease the recreational overage. He suggests working with the recreational fishermen to give them a real solution to the problems in the recreational fishery. The SESSC should review the analysis of Amendment 28 before the Council takes final action; their vote was null and void because a member of the SESSC shouldn't have been there. They should re-vote before the Council takes final action. This is honestly offensive to those who make a living on the water.

Tylor Scott- Commercial
Mr. Scott is new to the fishery and opposes reallocation because it doesn't solve the problems of the recreational fishery and will cause instability in the commercial sector. He supports Alternative 1.

Nena Hale- Owns a business catering to recreational fishermen
Ms. Hale said it's hard for her to have to take a stance on this issue, because without commercial and recreational fishermen, Port Aransas wouldn't be the town that it is. There is an abundance of fish now, and there are so many that you have to release that die while targeting other species. She is not sure where she stands on this issue but feels that there has to be a middle ground that will help both sectors. It is recreational fishers who come to her boutique; they support her business and she depends on them for her livelihood, so she wants them to have more fishing opportunities.

Ken Sims- Boat captain; has worked in both sectors
Mr. Sims opposes reallocation and supports Alternative 1 because it won't solve any problems. This needs to be solved with a different way of managing the recreational sector. We should try tags or licenses like the red fish program in Texas. Giving more fish to the recreational sector will ensure higher discard mortality, because they continue to fish and discarded fish float off dead and are then eaten by other predators, which is ridiculous. Fifteen years ago, fishermen used to struggle to catch fish. What we are doing is working. Today, the snapper are huge. Commercial fishermen are not harming the rebuilding plan because they are accountable. What we're doing in the recreational sector is wrong; charter guys need their own regulations, and everyone needs to play by the rules.

Scott Hickman- Charter and commercial
Mr. Hickman said the CFA has been begging for a new management system for the recreational fishery for 5 years, and he is disappointed that this is what we get. We're going to take fish from an accountable fishery and dump it into the unaccountable side for two more fishing days? That is silly and won't help his charter business. Until we work to get a new management system, we're never going to fix our problems. Why are we working on this instead of Amendment 39 [regional management], where Texas can manage their own fish through tags, or however they

want? The Council needs to do something different. He supports Alternative 1, no action on this amendment.

Pete Petropoulos- Recreational
Mr. Petropoulos is a capitalist and believes there is no reason to take anything from the commercial fisherman. He supports Alternative 1.

Kevin Haller- Charter and commercial
Mr. Haller sees both sides and opposes reallocation because it doesn't solve the problems in the recreational fishery. It will cause instability to the commercial fishery, and the recreational sector will continue to overharvest their allocation without accountability. He supports Alternative 1, status quo. The recreational sector needs a real solution to protect the resource. The SESSC should review the analysis, and it should be re-done before the Council takes final action.

Mike Hurst- Representing S.E.A.
Mr. Hurst does not think it's right that anglers have 20 days to fish during the worst wind of the year. He prefers Alternative 6, but since that option was not on the table to solve that problem, they would like to ask for Alternative 5.

Norman Oats- Recreational
Mr. Oats was fishing in the 1980's when the stock was ok. He then came back in 2001 when it was very hard to catch a snapper. Now, for 10 years they have only had a month of fishing. If we don't increase the quota, we're all in trouble. He supports Alternative 5 because he wants to fish more than 30 days a year. Under that alternative, if the ACL is increased we all benefit. The Council is losing credibility because the ACL is wrong. Nice size snapper are everywhere. He says to do more offshore research and see; don't just look at the closest rigs, but study some hilltops and use data that is not 20 years old. Start with a 3 month season and a 4-fish per person bag limit and if the stock decreases, then cut it. Do real research. He catches snapper in 35' of water.

Corey Garcia- Commercial
Mr. Garcia opposes reallocation and supports Alternative 1 because it will not solve problems in the recreational fishery, overharvests will continue, and [reallocation] will cause instability in the commercial sector. He suggests working with recreational fishermen to give them a real solution like tags so they can fish year round. There are plenty of fish out there and the Council needs to find a way to let them fish. The SESSC should review the amendment before the Council takes final action.

Mike Miglini-
Mr. Miglini said Amendment 28 is an insult to those trying to actually get a fishery management plan in place that will bring results. It will not solve the problems of the recreational fishery and will result in further overharvest. It's not the private recreational angler or the charter industry's fault that the Council has consistently failed to address a management system that provides both accountability and flexibility. The recreational sector needs to end derby fishing and start using tags for private anglers, just like the red drum system in Texas, so they can fish on their schedule

not when the government tells them to fish. The charter guys need their own sector allocation. Fishermen need to give up good harvest data from recreational anglers on private boats, from charter/headboats, and continue to get data from the commercial industry. This amendment and this reallocation is a false promise and the Council must develop a management plan that works. It's like putting more fuel in a boat that has autopilot moving in the wrong direction. We'll continue to see shorter and shorter seasons even with the reallocation of fish. We need to manage in a way that is efficient. Dumping fish back instead of using a tag system is an insult to conservation and the MSA. He supports status quo (Alternative 1). The SESSC should review Amendment 28 before the Council takes final action, because the initial vote to accept the methodology was null as a member was in conflict [of interest]. We have more than a ton of red snapper here, and we need a world class management system that allows us to harvest recreationally, in a sustainable manner, without wasting fish. Amendment 28 will not do that.

Gus Lopez- Commercial
Mr. Lopez supports Alternative 1, no action. They do this for a living; it's not for fun. If you're here you like to fish, but for commercial guys, it's their livelihood. It seems unfair to take from them and give it away for recreational purposes. It doesn't solve problems. Instead, he suggests letting the recreational sector fish whenever they want using a tag system. World class red snapper fishing is in our back yard, so why strip it back to making it hard to fish? Why take fish from an accountable sector and dump them into a system that isn't accountable? There are a lot of changes that will have to take place to make the recreational sector accountable like the commercial sector, which is law abiding, non-wasteful, and protective for the future generations. The SESSC needs to review Amendment 28 before the Council takes final action. What are the real reasons for changing allocation? He wondered what net benefits we were striving for.

Michael Matthews- Commercial and former headboat fisherman
Mr. Matthews is against the amendment; he supports Alternative 1, no action. He opposes reallocation because it won't solve the issues in the fishery and will cause problems on the commercial side. We need to work with recreational fishermen and find something that will work for them. Reallocation will only make things worse for the recreational fishery and for him.

Brenda Ballard- Recreational
Ms. Ballard supports Alternative 5. She doesn't want to take anything away from commercial fishermen. She doesn't have a yacht; she has a 25-foot boat and it's hard for them to get out. The inshore rigs are fished out and they have to go further. She only gets to fish five days out of the year, because she works for a living and she wants more opportunities to fish. She does not believe that Alternative 5 will hurt commercial fishermen in any way. Fishing is fun and she wants to be able to use the additional 75% to increase their opportunity for more fishing days.

Russell Sanguinet- Headboat operator
Mr. Sanguinet does not support any part of the amendment because there is an overabundance of fishing regulations. He is an active participant in the headboat cooperative (EFP) and he is 100% accountable. The problem is not the fish, it's the lack of enforcement and the bad management. The enforcement needs to account for everyone, not just the for-hire sector. This is a temporary patch on the problem, and it's not going to fix anything.

Paul Kennedy, III- Recreational
Mr. Kennedy gets out 8-10 times a year and he likes to take friends and family fishing. Red snapper is his most consistent fish. He doesn't understand the way it's managed and the limits put on them. The fish are so plentiful, he needs to avoid them and he doesn't understand management. He wants to bring a few home to eat and he can catch them in state waters. These are the strictest limits we have on any fish and they are the most abundant species. These regulations are ridiculous. Recreational fishermen are not being tracked like the headboats. It's his goal that recreational fishermen can fish year round. With a 2-fish per person bag limit, we will never overfish the red snapper. He is allowed to catch 10 speckled trout in the bays, but can rarely catch the limit. Red snapper is a mismanaged resource and the Council should give a longer season because it's not overfished. He wants to see some better data on catch. He wonders about how the management system is set up so when everyone goes out, they can catch their limit, but they are only allowed 2 fish.

Gary Hough- Recreational
Mr. Hough has seen a major comeback in the number of fish that are available in both the well-known and the more secretive spots. He supports an increased allocation for the recreational fishermen. Alterative 5 is the most palatable. He does think it should be tilted even more towards the recreational fishermen. On this side of the coast, it is dangerous to fish the first two weekends of snapper season because of the wind. The first of June is a horrible time to fish. There is no way the amount of recreational fish being caught could be harming the population.

Jerry Bravenec-
Mr. Bravenec said one of the biggest issues is accountability. The thing that concerns him most is that Texas continues to be penalized for other areas overharvesting red snapper. Red snapper don't move around too much. There has been a major rebound in the past five years, and he does not want to be penalized by the other areas overfishing. Alternative 5 is good for recreational fishermen without harming the commercial sector. TPWD needs to manage the resource and we need to be managing based on the fish we have locally.

San Antonio, Texas
March 18, 2014

Council/Staff
Patrick Riley
Emily Muehlstein
Karen Hoak

36 members of the public attended.

Jason Belz- Recreational
Mr. Belz wants a longer snapper season. It's rough in Texas and they like to catch billfish, but it's nice to have something to eat, something that they can catch on the way back in especially since they burn a lot of fuel. Red snapper are everywhere; they come to the surface in 300 feet of water. He does not want commercial fishermen to have 51% while the public has only 49%.

David Triplett- Recreational
Mr. Triplett questions the red snapper data and where the statistics are coming from that says recreational fishermen are catching the amount of pounds that they are. He does it as a hobby for his family, and there are very few days they can get out, especially with the high winds in June. The statistics seem very inaccurate, and he can't catch anything else. They run into them everywhere and, if you catch red snapper while trolling there is something wrong; the system is broken. He wants to see a longer season and he thinks there is a better way to count the catch in the recreational sector.

Michael Jacob-
Mr. Jacob said the rules don't reflect what anglers are seeing. He is conservation minded and follows the rules all the time. He used to have trouble catching snapper, but now you can free-line dead shrimp or troll wahoo lures in 200 feet of water and catch red snapper during amberjack season. He kills 10 snapper for every amberjack he catches. There is a nuisance with dolphin; you feed red snapper directly to them or the sharks. They are not releasing any of the fish. He catches between 25 and 75 fish during the entire season and feeds around 500 fish to predators. The commercial guys are likely more important and he doesn't want to take away from them. The amount of fish that go to the dolphins and sharks is insane. We are doing nothing about it but sitting on our hands. The numbers are inaccurate and it's getting hard to follow the rules.

Liz Hewitt-
Ms. Hewitt supports Alternative 5, or possibly Alternative 6. She wonders why we don't have a federal fishing license to track catch.

Ray Weldon-Recreational
Mr. Weldon supports Alternative 6, although it's not really reallocation. According to the American Sportfishing Association, recreational fishermen catch 2% of fish but provide 3 times more value to the gross domestic product than commercial landings. For every 1 pound of fish caught, they add $152 to the GDP. There are about 400 shareholders holding 51% of the red snapper fishery and they don't even put enough money back to cover the cost of monitoring the program itself. The EDF, restaurant chefs, and fishermen are using the slogan "protein for America," but they are getting wealthy providing fish for the wealthy at $18 a pound. No one will be put out of business with any of these reallocation options. There are less commercial fishermen now than ever catching more fish than ever. They are looking towards sector separation and inter-sector trading so they can sell quota to charter captains who will then sell them back to the recreational fishermen. I guess the commercial fishermen don't really care about feeding America. Mr. Weldon sat on the Ad Hoc Private Recreational Data Collection Advisory Panel and has not seen the improvements he's looking for. The MRIP data is messed up and NMFS is still not getting the data they need from the MRIP states. Louisiana dropped out [of MRIP] and is now getting their own data, just like Texas. It's not the best, but when in 1996 you could catch 7 fish per person for 360 days and catch 4 million pounds and now, in 2012, you can catch 2 fish per person and fish for 30 days and you are catching 5 million pounds? Impossible!

Jean Streetman- Recreational
Mr. Streetman supports Alternative 5 and agreed with the comments of others.

Norman Long- Recreational
Mr. Long has been fishing for over 50 years. Alternative 5 is his choice if he has to pick one. They are using a 30-year old allocation and data, and everything is out of whack and in need of a total overhaul. Last summer, he fished 20 days and left state waters once or twice because he didn't need to. There are more red snapper out there than he can chase. You can catch all you want at 8-9 pounds. Why can't we seem to get a longer season in federal waters? We need new science, new data, and new rules. It's ludicrous to give 51% of the fishery to 400 people. They have a place in the overall picture but not a guaranteed deal like they have now. There are plenty of fish out there. He remembers days when that was not the case so we need to be careful to not overharvest. By setting good limits, we now have plenty again.

Jerry Walker-
Mr. Walker said we need to have a new look at what's going on in the Gulf. You try to catch a different species and you're inevitably catching snapper because they're everywhere, top to bottom, every wreck, every rig, solid fish. The ecosystem is out of sync; we need to increase the limit and the number of days to fish.

Gary Johnson- Texas Restaurant Association
Mr. Johnson said that at current levels, the commercial industry stands to lose ½ million pounds with the current allocation, which will affect the portion sizes on plates for people supplied with fish. There are places not near the water, customers that don't fish, all who want to eat snapper. We need to somehow look into regional management. He supports Alternative 1, no action.

Leonard Philipp-
Mr. Phillip supports Alternative 5 and agrees with the others.

Michael Miglini-
Mr. Miglini supports Alternative 1, no reallocation. He thinks it's a false promise for the recreational fishery. For years the charter boats have tried to bring real solutions to the Council. Reallocating only feeds more fish to a broken management plan. There are a ton of red snapper out there and reallocation is barely going to give more days. There needs to be a fish tag program like the red drum that allows 365 days of fishing a year, along with accountability and reliable data on the total count of fish harvested. The charter industry needs their own allocation and the private sector needs a system that doesn't force them to throw back dead fish. He suggests focusing on meaningful solutions to the problems in the recreational fishery.

Bobby Hinds- Recreational
Mr. Hinds supports Alternative 5. There are so many fish out there, it's ridiculous. They can limit out a full boat without going into federal waters. The quota should be raised and the season should be longer in federal waters.

Pam Baker – Environmental Defense Fund
Ms. Baker supports Alternative 1. Allocation has been on the table for a really long time and is choking progress on other issues such as federal fishing licenses and predators eating discards. The amendment doesn't have the opportunity to achieve its objectives, and it pits fishermen against each other. The demand for fresh fish is strong, but fishing recreationally is also a valuable use of the resource. The stated purpose of increasing net benefits cannot be achieved by increasing the number of fish in a common pool, managed by bag/size limits. No group or individual is benefiting from that. The other stated purpose is to increase stability of the fishery. Maybe reallocation will increase the recreational fishery by 2 or 3 days, but it doesn't increase the stability or predictability of the season. Stability is about increasing opportunity and predictability. Reallocation does not do that. The Council is avoiding tackling the improvements that are needed to solve the issues with the fishery.

Wes Galloway- Recreational
Mr. Galloway doesn't want to change things for the commercial fishery; it's got the IFQ and that is fine. He felt that 51% of the public resource going for commercial use is backwards. Half of the alternatives are not reallocation at all. No movement can be made towards reallocation because IFQs are already out there. For alternatives beyond the quota, he supports Alternative 5.

Scott Hickman- Charter, commercial, boat dealer
Mr. Hickman supports Alternative 1. He is offended that the Gulf Council has come to the recreational fishermen with a plan offering two extra days. With Florida non-compliance, we likely won't even see that possible increase but rather, a reduction in days. It's ludicrous. He demands that the Council do something real. He asks why CCA is pushing Amendment 28; what about Amendment 39 so Texas can get its own piece of the pie? Reallocation is a poor plan for the recreational fisherman. If that's the best we can do, we're in trouble. He demands accountability and flexibility through tags or something else that allows fishermen to select when to fish. Amendment 28 is a joke and will not help. The Council has pitted fishermen against one another. He wants status quo (Alternative 1), and to go back to the table. Fix the problem so people can fish when they want to fish. He supports fish tags, regional management, and he likes iSnapper.

David Ruthmann- Recreational
Mr. Ruthmann is not opposed to any of the allocation options but that's not the end solution to the problem. We're talking about adding a few days to a 1 or 2 fish per person limit when it's too rough for Texans to get out on the water. There must be more to it. We are oversimplifying a process that is broken. Regional management is a good idea, especially because our water is shallower here than in other parts of the Gulf.

Buddy Guindon- Commercial
Mr. Guindon grew his family business around fixing the fishery. He believes that they [recreational anglers] should have the right to fish, but also to use a program to report data and get an accurate count. The Harte Research Institute already has a program that can be used for them to report their fish. As a commercial fisherman, he doesn't represent himself; he represents anyone who goes to a restaurant or grocery store or fish market and buys a fish to eat. You're not going to hurt him by taking 50% of his fish, but you'll harm the new entrants, the people who

are struggling to get IFQ and start in the industry. When you say 400 people, think of 400 businesses. If we don't allow them to grow, they're going to fail. They need the opportunity to be successful and to grow. Let these people do their job. Commercial fishermen are not at fault for the current situation. Force the fishery managers to do their job and let them know you want to be accountable. Also, understand that Florida has 250 fishermen for every one we have. The east is taking away your fish by allowing the other areas to harvest the fish. Of the fish consumed in this country, 97% of it comes from a grocery store. Commercial fishermen catch inexpensive fish as well as red snapper (blue fish). Don't listen to what CCA pounds into your head; get real solutions. Alternative 5 won't give you anything more. A good management system will give you what you want: year round fishing.

Shane Cantrell- Charter
Mr. Cantrell said it's a mess that we're here and discussing moving 500,000 pounds from the commercial industry to give the recreational sector 2-4 extra fishing days. He questions moving fish from the commercial fishery, which is accountable, and giving them to an unaccountable system for 4 extra days. That is a management issue. We need tags or regional management. He travels the coast and there is an incredible number of fishermen on the east side that take trips 2 and 3 times a day fishing red snapper. It's not fair to Texas. He has a hard time believing that Texas can't get past the 1% of the allocation from Florida to implement a regional management plan. Disturbing.

Brian Wyatt- Recreational
Mr. Wyatt got to this meeting and it seemed chaotic because everyone is passionate. He's been fishing for a long time and his dad was a commercial fisherman. The Gulf is broken due to federal management. Texas could manage the waters much better than the federal government. He doesn't like Alternative 5 fully; he supports it most because the economic value of the recreational fishery is much greater. This is a publicly owned resource and the 51/49% split is out of line. We all pay our fair share, but recreational fishers are stuck on the dock, some with a $200,000 boat, and they can't fish unless they pay a charter boat? That is not right. Fish tags aren't right either. For private recreational anglers, these measures are nowhere near enough. For every 1 million pounds over the TAC that the federal government says can be caught, 25% goes to commercial and 75% to the recreational fishery. Every million pounds equates to $35 million. Everyone should be able to fish every day they want to for red snapper because there are plenty of them.

Galveston, Texas
March 19, 2014

Council/Staff
Patrick Riley
Carrie Simmons
Emily Muehlstein

35 members of the public attended.

Scott Hickman- Charter and commercial
Mr. Hickman said the plan to save the recreational fishery only gives two days to the recreational sector. The plan is to take fish away from a system where people fish accountably and provide fresh fish year round and transfer it to a rotten system. You're not even going to see the fish you take from the commercial fishermen. Florida has just gone non-compliant and those extra fish are going to disappear. Mr. Hickman wants a completely different system; something that works like the commercial system. He says no to Amendment 28. He supports Alternative 1. The Council needs to find a better management system and leave us a legacy of fishing.

Steven Myer- Recreational
Mr. Myer has spoken to TPWD and knows they don't have landings on the recreational side, and he doesn't understand where we're getting our data. Nine times out of 10, the weather is too bad for fishing during the recreational season. There needs to be a better way to determine what we're landing, and the quota needs to be fixed.

Kristen McConnell- Environmental Defense Fund
Ms. McConnell encourages the Council to choose Alternative 1, no action, and move reallocation off the table to make room for better work. This issue has been choking progress on other management plans that will actually fix things. There is high demand for both fresh seafood and recreational fishing opportunities and we should not have to decide between the two. This document does nothing to meet the objectives stated in the document. The economic value won't be realized by the recreational fishery if you continue to use a common pool of fish regulated by days and bag limits. Stability is frustrating, because allocation won't change the stability of the recreational red snapper fishery. We've had increases in the TAC over the years and it hasn't solved the season problem or the issue of stability. Reallocation won't fix that problem. There are a variety of ideas; regional management, tags, charter IFQ, and days at sea, that could be actual solutions. The Council needs to stop this and do something real.

Billy Wright- Recreational and charter
Mr. Wright supports Alternative 1, No action. Moving fish to the unaccountable sector doesn't seem like the right thing to do.

Tom Hilton-
We've had this allocation for years and we should have looked at it according to the NOAA policy but, now there is staunch opposition. The commercial IFQ program has privatized our fish and turned them into stock basically. The commercial guys have a stock portfolio and he is in favor of Alternative 5. Recreational fishermen don't want to cut commercial fishing out or act like they don't have a place at the table. If we choose alternative 5 about 17 million dollars of fish will be transferred to the recreational fishery. A high-liner that owns 6% of the red snapper shares (share cap) is worth about 11 million dollars and he can retire sell them to make money for his retirement. I don't agree with any plan that privatized the resources. This is not the solution and won't fix our red snapper problems but Alternative 5 is a step in the right direction. We need data. We should implement Alternative 5 and let the states take the bull by the horns with data collection.

Bruce Daneki- Recreational
He doesn't begrudge anyone earning a living by catching red snapper. It is an endangered public resource and he's against anyone having ownership. There are clearly more fish but despite this the recreational fisherman continues to be penalized. While the TAC increases and the commercial fishery gets more pounds and money and the recreational fisherman gets a shorter season as the fish get bigger. Success of stock improvement isn't shared with the recreational fishery. He supports Alternative 5. We're not greedy and everyone should benefit but the recreational sector has been struggling in the recent past. Jim Donofrio said ownership of our nation's public resourced are replenished and the commercial sector was gifted their allocation and they paid noting for their private rights. Against catch shares and a special program for headboats.

Fred Howard- Recreational
He is in favor of Alterative 5, not because it's a solution but because it's a first step that needs to be taken. Why can't the Gulf Council separate the fishery from the fishery in Texas.

Bill Hull-
Mr. Hull is in favor of Alternative 5.

David Conrad- Charter
Mr. Conrad favors Alternative 1. We need to work on a system that makes the recreational sector accountable. We don't want to move fish from the accountable sector to the non accountable one.

David Cochraine- Charter
Mr. Cochraine supports Alternative 1 because reallocation is not a solution. We should not take fish from commercial fishermen to add 2 extra days to the recreational fishery. Recreational management needs to be improved. We have a management problem and a data collection/accountability problem not an allocation problem. Accountably is the key to a better management system.

David Cuiton-
It appears that the harvest data for the recreational fishermen is off. Whatever the solution is to the problem he hopes that we can mutually work it out.

Jaron Cressi- Commercial and recreational
Mr. Cressi is against reallocation and supports Alternative 1.

Buddy Guindon- Commercial
Reallocation won't hurt him, he is a big share holder and he was catching fish before the catch share program was implemented. He knows how to fish. The problem he sees with reallocation is that it will hurt small businessmen the new entrants into the fishery. Taking 8% of the commercial quota and giving it to the recreational fishery will get 700 recreational fishermen to go out and catch a fish but it will put the little guy out of business. Recreational fishermen can catch what they want and when we consider what's best for the red snapper fishery we need to get an accountably system. We don't have to wonder if the federal management is doing a good

job because you'll be part of that system. Self reported data like the iSnapper system will ensure that the government knows exactly what was harvested. Reallocation is a game so the Council can say "look what we gave you", but it does nothing to solve the problem. I promise the recreational season will continue to collapse. We've rebuild the fishery but the federal government hasn't given recreational fishermen the tools to stay within the catch limits. The state representatives don't want accountability to happen. CCA doesn't bring solution to the table the only tell you what's wrong. They did this with redfish, trout, and flounder; they promised to give back commercial harvest once the stocks were healthy, but never did. I'll never have the opportunity to catch them again. We need a management plan to fix these problems.

Bill Cochraine-
Mr. Cochraine supports Alternative 1: no action. He thinks everyone agrees that there is a problem with recreational accountability. We all know that once there is an accountably system in place then we can get some real data. We're going in the wrong direction by trying to fix a problem with reallocation; there are more fish than ever but we need to count. Choosing any of the alternatives besides Alternative 1 will set a bad precedent; and if this is done he is worried that this will continue to happen. When 2 days are added then the recreational anglers are going to keep asking for more each year.

KP Burnette- Commercial
Supports Alternative 1; no action.

Sean Warren- Charter
Supports Alternative 1; no action, and suggests Council move forward with sector separation.

Dan Green-
Against reallocation and supports Alternative 1. Why take fish out of an accountable sector and give it to a non-accountable one. We work on a new management plan for the recreational anglers.

LG Boyd-
Supports Alternative 1 and suggests the Council fix management first.

Shane Cantrell- Charter
We're not trying to take anything from anyone. Commercial fishermen are not hoarding these fish in their house, they're harvesting them for the American public. The guy from Kansas who fishes with me doesn't want to own a boat and it makes no sense, but if he wants fish he should be able to buy fish from a restaurant or fish on my boat. You're proposing to take fish from the commercial fishermen to give recreational anglers 2 more days. It's a band-aid on a sinking ship and we need to find a real solution for the recreational fishery instead.

Garrett King- Charter and commercial
Supports Alternative 1; no action.

Mark Friedberg- Seafood dealer
Mr. Friedberg supports Alternative 1. NMFS is trying to pit the commercial fishermen against recreational fishermen. We commercial folks all started fishing as recreational fishermen. As a recreational fishermen I wouldn't settle on two extra days from the Council. Recreational anglers need to demand a different plan.

Jamie Cantu- Charter
Mr. Cantu supports Alternative 1 and supports sector separation

John Spike- Recreational
Mr. Spike wants to clarify that he is checked all the time for his data.

Jason Delgado- Recreational
He is a boat owner and went of 10 times last season with lots of friends. On average they took 18-20 pound fish. He would support Alternative 5 reasoning that if the rising tide lifts all boats then increases in ACL should benefit the recreational anglers as well. He has not heard anyone say that they don't want to be accountable and there have been conversations about tags and other methods of accomplishing that. He would like the recreational fishermen to have a better system. The people we fish with all follow the rules and we support better accountability.

Larry Millican- Recreational
Supports Alternative 5 because the numbers are skewed in the recreational catch data. In the 1960's you could catch all kinds of fish whenever you tried. In the 70's and 80's it got tough, but recently that's drastically improved because of the rules. He doesn't like 2 fish bag and short season and he wants more, but he also cautions that when you take your boat offshore now he doesn't see may people even with all the technology we have. In the 80's and 90's there were people and boats everywhere, and has a hard time believing that effort is increasing because there's no one out there. I've never been stopped in all my days of fishing and he would like catch be recorded better. In his opinion the recreational fishermen are not taking near what Council thinks is being harvested.

Bill Evans –
Mr. Evans supports Alterative 5.

St. Petersburg, Florida
March 24, 2014

Council/Staff
Martha Bademan
Assane Diagne
Carrie Simmons

30 Members of public attended.

Steve Maisel- Commercial
Mr. Maisel was in favor of no reallocation of red snapper, No Action; Alternative 1.

Bill Tucker- Commercial
Mr. Tucker was in favor of No Action; Alternative 1. He said the recreational sector has already landed 56% of the quota, not the 49% they are currently allocated. He has no personal ill feelings about the recreational sector, but feels it is no surprise that the recreational sector is meeting their quota earlier and the season length is getting shorter. He believes that there are more people in the recreational fishery, with more access to the fishery due to the recovering red snapper stock and a more affluent society. Mr. Tucker stated he wanted the anglers from the recreational sector to discuss other avenues to increase the season length, such as agreeing to go down to a 1-fish bag limit, instead of taking fish away from the commercial sector. He also stated there was a lot of misinformation going around about charter vessels being tied to the dock when red snapper season is closed, but in reality they were out fishing. He asked why you would reallocate to 1-3% of the U.S. population, when it is clearly not good practice to reward a sector that is unaccountable.

Ed Maccini- Commercial, President of S.O.F.A.
Mr. Maccini is in favor of No Action; Alternative 1. He knows the red snapper stock is recovering in the Gulf of Mexico, and knows that the recreational sector is catching the bag limit and the red snapper are larger, due to the management efforts the Council has completed to date. Because of the rebuilding efforts both sectors participated in, both sectors need to fish as many days to achieve their limit. For example, since the commercial sector was moved to an IFQ system, he fishes fewer days, fishes when he wants, and his vessels yield greater catch in a shorter number of days. He said the consumer is involved in the recreational sector and he would like see the recreational sector develop a management plan to increase the season length on their own, with a program such as days-at-sea.

Jim Zurbrick- Commercial, Steinhatchee
Mr. Zurbrick stated he was in favor of No Action, Alternative 1. He said many of the recreational fishing clubs (CCA and FRA) claimed to be conservationists, but when he attended a meeting hosted by Florida FWC to improve data collection for offshore recreational fishermen, the idea was met with much resistance. He wants the recreational sector to come to the podium with a solution. If they don't want the FWC developed offshore vessel permit, then the recreational fishery should consider a days-at-sea program, tagging program, or any other fishery management plan that would address the problems in the recreational sector's accountability. He agrees the fishery in Florida is not the same as it was years ago and he believes it will never be the same, due to the number of people participating in the private recreational fishery. Mr. Zurbick stated if the private recreational anglers do not become accountable for their own fishery and think outside the box, they could end up with a 20-day or less red snapper fishing season.

Mike Colby- Charter, Clearwater Marine Association and Charter Association
Mr. Colby said in preparation of this meeting he reviewed the comments online and a majority of them were rambling comments that had nothing to do with Reef Fish Amendment 28. He hopes the Council considers the quantity and quality of comments submitted online. He said he would like to see a sound recreational management plan. Mr. Colby stated the data being used for Reef

Fish Amendment 28, has been considered in the past to be fatally flawed. Yet now that same data is being used to reallocate in favor of the recreational sector. So, for reallocation some recreational anglers think it is okay to use the data, in fact embrace it, since it gives them the personal solution they are seeking. Further, if this same data is fatally flawed then there are no reasons or excuses why it can't be used in the development of Reef Fish Amendment 40-Sector Separation. Until a better data collection system is developed he can't endorse any of the alternatives, except No Action; Alternative 1.

Wayne Werner- Commercial, F/V Sea Quest
Mr. Werner stated he was in favor of No Action; Alternative 1. He stated he did not understand how anyone could be in favor of taking away 500,000 meals from consumers, for 2 extra days to fish in the recreational sector. He said he had great concerns about overharvest by the recreational sector and didn't see any justification for giving them any additional fishing days. Mr. Werner stated the recreational data used in the economic efficiency analysis was fatally flawed, in fact most of the recreational data used in that analysis came from recreational anglers in the South Atlantic. He suggested that Amendment 28 was a "feel-good" amendment for the CCA. He pointed out that there had been studies done by NMFS that showed recreational anglers would rather have 1 larger fish and more days than to catch 2 fish and have a shorter season. He stated he did not agree with the Council putting Mr. Gentner on the Socio-economic SSC. Mr. Gentner was the deciding vote and he was in violation of the Council's policies to serve on an advisory committee.

Thomas Shook- Seafood company owner, Clearwater
Mr. Shook stated he was in favor of No Action; Alternative 1. He said the commercial sector has to become accountable for every pound of red snapper landed and that he didn't see why there couldn't be more accountability for the recreational sector.

John Schmidt- Commercial
Mr. Schmidt is in favor of No Action; Alternative 1. He stated that Amendment 28 was supposed to increase net benefits to the nation, not net benefits to the recreational sector. Most of the American public doesn't have access to federal waters and must access the resource through the commercial fishery. Since the Council implemented a strict rebuilding plan, there has been an incredible recovery and advances in the fishery. During these rebuilding efforts, the commercial sector had never gone over its allocation and had never asked for any of the recreational sector's allocation. Mr. Schmidt stated he felt Amendment 28 had been rushed, more so than many of the other Council actions. He stated he was not happy with the membership on the Socio-economic SSC, especially when the deciding vote was cast by a CCA representative. He is unsure why the Council ever considered putting such an individual on the panel. He felt moving forward with Reef Fish Amendment 28 – reallocation was not a solution; instead it is unfair, and not based on sound science.

Tom Wheatley- PEW Charitable Trusts
Mr. Wheatley stated although this seems like a simple amendment (and he agrees that there should be a fair and systematic review of sector allocations), he does not think the current document supports the red snapper rebuilding plan. He would like to see in-season and post-season accountability measures added to the current draft of the amendment; without these, he

does not understand how these shifts in allocation could be biologically safe. Therefore, if a new action was added to this amendment that would ensure the rebuilding plan for red snapper was not compromised, he could see this document moving forward. But until then, PEW was not in support of this action.

Frank Chivas- Restaurateur and recreational
Mr. Chivas is in favor of No Action; Alternative 1. He noted that he had been fishing since 1968 and seen the results of overfishing happen in 3 years, (by 1971) red snapper were almost gone. He credited conservation measures with bringing the stock back. He knows red snapper is the fish of choice in many restaurants. In his restaurants, over 20% of fish sold is red snapper, and now more grocery stores are selling red snapper as the stock recovers. He personally has seen more red snapper in the last 3 years than ever before. He believes the rebuilding plan is working fine and should be left as is.

Eric Mercadante- Dual-permitted federal charter and commercial
Mr. Mercadante said he lands 90% of his red snapper commercially. He said he is closely checked and monitored when he lands his catch commercially, but none of his charter trips have ever been checked. He said, recreationally everyone wants a trophy fish, especially a large red snapper. He would like to see the recreational sector get away from a short derby fishing season. He is in agreement that the recreational sector should get together and discuss licenses, tagging, and accountability for what they are catching and landing. Until the recreational sector does this he is in favor of No Action; Alternative 1.

Shawn Watson- Commercial
Mr. Watson is in favor of No Action; Alternative 1.

Jason DeLaCruz- Commercial and seafood dealer
Mr. DeLaCruz is in favor of No Action; Alternative 1. He has a fuel dock at John's Pass and he is unsure how the two additional fishing days in the current preferred alternative are going to help the recreational sector or his business. He doesn't think fish should be taken away from the commercial sector and that such rules will make it hard for them to make a living. He thinks that is the real economic impact of the preferred alternative, versus the economic analysis cited in the amendment. He said the Socio-economic SSC said it was okay to move forward with reallocation, but voted it was based on poor economic data and the Socio-economic SSC were only in consensus on minimal changes to the current allocation.

Gregg Pruitt- Commercial and dealer Fish Busters, Madeira Beach
Mr. Pruitt is in favor of No Action; Alternative 1 until the recreational sector can be constrained to their current allocation and become more accountable. He stated that it is possible that the recreational sector may need to pay for a data collection system or program like the commercial sector does which contributes 3% of their ex-vessel value of landings to the agency for program operations.

Dennis O'Hern- Recreational, FRA
Mr. O'Hern stated the recreational sector has requested better data collection for years and it is the Office of Science and Technology's fault for not improving the survey system, not the

recreational anglers. In fact, recreational anglers have requested an improved survey system since 2000 and it still hasn't been completed. He emphasized that the recreational sector was being accountable every year. He complimented the State of Florida's efforts for taking the lead on strategies to improve data collection and applauded the efforts of the Louisiana Department of Fisheries and Wildlife. He stated if there was better data collection for the recreational sector, there would be a 6 month, 3-fish bag limit as once suggested by Dr. Shipp. He suggested more and better surveys of anglers would help this happen. Mr. O'Hern said until NMFS and the Office of Science and Technology improve the data collection program for recreational anglers, and were held accountable for their actions. The FRA was not in support of moving forward with this amendment, so he supports No action; Alternative 1.

Jim Bonnell- Commercial
Mr. Bonnell supports No Action; Alternative 1. He stated he has been fishing for 30 years and doesn't understand how commercial logbooks can be questioned, when recreational anglers can just tell the samplers how many fish they caught without any validation. He doesn't see how the recreational survey could be adequate to determine landings or support any modifications to the allocation.

Ricky Baker- Commercial
Mr. Baker is in favor of No Action; Alternative 1. He has spent 30 years commercial fishing and feels the recreational data collection system is flawed. He noted that there were worries when logbooks were first required, some people felt the government would know what they were doing and where they were fishing and of course people didn't like that, but the system worked. He explained that in 1980, red snapper were almost gone and now they are everywhere.

Sean Wert- Commercial
Mr. Wert is in favor of No Action; Alternative 1. He stated he does not understand how the agency can make commercial fishermen jump through so many hoops compared to the recreational sector, yet they are going to get more fish. Mr. Wert stated he didn't understand how the agency had any idea what the recreational landings are based on the current collection system.

Cody Chivas- Commercial and restaurateur
Mr. Chivas is in favor of No Action; Alternative 1. He stated that he did not understand how the commercial sector has to be accountable for every single pound, compared to the recreational sector, yet the agency is looking at giving them more fish.

Jackson Beatty- Recreational and diver
Mr. Beatty said he wanted to be an accountable angler and was willing to go to a 1-fish bag limit if it meant a longer fishing season. He wanted to work with other recreational anglers to improve accountability and increase fishing opportunities. He supported No Action; Alternative 1.

James Coble- Recreational and tackle shop owner
Mr. Coble stated he was in favor of Alternative 5: If the red snapper quota is less than or equal to 9.12 mp, maintain the commercial and recreational red snapper allocations at 51% and 49% of the red snapper quota, respectively. If the red snapper quota is greater than 9.12 mp, allocate

75% of the amount in excess of 9.12 mp to the recreational sector and 25% to the commercial sector.). He felt it was the most viable option in the amendment. He didn't understand why it was such a bad alternative for the commercial sector. He stated that the recreational fishery has to get more bang out of every fish they catch, and needs to be more accountable. He noted that no recreational fishers had VMS on their boats and that they didn't report their catches. He urged recreational anglers to step up to the plate and help get the fishery in shape.

Webinar
March 20, 2014

Staff
Emily Muehlstein
Charlene Ponce

10 members of the public attended.

David Krebs- Commercial
Supports Alternative 1; no action. Flexibility and accountability need to be built into the recreational sector before any other action is taken.

Eric Brazer-
Supports Alternative 1. There are no effective accountability measures for the recreational fishing sector. Until we solve that problem the recreational sector will continue to over harvest their portion of the allocation. Do not take final action on Amendment 28 until or unless the SESSC does a final analysis of the methodology used.

Brian Jilek-
Meetings should be held on weekends so that more people have an opportunity to attend.

Ken Haddad-
All the information that has come to the Council has said that the snapper allocation needs to be revisited. The recreational sector is in agreement that Alternative 5 is a stabilizing action that will allow the Council to focus on a new management regime for red snapper.

V. Comment Letter on the Draft Environmental Impact Statement from the Environmental Protection Agency.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

July 16, 2015

Dr. Roy E. Crabtree
Regional Administrator
Southeast Regional Office
National Oceanic and Atmospheric Administration
263 13th Avenue South
St. Petersburg, Florida 33701

Subject: Red Snapper Allocation Amendment 28 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico Draft Environmental Impact Statement; CEQ No.: 20150157

Dear Dr. Crabtree:

The U.S. Environmental Protection Agency (EPA) has reviewed the subject National Oceanic and Atmospheric Administration (NOAA) Draft Environmental Impact Statement (DEIS) in accordance with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. EPA understands that the purpose and need for the proposed Amendment is to evaluate the reallocation of the red snapper harvest consistent with the 2015 red snapper assessment update to ensure that allowable catch and recovery benefits are fairly and equitably allocated between the commercial and recreational sectors to achieve optimum yield.

NOAA evaluated eight Action Alternatives and one No Action Alternatives. Alternative 1 (No Action) would continue to allocate 49% of the red snapper quota to the recreational sector and 51% to the commercial sector. Alternatives 2, 3, and 4 are similar in that they consider fixed percentage increases to the recreational red snapper allocation of 3%, 5%, and 10%, respectively from Alternative 1 or No Action Alternative. Alternatives 5, 6 and 7 allocate increases in annual catch limit (ACL) above a certain threshold. At or below the threshold (Alternatives 5, 6, and 7 have varied degrees of thresholds), red snapper would continue to be allocated with 51% of the red snapper ACL comprising the commercial quota and 49% comprising the recreational quota. Alternatives 8 and Alternative 9 would base reallocation on the effects of revised recreational data used in the update stock assessment that led to higher stock ACL. The higher stock ACL is based on revisions to the calibrated Marine Recreational Information Program (MRIP) catch estimates in the recreational sector and changes in the recreational size selectivity due to recreational fishermen targeting larger fish. Alternative would allocate 51.5% and 48.5% of the red snapper quota to the recreational and commercial sectors, respectively. Alternative 9 would allocate the amount of quota attributable to the change in size selectivity by the recreational sector. NOAA selected both Alternative 8 and 9 as the preferred alternatives.

EPA has a responsibility to review and comment on major Federal actions significantly affecting the quality of the human environment, including FMPs and FMP Amendments (Amendments) as developed, approved, and implemented under the Magnuson–Stevens Act (MSA) where those Plans and Amendments are subject to the EIS requirement of NEPA, but it should be clear that we defer to NOAA and the Councils as to the development of fishery statistics and the relative importance of the commercial and recreational fisheries for each species.

EPA Comments on the DEIS:

1. Preferred Alternatives: EPA appreciates that several alternatives for proposed actions were presented and that preferred alternatives were identified in the DEIS. Overall, EPA is supportive of the preferred alternatives, but as noted in previous comment letters, EPA remains concerned regarding the confusing display of multiple preferred alternatives rather than having one preferred alternative. EPA continues to recommend that NOAA consolidate and concisely describe one preferred alternative. Specifically, EPA recommends that NOAA combine Alternative 8 and Alternative 9 into one Alternative.

2. Economic Analysis: Throughout Chapter 3.5 Description of the Economic Environment, NOAA displays several tables demonstrating economic indicators and the years displayed are 2010-2014. On page 58, NOAA identifies the issue that the recreational sector was impacted in 2010 by the Deepwater Horizon MC252 oil spill. As a way of comparison, EPA recommends that data from years 2008 and 2009 be included in the FEIS to better demonstrate the economic impact of the Deepwater Horizon spill.

3. Environmental Justice (EJ): On page 54 of the DEIS, NOAA discusses environmental justice issues and states that "*information on race, ethnicity, and income status for groups at the different participation levels and roles is not available*". The DEIS does not provide a specific rationale as to why this information is not available. EPA recommends that NOAA clarify why this information is unavailable and include a discussion in the FEIS. Also, in Chapter 4 (Environmental Consequences) of the DEIS it does not discuss potential impacts to EJ communities. EPA acknowledges that there is a brief EJ considerations discussion in Chapter 3.5. However, there is no corresponding EJ impact discussion in the Chapter 4. EPA requests that NOAA consider a further review of the Council on Environmental Quality's (CEQ) published guidance (Environmental Justice: Guidance under the National Environmental Policy Act, December 1997: http://www.epa.gov/environmentaljustice/resources/policy/ej_guidance_nepa_ceq1297.pdf), and provide additional information in the FEIS pertaining to EJ and the potential environmental consequences of the proposed fishery management plan.

EPA DEIS Rating:

Although some clarification comments were offered for this DEIS, EPA generally supports NOAA and the Councils on the proposed alternatives and gives deference to their fishery expertise. Therefore, EPA rates this DEIS as LO-1 (Lack of Objections-Adequate). Attached is an explanation of the EIS rating criteria. We request that NOAA and the Councils directly respond to our attached comments in a dedicated section of the FEIS.

EPA appreciates the opportunity to review the DEIS. Should NOAA have questions regarding our comments on the DEIS, please feel free to contact Jamie Higgins at 404-562-9681 or by e-mail at higgins.jamie@epa.gov.

Sincerely,

Heinz J. Mueller, Chief for
NEPA Program Office
Resource Conservation and Restoration Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL IMPACT STATEMENT (EIS) RATING SYSTEM CRITERIA

EPA has developed a set of criteria for rating Draft EISs. The rating system provides a basis upon which EPA makes recommendations to the lead agency for improving the draft.

RATING THE ENVIRONMENTAL IMPACT OF THE ACTION

$ LO (Lack of Objections): The review has not identified any potential environmental impacts requiring substantive changes to the preferred alternative. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposed action.

$ EC (Environmental Concerns): The review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact.

$ EO (Environmental Objections): The review has identified significant environmental impacts that should be avoided in order to adequately protect the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). The basis for environmental objections can include situations:

1. Where an action might violate or be inconsistent with achievement or maintenance of a national environmental standard;
2. Where the Federal agency violates its own substantive environmental requirements that relate to EPA's areas of jurisdiction or expertise;
3. Where there is a violation of an EPA policy declaration;
4. Where there are no applicable standards or where applicable standards will not be violated but there is potential for significant environmental degradation that could be corrected by project modification or other feasible alternatives; or
5. Where proceeding with the proposed action would set a precedent for future actions that collectively could result in significant environmental impacts.

$ EU (Environmentally Unsatisfactory): The review has identified adverse environmental impacts that are of sufficient magnitude that EPA believes the proposed action must not proceed as proposed. The basis for an environmentally unsatisfactory determination consists of identification of environmentally objectionable impacts as defined above and one or more of the following conditions:

1. The potential violation of or inconsistency with a national environmental standard is substantive and/or will occur on a long-term basis;
2. There are no applicable standards but the severity, duration, or geographical scope of the impacts associated with the proposed action warrant special attention; or
3. The potential environmental impacts resulting from the proposed action are of national importance because of the threat to national environmental resources or to environmental policies.

RATING THE ADEQUACY OF THE ENVIRONMENTAL IMPACT STATEMENT (EIS)

$ 1 (Adequate): The Draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

$ 2 (Insufficient Information): The Draft EIS does not contain sufficient information to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the reviewer has

identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the Draft EIS, which could reduce the environmental impacts of the proposal. The identified additional information, data, analyses, or discussion should be included in the Final EIS.

$ 3 (Inadequate): The Draft EIS does not adequately assess the potentially significant environmental impacts of the proposal, or the reviewer has identified new, reasonably available, alternatives, that are outside of the spectrum of alternatives analyzed in the Draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. The identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. This rating indicates EPA's belief that the Draft EIS does not meet the purposes of NEPA and/or the Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised Draft EIS.

VI. Response to comments from the Environmental Protection Agency (EPA) on the Draft Environmental Impact Statement (DEIS) for Amendment 40

Although offering some clarifying comments, the EPA supports the National Marine Fisheries Service (NMFS) on Amendment 28 and gives deference to NMFS's expertise in managing fishery resources. The EPA rated this DEIS as an "LO-1" (Lack of Objections-Adequate). This means the DEIS adequately sets forth the environmental impacts of the alternatives and no further analysis or data collection is necessary. However, an EPA reviewer may suggest the addition of clarifying language or information in the final environmental impact statement (FEIS). However, in their review, the EPA offered several comments for clarification in the DEIS. These comments and NMFS's response follow.

Comment: The EPA noted that Alternatives 8 and 9 were selected as preferred and suggested these alternatives be combined.

Response: In actuality, only Alternative 8 was selected as preferred and is the only alternative in Section 2.1 identified as preferred. In Section 4.1.1, Alternative 9 was inadvertently identified as the preferred alternative. This has been corrected and only one alternative (Alternative 8) is listed as preferred in the FEIS. Because of differences in how the allocations were calculated for Preferred Alternative 8 and Alternative 9 as well as the clear preferences received through public comment for each these alternatives, the Gulf of Mexico Fishery Management Council (Council) and NMFS have determined it is better maintain separate alternatives.

Comment: The EPA noted that throughout Section 3.5, the DEIS has several tables showing economic indicators for the years 2010-2014. However, on page 58 of the DEIS, the document notes that the recreational sector was impacted in 2010 by the Deepwater Horizon MC252 oil spill. As a way of comparison, the EPA recommends that data from years 2008 and 2009 be included in the FEIS to better demonstrate the economic impact of the oil spill.

Response: Data from 2008 and 2009 has been added to the appropriate tables in Section 3.5.

Comment: The EPA noted that the DEIS does discuss environmental justice (EJ) issues and states that "information on race, ethnicity, and income status for groups at the different participation levels and roles is not available." However, the DEIS does not provide a specific rationale as to why this information is not available. Thus, the EPA recommends a clarification on why this information is unavailable. Also, the EPA identified that in in Chapter 4 there is no discussion of potential impacts to environmental justice (EJ) communities and requests that FEIS include additional information on the potential environmental consequences of the proposed action fishery management plan.

Response: In response to the comment concerning the following sentence "information on race, ethnicity, and income status for groups at the different participation levels and roles is not available," NMFS added a statement that "these types of data are not collected by NMFS or other agencies."

In response to the second part of the comment, the referenced 1997 Council on Environmental Quality guidance specifically states, "Neither the Executive Order nor this guidance prescribes any specific format for examining environmental justice, such as designating a specific chapter or section in an EIS or EA on environmental justice issues" (p.10). In Gulf of Mexico Council/NMFS National Environmental Policy Act (NEPA) documents, the EJ section is placed immediately following the community description, as the EJ analysis directly builds on the analysis and figures provided there. The Council/NMFS have received positive feedback in previous EPA reviews for this approach. Further, the EJ analysis is not the same analysis as completed in Chapter 4 as required by the NEPA.

There is more recent guidance from the EPA on considering EJ in the development of regulatory actions than the 1997 document cited in the EPA comments (May 2015 document titled "Guidance on Considering Environmental Justice during the Development of Regulatory Actions"). This guidance has been useful in addressing EJ concerns in Council/NMFS analyses. This May 2015 publication may be found at http://www.epa.gov/environmentaljustice/resources/policy/considering-ej-in-rulemaking-guide-final.pdf

VII. Response to Comments from the Public on the Draft Environmental Impact Statement (DEIS) for Amendment 40

The National Marine Fisheries Service (NMFS) received a total of 629 comments from individuals and organizations including the Environmental Protection Agency (EPA) during the DEIS 45-day comment period that started June 5, 2015, and ended July 20, 2015. Of the comments received, three were from fishing constituent groups (Coastal Conservation Association, Gulf of Mexico Reef Fish Shareholder's Alliance, and Organized Seafood Association of Alabama) and one was from a non-governmental organization (Environmental Defense Fund). Most comments (459) supported reallocation in some form. Specific to the alternatives, 384 commenters supported Alternative 9 as the preferred alternative, 65 did not support any specific alternative but supported reallocation in general, three supported Alternative 6, two supported either Alternative 6 or 9, two supported alternative 8, and one each supported Alternatives 4, 5, and 7. Fourteen comments recommended the Gulf of Mexico Fishery Management Council (Council) not take any action. Many of the remaining commenters expressed general frustration with red snapper recreational management and many suggested management measures outside the scope of this action. Suggested measures included increasing the recreational season length, increasing the bag limit, changing the size limit, supporting regional management (currently being analyzed in Amendment 39), creating a fish tag system, and making red snapper a game fish. In addition to these comments, the EPA (see Section V above) gave the DEIS a LO-1 rating (lack of objection-adequate) and the Department of Interior indicated they did not have any comments at this time.

Response to general comments on the DEIS:

The following are comments specific to actions in Amendment 28

Comment: NMFS should use a bioeconomic model that would address concerns raised by the Council's Socioeconomic Scientific and Statistical Committee (SSC) on the economic analyses.

Response: The economic analysis conducted for the DEIS is based on the best available information. At this time, a bioeconomic model capable of addressing red snapper allocation issues is not available. NMFS is exploring the feasibility of building bioeconomic models for certain fisheries in the Southeast, including the red snapper segment of the reef fish fishery.

Comment: Economic losses by the commercial sector as a result of recalibration have not been sufficiently analyzed, particularly as a result of historic underestimation of stock productivity.

Response: An economic analysis of all alternatives, including those based on Marine Recreational Information Program (MRIP) recalibration (Alternatives 8 and 9), has been conducted as part of the DEIS. For each alternative, losses to the commercial sector and potential gains to the recreational have been quantified to the extent possible. The MRIP recalibration found that the red snapper stock productivity was previously underestimated. This may indicate that the annual catch limit (ACL) in previous years could have been higher; however, these potential ACLs for previous years have not been estimated. It should be stressed that the setting of ACLs in previous years was based on the best available information available

at that time. In the absence of estimated potential ACLs, economic benefits or losses to either the commercial or recreational sector could not be estimated.

Comment: The rationale provided for Alternatives 8 and 9 is not credible because the MRIP calibration can only be applied to recent years and, for Alternative 9, there is no way to know if current recreational selectivity will remain constant or change over time.

Response: The MRIP Access Point Angler Intercept Survey (APAIS) was developed to replace the original Marine Recreational Fisheries Statistics Survey (MRFSS) Access Point Survey in response to a review by the National Research Council of how NMFS estimates recreational catch and effort. In addition, the MRIP implemented new data collection methods beginning in March 2013. As a result of these changes in methodology, there was a need to calibrate the original MRFSS information with MRIP information. A recent workshop examining MRFSS/MRIP calibration (SEDAR 41 2015) recommended calibration is needed in part because "discontinuity in time series estimates is a concern for assessment and management efforts." The workshop examined several calibration methods (see response to next comment) and selected a ratio method for the short term. Given that MRFSS catch information used in the assessment extended back to 1981 in the SEDAR 31 (2013) and SEDAR 31 Update (2015) assessments, this recreational catch data needed to be calibrated to be integrated with the more recent MRIP catch information. Thus, as described in Section 3.3 of Amendment 28, MRIP estimates from 2004-2012 were rescaled to the more recent MRIP estimates to account for possible undersampling during certain hours of the day. The "rescaled" MRIP (2004-2013) landings were then used to rescale years prior to 2004 as done in SEDAR 31 (2013). This approach was considered to be based on the best available information in setting the 2015-2017 acceptable biological catches (ABCs) that were approved by the Council and implemented through a 2015 framework action (GMFMC 2015).

The comment is correct that selectivity may change over time. Selectivity, as used in the red snapper assessment (SEDAR 31 2013) is defined as the probability of fish being caught by a fishing gear as a function of the age of the fish with a retention function to estimate the proportion of fish that were caught and subsequently discarded (See Section 3.3 of Amendment 28). Examples of factors that could alter selectivity patterns include changes in fishing behaviors or gears by fishermen, or changes in year-class strength within the stock over time. Should selectivity change, this could affect assessment outcomes and could be used to re-estimate allocation by using a similar formula to that used in Action 1, Alternative 9 of Amendment 28. The Council could re-evaluate and possibly change the red snapper allocation in a future action should they deem it appropriate.

Comment: A more comprehensive analysis of fishery conditions should be conducted before NMFS and the Council can conclude that the recalibration of recreational landings is appropriate and can be applied to historical landings.

Response: In developing the APAIS to replace the original MRFSS Access Point Survey, several changes were made in the sampling design. As a result, there is a need to calibrate the original time series of MRFSS to the new time series of MRIP estimates for stock assessments (SEDAR 41 2015). A workshop examining how to approach catch estimates from the two

survey methods concluded that a calibration is necessary and appropriate (Saltz et al, 2012). The workshop also recommended that three different calibration approaches should be considered. A second workshop (SEDAR41 2015) was convened to, in part, "determine how best to adjust survey estimates to maintain a valid time series of catch estimates." This workshop evaluated methods in terms of interim needs for calibrating catch estimates with long-term solutions for calibration. The workshop panel recognized that it will take time to develop the recommended model-based approach. Therefore, they recommended a ratio method be used in the interim. This ratio method is, at least over the short term, considered to be based on the best scientific information available. The ratio method was used to reassess red snapper (SEDAR 31 Update 2015) and increase the red snapper ABC (GMFMC 2015). In the future, a model-based approach may be developed and applied to recreational catch information. The Council could reconsider allocation based on any new information that results from that action.

Comment: The MRIP methodology is incomplete and thus invalidates the analysis of the allocations provided in Preferred Alternative 8 and Alternative 9. Any analyses of reallocation implications cannot be performed until all calibration approaches being evaluated in SEDAR 41 (2015) have been fully analyzed.

Response: As mentioned above, calibration of MRFSS and MRIP is necessary because each survey covers a different time series. The calibration workshop panel cited in SEDAR 41 (2015) recognized that in addressing existing management and assessment deadlines, there is a requirement to use some interim calibration method until appropriate long-term calibration solutions can be developed. It is unclear how long it will take to develop these long-term calibrations. In evaluating the SEDAR 31 Update (2015), the Standing and Reef Fish SSC was aware of the use of the interim ratio calibration method and the assumptions this method is based on recreational catch estimates. Nonetheless, the SSC recommended at their January 6-8, 2015, meeting[29] that the "red snapper update base assessment model is the best scientific information available and is acceptable for management purposes." The Council subsequently implemented ACL increases for both the recreational and commercial sectors (GMFMC 2015) based upon the ABC recommendations from the SSC's review of the SEDAR 31 Update (2015) assessment.

Comment: Reallocating red snapper quota is projected to cause a further decline in the spawning potential ratio in the eastern Gulf of Mexico (Gulf) and may contribute to localized depletion in that region.

Response: Analyses by the Southeast Fisheries Science Center (SEFSC) (Appendix H of Amendment 28)) and reviewed by the Council's Scientific and Statistical Committee (SSC) indicate that shifting allocation to the recreational sector may allow for increases in the overfishing limits and ABCs for the Gulf stock as discussed in Section 3.3 of Amendment 28. However, with this increase, there is a disproportionate effect on the eastern and western portions of the stock as discussed in Section 4.1.2 of Amendment 28. This is because a greater recreational quota would lead to an increase in recreational fishing effort. Because most recreational red snapper fishing occurs in the eastern Gulf (Appendix H of Amendment 28), an increased fraction of the eastern population would be removed compared to the western

[29] Gulf of Mexico Fishery Management Council Standing and Special Scientific and Statistical Summary. January 6-8.

population. This would lead to a further depressed eastern stock size when compared to no action (a spawning potential ratio of 4.6% under a recreational allocation of 70% compared to a spawning potential ratio of 7% under no action). The SEFSC analyses indicated the western stock would continue to rebuild and allow the Gulf red snapper stock as a whole continue recover per the red snapper rebuilding plan. This information was considered by the Council in selecting a preferred alternative.

Comment: Reallocating red snapper quota will not bring stability to the recreational fishing season or reduce the likelihood of recreational overages, but it will undermine the successful individual fishing quota program in the commercial sector.

Response: The reallocation of red snapper from the commercial sector to the recreational sector is not expected by itself to stabilize the recreational sector nor reduce the likelihood of recreational overages, nor was this the main objective of Amendment 28. Although reallocating red snapper to the recreational sector could provide some relief, it would only result in a minor adjustment to the recreational season (see Section 4.2 of Amendment 28). To reduce the likelihood of recreational overages, the Council recently adopted and NMFS implemented recreational accountability measures that establish 1) a 20% buffer to the recreational quota, on which the season length would be projected; and 2) an overage adjustment which would decrease the recreational quota in the year following a quota overage by the amount of the overage (GMFMC 2014). These accountability measures, not reallocation, are expected to reduce the likelihood of the recreational sector exceeding its quota.

Comment: The DEIS does not contain a full range of reasonable alternatives because there are no alternatives analyzing the effects of increasing the commercial allocation.

Response: As stated in Section 2.1 of Amendment 28, the Council initially considered alternatives that increased the commercial sector's allocation at a special Reef Fish Committee meeting in January 2013[30]. However, in weighing the economic analyses conducted by the SEFSC, the loss of fishing opportunities by the recreational sector, and considering the results of the 2014 update red snapper stock assessment (SEDAR 31 Update 2015), the Council concluded that such a reallocation would not meet the purpose and need of this action. Therefore, the Council limited the alternatives to either no action or increasing the recreational sector's allocation above 49 percent.

Comment: The DEIS is internally inconsistent; descriptions of Preferred Alternative 8 contradict one another. Specifically, the text was confusing whether the allocation would be fixed by the Council until changed later, or fluctuate with revised MRIP catch estimates used in subsequent stock assessments.

Response: The allocations presented in Preferred Alternative 8 and Alternative 9 were intended to be remain fixed until such time the Council determines it is necessary to revise the allocations.

[30] Tab SP-4(b), Special Reef Fish Management Committee Meeting, Gulf of Mexico Fishery Management Council, and is available in the briefing book archives for the January 2013 meeting on the Council website (http://www.gulfcouncil.org).

The description of these alternatives in Section 2.1 of Amendment 28 has been revised to better explain this intent.

Comment: Amendment 28 is likely underestimating true recreational fishing mortality because venting tools are no longer required and recreational fishermen are able to target larger fish in deeper waters because of improved electronic navigational and fish-finding equipment.

Response: Management measures put in place through Reef Fish Amendment 27 (GMFMC 2007) to reduce reef fish discard mortality required the use of non-stainless steel circle hooks, dehooking devices, and venting tools. However, some scientific studies had questioned the usefulness of venting tools in preventing discard mortality in fish, particularly those caught in deep waters (GMFMC 2013). In addition, some fish caught in shallow waters may not need to be vented, and attempts at venting may cause damage to fish by improper venting and increased handling times. Finally, the venting tool requirement interfered with using other devices to reduce barotrauma such as fish descenders (devices that rapidly take fish back down to depth). Therefore, in August 2013, the Council decided to remove the venting tool requirement due to questions of its efficacy and also allow fishermen to use other methods to minimize barotrauma (GMFMC 2013). The effects of no longer requiring venting tools on discard mortality are unknown. Fishermen may still continue to use venting tools as well as other devices. This change in regulations will likely be examined in subsequent red snapper stock assessments.

Comment: Nowhere in the DEIS is selectivity explained in great detail.

Response: An elaboration on what selectivity means relative to the stock assessment was added to Section 3.3 of Amendment 28. This elaboration indicates that for the purposes of the red snapper assessment, selectivity is defined as the probability of fish being caught (landed or discarded) by a fishing gear as a function of the age of the fish. This definition incorporates both gear attributes and availability of the stock to the fishery. A retention function is then applied to estimate the proportion of fish that were caught that are subsequently discarded (dead or alive), and dead discards are calculated using a discard mortality rate that, in this case of recreational red snapper, is constant with length and age.

Comment: Appendix H of Amendment 28 is missing from the DEIS.

Response: Appendix H was inadvertently left out of the DEIS. It has been included in Amendment 28 and integrated FEIS.

Comment: The effects of inconsistent state and federal regulations on the recreational sector are not sufficiently analyzed, particularly with respect to shorter federal fishing seasons.

Response: The effect of inconsistent state and federal regulations is outside the scope of Amendment 28. The purpose of Amendment 28 is to merely reallocate the red snapper harvest consistent with the 2014 red snapper assessment update (SEDAR 31 Update 2015) to ensure the allowable catch and recovery benefits are fairly and equitably allocated between the commercial and recreational sectors to achieve optimum yield. Thus, this amendment does not address fishing season lengths or reconciling inconsistent state and federal regulations.

References

GMFMC. 2007. Final amendment 27 to the reef fish fishery management plan and amendment 14 to the shrimp fishery management plan including supplemental environmental impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. 490 pp with appendices. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20RF%20Amend%2027-%20Shrimp%20Amend%2014.pdf

GMFMC. 2013. Framework action to set the annual catch limit and bag limit for vermilion snapper, set annual catch limit for yellowtail snapper, and modify the venting tool requirement. Gulf of Mexico Fishery Management Council, Tampa, Florida. 171 p. http://www.gulfcouncil.org/docs/amendments/2013%20Vermilion-Yellowtail-Venting%20Tool%20Framework%20Action.pdf

GMFMC. 2014. Recreational Accountability Measures for Red snapper, including environmental assessment, regulatory impact review, and regulatory flexibility act analysis. Framework action to the fishery management plan for the reef fish resources of the Gulf of Mexico. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/docs/amendments/Final%20Recreational%20AMs%20for%20Red%20Snapper%2010-6-2014.pdf

GMFMC. 2015. Framework Action to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico. Gulf of Mexico Fishery Management Council, Tampa, Florida. 66 p.

SEDAR 31. 2013. Stock assessment report Gulf of Mexico red snapper. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

SEDAR 31 Update. 2015. Stock assessment report Gulf of Mexico red snapper. Southeast Data, Assessment, and Review. North Charleston, South Carolina.

SEDAR 41. 2015. MRIP Calibration Workshop II – Final Report. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/

Salz et al. 2012. MRFSS/MRIP Calibration Workshop ad-hoc Working Group Report. MFS/S&T/MRIP, Silver Spring, MD.

APPENDIX E. FISHERY ALLOCATION POLICY

Gulf of Mexico Fishery Management Council Fishery Allocation Policy

This allocation policy was developed by the Gulf of Mexico Fishery Management Council to provide principles, guidelines, and suggested methods for allocation that would facilitate future allocation and reallocation of fisheries resources between or within fishery sectors.

Issues considered in this allocation policy include principles based on existing regulatory provisions, procedures to request and initiate (re)allocation, (re)allocation review frequency, tools and methods suggested for evaluating alternative (re)allocations.

1. Principles for Allocation

   a. Conservation and management measures shall not discriminate between residents of different states.

   b. Allocation shall:

      (1) be fair and equitable to fishermen and fishing sectors;
      (i) fairness should be considered for indirect changes in allocation
      (ii) any harvest restrictions or recovery benefits be allocated fairly and equitably among sectors

      (2) promote conservation
      (i) connected to the achievement of OY
      (ii) furtherance of a legitimate FMP objective,
      (iii) promotes a rational, more easily managed use

      (3) ensure that no particular individual, corporation, or other entity may acquire an excessive share.

   c. Shall consider efficient utilization of fishery resources but:
      (1) should not just redistribute gains and burdens without an increase in efficiency

      (2) prohibit measures that have economic allocation as its sole purpose.

   d. Shall take into account: the importance of fishery resources to fishing communities by utilizing economic and social data in order to:
      (1) provide for the sustained participation of fishing communities

      (2) minimize adverse economic impacts on fishing communities.

e. Any fishery management plan, plan amendment, or regulation submitted by the Gulf Council for the red snapper fishery shall contain conservation and management measures that:
   (1) establish separate quotas for recreational fishing (including charter fishing) and commercial fishing.

   (2) prohibit a sector (i.e., recreational or commercial) from retaining red snapper for the remainder of the season, when it reaches its quota.

   (3) ensure that the recreational and commercial quotas reflect allocation among sectors and do not reflect harvests in excess of allocations.

2. Guidelines for Allocation

   a. All allocations and reallocations must be consistent with the Gulf of Mexico Fishery Management Council's principles for allocation.

   b. An approved Council motion constitutes the only appropriate means for requesting the initiation of allocation or reallocation of a fishery resource. The motion should clearly specify the basis for, purpose and objectives of the request for (re)allocation.

   c. The Council should conduct a comprehensive review of allocations within the individual FMPs at intervals of no less than five years.

   d. Following an approved Council motion to initiate an allocation or reallocation, the Council will suggest methods to be used for determining the new allocation. Methods suggested must be consistent with the purpose and objectives included in the motion requesting the initiation of allocation or reallocation.

   e. Changes in allocation of a fishery resource may, to the extent practicable, account for projected future socio-economic and demographic trends that are expected to impact the fishery.

   f. Indirect changes in allocation, i.e., shifts in allocation resulting from management measures, should be avoided or minimized to the extent possible.

3. Suggested Methods for Determining (Re)Allocation

   a. Market-based Allocation

      (1) Auction of quota

      (2) Quota purchases between commercial and recreational sectors
         (i) determine prerequisites and conditions:
            (a) quota or tags or some other mechanism required in one or both sectors
            (b) mechanism to broker or bank the purchases and exchanges

(c) annual, multi-year, or permanent
(d) accountability for purchased or exchanged quota in the receiving sector

b. Catch-Based (and mortality) Allocation

(1) historical landings data
(i) averages based on longest period of credible records
(ii) averages based on a period of recent years
(iii) averages based on total fisheries mortality (landings plus discard mortality) by sector
(iv) allocations set in a previous FMP
(v) accountability (a sector's ability to keep within allocation)

c. Socioeconomic-based Allocation

(1) socio-economic analyses
(i) net benefits to the nation
(ii) economic analysis limited to direct participants
(iii) economic impact analysis (direct expenditures and multiplier impacts)
(iv) social impact analysis
(v) fishing communities
(vi) participation trends
(vii) "efficiency" analysis
(a) lowest possible cost for a particular level of catch;
(b) harvest OY with the minimum use of economic inputs

d. Negotiation-Based Allocation

(1) Mechanism for sectors to agree to negotiation and select representatives

(2) Mechanism to choose a facilitator

(3) Negotiated agreement brought to Council for normal FMP process of adoption and implementation.

APPENDIX F. CURRENT FEDERAL REGULATIONS FOR GULF OF MEXICO RECREATIONAL RED SNAPPER MANAGEMENT

1. § 622.9 Prohibited gear and methods--general.

(e) Use of Gulf reef fish as bait prohibited. Gulf reef fish may not be used as bait in any fishery, except that, when purchased from a fish processor, the filleted carcasses and offal of Gulf reef fish may be used as bait in trap fisheries for blue crab, stone crab, deep-water crab, and spiny lobster.

2. § 622.20 Permits and endorsements

(b) Charter vessel/headboat permits. For a person aboard a vessel that is operating as a charter vessel or headboat to fish for or possess Gulf reef fish, in or from the EEZ, a valid charter vessel/headboat permit for Gulf reef fish must have been issued to the vessel and must be on board.

(1) Limited access system for charter vessel/headboat permits for Gulf reef fish. No applications for additional charter vessel/headboat permits for Gulf reef fish will be accepted. Existing permits may be renewed, are subject to the restrictions on transfer in paragraph (b)(1)(i) of this section, and are subject to the renewal requirements in paragraph (b)(1)(ii) of this section.

(i) Transfer of permits--(A) Permits without a historical captain endorsement. A charter vessel/headboat permit for Gulf coastal migratory pelagic fish or Gulf reef fish that does not have a historical captain endorsement is fully transferable, with or without sale of the permitted vessel, except that no transfer is allowed to a vessel with a greater authorized passenger capacity than that of the vessel to which the moratorium permit was originally issued, as specified on the face of the permit being transferred. An application to transfer a permit to an inspected vessel must include a copy of that vessel's current USCG Certificate of Inspection (COI). A vessel without a valid COI will be considered an uninspected vessel with an authorized passenger capacity restricted to six or fewer passengers.

(B) Permits with a historical captain endorsement. A charter vessel/headboat permit for Gulf coastal migratory pelagic fish or Gulf reef fish that has a historical captain endorsement may only be transferred to a vessel operated by the historical captain, cannot be transferred to a vessel with a greater authorized passenger capacity than that of the vessel to which the moratorium permit was originally issued, as specified on the face of the permit being transferred, and is not otherwise transferable.

(C) Procedure for permit transfer. To request that the RA transfer a charter vessel/headboat permit for Gulf reef fish, the owner of the vessel who is transferring the permit and the owner of the vessel that is to receive the transferred permit must complete the transfer information on the reverse side of the permit and return the permit and a completed application for transfer to the RA. See § 622.4(f) for additional transfer-related requirements applicable to all permits issued under this part.

(ii) Renewal. (A) Renewal of a charter vessel/headboat permit for Gulf reef fish is contingent upon the permitted vessel and/or captain, as appropriate, being included in an active

survey frame for, and, if selected to report, providing the information required in one of the approved fishing data surveys. Surveys include, but are not limited to–-

(1) NMFS' Marine Recreational Fishing Vessel Directory Telephone Survey (conducted by the Gulf States Marine Fisheries Commission);

(2) NMFS' Southeast Headboat Survey (as required by § 622.26(b)(1));

(3) Texas Parks and Wildlife Marine Recreational Fishing Survey; or

(4) A data collection system that replaces one or more of the surveys in paragraph (b)(1)(ii)(A),(1),(2), or (3) of this section.

(B) A charter vessel/headboat permit for Gulf reef fish that is not renewed or that is revoked will not be reissued. A permit is considered to be not renewed when an application for renewal, as required, is not received by the RA within 1 year of the expiration date of the permit.

(iii) Requirement to display a vessel decal. Upon renewal or transfer of a charter vessel/headboat permit for Gulf reef fish, the RA will issue the owner of the permitted vessel a vessel decal for Gulf reef fish. The vessel decal must be displayed on the port side of the deckhouse or hull and must be maintained so that it is clearly visible.

(2) A charter vessel or headboat may have both a charter vessel/headboat permit and a commercial vessel permit. However, when a vessel is operating as a charter vessel or headboat, a person aboard must adhere to the bag limits. See the definitions of "Charter vessel" and "Headboat" in § 622.2 for an explanation of when vessels are considered to be operating as a charter vessel or headboat, respectively.

(3) If Federal regulations for Gulf reef fish in subparts A or B of this part are more restrictive than state regulations, a person aboard a charter vessel or headboat for which a charter vessel/headboat permit for Gulf reef fish has been issued must comply with such Federal regulations regardless of where the fish are harvested.

3. § 622.26 Recordkeeping and reporting.

(b) Charter vessel/headboat owners and operators–-(1) Reporting requirement. The owner or operator of a vessel for which a charter vessel/headboat permit for Gulf reef fish has been issued, as required under § 622.20(b), or whose vessel fishes for or lands such reef fish in or from state waters adjoining the Gulf EEZ, who is selected to report by the SRD must maintain a fishing record for each trip, or a portion of such trips as specified by the SRD, on forms provided by the SRD and must submit such record as specified in paragraph (b)(2) of this section.

(2) Reporting deadlines--(i) Charter vessels. Completed fishing records required by paragraph (b)(1) of this section for charter vessels must be submitted to the SRD weekly, postmarked not later than 7 days after the end of each week (Sunday). Information to be reported is indicated on the form and its accompanying instructions.

(ii) Headboats. Completed fishing records required by paragraph (b)(1) of this section for headboats must be submitted to the SRD monthly and must either be made available to an authorized statistical reporting agent or be postmarked not later than 7 days after the end of each month. Information to be reported is indicated on the form and its accompanying instructions.

4. § 622.27 At-sea observer coverage.

(a) Required coverage. A vessel for which a Federal commercial vessel permit for Gulf reef fish or a charter vessel/headboat permit for Gulf reef fish has been issued must carry a NMFS-approved observer, if the vessel's trip is selected by the SRD for observer coverage. Vessel permit renewal is contingent upon compliance with this paragraph (a).

(b) Notification to the SRD. When observer coverage is required, an owner or operator must advise the SRD in writing not less than 5 days in advance of each trip of the following:

(1) Departure information (port, dock, date, and time).

(2) Expected landing information (port, dock, and date).

(c) Observer accommodations and access. An owner or operator of a vessel on which a NMFS-approved observer is embarked must:

(1) Provide accommodations and food that are equivalent to those provided to the crew.

(2) Allow the observer access to and use of the vessel's communications equipment and personnel upon request for the transmission and receipt of messages related to the observer's duties.

(3) Allow the observer access to and use of the vessel's navigation equipment and personnel upon request to determine the vessel's position.

(4) Allow the observer free and unobstructed access to the vessel's bridge, working decks, holding bins, weight scales, holds, and any other space used to hold, process, weigh, or store fish.

(5) Allow the observer to inspect and copy the vessel's log, communications logs, and any records associated with the catch and distribution of fish for that trip.

5. § 622.29 Conservation measures for protected resources.

(a) Gulf reef fish commercial vessels and charter vessels/headboats--(1) Sea turtle conservation measures. (i) The owner or operator of a vessel for which a commercial vessel permit for Gulf reef fish or a charter vessel/headboat permit for Gulf reef fish has been issued, as required under
§§ 622.20(a)(1) and 622.20(b), respectively, must post inside the wheelhouse, or within a waterproof case if no wheelhouse, a copy of the document provided by NMFS titled, "Careful Release Protocols for Sea Turtle Release With Minimal Injury," and must post inside the wheelhouse, or in an easily viewable area if no wheelhouse, the sea turtle handling and release guidelines provided by NMFS.

(ii) Such owner or operator must also comply with the sea turtle bycatch mitigation measures, including gear requirements and sea turtle handling requirements, specified in §§ 635.21(c)(5)(i) and (ii) of this chapter, respectively.

(iii) Those permitted vessels with a freeboard height of 4 ft (1.2 m) or less must have on board a dipnet, tire, short-handled dehooker, long-nose or needle-nose pliers, bolt cutters, monofilament line cutters, and at least two types of mouth openers/mouth gags. This equipment must meet the specifications described in §§ 635.21(c)(5)(i)(E) through (L) of this chapter with the following modifications: the dipnet handle can be of variable length, only one NMFS-approved short-handled dehooker is required (i.e., § 635.21(c)(5)(i)(G) or (H) of this chapter); and life rings, seat cushions, life jackets, and life vests or any other comparable, cushioned, elevated surface that allows boated sea turtles to be immobilized, may be used as alternatives to

tires for cushioned surfaces as specified in § 635.21(c)(5)(i)(F) of this chapter. Those permitted vessels with a freeboard height of greater than 4 ft (1.2 m) must have on board a dipnet, tire, long-handled line clipper, a short-handled and a long-handled dehooker, a long-handled device to pull an inverted "V", long-nose or needle-nose pliers, bolt cutters, monofilament line cutters, and at least two types of mouth openers/mouth gags. This equipment must meet the specifications described in § 635.21(c)(5)(i)(A) through (L) of this chapter with the following modifications: only one NMFS-approved long-handled dehooker (§ 635.21(c)(5)(i)(B) or (C)) of this chapter and one NMFS-approved short-handled dehooker (§ 635.21(c)(5)(i)(G) or (H) of this chapter) are required; and life rings, seat cushions, life jackets, and life vests, or any other comparable, cushioned, elevated surface that allows boated sea turtles to be immobilized, may be used as alternatives for cushioned surfaces as specified in § 635.21(c)(5)(i)(F) of this chapter.

(2) Smalltooth sawfish conservation measures. The owner or operator of a vessel for which a commercial vessel permit for Gulf reef fish or a charter vessel/headboat permit for Gulf reef fish has been issued, as required under §§ 622.20(a)(1) and 622.20(b), respectively, that incidentally catches a smalltooth sawfish must--

(i) Keep the sawfish in the water at all times;

(ii) If it can be done safely, untangle the line if it is wrapped around the saw;

(iii) Cut the line as close to the hook as possible; and

(iv) Not handle the animal or attempt to remove any hooks on the saw, except for with a long-handled dehooker.

(b) [Reserved]

6. § 622.30 Required fishing gear.

For a person on board a vessel to fish for Gulf reef fish in the Gulf EEZ, the vessel must possess on board and such person must use the gear as specified in paragraphs (a) through (c) of this section.

(a) Non-stainless steel circle hooks. Non-stainless steel circle hooks are required when fishing with natural baits.

(b) Dehooking device. At least one dehooking device is required and must be used to remove hooks embedded in Gulf reef fish with minimum damage. The hook removal device must be constructed to allow the hook to be secured and the barb shielded without re-engaging during the removal process. The dehooking end must be blunt, and all edges rounded. The device must be of a size appropriate to secure the range of hook sizes and styles used in the Gulf reef fish fishery.

(c) Venting tool. At least one venting tool is required and must be used to deflate the abdominal cavities of Gulf reef fish to release the fish with minimum damage. This tool must be a sharpened, hollow instrument, such as a hypodermic syringe with the plunger removed, or a 16-gauge needle fixed to a hollow wooden dowel. A tool such as a knife or an ice-pick may not be used. The venting tool must be inserted into the fish at a 45-degree angle approximately 1 to 2 inches (2.54 to 5.08 cm) from the base of the pectoral fin. The tool must be inserted just deep enough to release the gases, so that the fish may be released with minimum damage.

7. § 622.32 Prohibited gear and methods.

Also see § 622.9 for additional prohibited gear and methods that apply more broadly to multiple fisheries or in some cases all fisheries.

(a) Poisons. A poison may not be used to take Gulf reef fish in the Gulf EEZ.

(b) [Reserved]

8. § 622.33 Prohibited species.

(d) Gulf reef fish exhibiting trap rash. Possession of Gulf reef fish in or from the Gulf EEZ that exhibit trap rash is prima facie evidence of illegal trap use and is prohibited. For the purpose of this paragraph, trap rash is defined as physical damage to fish that characteristically results from contact with wire fish traps. Such damage includes, but is not limited to, broken fin spines, fin rays, or teeth; visually obvious loss of scales; and cuts or abrasions on the body of the fish, particularly on the head, snout, or mouth.

9. § 622.34 Seasonal and area closures designed to protect Gulf reef fish.

(a) Closure provisions applicable to the Madison and Swanson sites and Steamboat Lumps, and the Edges-- (1) Descriptions of Areas. (i) The Madison and Swanson sites are bounded by rhumb lines connecting, in order, the following points:

Point	North lat.	West long.
A	29°17'	85°50'
B	29°17'	85°38'
C	29°06'	85°38'
D	29°06'	85°50'
A	29°17'	85°50'

(ii) Steamboat Lumps is bounded by rhumb lines connecting, in order, the following points:

Point	North lat.	West long.
A	28°14'	84°48'
B	28°14'	84°37'
C	28°03'	84°37'
D	28°03'	84°48'
A	28°14'	84°48'

(iii) The Edges is bounded by rhumb lines connecting, in order, the following points:

Point	North lat.	West long.
A	28°51'	85°16'
B	28°51'	85°04'
C	28°14'	84°42'
D	28°14'	84°54'
A	28°51'	85°16'

(2) Within the Madison and Swanson sites and Steamboat Lumps, possession of Gulf reef fish is prohibited, except for such possession aboard a vessel in transit with fishing gear stowed as specified in paragraph (a)(4) of this section.

(3) Within the Madison and Swanson sites and Steamboat Lumps during November through April, and within the Edges during January through April, all fishing is prohibited, and possession of any fish species is prohibited, except for such possession aboard a vessel in transit with fishing gear stowed as specified in paragraph (a)(4) of this section. The provisions of this paragraph, (a)(3), do not apply to highly migratory species.

(4) For the purpose of paragraph (a) of this section, transit means non-stop progression through the area; fishing gear appropriately stowed means--

(i) A longline may be left on the drum if all gangions and hooks are disconnected and stowed below deck. Hooks cannot be baited. All buoys must be disconnected from the gear; however, buoys may remain on deck.

(ii) A trawl net may remain on deck, but trawl doors must be disconnected from the trawl gear and must be secured.

(iii) A gillnet must be left on the drum. Any additional gillnets not attached to the drum must be stowed below deck.

(iv) A rod and reel must be removed from the rod holder and stowed securely on or below deck. Terminal gear (i.e., hook, leader, sinker, flasher, or bait) must be disconnected and stowed separately from the rod and reel. Sinkers must be disconnected from the down rigger and stowed separately.

(5) Within the Madison and Swanson sites and Steamboat Lumps, during May through October, surface trolling is the only allowable fishing activity. For the purpose of this paragraph (a)(5), surface trolling is defined as fishing with lines trailing behind a vessel which is in constant motion at speeds in excess of four knots with a visible wake. Such trolling may not involve the use of down riggers, wire lines, planers, or similar devices.

(6) For the purpose of this paragraph (a), fish means finfish, mollusks, crustaceans, and all other forms of marine animal and plant life other than marine mammals and birds. Highly migratory species means tuna species, marlin (*Tetrapturus spp.* and *Makaira spp.*), oceanic sharks, sailfishes (*Istiophorus spp.*), and swordfish (*Xiphias gladius*).

10. § 622.35 Gear restricted areas.

(a) Reef fish stressed area. The stressed area is that part of the Gulf EEZ shoreward of rhumb lines connecting, in order, the points listed in Table 2 in Appendix B of this part.

(1) A powerhead may not be used in the stressed area to take Gulf reef fish. Possession of a powerhead and a mutilated Gulf reef fish in the stressed area or after having fished in the stressed area constitutes prima facie evidence that such reef fish was taken with a powerhead in the stressed area. The provisions of this paragraph do not apply to hogfish.

(2) A roller trawl may not be used in the stressed area. Roller trawl means a trawl net equipped with a series of large, solid rollers separated by several smaller spacer rollers on a separate cable or line (sweep) connected to the footrope, which makes it possible to fish the gear over rough bottom, that is, in areas unsuitable for fishing conventional shrimp trawls. Rigid framed trawls adapted for shrimping over uneven bottom, in wide use along the west coast of Florida, and shrimp trawls with hollow plastic rollers for fishing on soft bottoms, are not considered roller trawls.

(b) Seasonal prohibitions applicable to bottom longline fishing for Gulf reef fish. (1) From June through August each year, bottom longlining for Gulf reef fish is prohibited in the portion of the Gulf EEZ east of 85°30' W. long. that is shoreward of rhumb lines connecting, in order, the following points:

Point	North lat.	West long.
A	28°58.70'	85°30.00'
B	28°59.25'	85°26.70'
C	28°57.00'	85°13.80'
D	28°47.40'	85°3.90'
E	28°19.50'	84°43.00'
F	28°0.80'	84°20.00'
G	26°48.80'	83°40.00'
H	25°17.00'	83°19.00'
I	24°54.00'	83°21.00'
J	24°29.50'	83°12.30'
K	24°26.50'	83°00.00'

(2) Within the prohibited area and time period specified in paragraph (b)(1) of this section, a vessel with bottom longline gear on board may not possess Gulf reef fish unless the bottom longline gear is appropriately stowed, and a vessel that is using bottom longline gear to fish for species other than Gulf reef fish may not possess Gulf reef fish. For the purposes of paragraph (b) of this section, appropriately stowed means that a longline may be left on the drum

if all gangions and hooks are disconnected and stowed below deck; hooks cannot be baited; and all buoys must be disconnected from the gear but may remain on deck.

(3) Within the Gulf EEZ east of 85°30' W. long., a vessel for which a valid eastern Gulf reef fish bottom longline endorsement has been issued that is fishing bottom longline gear or has bottom longline gear on board cannot possess more than a total of 1000 hooks including hooks on board the vessel and hooks being fished and cannot possess more than 750 hooks rigged for fishing at any given time. For the purpose of this paragraph, "hooks rigged for fishing" means hooks attached to a line or other device capable of attaching to the mainline of the longline.

(c) Reef fish longline and buoy gear restricted area. A person aboard a vessel that uses, on any trip, longline or buoy gear in the longline and buoy gear restricted area is limited on that trip to the bag limits for Gulf reef fish specified in § 622.38(b) and, for Gulf reef fish for which no bag limit is specified in § 622.38(b), the vessel is limited to 5 percent, by weight, of all fish on board or landed. The longline and buoy gear restricted area is that part of the Gulf EEZ shoreward of rhumb lines connecting, in order, the points listed in Table 1 in Appendix B of this part.

(d) Alabama SMZ. The Alabama SMZ consists of artificial reefs and surrounding areas. In the Alabama SMZ, fishing by a vessel that is operating as a charter vessel or headboat, a vessel that does not have a commercial permit for Gulf reef fish, as required under § 622.20(a)(1), or a vessel with such a permit fishing for Gulf reef fish is limited to hook-and-line gear with three or fewer hooks per line and spearfishing gear. A person aboard a vessel that uses on any trip gear other than hook-and-line gear with three or fewer hooks per line and spearfishing gear in the Alabama SMZ is limited on that trip to the bag limits for Gulf reef fish specified in § 622.38(b) and, for Gulf reef fish for which no bag limit is specified in § 622.38(b), the vessel is limited to 5 percent, by weight, of all fish on board or landed. The Alabama SMZ is bounded by rhumb lines connecting, in order, the following points:

Point	North lat.	West long.
A	30°02.5'	88°07.7'
B	30°02.6'	87°59.3'
C	29°55.0'	87°55.5'
D	29°54.5'	88°07.5'
A	30°02.5'	88°07.7'

11. § 622.37 Size limits.

All size limits in this section are minimum size limits unless specified otherwise. A fish not in compliance with its size limit, as specified in this section, in or from the Gulf EEZ, may not be possessed, sold, or purchased. A fish not in compliance with its size limit must be released immediately with a minimum of harm. The operator of a vessel that fishes in the EEZ is responsible for ensuring that fish on board are in compliance with the size limits specified in this section. See § 622.10 regarding requirements for landing fish intact.

(a) Snapper—-(1) Red snapper–-16 inches (40.6 cm), TL, for a fish taken by a person subject to the bag limit specified in § 622.38 (b)(3) and 13 inches (33.0 cm), TL, for a fish taken by a person not subject to the bag limit.

12. § 622.38 Bag and possession limits.

(a) Additional applicability provisions for Gulf reef fish. (1) Section 622.11(a) provides the general applicability for bag and possession limits. However, § 622.11(a) notwithstanding, bag and possession limits also apply for Gulf reef fish in or from the EEZ to a person aboard a vessel that has on board a commercial permit for Gulf reef fish--

(i) When trawl gear or entangling net gear is on board. A vessel is considered to have trawl gear on board when trawl doors and a net are on board. Removal from the vessel of all trawl doors or all nets constitutes removal of trawl gear.

(ii) When a longline or buoy gear is on board and the vessel is fishing or has fished on a trip in the reef fish longline and buoy gear restricted area specified in § 622.35(c). A vessel is considered to have a longline on board when a power-operated longline hauler, a cable of diameter and length suitable for use in the longline fishery, and gangions are on board. Removal of any one of these three elements, in its entirety, constitutes removal of a longline.

(iii) For a species/species group when its quota has been reached and closure has been effected, provided that no commercial quantities of Gulf reef fish, i.e., Gulf reef fish in excess of applicable bag/possession limits, are on board as specified in paragraph (a)(2) of this section.

(iv) When the vessel has on board or is tending any trap other than a stone crab trap or a spiny lobster trap.

(2) A person aboard a vessel that has a Federal commercial vessel permit for Gulf reef fish and commercial quantities of Gulf reef fish, i.e., Gulf reef fish in excess of applicable bag/possession limits, may not possess Gulf reef fish caught under a bag limit.

(b) Bag limits--

(3) Red snapper--2. However, no red snapper may be retained by the captain or crew of a vessel operating as a charter vessel or headboat. The bag limit for such captain and crew is zero.

13. § 622.39 Quotas.

See § 622.8 for general provisions regarding quota applicability and closure and reopening procedures. This section, provides quotas and specific quota closure restrictions for Gulf reef fish.

(a) Gulf reef fish--

(2) Recreational quotas. The following quotas apply to persons who fish for Gulf reef fish other than under commercial vessel permits for Gulf reef fish and the applicable commercial quotas specified in paragraph (a)(1) of this section.

(i) Recreational quota for red snapper--4.145 million lb (1.880 million kg), round weight.

(c) Restrictions applicable after a recreational quota closure--

(1) After closure of the recreational quota for red snapper. The bag and possession limit for red snapper in or from the Gulf EEZ is zero.

APPENDIX G. ECONOMIC ANALYSIS OF RED SNAPPER ALLOCATION ALTERNATIVES FOR AMENDMENT 28 TO THE GULF OF MEXICO REEF FISH FMP

Juan J. Agar, David W. Carter

Southeast Fisheries Science Center

National Oceanic and Atmospheric Administration

75 Virginia Beach Drive

Miami, FL 33149

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Introduction

This report investigates the economic effects of the alternatives proposed in Amendment 28 to the Reef Fish Fishery Management Plan (FMP) of the Gulf of Mexico. Amendment 28 considers revising the 51% commercial/49% recreational allocation formula set in Amendment 1 to the Reef Fish FMP. Specifically, alternatives 2 through 4 consider increasing the recreational sector allocation by 3%, 5% and 10%, respectively; whereas alternatives 5 and 6 would only reallocate quota increases when the red snapper quota is greater than 9.12 million pounds (mp) whole weight (ww) (Table 2). Alternative 5 would allocate 75% of quota increases (above 9.12 mp) to the recreational sector and 25% to the commercial sector, whereas alternative 6 would allocate 100% of the quota increases (above 9.12 mp) to the recreational sector.

Conceptually, the economic value of a two-sector fishery, given a set quota level, reaches a maximum when quota is efficiently allocated among the two sectors. This occurs when the net benefit of the last unit of quota allocated to one sector equals the net benefit of the last unit of quota allocated to the other sector. If these marginal net benefits are not equal, then the economic benefits to the nation can be improved by shifting quota from the sector with the lower marginal net benefit to the sector with the higher marginal net benefit for a unit of quota.

In the 2012 red snapper allocation analysis (Agar and Carter 2012a), we found that the current allocation was not economically efficient because the marginal net benefit for an additional unit of quota differed between the commercial and recreational sectors. However, we cautioned that the extent to which economic benefits could be increased via reallocation could not be adequately determined at the time. We noted that additional research, improvements in the quality of existing data collections, and new data collections were necessary in order to estimate the economic effects of non-marginal changes to allocation. The caveats mentioned in Agar and Carter (2012a) also

apply to this analysis. The methods used in this analysis follow our earlier work with red snapper and grouper species (Agar and Carter 2012a, b; Carter et al. 2008).

The remainder of the report is structured as follows. Section 2 describes the estimation of the commercial net benefits for the proposed reallocation alternatives. Section 3 describes the calculation of the recreational net benefit for the proposed allocation changes. The last section summarizes the economic effects of the proposed reallocation alternatives and discusses the key results of the analysis.

Commercial Sector Analysis

We explored the economic effects of alternative red snapper quota reallocations using two alternative approaches. The first approach attempted to estimate a derived demand model for red snapper allocation (leased quota) from indirect, trip-level revenue (profit) functions analogous to the framework used by Squires and Kirkley (1995), Carter et al. (2008), and Gentner et al. (2010). Unfortunately, this approach proved unfruitful because the absence of data on rental prices limited our ability to estimate how quasi-fixed input usage would be change in response to quota changes (see, Appendix A for discussion); hence, we pursued a second approach to estimate the economic effects of changes in the allocation formula. The second approach used a reduced form, linear equation to examine the relationship between red snapper allocation prices and quota levels (Newell et al. 2005). In the red snapper commercial fishery, IFQ allocation is the actual poundage of red snapper that shareholder or allocation holder can possess, land, or sell during a given calendar year.

We use allocation prices because they serve as sound proxies for net economic benefits because fishermen will only purchase additional units of allocation as long the as the expected net revenue of the last unit of allocation purchased equals or exceeds the allocation price. At the margin, the

net revenue of last unit of allocation purchased should equal the allocation price. In other words, the market based allocation prices are expected to reflect the expected net revenue from holding additional units of allocation (Clark, 1982; Newell et al. 2005).

In well-behaved quota markets, we expect allocation prices to be a function of, among other things, output and factor prices, harvesting technology, fish abundance, and quota. In particular, we expect the allocation price for red snapper to be positively related to the dockside price of red snapper and negatively related to input prices such as fuel. Also, all other things being equal, as quota levels increase, allocation prices are expected to fall.

Specification and Data for the Allocation Price Regression

We used a specification for the allocation price equation that is similar to the one put forth by Newell et al. (2005). However, our specification is considerably more parsimonious given data limitations and the number of observations available. Specifically, we modelled the average monthly red snapper allocation prices as a function of red snapper dockside prices, diesel fuel price index, annual red snapper quota levels, and dummy variables for quarter and year.[31]

Data on quota levels, and allocation and dockside prices were obtained from the Southeast Regional Office (SERO) IFQ Database. [32] The diesel (#2, WPU057303) price index was obtained from the U.S. Bureau of Labor Statistics along with the consumer price index (CUSR0000SA0) that was used to adjust all prices to 2012 dollars. The analysis focused on the 2007-2012 period when the IFQ program was in place. About 80 percent of the allocation transactions reported zero or very low allocation prices because many participants were concerned about privacy and also because many of the transactions are believed that to have involved non-arm length transfers

[31] We tried other specification that regressed allocation prices against the number of monthly allocation transfers, monthly landings and cumulative landings but these were not statistically significant.
[32] In the commercial red snapper fishery, landings are usually expressed in pounds gutted weight (gw) and dockside, share and allocation prices in dollars per pound of gw. The whole weight to gutted weight conversion factor is 1.11.

between related accounts. Therefore, we created monthly allocation price averages using only observations with values greater or equal $1.2 but less or equal than $5. In addition, because many dockside prices for red snapper were reported as net of allocation price (i.e., dockside price minus allocation price) we generated monthly dockside prices using observations with prices equal or greater than $2.6 and but less than $10. The values generated for monthly allocation and dockside prices follow the guidelines used in the 5 year review of the red snapper IFQ program. The descriptive statistics of the variables used in the analysis are found in Table 3.

Commercial Sector Results

Table 4 shows the OLS results of 4 different models that considered the relationship between red snapper allocation prices and dockside prices, diesel price index, quarterly and yearly variables, and quota levels. In general, the results show that much of the variation in average allocation prices is explained by yearly dummies. Most of the explanatory variables such as dockside prices, diesel 2 index, are not statistically significant when yearly dummy variables are included (Models 2 and 3). Only Model 4 yields a quota parameter that is negative and statistically significant at the 5% level.

To predict the effect of changing quotas on allocation prices while controlling for dockside price, diesel fuel prices and quarterly and yearly fixed effects we use Model 4. The predicted mean allocation price over a range of quotas levels is shown in Table 5 along with the lower (95Lower) and upper (95Upper) confidence estimates of the mean. Table 6 shows the estimated forgone annual net economic benefits from reallocating quota from the commercial to the recreational sector. Alternative 2 (3% change in allocation) was the least onerous alternative to the commercial sector resulting in a net annual loss of $0.8 million, whereas alternative 4 (10% change in allocation) and 6 (100% allocation of quota increases above 9.12 mp) were the most onerous

alternatives to the commercial sector resulting in an annual loss in net benefits of $2.9 million and $2.5 million, respectively.

Recreational Sector Analysis

This section describes the methods used to determine the change in economic net benefits to the recreational sector associated with the allocation alternatives proposed for red snapper in the Gulf of Mexico. The general method is simple: the net benefits of a change in allocation equal the implied change in harvest times the net benefit per pound of fish. Most of this section is spent discussing the approach used to calculate the net benefit for a pound of fish in the recreational sector. We provide further discussion of the concept of net benefit, or willingness-to-pay (WTP), in our previous report on red snapper (Agar and Carter 2012b).

Background and Assumptions

There is no quota market (e.g., ITQ) for recreationally harvested red snapper in the Gulf of Mexico. Nor are harvest estimates timely enough to allow "real-time" quota monitoring in the recreational sector. Therefore, any additional quota allocated to the recreational sector must be distributed via changes in fishing regulations (e.g., bag limits and season length). The regulations used to distribute additional quota can influence the amount of economic benefit generated, if any. In fact, preliminary research at the University of Maryland suggests that the way the recreational sector is managed has important implications for the way we should *measure* the economic benefits of reallocation. Discussion of this issue is beyond the scope of this report, but should be kept in mind as many of the margins we discuss below (trips per season, harvest per trip, etc.) are irrelevant to the analysis if there is no mechanism in place to sort anglers along the margin according to their preferences.

Consider the ways in which aggregate recreational harvest might increase given a reallocation. That is, how can an increase in harvest allocated to the recreational sector be absorbed? In general, aggregate harvest can increase if more pounds are harvested per trip or if more trips are taken. Pounds per trip can increase when more or bigger fish are harvested per trip either because of improvements in the stock, a change in the bag or size limit, changes in technology, or an increase in the time spent fishing per trip. In increase in trips occurs when new anglers start fishing, existing anglers take more trips, or existing trips are redirected from other species to harvest red snapper.

Based on discussions with Council and SERO staff, we assume that there will be no change in the number of pounds harvested per trip, primarily because the Council is unlikely to change the bag or minimum size limits. The Council is likely to extend the red snapper fishing season to allocate additional harvest to the recreational sector. Given data and model limitations we are forced to take a narrow view regarding the effect of the longer season on fishing activity. Specifically, we assume that no new anglers will start fishing and that existing anglers will not change the number of trips they take when the season is extended. If there are no new anglers or trips and the harvest per trip is unchanged, then aggregate harvest can only increase if anglers previously fishing for other species *redirect* to harvest red snapper when the season is open. These assumptions were implicit in our previous analyses, but were somewhat less controversial because we were measuring economic value at the margin or evaluating very small allocation changes. Presently, the Council is considering relatively larger changes in allocation (e.g., 10 percent) and the assumptions of no new anglers or trips are more tenuous. In any case, if new anglers or trips result from the increase in allocation to the recreational sector and the extension of the season, then the increase in economic benefits would probably be higher than measured in this report.

We make five other methodological assumptions:[33] 1) anglers harvest the bag limit, i.e., harvest two red snapper per trip; 2) the average weight per red snapper is 6.34 based on the average from 2011; 3) the net benefit of two red snapper harvested per trip is the same for all trips taken over the season; 4) the net benefit curve for the number of red snapper harvested per trip is estimated using data from 2003; and 5) changes in net benefits to for-hire operators are not measured. Currently, the daily bag limit of red snapper is two fish. Figure 1 demonstrates the potential sensitivity of our results to the different assumptions about the average fish weight and the number of red snapper harvested per trip. In general, the heavier the fish on average, the lower the measures of net benefit. This somewhat counterintuitive outcome is because lower weight fish means more fish can be caught for a given quota increase. Similarly, if we were to assume that only one fish is harvested per trip, instead of two fish, then the measures of net benefit would be higher, as the preference for a second fish is less than for the first.

As we describe below, our estimate of angler benefit for fish on a trip is based on data from 2003 (inflation adjusted). Currently an economic survey of anglers in the Gulf of Mexico is being fielded and is scheduled to end in spring of 2014. We will have some preliminary results by the end of the year. Until then, however, we do not know whether estimates using more recent data would be higher or lower than the estimates from the 2003 data. Consequently, we cannot speculate as to how our measures of the economic value associated with increased quota in the recreational sector would change with more recent data.

We do not attempt to measure changes in economic value (producer surplus) accruing to operators/owners in the charter and head boat industry. In fact, by assuming that trips do not

[33] As in the previous analyses, we also ignore dynamic feedbacks (e.g., congestion or stock effects) because this type of response is unlikely to be significant in the short-term, i.e. one year.

change, we are also assuming that the only way to have changes in producer surplus would be for for-hire profits to be relatively higher on trips that offer red snapper. The angler benefit estimates described below suggest that some anglers are indeed willing to pay a premium for trips that offer red snapper. However, for the analysis we assume that trip costs are same regardless of species offerings such that the all economic value increase (surplus) from longer seasons accrues to anglers. Our estimates of the economic value associated with increased quota in the recreational sector would be higher if we were to include the value accruing to the for-hire sector operators/producers. The potential consequences for our results of relaxing the key assumptions we have described are summarized in Table 7 .

Calculation of the Net Benefit of Two Red Snapper Harvested per Trip

Following Agar and Carter (2012a,b) we use the results from an analysis of a stated preference choice experiment conducted in 2003 (Carter and Liese 2012). In this analysis, the total benefit[34] for harvest of species *j* per trip by angler *i* is given by

(1) $$\boldsymbol{TB_{ij}(h) = \beta_{ij} \sinh^{-1} h_j}$$

where β_{ij} is a preference parameter for the harvest of h_j number of fish of species j. The preference parameters are randomly distributed and correlated across species as a multivariate normal: $\beta_{ij} \sim N(\bar{\beta}_j, \Omega)$ where a $\bar{\beta}_j$ is the mean vector and Ω is the covariance matrix for the joint distribution. Expression 1 measures the amount of money you would have to take from angler *i* to make him indifferent to harvesting *h* fish per trip versus no fish per trip. Figure 2 shows the total benefit function plotted over the number of fish harvested per trip for each species evaluated at the

[34] Total benefit is measured by the compensating variation that equates the indirect utility of a trip harvesting *h* fish of species *j* with the indirect utility of a trip that harvests zero fish of species *j*.

mean value of the preference parameter.[35] This figure suggests that the average angler would be willing to pay around $200 to keep two red snapper on a trip versus a trip where no red snapper could be kept. Note, however, that we are assuming that red snapper harvest increases with an extended season because anglers redirect from harvesting another species. Therefore, we need to subtract the total anglers get from the harvest of their next preferred species to get a net benefit for the opportunity to harvest two red snapper on a trip. We used the following Monte Carlo simulation to estimate this net benefit and associated confidence bounds:

1. Draw 10,000 vectors of 14 parameters from the multivariate normal, including 4 species preference parameters, $(\bar{\beta}_1, \bar{\beta}_2, \bar{\beta}_3, \bar{\beta}_4)$, and the 10 components, $(\rho_{11}, \rho_{21}, \rho_{22}, \rho_{31}, \rho_{32}, \rho_{33}, \rho_{41}, \rho_{42}, \rho_{43}, \rho_{44})$, of the lower triangular Cholesky factorization matrix corresponding to the estimate of Ω. The mean preference parameters and Cholesky terms along with the corresponding covariance matrix are shown in the Appendix.
2. For each of the 10,000 vectors of preference parameters and lower triangular Cholesky factorization matrix elements drawn in step 1:
    a. Draw 10,000 "anglers" or coefficient vectors, $(\bar{\beta}_{i1}, \bar{\beta}_{i2}, \bar{\beta}_{i3}, \bar{\beta}_{i4})$, from the multivariate normal using the mean preference parameters and the Cholesky factorization matrix terms as follows:

$$\begin{pmatrix} \beta_{i1} \\ \beta_{i2} \\ \beta_{i3} \\ \beta_{i4} \end{pmatrix} = \begin{pmatrix} \bar{\beta}_1 \\ \bar{\beta}_2 \\ \bar{\beta}_3 \\ \bar{\beta}_4 \end{pmatrix} + \begin{bmatrix} \rho_{11} & & & \\ \rho_{21} & \rho_{22} & & \\ \rho_{31} & \rho_{32} & \rho_{33} & \\ \rho_{41} & \rho_{42} & \rho_{43} & \rho_{44} \end{bmatrix} \begin{bmatrix} \zeta_{i1} \\ \zeta_{i2} \\ \zeta_{i3} \\ \zeta_{i4} \end{bmatrix}$$

[35] The graph is plotted from zero to five fish, but the original experiment did not include alternative trips in which no fish were harvested. Hence the value of one fish is an out-of-sample extrapolation. Zero marginal value for zero fish is a quite plausible assumption.

where the ζ terms are drawn from the standard normal distribution.

b. Calculate total benefit for two fish per trip for each species for each of the 10,000 "anglers" drawn in 2a using equation 1.

c. Based on the results in 2b, keep the "red snapper anglers" where the total benefit for red snapper is greater than the total benefit for other species.

d. For each "red snapper angler", calculate the net benefit as the total benefit for red snapper minus the total benefit for the species with the next highest total benefit.

e. Return the mean (and median) net benefit over the vector calculated in 2d.

3. Calculate the mean and confidence bounds based on the 10,000 estimates of the mean and median net benefit generated by evaluating step 2 on each of the vectors drawn in step 1.

This measure of net benefit is converted to net benefit per pound by dividing by the pounds per fish and the number of fish harvested on the trip, assumed to be two fish based on the current bag limit.

The results of the simulation are shown in Table 8. On average around 20% of the 10,000 anglers "preferred" red snapper over the other three species, i.e., these anglers had a total benefit for red snapper that was higher than the total benefit for any other species. The mean and confidence bounds are shown for the simulated mean and median net benefit estimates in 2003 and 2012 dollars. We also show the results converted to the net benefit per pound. The estimates range from $8 to $12 per pound in 2012 dollars. Note that these confidence bounds only account for parameter uncertainty and the heterogeneity angler preferences. There are other potential sources (e.g., structural or model) of uncertainty that are not captured.

Recreational Sector Results

Table 9 shows the economic value of changes in the red snapper allocation to the recreational sector. The allocation is shown in the first column and the change in the allocation from the Alternative 1 (status quo) is shown in the second column. The numbers in the second column are multiplied by the *mean* net benefit per pound in 2012 dollars ($11.21) from Table 8 to get the change in economic value relative to the status quo that is presented in the last column. This simple method ensures that the change in economic value moves in the same direction and is proportional to the change in allocation to the recreational sector.

Results and Conclusions

Amendment 28 to the GOM Reef Fish FMP is revisiting the existing allocation formula between the commercial and recreational sectors. Specifically, the Amendment is considering alternatives that would increase the recreational sector allocation between 3% and 10% or assigning 25% or 100% of the quota increases to the recreational sector when snapper quota is greater than 9.12 mp ww.

This analysis shows that on economic efficiency grounds, benefits to the nation could be increased by redistributing some of the quota from the commercial to the recreational sector. In general, the larger the share of quota redistributed to the recreational sector, the greater the economic benefits to the nation. The analysis suggests that the 10% redistribution alternative generates the most benefits to the nation, at about $6.16 million annually whereas the 3% redistribution alternative generates the least benefits to the nation of about $1.92 million annually. Table 9 summarizes the key results of the analysis. We caution, however, that the results of this analysis are conditional on a number of simplifying assumptions and, strictly speaking, apply at the margin and to the quota level at the time the data were collected. The methods and assumptions become tenuous at “large” reallocations. As emphasized in our previous allocation work (Agar

and Carter 2012a, b), more and better data and analysis are necessary to accurately measure the potential economic implications of relatively large reallocations of fishery stocks as well as adequately capture other economic surpluses in the wholesale and retail markets. However, some of these surpluses are not expected to be large due to the presence of substitutes.

Finally, it should be pointed out, that National Standard 5 of the Magnuson Stevens Reauthorization Act of 2006 states "Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose." In other words, economic efficiency considerations alone should not be the only guiding criteria for making re-allocation decisions.

Table 2. Gulf of Mexico Red Snapper Allocation Alternatives

Alternative	Commercial Sector Quota (Million Pounds Whole Weight)	Commercial Sector %	Recreational Sector Quota (Million Pounds Whole Weight)	Recreational Sector %
1 (Status Quo)	5.610	51.0	5.390	49.0
2	5.280	48.0	5.720	52.0
3	5.060	46.0	5.940	54.0
4	4.510	41.0	6.490	59.0
5	5.121	46.6	5.879	53.4
6	4.651	42.3	6.349	57.7

Table 3. Descriptive Statistics of the Variables Used in the Analysis (n=72)

Variable	Mean	Median	Std. dev.	Min	Max
Red snapper monthly allocation price ($/lb)	2.84	2.98	0.34	1.99	3.31
Red snapper monthly dockside price ($/lb)	4.37	4.42	0.13	4.05	4.54
Diesel #2 price index	0.85	0.83	0.21	0.44	1.36
Red Snapper commercial quota (Million Pounds Gutted Weight)	2.81	2.99	0.52	2.30	3.71

Sources: NOAA IFQ Database and BLS. All prices are adjusted to 2012 dollars using the CPI.

Table 4. Allocation Price Regression Results (n=72)				
Independent Variables	Model 1	Model 2	Model 3	Model 4
Intercept	-6.70523*** (0.61902)	-6.81492*** (0.60554)	0.77921 (1.31535)	1.51673 (1.43179)
Monthly dockside price	2.13208*** (0.14335)	2.15326*** (0.14021)	0.45214 (0.29226)	0.34118 (0.30846)
Diesel #2 price index	-0.12826 (0.09848)	-0.16243** (0.09714)	-0.15544 (0.13327)	-0.23727* (0.13504)
Commercial Quota	0.11914*** (0.04145)	0.13078*** (0.04237)	-0.09668 (0.06520)	-0.20046** (0.08734)
Quarter 2		0.05893 (0.05162)		0.05401 (0.04198)
Quarter 3		0.05534 (0.05287)		0.13020** (0.04961)
Quarter 4		-0.06062 (0.05252)		0.06270 (0.05119)
Year 2008			0.20261** (0.08427)	0.20201*** (0.08185)
Year 2009			0.52325*** (0.09461)	0.50200*** (0.09345)
Year 2010			0.68000*** (0.10973)	0.72767*** (0.11596)
Year 2011			0.74341*** (0.12851)	0.85477*** (0.14463)
Year 2012			0.76603*** (0.14856)	0.91003*** (0.17169)
R Squared	0.7976	0.8176	0.8851	0.8978
Adjusted R Squared	0.7886	0.8008	0.8705	0.8791
F Value	89.31	48.56	60.66	47.92
Prob.> F	<.0001	<.0001	<.0001	<.0001

Table 5. Predicted Mean Allocation Price at Different Quota Levels

Quota (Million Pounds Gutted Weight)	Predicted Price ($/lb)		
	Mean	95Lower	95Upper
4.06	2.95	2.69	3.21
4.19	2.93	2.66	3.19
4.56	2.85	2.56	3.15
4.61	2.84	2.55	3.14
4.76	2.81	2.50	3.12
5.06	2.75	2.41	3.10

Table 6. Annual Economic Cost (Losses) to the Commercial Sector of the Various Reallocation Alternatives.

Alternative	Quota (Million Pounds Gutted Weight)	Quota share (%)	Poundage lost relative to Alt. 1	Economic cost (losses) ($ million/year)
1 (Status quo)	5.06	51	-	-
2	4.76	48	0.30	0.8 (0.7-0.9)
3	4.56	46	0.50	1.4 (1.2-1.6)
4	4.06	41	1.00	2.9 (2.6-3.2)
5	4.61	46.6	0.45	1.3 (1.1-1.4)
6	4.19	42.3	0.87	2.5 (2.2-2.7)

Table 7. Effect of Relaxing Key Assumptions in Recreational Sector Analysis

Assumption	Relaxing Assumption Makes Results
No new anglers or trips	Higher
All trips harvest two red snapper	Higher
Data from 2003	?
Only measured value to angler (i.e., for-hire operators not included)	Higher

Table 8. Net Benefit for Two Red Snapper Keep Calculated from the Simulation

	Simulated Mean	Simulated Median
--Net Benefit (2003 dollars)--		
Mean	$114.06	$92.75
95Lower	$104.71	$84.09
95Upper	$123.73	$101.74
--Net Benefit (2012 dollars)--		
Mean	$142.11	$115.56
95Lower	$130.46	$104.76
95Upper	$154.16	$126.76
--Net Benefit per pound (2012 dollars)--		
Mean	$11.21	$9.11
95Lower	$10.29	$8.26
95Upper	$12.16	$10.00

Notes: The 2003 dollars are inflated to 2012 dollars using the January CPI from series CUSR0000SA0. The net benefit per pound is based on two fish at 6.34 pounds each.

Table 9. Economic Value of Changes in the Red Snapper to the Recreational Sector

Alternative	Recreational Allocation (Million Pounds Whole Weight)	Change in Recreational Allocation from Alt1	Change in Economic Value to Anglers Relative to Alt1 (Millions$)
1 (Status Quo)	5.39		
2	5.72	0.33	$2.72
3	5.94	0.55	$4.53
4	6.49	1.1	$9.06
5	5.88	0.49	$4.03
6	6.35	0.96	$7.90

Table 10. Change in Benefits (Millions of Dollars) to the Commercial and Recreational Sectors and the Net Benefits of the Alternative Allocations Relative to the Status Quo (Alternative 1)

Alternative	Commercial	Recreational	Net
2	-$0.80	$2.72	$1.92
3	-$1.40	$4.53	$3.13
4	-$2.90	$9.06	$6.16
5	-$1.30	$4.03	$2.73
6	-$2.50	$7.90	$5.40

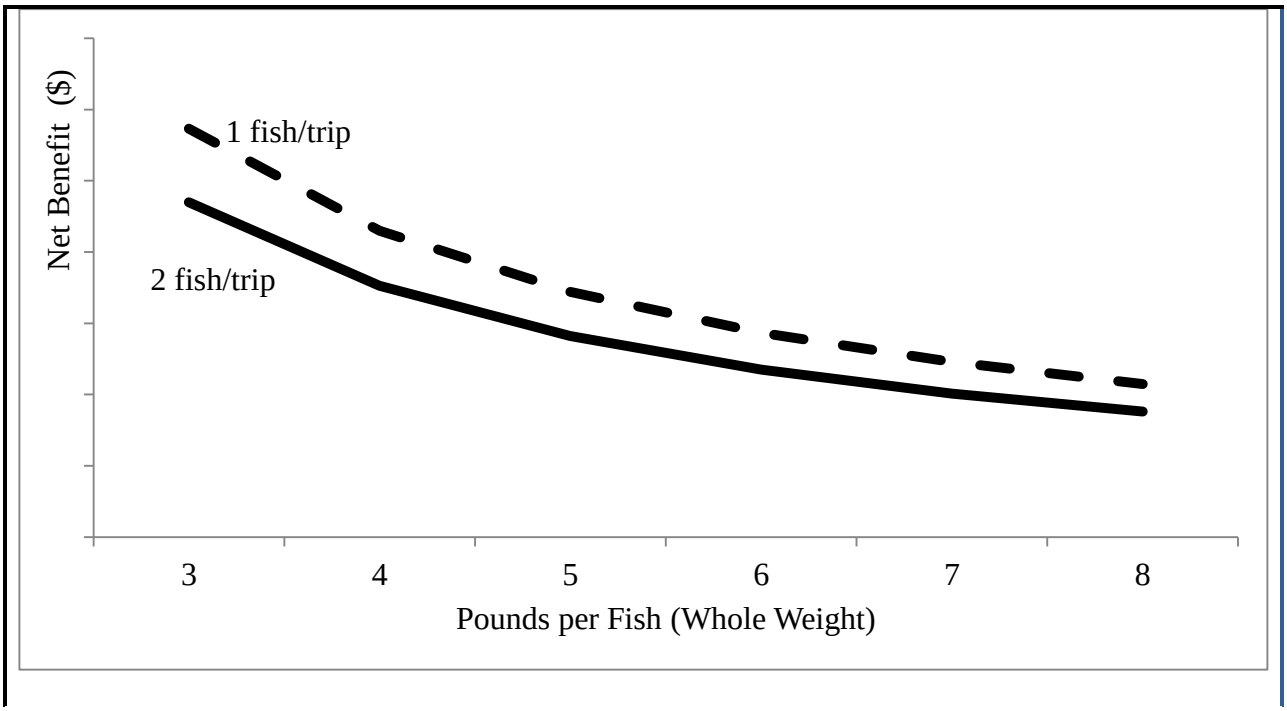


Figure 1. Sensitivity of Recreational Net Benefit Calculations to Pounds per Fish and the Number of Fish Harvested per Trip.

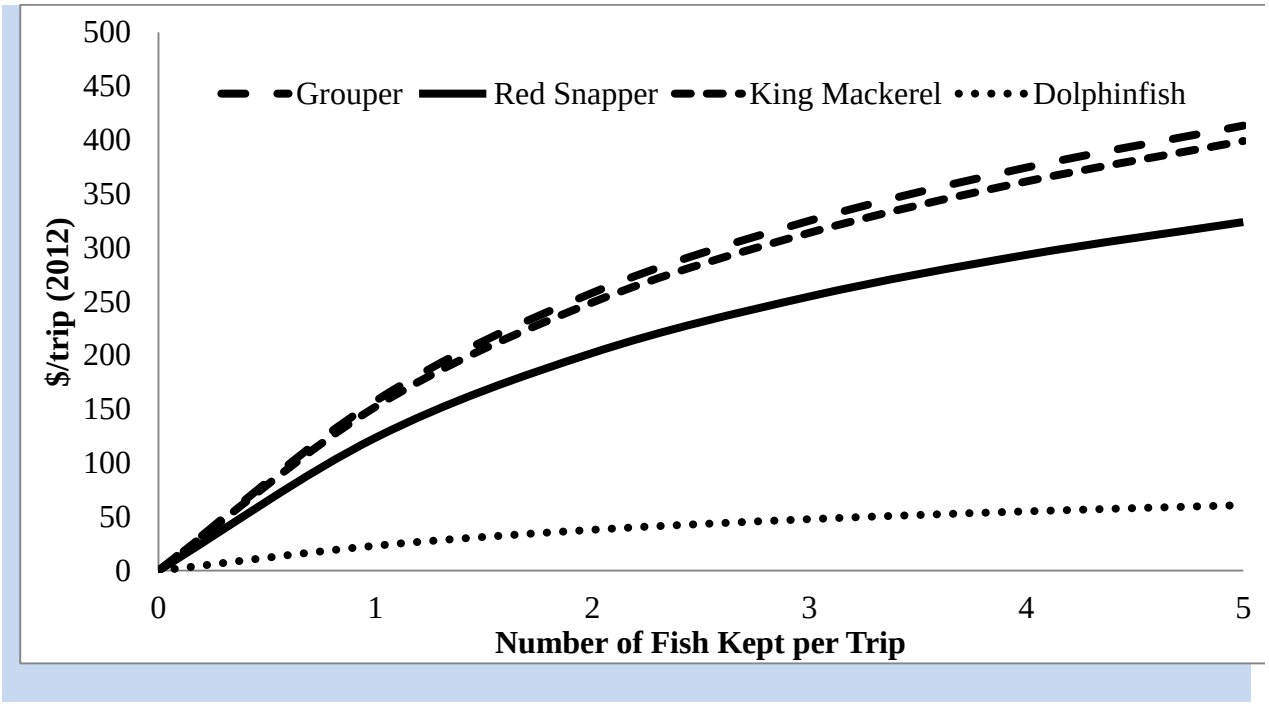


Figure 2. Average Angler Total Benefit by Number of Fish Kept per Trip for each Species

References

Agar, J.J. and D.W. Carter. 2012a. "Is the Allocation of Red Snapper in the Gulf of Mexico Economically Efficient?" NOAA Fisheries, Southeast Fisheries Science Center, Miami, Florida.

Agar, J.J. and D.W. Carter. 2012b. "Are the Allocations of Gag, Red, and Black Grouper in the Gulf of Mexico Economically Efficient?" NOAA Fisheries, Southeast Fisheries Science Center, Miami, Florida.

Carter, D.W., J.J. Agar, and J.R. Waters. 2008. Economic Framework for Fishery Allocation Decisions with an Application to Gulf of Mexico Red Grouper. *NOAA Technical Memorandum* NMFS-SEFSC-576, 96 p.

Carter, D.W. and C. Liese. 2012. "The Economic Value of Catching and Keeping or Releasing Saltwater Sportfish in the Southeast USA." *North American Journal of Fishery Management* 23: 613-625.

Clark, C.W. 1982. "Towards a predictive model for the economic regulation of commercial fisheries." *Canadian Journal of Fisheries and Aquatic Sciences*, **37**:1111-1129.

Gentner, B., J. Kirkley, P. R. Hindsley, and S. Steinback. 2010. Summer Flounder Allocation Analysis. *NOAA Technical Memorandum* NMFSF/SPO-111, 93 p.

Newell, R.G., Sanchirico, J.N. and Kerr, S. 2005. "Fishing Quota Markets." *Journal of Environmental Economics and Management* 49: 437–462.

Squires, D. and J. Kirkley. 1991. "Production Quota in Multiproduct Pacific Fisheries." *Journal of Environmental Economics and Management* 21: 109-126.

Squires, D. and J. Kirkley. 1995. "Resource Rents from Single and Multispecies Individual Transferable Quota Programs." *ICES Journal of Marine Science*, 52 (2):153-164.

Appendix A: Discussion of the Derived Demand Approach to Benefits Estimation in the Commercial Sector

This approach models how fishermen choose their profit maximizing species mix at the trip level given quasi-fixed inputs (e.g., capital and labor available), weather, resource constraints, relative product prices, etc. These models can examine how fishermen would change their harvest mix and revenue stream if either quota(s) were imposed or quota levels were changed. This can be done by imputing a *virtual or net dockside price (i.e., dockside price minus allocation price)* for each of the quota-constrained species.[36] After determining the impact of virtual prices on the harvest level and mix of the fleet, the economic impact of quota changes can be calculated by integrating under the allocation price curve.

For the red snapper allocation analysis, we estimated the output (harvest) supply functions derived from two different Leontief revenue specifications. The first specification included two species (i.e., red snapper and other species) and the second one included three species (i.e., red snapper, other mid-water snappers-mainly vermilion snapper, and other species). These models regressed each species (or species' group) harvest per trip against relative dockside prices (virtual price for red snapper since it was quota constrained), quasi-fixed input (i.e., crewdays*vessel length), and dummy variables for quarter, year, and region (i.e., Panhandle Florida plus Alabama and Mississippi, Non-Panhandle Florida, Texas, Louisiana).

In general, we found that own-price elasticity of supply of red snapper was positive but fairly inelastic suggesting that fishermen have limited ability to re-adjust their production of red snapper in response to changes in its own-virtual price. To examine the economic effect of changing quota levels, we assumed that fishermen would take same number of trips as in 2012 and would readjust

[36] Virtual prices are equivalent to those 'net' dockside prices (i.e., dockside price minus allocation price) that would induce a fishing vessel operating without quota constrains to operate in the same manner as when faced with quotas (Squires and Kirkley, 1991).

their catch mix in response to changes in red snapper's virtual price. Unfortunately, these models predicted that the fleet could not exhaust the 36.4% increase in red snapper quota, from 3.71 mp gutted weight (gw) in 2012 to 5.06 mp gw in 2013, by re-organizing their product mix at the 2012 effort levels indicating that the relatively large quota increase could only be absorbed with additional trips. Because we do not have the information on rental prices for quasi-fixed inputs (i.e., of crew days times vessel length) currently we cannot determine how effort would change in response to changes in the quota/virtual price (Squires and Kirkley, 1991).

Appendix B: Materials for the Monte Carlo Simulation in the Recreational Sector Analysis

Table B.1. Mean Parameters

Species	Type	Symbol	Mean Estimate	Covariance Matrix Label
dolphin	Beta	β_3	2.1	d
dolphin, grouper	Cholesky	ρ_{13}	0.549	dg
dolphin, red snapper	Cholesky	ρ_{23}	0.423	dr
grouper	Beta	β_1	1.43	g
king mackerel	Beta	β_4	1.38	k
king mackerel, dolphin	Cholesky	ρ_{34}	0.985	kd
king mackerel, grouper	Cholesky	ρ_{14}	0.813	kg
king mackerel, red snapper	Cholesky	ρ_{24}	0.0242	kr
red snapper	Beta	β_2	1.12	r
red snapper, grouper	Cholesky	ρ_{12}	0.859	rg
dolphin, dolphin	Cholesky	ρ_{33}	10.7	dd
grouper, grouper	Cholesky	ρ_{11}	1.51	gg
king mackerel, king mackerel	Cholesky	ρ_{44}	1.69	kk
red snapper, red snapper	Cholesky	ρ_{22}	1.03	rr

Table B.2. Covariance Matrix

	d	dg	dr	g	k	kd	kg	kr	r	rg	dd	gg	kk	rr
d	0.0873	0.00136	0.00101	0.00349	0.00422	0.00201	0.00111	2.96E-05	0.0028	0.00115	-0.00072	0.00217	0.00243	0.00158
dg	0.00136	0.00159	0.000848	0.000605	0.00048	0.00111	0.000153	3.24E-05	0.000396	0.000316	0.00495	0.000587	0.000635	0.000371
dr	0.00101	0.000848	0.00127	0.000445	0.000372	0.000806	0.000184	-5.6E-05	0.000309	0.000256	0.00438	0.000434	0.0005	0.000343
g	0.00349	0.000605	0.000445	0.00365	0.00171	0.000997	0.00079	6.19E-05	0.00131	0.000792	0.00982	0.00159	0.00168	0.00102
k	0.00422	0.00048	0.000372	0.00171	0.00416	0.000905	0.000852	3.23E-05	0.0012	0.000784	0.00925	0.00134	0.00166	0.000872
kd	0.00201	0.00111	0.000806	0.000997	0.000905	0.00269	0.000479	5.12E-05	0.000694	0.000566	0.00843	0.000982	0.00114	0.000656
kg	0.00111	0.000153	0.000184	0.00079	0.000852	0.000479	0.0022	-0.00019	0.000613	0.000656	0.00636	0.000971	0.000918	0.000552
kr	2.96E-05	3.24E-05	-5.6E-05	6.19E-05	3.23E-05	5.12E-05	-0.00019	0.000841	1.44E-05	-5.6E-05	-0.00015	6.38E-05	0.000101	6.16E-05
r	0.0028	0.000396	0.000309	0.00131	0.0012	0.000694	0.000613	1.44E-05	0.00291	0.000575	0.00713	0.00106	0.00118	0.00071
rg	0.00115	0.000316	0.000256	0.000792	0.000784	0.000566	0.000656	-5.6E-05	0.000575	0.00146	0.00632	0.00103	0.000991	0.000559
dd	-0.00072	0.00495	0.00438	0.00982	0.00925	0.00843	0.00636	-0.00015	0.00713	0.00632	0.132	0.0103	0.012	0.00657
gg	0.00217	0.000587	0.000434	0.00159	0.00134	0.000982	0.000971	6.38E-05	0.00106	0.00103	0.0103	0.00239	0.00172	0.00101
kk	0.00243	0.000635	0.0005	0.00168	0.00166	0.00114	0.000918	0.000101	0.00118	0.000991	0.012	0.00172	0.00312	0.00111
rr	0.00158	0.000371	0.000343	0.00102	0.000872	0.000656	0.000552	6.16E-05	0.00071	0.000559	0.00657	0.00101	0.00111	0.00144

Mathematica Notebook for the Net Benefit of 2 Red Snapper Harvested on a Trip (referred to as "Net WTP" in the Notebook)

Total willingness-to-pay (WTP) function

```
twtp=b ArcSinh[h];
```

Parameters from the 2003 SPCE model (grouper, red snapper, dolphinfish, and king mackerel)

Mean (scaled) random parameter vector and corresponding covariance matrix

```
betas={1.430,1.120,2.100,1.380} ;
cov={{3.450,1.510,5.901,0.205},
   {1.510,1.970,4.543,0.557},
   {5.901,4.543,115.000,10.579},
   {0.205,0.557,10.579,4.840} };
```

Select the number corresponding to the species for the rest of the analysis (red snapper is species 2)

```
sn=2.;
```

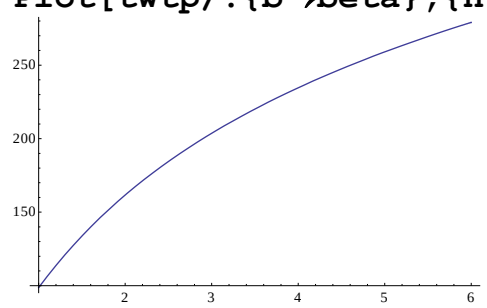
Plot of total willingness-to-pay parameterized with the mean species parameter from the 2003 SPCE model

Select the mean parameter of the species of interest and rescale

```
beta=betas[[sn]] 100.;
```

Plot of the total from one to six fish

```
Plot[twtp/.{b→beta},{h,1,6}]
```



Total WTP per trip at one and two fish

```
 twtp/.{b→beta, h→1}
twtp/.{b→beta, h→2}
 98.7138
 161.687
```

Set seed for random draws

```
 SeedRandom[1234];
```

Function to select rows from a matrix based on criteria applied to one column.

```
select[table:{colNames_List,rows__List},where[condition_]]:
=With[{selF=Apply[Function,Hold[condition]/.Dispatch[Thread
[colNames→Thread[Slot[Range[Length[colNames]]]]]]]},Select[
{rows},selF@@#&]];
```

Parameter estimates and related covariance matrix from the RPL model, including the heterogeneity (covariance) terms.

```
betas0={2.1,0.549,0.423,1.43,1.38,0.985,0.813,0.0242,1.12,0
.859,10.7,1.51,1.69,1.03};
cov0=Import["C:\\Users\\dcarter\\Desktop\\working\\projects
\\seConjoint2003\\output\\BIOGEME\\runToGetVCOV\\vcov.csv"]
;
```

Create a multivariate normal distribution with the mean parameter estimates and related covariance matrix from the RPL model.

```
 betasn0=MultinormalDistribution[betas0,cov0];
```

Draw 10,000 vectors of the parameter estimates from the RPL model, including the heterogeneity (covariance) terms.

```
 betasn0100=RandomVariate[betasn0,10000.] ;
```

Functions to correctly order the parameter vector and Cholesky matrix and to reconstruct the covariance matrix of the random parameters.

```
 cbetas[b_]:={b[[4]],b[[9]],b[[1]],b[[5]]}
ccol[c_]:=
 (
  cc={
    {c[[12]],0,0,0},
    {c[[10]],c[[14]],0,0},
```

```
    {c[[2]],c[[3]],c[[11]],0},
    {c[[7]],c[[8]],c[[6]],c[[13]]}
    }
  )
ccov[c_]:=
 (
  ccol[c].ConjugateTranspose[ccol[c]]
  )
 MatrixForm[ccol[betas0]]
MatrixForm[ccov[betas0]]
MatrixForm[cov]
 (_{
  {1.51, 0, 0, 0},
  {0.859, 1.03, 0, 0},
  {0.549, 0.423, 10.7, 0},
  {0.813, 0.0242, 0.985, 1.69}
 }_)
 (_{
  {2.2801, 1.29709, 0.82899, 1.22763},
  {1.29709, 1.79878, 0.907281, 0.723293},
  {0.82899, 0.907281, 114.97, 10.9961},
  {1.22763, 0.723293, 10.9961, 4.48788}
 }_)
 (_{
  {3.45, 1.51, 5.901, 0.205},
  {1.51, 1.97, 4.543, 0.557},
  {5.901, 4.543, 115., 10.579},
  {0.205, 0.557, 10.579, 4.84}
 }_)
```

Function to calculate the net WTP for *fish* red snapper on a trip when red snapper is available given *d* draws from a multiviariate normal distribution of random parameters given a vector *betasa* including the four preference parameters and the 10 elements of the lower triangular Cholesky matrix corresponding with the preference parameter covariance matrix.

```
 netWTP[fish_,d_,betasa_]:=
 (

betasns100=Table[cbetas[betasa]+Transpose[ccol[betasa]].Ran
domVariate[NormalDistribution[],4],{i,1,d}] 100;
  wtp2=Table[twtp/.{b→betasns100[[All,i]],
```

```
h→fish},{i,1,4}];
  wtp2[[3,All]]=wtp2[[3,All]]/10;
  wtp2t=Transpose[wtp2];
  tt=Table[Max[wtp2t[[i,All]]]==wtp2t[[i,2]],{i,d}];
  wtp2tf=MapThread[Prepend,{wtp2t,tt}];

wtp2tff=Prepend[wtp2tf,{"rsmax","wtp2g","wtp2r","wtp2d","wt
p2k"}];
  wtp2tff0=select[wtp2tff,where["rsmax"□True]];
  tt2=Table[wtp2tff0[[i,3]]-
Max[wtp2tff0[[i,{2,4,5}]]],{i,Length[wtp2tff0]}];
  drs=Length[tt2];
  {N[drs/d],If[drs□0,0,Mean[tt2]],If[drs□0,0,Median[tt2]]}
  )
```

Test evaluation for 2 fish using 10,000 draw and the means of the four preference parameters and the 10 elements of the lower triangular Cholesky matrix

```
 netWTP[2,10000.,Mean[betasn0]]
 {0.2328,114.867,93.2638}
```

Launch the kernels used for parallel evaluation and distribute the netWTP function to each kernal.

```
 LaunchKernels[]
DistributeDefinitions[netWTP]

{KernelObject[1,local],KernelObject[2,local],KernelObject[3
,local],KernelObject[4,local],KernelObject[5,local],KernelO
bject[6,local]}
```

Use the 10,000 vectors of the parameter estimates from the RPL model to run the net red snapper WTP function 10,000 times.

```
netWTPmc=ParallelTable[netWTP[2,10000.,RandomVariate[Multin
ormalDistribution[betas0,cov0]]],{i,1.,10000.}];
```

Summary statistics from the run of the net red snapper WTP function 10,000 times

```
 Mean[netWTPmc]
Median[netWTPmc]
```

```
Quantile[netWTPmc,1-.975]
Quantile[netWTPmc,.975]
(Quantile[netWTPmc,.975]-Mean[netWTPmc])/Mean[netWTPmc]
(Quantile[netWTPmc,.025]-Mean[netWTPmc])/Mean[netWTPmc]
 {0.22749,114.063,92.7491}
 {0.2274,114.066,92.6894}
 {0.2032,104.709,84.086}
 {0.2525,123.732,101.737}
 {0.109939,0.084772,0.0969103}
 {-0.106774,-0.0822161,-0.0934628}
```

APPENDIX H. SENSITIVITY RUNS TO EVALUATE THE EFFECT OF RECALIBRATED RECREATIONAL REMOVALS AND RECREATIONAL SELECTIVITY

SENSITIVITY RUNS TO EVALUATE THE EFFECT OF RECALIBRATED RECREATIONAL REMOVALS AND RECREATIONAL SELECTIVITY ON ESTIMATES OF OFL, ABC AND MSY FOR GULF RED SNAPPER

Southeast Fisheries Science Center

March 9, 2015

1. INTRODUCTION

During the January 2015 Gulf of Mexico Fishery Management Council (Council) Standing and Special Reef Fish SSC meeting, the Southeast Fisheries Science Center presented the results of the Red Snapper assessment update. Center staff noted that estimates of the overfishing limit (OFL), acceptable biological catch (ABC) and maximum sustainable yield (MSY) were higher for the update than for the most recent benchmark stock assessment (SEDAR 31) and noted that this disparity likely resulted from a recent recalibration of recreational landing and discard estimates (MRIP) and a new selectivity time-block (2011-2014) added to the update assessment to accommodate a recent increase in the size of red snapper landed in the recreational sector. The Council requested two sensitivity analyses to further elucidate the reason for this disparity:

1. Project the annual OFLs at $F_{26\%SPR}$ and the ABCs at $F_{REBUILD}$ from 2015-2032 using pre-MRIP recalibrated estimates.
2. Project the annual OFLs at $F_{26\%SPR}$ and the ABCs at $F_{REBUILD}$ from 2015-2032 using pre-MRIP recalibrated estimates and no new recreational selectivity block for 201 1-2013.

2. METHODS

The requested sensitivity runs are based on the 2014 update of the SEDAR 31 Gulf of Mexico red snapper assessment (SEDAR 31). Like SEDAR 31, the update assessment and associated projections were conducted using Stock Synthesis (SS: V3.24U[1]). SS is an integrated statistical catch-at-age model which is widely used for stock assessments in the United States and throughout the world. The model, and accompanying documentation and examples are available on the NOAA Toolbox website (NOAA 2011: http://nft.nefsc.noaa.gov/SS3.html). Descriptions of SS algorithms and options were also summarized by Methot (2000) and Methot and Wetzel (2013).

Deterministic projections were run to evaluate stock status and associated retained yields for the specified sensitivity runs. Projections were run from 2015 to 2032 using the base model configuration with provisional 2014 catches as reviewed by the GMFMC SSC on February 19, 2015. Projections were run assuming that selectivity, discarding, and retention would continue as they had in three most recent years (2011-2013). The expected fishing effort levels for the 6 bycatch fleets (shrimp, recreational closed season, and commercial without IFQ allocation) in 2015-2032 were assumed be the same as in 2013. Forecast recruitments were derived from the model estimated Beverton-Holt stock-recruitment relationship, based on the recent time period (i.e., 1984-2013).

The overfishing limit (OFL) and acceptable biological catch (ABC) were calculated as stipulated by the GMFMC SSC during their January 2015 meeting in Tampa, Florida. OFL was calculated as the median (50th percentile) of the probability density function (PDF) of retained yield (millions of lbs) using the projection of FSPR26%. The acceptable biological catch (ABC) was calculated at a P* of 0.427 (the 42.7^{th} percentile) of the PDF of retained yield using the projection of $F_{REBUILD}$, which achieves a gulfwide spawning potential ratio (SPR) of 26% in 2032. A P* of

[1] Stock Synthesis Version 3.24U was made available by Richard Methot (Richard.Methot@noaa.gov) on March 4, 2015. This version allows allocation fractions to vary annually during the projection.

0.427 implies a 42.7% probability of overfishing in any given year. Both sensitivity runs used a 51% commercial: 49% recreational allocation (2015-2032) when projecting OFLs and ABCs.

3. RESULTS AND DISCUSSION

Two important changes were made to the 2014 red snapper update assessment: (1) recent recreational removals were increased owing to a recent recalibration of MRIP recreational landing and discard estimates (**Figure 1**), and (2) a new selectivity time-block (2011-2014) which was added to accommodate a recent increase in the size of red snapper landed in the recreational sector (**Figure 2**). These modifications did not notably affect annual estimates of spawning stock biomass relative to the unfished condition (SSB/SSB_0**; Figure 3**)or fishing mortality (**Figure 4**) but had a modest effect on estimated recruitment (**Figure 5**).

Estimates of OFL and ABC were sensitive to the treatment of MRIP removals and recent recreational selectivity (**Table 1-2**, **Figure 6-7**). The lowest estimated OFL and ABC values occurred when using the pre-recalibrated MRIP estimates without allowing new estimates of 2011-2014 selectivity for the recreational fisheries. Intermediate OFL estimates resulted from using pre-recalibrated MRIP estimates while allowing the new selectivity estimates, and the highest OFL estimates were associated with the approved base model (Recalibrated MRIP, New Selectivity Block).

The results described in this report are dependent on a number of strong assumptions: (1) that selectivity, discarding, and retention will continue as they have in the three most recent years (2011-2013); (2) that the expected fishing effort levels for the 6 bycatch fleets will continue at 2014 levels; and (3) that forecast recruitments will continue at the average of the recent time period (i.e., 1984-2013). If any of these assumptions are violated (e.g. by a change in selectivity, retention/high-grading, environmentally driven recruitment fluctuations) the projected yields will be lower/higher than those required to permit recovery of the red snapper stock by 2032.

4. ACKNOWLEDGMENTS

Stock assessment products depend on a large team of data providers and analysts. In addition to the analytical team (Shannon Cass-Calay (lead), Clay Porch, John Walter and Jake Teztlaff, this update assessment would not have been possible without the substantial efforts of Refik Orhun, Neil Baertlein, Jessica Stephen and Andy Strelcheck (Commercial Catch), Vivian Matter (Recreational Catch and Discards), Kevin McCarthy (Commercial Discards and CPUE), Adyan Rios (Recreational CPUE), Robert Allman, Beverley Barnett and Linda Lombari-Carlson (Life History), Adam Pollock and Walter Ingram (Fishery Independent CPUE), Rick Hart and Jeff Isely (Shrimp Bycatch), Ching-Ping Chih (Size and Age Composition), Sean Powers and John Walter (ROV age composition), Matthew Campbell (Discard Mortlaity) Beverly Sauls and Alisha Gray (Headboat/Charter Discard Size/Age Comp), and Elizabeth Scott-Denton (Shimp Bycatch Size/Age Comp).

5. LITERATURE CITED

Methot, R.D., 2000. Technical description of the Stock Synthesis assessment program.NOAA Tech Memo. NMFS-NWFSC-43.SEDAR. 2013.

Methot, R.D. and Wetzel, C.R. 2013. Stock synthesis: A biological and statistical framework for fish stock assessment and fishery management. Fish. Res. 42:86-99.

NOAA Fisheries Toolbox, 2011. Stock Synthesis, Version 3.23b. http://nft.nefsc.noaa.gov

SEDAR 31 – Gulf of Mexico Red Snapper Stock Assessment Report. SEDAR, North Charleston SC. 1103 pp. Available online at: http://www.sefsc.noaa.gov/sedar/Sedar_Workshops.jsp?WorkshopNum=31

Table 1. OFL (retained yield in millions of lbs whole weight) for the base model and two sensitivity runs. OFL was calculated as the median (50th percentile) of the probability density function (PDF) of retained yield (millions of lbs) using the projection of FSPR26%.

YEAR	BASE	Pre-MRIP Recalibration	Pre-MRIP Recalibration No Sel Block
2015	16.10	15.12	13.42
2016	15.31	14.38	12.68
2017	14.79	13.90	12.31
2018	14.25	13.35	12.04
2019	13.60	12.71	11.69
2020	13.17	12.31	11.49
2021	12.93	12.08	11.36
2022	12.79	11.94	11.27
2023	12.77	11.90	11.25
2024	12.77	11.90	11.26
2025	12.78	11.90	11.26
2026	12.78	11.89	11.26
2027	12.78	11.89	11.27
2028	12.79	11.89	11.27
2029	12.79	11.89	11.27
2030	12.80	11.89	11.28
2031	12.80	11.89	11.28
2032	12.80	11.89	11.28
EQUIL	12.91	11.96	11.37

Table 2. ABC (retained yield in millions of lbs whole weight) for the base model and two sensitivity runs. ABC was calculated at a P* of 0.427 (the 42.7th percentile) of the PDF of retained yield using the projection of $F_{REBUILD}$, which achieves a gulfwide spawning potential ratio (SPR) of 26% in 2032. A P* of 0.427 implies a 42.7% probability of overfishing in any given year.

Year	BASE	Pre-MRIP Recalibration	Pre-MRIP Recalibration No Sel Block
2015	14.29	13.63	11.97
2016	13.96	13.27	11.59
2017	13.75	13.03	11.43
2018	13.39	12.63	11.28
2019	12.85	12.08	11.03
2020	12.49	11.74	10.90
2021	12.29	11.56	10.82
2022	12.18	11.44	10.75
2023	12.17	11.42	10.75
2024	12.19	11.42	10.76
2025	12.21	11.43	10.78
2026	12.22	11.43	10.77
2027	12.23	11.43	10.78
2028	12.24	11.44	10.79
2029	12.25	11.44	10.80
2030	12.26	11.44	10.80
2031	12.27	11.45	10.78
2032	12.27	11.45	10.84
EQUIL	12.40	11.53	10.93

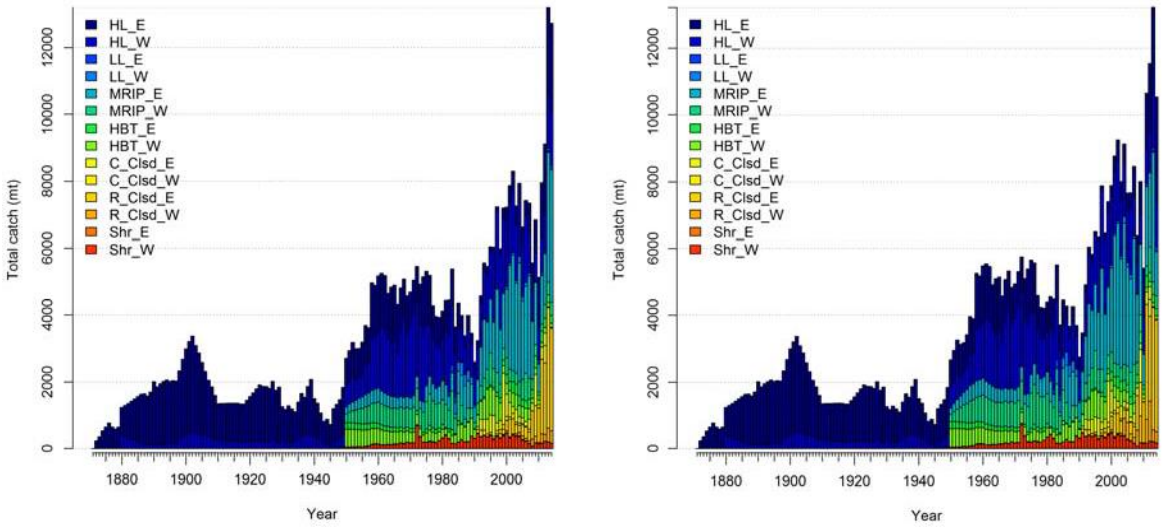


Figure 1. Gulfwide estimated red snapper removals before (left) and after (right) the MRIP recalibration.

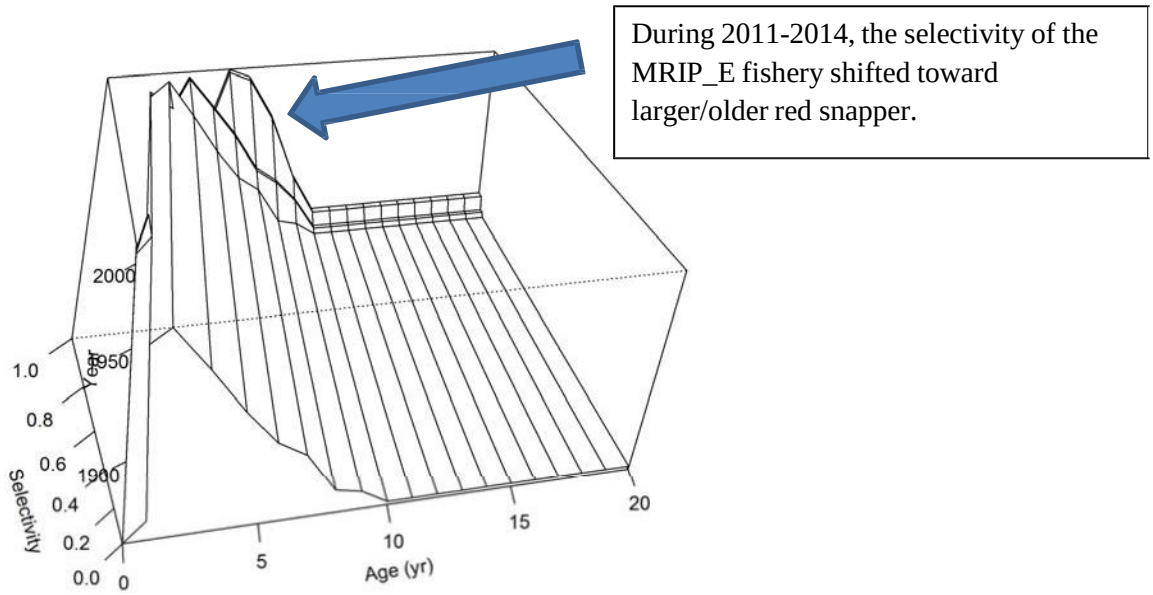


Figure 2. A representative example of the change in the selectivity of the recreational fisheries during 2011-2014. Data indicates that recreational fishers have shifted to larger/older red snapper in the most recent years.

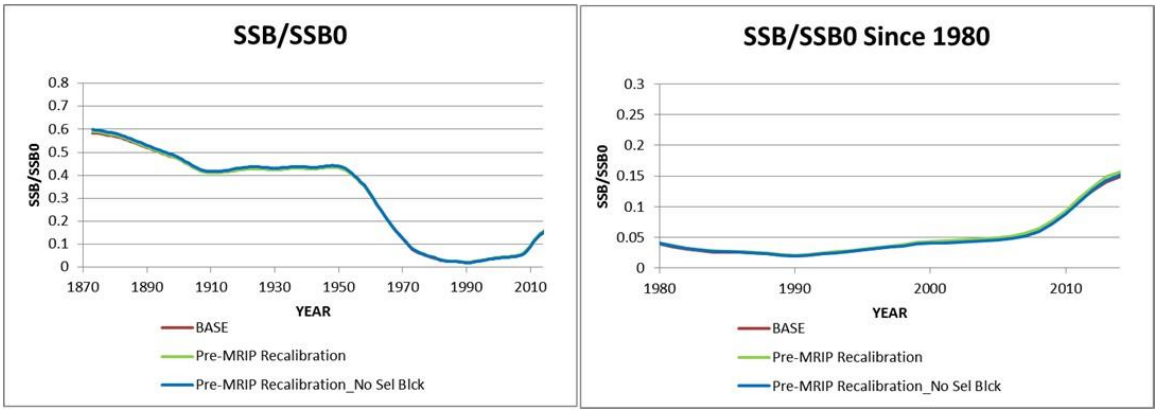


Figure 3. Annual estimates of spawning stock biomass relative to unfished levels during 1872-2013 (left) and in the recent period (right).

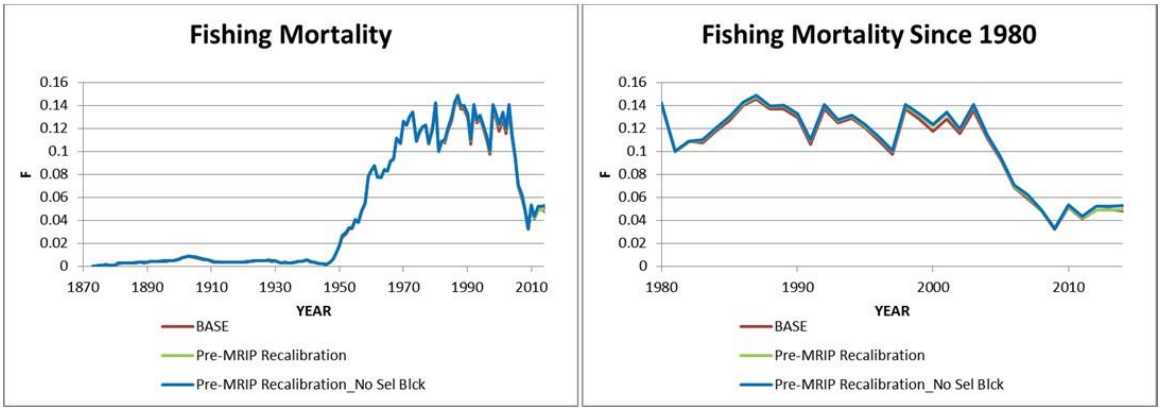


Figure 4. Annual estimates of fishing mortality (computed across all ages) during 1872-2013 (left) and in the recent period (right).

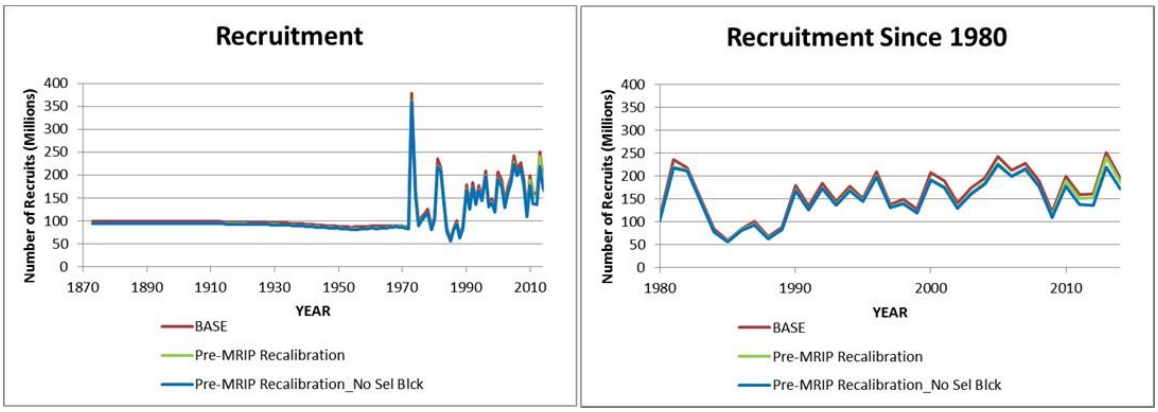


Figure 5. Annual estimates of recruitment (Age 0) during 1872-2013 (left) and in the recent period (right).

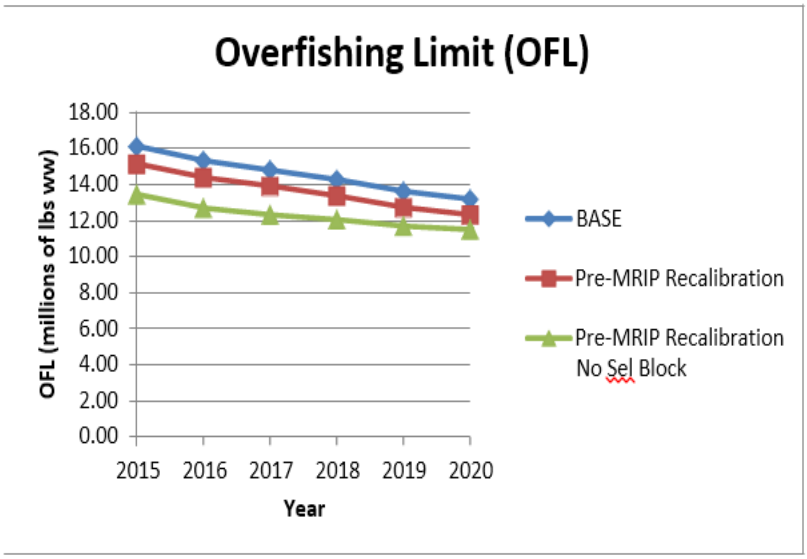


Figure 6. OFL (retained yield in millions of lbs whole weight) for the base model and two sensitivity runs. OFL was calculated as the median (50th percentile) of the probability density function (PDF) of retained yield (millions of lbs) using the projection of FSPR26%.

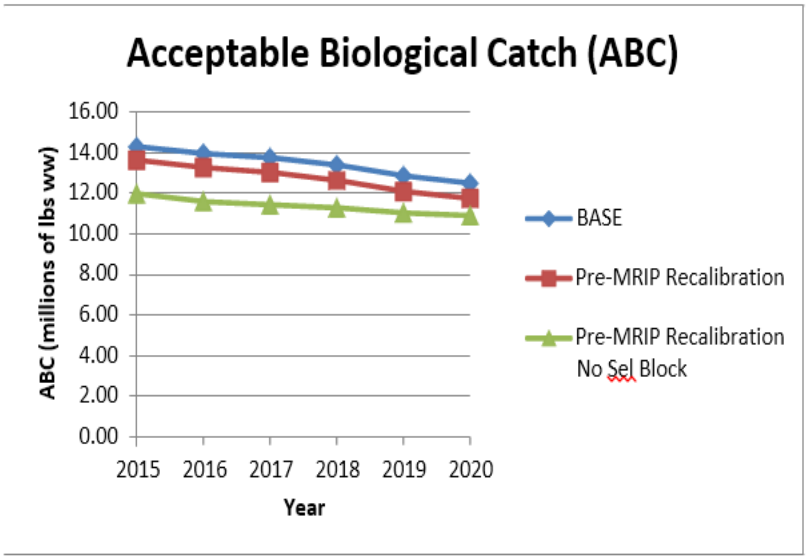


Figure 7. ABC (retained yield in millions of lbs whole weight) for the base model and two sensitivity runs. ABC was calculated at a P* of 0.427 (the 42.7th percentile) of the PDF of retained yield using the projection of $F_{REBUILD}$, which achieves a gulfwide spawning potential ratio (SPR) of 26% in 2032. A P* of 0.427 implies a 42.7% probability of overfishing in any given year.

THE EFFECT OF ALTERNATIVE ALLOCATIONS FOR THE RECREATIONAL AND COMMERCIAL RED SNAPPER FISHERIES IN THE U.S. GULF OF MEXICO

Southeast Fisheries Science Center

March 9, 2015

1. INTRODUCTION

During the January 2015 Gulf of Mexico Fishery Management Council (Council) meeting, the Council requested information pertaining to several proposed alternatives to Amendment 28 of the Reef Fish Fishery Management Plan. These concern the modification of red snapper allocation between the commercial and recreational sectors. Specifically, the Council requested projections of annual OFLs at F26%SPR and annual ABCs at $F_{REBUILD}$ for the period 2015-2032 using the base assessment model run from the most recent update stock assessment. Beginning in 2016, projections should assume the following allocations between the commercial and recreational sectors:

a) 51 % commercial, 49% recreational
b) 45% commercial: 55% recreational
c) 40% commercial, 60% recreational
d) 35% commercial, 65% recreational
e) 30% commercial, 70% recreational

For all projections, the allocation in 2015 was fixed at the current levels, 51% commercial and 49% recreational.

2. METHODS

The results presented in this paper were based on the 2014 update of the SEDAR 31 Gulf of Mexico red snapper assessment (SEDAR 31). Like SEDAR 31, the update assessment and associated projections were conducted using Stock Synthesis (SS: V3.24U[1]). SS is an integrated statistical catch-at-age model which is widely used for stock assessments in the United States and throughout the world. The model, and accompanying documentation and examples are available on the NOAA Toolbox website (NOAA 2011: http://nft.nefsc.noaa.gov/SS3.html). Descriptions of SS algorithms and options were also summarized by Methot (2000) and Methot and Wetzel (2013).

Deterministic projections were run to evaluate stock status and associated retained yields for the specified allocation scenarios. Projections were run from 2015 to 2032 using the base model configuration with updated 2014 catches as reviewed and approved by the GMFMC SSC on February 19. 2015. Projections were run assuming that selectivity, discarding, and retention would continue as they had in the three most recent years (2011-2013). The expected fishing effort levels for the 6 bycatch fleets (shrimp, recreational closed season, and commercial without IFQ allocation) in 2015-2032 were assumed be the same as in 2013. Forecast recruitments were assumed to continue at the average of the recent time period (i.e., 1984-2013).

The overfishing limit (OFL) and acceptable biological catch (ABC) were calculated as stipulated by the GMFMC SSC during their January 2015 meeting in Tampa, Florida. OFL was calculated as the median (50th percentile) of the probability density function (PDF) of retained yield (millions of lbs) using the projection of FSPR26%. The acceptable biological catch (ABC) was calculated at a P* of 0.427 (the 42.7^{th} percentile) of the PDF of retained yield using the projection of $F_{REBUILD}$, which achieved a gulfwide spawning potential ratio (SPR) of 26% in 2032. A P* of 0.427 implies a 42.7% probability of overfishing in any given year.

[1] Stock Synthesis Version 3.24U was made available by Richard Methot (Richard.Methot@noaa.gov) on March 4, 2015. This version allows allocation fractions to vary annually during the projection.

3. RESULTS AND DISCUSSION

The computed OFL (retained yield in millions of lbs whole weight) was positively correlated to the magnitude of recreational allocation over the range of allocations examined (**Figure 1, Table 1**). When 49% of the catch was allocated to the recreational fisheries, the corresponding OFL was 16.1 mp in 2015, 15.31 mp in 2016 and 14.79 mp in 2017. In comparison, when 70% of the catch was allocated to the recreational fisheries, the corresponding OFL increased to 18.17 mp in 2015, 16.71 mp in 2016 and 15.89 mp in 2017.

Similarly, the computed ABC (retained yield in millions of lbs whole weight) was also positively correlated to the magnitude of recreational allocation over the range of allocations examined (**Figure 2, Table 2**). When 49% of the catch was allocated to the recreational fisheries, the corresponding ABC was 14.29 mp in 2015, 13.96 mp in 2016 and 13.75 mp in 2017. In comparison, when 70% of the catch was allocated to the recreational fisheries, the corresponding ABC increased to 16.05 mp in 2015, 15.24 mp in 2016 and 14.78 mp in 2017.

The magnitude of recreational allocation did not affect the speed of recovery to the gulfwide management target ($SSB_{SPR26\%}$; **Figure 3**). However, when the trajectory of spawning stock biomass (SSB/SSB_0) was examined by region, increasing the recreational allocation was expected to result in decreasing spawning stock biomass in the eastern Gulf of Mexico during 2015-2032, while a modest but opposite effect was observed in the western Gulf (**Figure 4**). Following a substantial recovery in the eastern Gulf during 2003–2013 (from 2% to 12% of unfished SSB) the projected spawning stock biomass in the eastern Gulf is expected to decline to 7% of unfished SSB by 2032 if the allocation is held at 49%, and to 4.6% of unfished SSB if the recreational allocation is increased to 70%.

Most recreational fishing takes place in the eastern Gulf of Mexico, therefore increasing the percent allocation of recreational fishing had the effect of increasing removals (landed and discarded dead) of the eastern stock (**Figures 5-7**) and decreasing removals from the western stock. Although the fraction of total red snapper biomass removed by all fisheries combined was insensitive to sector allocation (**Figure 5**), the fraction extracted by the MRIP_E fishery was projected to increase significantly with higher recreational allocation (**Figure 5-6**), which caused a substantial increase in the total removals of the eastern stock (**Figure 7**). When 49% of the retained yield was allocated to the recreational fishery, less than 25% of the eastern standing biomass was predicted to be removed each year. When the recreational allocation was increased to 70%, the removed fraction increased to 30% by 2030.

The predicted regional recruitments also have some influence on corresponding trends in projected spawning stock biomass. For most of the period since 1984 the estimated eastern recruitment (number of Age-0 red snapper) has generally been lower than the estimated western recruitment (**Figure 8**). The eastern stock experienced several years of fortuitously high recruitment during the 2000s that boosted spawning biomass in the short-term, but recruitment subsequently returned to intermediate levels (**Figure 8**). The projections assumed that future recruitments would continue at intermediate levels (average from 1984-2013) for each region, therefore the very stong year-classes from the 2000s eventually die off and are not fully replaced (**Figure 8**).

The results described in this report were dependent on a number of strong assumptions: 1) that selectivity, discarding, and retention will continue as they have in the three most recent years (2011-2013); 2) that the expected fishing effort levels for the 6 bycatch fleets will continue at 2013 levels; and 3) that forecast recruitments continue at the average of the recent time period (i.e., 1984-2013). If any of these assumptions are violated (e.g. by a change in selectivity, retention/high-grading, environmentally driven recruitment fluctuations) the projected yields will be lower/higher than those required to permit recovery of the red snapper stock by 2032.

4. ACKNOWLEDGMENTS

Stock assessment products depend on a large team of data providers and analysts. In addition to the analytical team (Shannon Cass-Calay (lead), Clay Porch, John Walter and Jake Teztlaff, this update assessment would not be possible without the substantial efforts of Refik Orhun, Neil Baertlein, Jessica Stephen and Andy Strelcheck (Commercial Catch), Vivian Matter (Recreational Catch and Discards), Kevin McCarthy (Commercial Discards and CPUE), Adyan Rios (Recreational CPUE), Robert Allman, Beverley Barnett and Linda Lombari-Carlson (Life History), Adam Pollock and Walter Ingram (Fishery Independent CPUE), Rick Hart and Jeff Isely (Shrimp Bycatch), Ching-Ping Chih (Size and Age Composition), Sean Powers and John Walter (ROV age composition), Matthew Campbell (Discard Mortlaity) Beverly Sauls and Alisha Gray (Headboat/Charter Discard Size/Age Comp), and Elizabeth Scott-Denton (Shimp Bycatch Size/Age Comp).

5. LITERATURE CITED

Methot, R.D., 2000. Technical description of the Stock Synthesis assessment program.NOAA Tech Memo. NMFS- NWFSC-43.SEDAR. 2013.

Methot, R.D. and Wetzel, C.R. 2013. Stock synthesis: A biological and statistical framework for fish stock assessment and fishery management. Fish. Res. 42:86-99.

NOAA Fisheries Toolbox, 2011. Stock Synthesis, Version 3.23b. http://nft.nefsc.noaa.gov

SEDAR 31 – Gulf of Mexico Red Snapper Stock Assessment Report. SEDAR, North Charleston SC. 1103 pp. Available online at: http://www.sefsc.noaa.gov/sedar/Sedar_Workshops.jsp?WorkshopNum=31

Table 1. OFL (retained yield in millions of lbs whole weight) as a function of recreational allocation. OFL was calculated as the median (50th percentile) of the probability density function (PDF) of retained yield (millions of lbs) using the projection of FSPR26%.

	OFL (Retained Yield Million Pounds Whole Weight)				
YEAR	**Rec 49%**	**Rec 55%**	**Rec 60%**	**Rec 65%**	**Rec 70%**
2015	16.10	16.70	17.19	17.69	18.17
2016	15.31	15.72	16.06	16.39	16.71
2017	14.79	15.12	15.38	15.64	15.89
2018	14.25	14.54	14.77	15.00	15.23
2019	13.60	13.87	14.09	14.31	14.52
2020	13.17	13.43	13.65	13.86	14.07
2021	12.93	13.19	13.40	13.61	13.81
2022	12.79	13.04	13.24	13.44	13.63
2023	12.77	13.01	13.20	13.39	13.57
2024	12.77	13.01	13.20	13.38	13.55
2025	12.78	13.01	13.19	13.36	13.53
2026	12.78	13.01	13.18	13.35	13.51
2027	12.78	13.01	13.18	13.34	13.50
2028	12.79	13.00	13.18	13.34	13.49
2029	12.79	13.01	13.17	13.34	13.49
2030	12.80	13.01	13.17	13.33	13.48
2031	12.80	13.01	13.18	13.33	13.48
2032	12.80	13.01	13.18	13.33	13.48
Equil	12.91	13.11	13.27	13.42	13.57

Table 2. ABC (retained yield in millions of lbs whole weight) as a function of recreational allocation. ABC was calculated at a P* of 0.427 (the 42.7th percentile) of the PDF of retained yield using the projection of $F_{REBUILD}$, which achieves a gulfwide spawning potential ratio (SPR) of 26% in 2032. A P* of 0.427 implies a 42.7% probability of overfishing in any given year.

ABC (Retained Yield Million Pounds Whole Weight)					
YEAR	**Rec 49%**	**Rec 55%**	**Rec 60%**	**Rec 65%**	**Rec 70%**
2015	14.29	14.76	15.18	15.61	16.05
2016	13.96	14.31	14.62	14.93	15.24
2017	13.75	14.04	14.29	14.53	14.78
2018	13.39	13.65	13.87	14.09	14.32
2019	12.85	13.10	13.31	13.52	13.73
2020	12.49	12.73	12.94	13.15	13.35
2021	12.29	12.54	12.74	12.94	13.14
2022	12.18	12.42	12.61	12.81	12.99
2023	12.17	12.40	12.59	12.77	12.95
2024	12.19	12.42	12.60	12.77	12.95
2025	12.21	12.43	12.60	12.77	12.94
2026	12.22	12.43	12.60	12.77	12.93
2027	12.23	12.42	12.61	12.77	12.93
2028	12.24	12.43	12.61	12.77	12.92
2029	12.25	12.44	12.61	12.77	12.92
2030	12.26	12.45	12.62	12.77	12.92
2031	12.27	12.45	12.62	12.77	12.92
2032	12.27	12.46	12.63	12.78	12.92
Equil	12.40	12.59	12.73	12.87	12.98

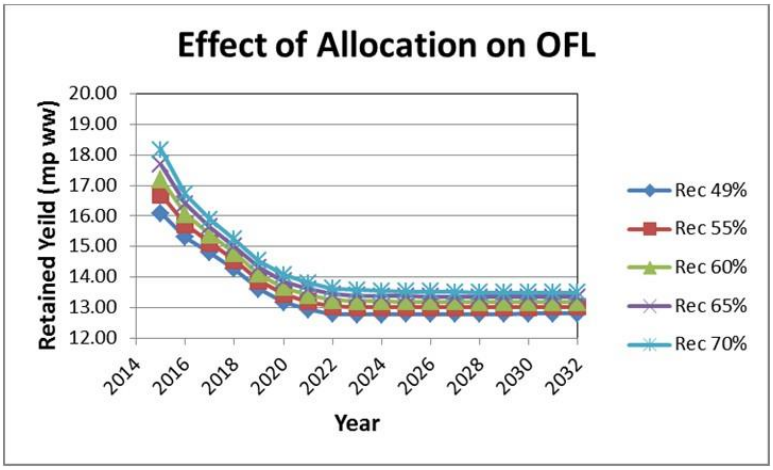


Figure 1. OFL (retained yield in millions of lbs whole weight) as a function of recreational allocation. OFL was calculated as the median (50th percentile) of the probability density function (PDF) of retained yield (millions of lbs) using the projection of FSPR26%.

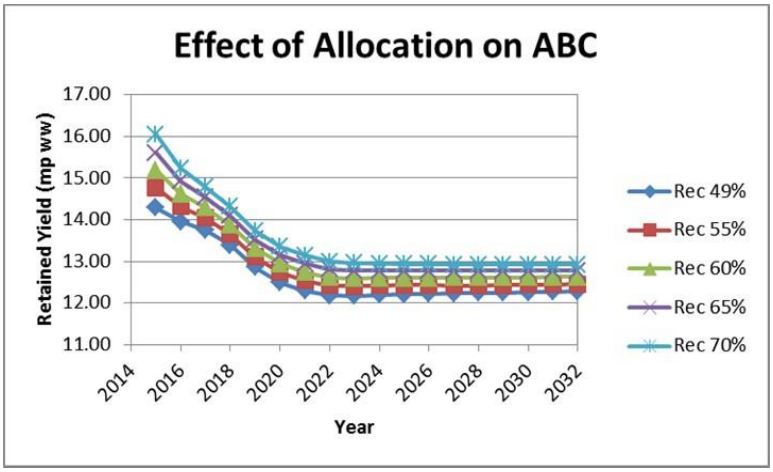


Figure 2. ABC (retained yield in millions of lbs whole weight) as a function of recreational allocation. ABC was calculated at a P* of 0.427 (the 42.7th percentile) of the PDF of retained yield using the projection of $F_{REBUILD}$, which achieves a gulfwide spawning potential ratio (SPR) of 26% in 2032. A P* of 0.427 implies a 42.7% probability of overfishing in any given year.

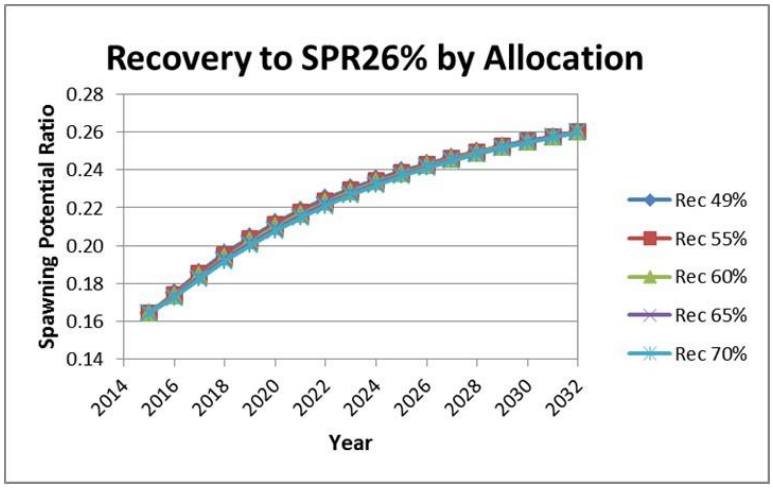


Figure 3. Recovery trajectory by allocation scenario. As expected, all scenarios achieve recovery to $SSB_{SPR26\%}$ by 2032.

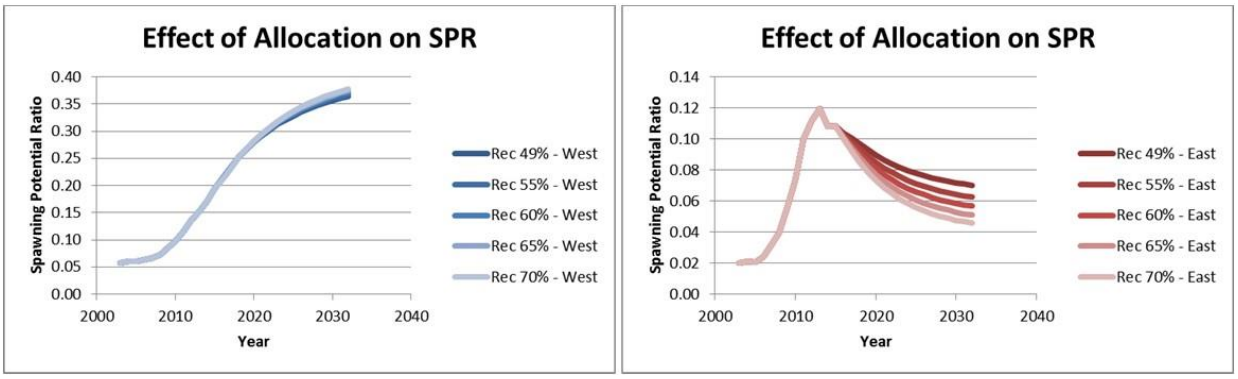


Figure 4. Effect of allocation scenario on SPR in the western Gulf (left panel) and the eastern Gulf (right panel).

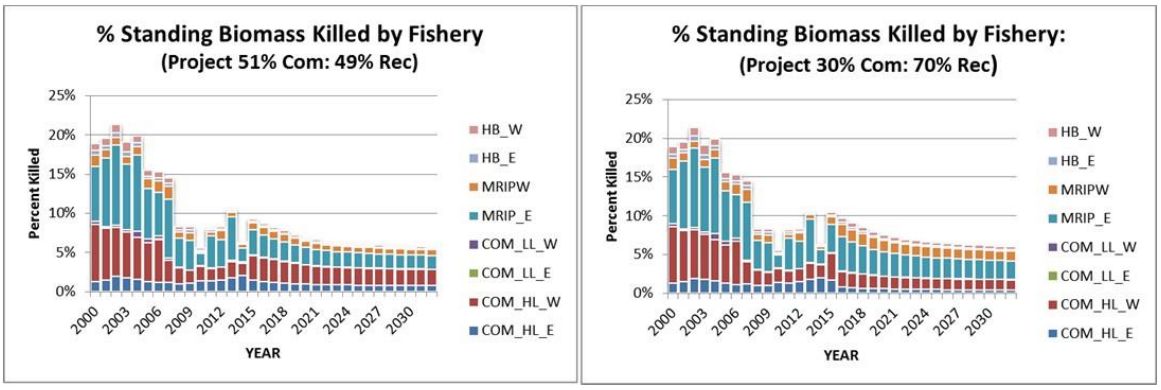


Figure 5. The fraction of total standing biomass killed by fishery at the current allocation (left panel) and at a recreational allocation of 70% (right panel).

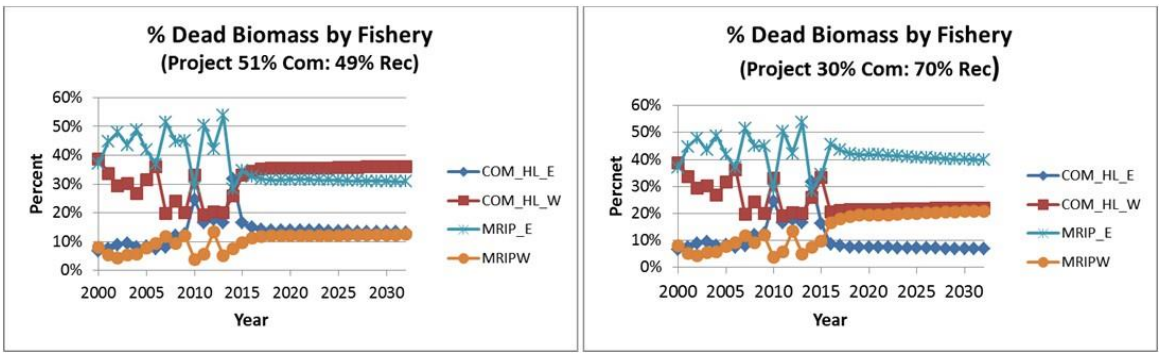


Figure 6. The fraction of total dead biomass (retained + dead discards) killed by fishery at the current allocation (left panel) and at a recreational allocation of 70% (right panel).

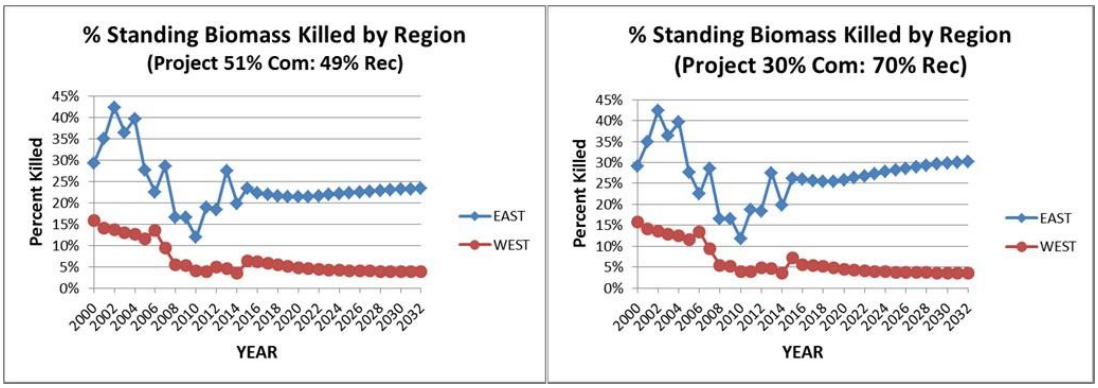


Figure 7. The fraction of total standing biomass killed by region at the current allocation (left panel) and at a recreational allocation of 70% (right panel).

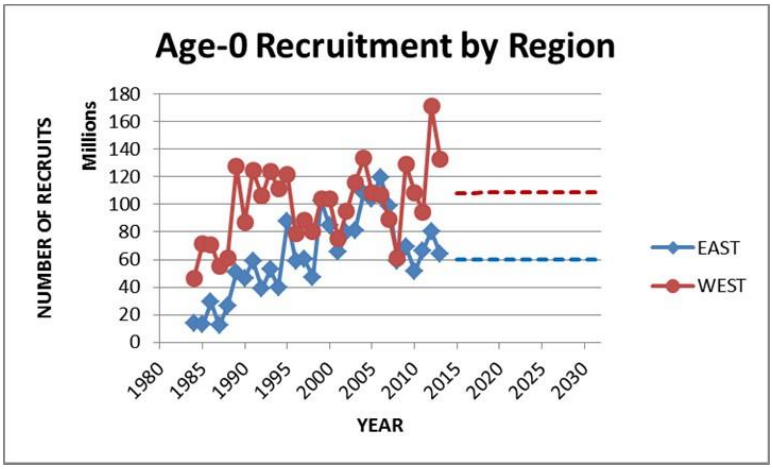


Figure 8. Observed (solid) and projected recruitment (dashed) by region.

APPENDIX I. TIMELINE FOR AMENDMENT 28

Timeline for Amendment 28 to the Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico. Referenced material can be found in Amendment 28.

Date	Action
January 2006 Council Meeting	Council initiates Amendment 29 to examine allocation between shallow water grouper species and a commercial grouper individual fishing quota program.
May 3-4, 2007	The Council's Socioeconomic Panel (SEP) examined grouper allocation issues.
June 2007 Council Meeting	Council initiates Amendment 28 to examine Red Snapper allocation.
November 2007 Council meeting	An Ad Hoc Allocation Committee composed of Council members established to study and develop consistent guidelines and principles for establishing allocations between recreational and commercial sectors.
October 2008 Council Meeting	Council's allocation policy adopted.
March 4, 2008	Evaluation on the allocation of red grouper (Carter et al. 2008) was reviewed by the SEP.
August 19-20, 2008	The SEP examined the social aspects of allocation.
April 2011 Council Meeting	Council removes grouper allocation from Amendment 30 and splits Amendment 30 into Amendments 30A and 30B. Grouper allocation is placed into a new amendment.
April 5, 2012	Southeast Fisheries Science Center (SEFSC) paper on gag, red and black grouper allocation and economically efficiency (see Agar and Carter 2012a) is reviewed by Socioeconomic Scientific and Statistical Committee (SSC).
April 2012 Council meeting	Amendment 28 scoping document on grouper allocation and Agar and Carter (2012a) presented to the Council.
June 2012 Council meeting	The Council reviews an options paper for Amendment 28 on gag, red grouper, and black grouper allocation to address sector allocation and adds both red snapper and recreational sector separation to the amendment.
August 2012 Council meeting	Council tables further discussion on Amendment 28 until 2013 red snapper benchmark assessment is completed. The Council suggests allocation be broken into two parts – 1) allocation between sectors and 2) allocation within the recreational sector.
October 10-11, 2012	The Socioeconomic SSC reviews red snapper allocation including a report by Agar and Carter (2012b)
October 2012 Council meeting	Council hears a SEFSC presentation on the economic efficiency of the 2012 red snapper allocation (Agar and Carter 2012b) and the Council moves to untable the discussion on Amendment 28.
January 2013 Special Council Reef Fish Committee meeting	Reef Fish Committee recommends that Amendment 28 only address red snapper.
February 2013 Council meeting	Grouper are removed from Amendment 28 (i.e., the amendment will only address red snapper).
May 29-31, 2013	Red Snapper Benchmark Assessment (SEDAR 31 2013) presented to the Standing and Reef Fish SSC and adopted as based on the best scientific information available.
June 2013	SEDAR 31 (2013) written report completed.
June 2013 Council meeting	SEDAR 31 (2013) is presented to the Council.
November 7, 2013	Notice of intent (NOI) to prepare an environmental impact statement (EIS) for Amendment 28.
November 8, 2013	Socioeconomic SSC reviews economic evaluation of the alternative red snapper allocations.
January 13, 2014	Socioeconomic SSC updated analyses from the economic evaluation provided at their November 8, 2013, meeting
February 2014 Council meeting	The Council reviewed the Socioeconomic SSC's November 2013 and January 2014 reports on red snapper allocation.

April 2014 Council meeting	The Council moved to add an accountability measure action to Amendment 28.
May 20, 2014	Supplemental NOI published indicating accountability measure actions would be added to Amendment 28 and its associated EIS.
June 2014 Council meeting	The Council moved to remove accountability action from Amendment 28, put the accountability action into a standalone amendment, and defer working on Amendment 28 until after final action is taken on Amendment 40.
August 5, 2014	Socioeconomic SSC reviewed analyses of Amendment 28 red snapper allocation alternatives.
September 8 – 10, 2014	Marine Recreational Information Program (MRIP) Calibration Workshop II (SEDAR 41 2015).
October 2014 Council meeting	The Council takes final action on Amendment 40.
January 6-8, 2015 - 2014	SEDAR 31 update assessment presented in PowerPoint format at the meeting of the Standing and Reef Fish SSC.
January 2015 Council meeting	An MRIP Calibration Update was provided to the Council's Data Collection Committee as well as a draft version of the report. The 2014 SEDAR 31 update assessment presented to Council Reef Fish Committee. The Council adds Alternatives 8 and 9 to Amendment 28.
February 19, 2015	The Standing and Reef Fish SSC convened via internet webinar to select ABC for 2015-2017 based on results of the update assessment.
March 3, 2015 (Council Webinar)	Council approved a framework action to implement 2015-2017 quotas and the recreational annual catch targets.
March 9, 2015	SEFSC written report "The effect of alternative allocations for the recreational and commercial red snapper fisheries in the U.S. Gulf of Mexico" (NMFS 2015a).
March 9, 2015	SEFSC written report "Sensitivity runs to evaluate the effect of recalibrated recreational removals and recreational selectivity on estimates of OFL, ABC, and MSY for Gulf red snapper" (NMFS 2015b).
March 24, 2015	SEDAR written report for MRIP Workshop Report II.
April 2015 Council meeting	Alternative 8 selected as preferred at the Council's meeting (vote 14-2).
May 20, 2015	Analyses of effects of alternative allocations and the effects of MRIP recalibration, selectivity changes, and allocation (NMFS 2015a, 2015b, 2015c) presented to the Standing and Reef Fish SSC.
May 29, 2015	Draft EIS filed with the Environmental Protection Agency
June 2015 Council meeting	May 2015 Standing and Reef Fish SSC report presented to the Council's Reef Fish Committee discussing the effects of alternative allocations and the effects of MRIP recalibration, selectivity changes, and allocation.
July 20, 2015	Comment period on draft EIS ends.
August 2015 Council meeting	Council takes final action on Amendment 28 (vote 12-5 to approve) with Alternative 8 as preferred.
September 16, 2015	Written report for SEDAR 31 Update (2015) assessment posted on SEDAR Web site.