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Emergency Action to Set Red Snapper Accountability Measures for the Recreational Sector of the Gulf of Mexico Reef Fish Fishery

Including Environmental Assessment, and Regulatory Impact Review

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

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ABBREVIATIONS USED IN THIS DOCUMENT

ABC	Acceptable biological catch
ACL	Annual catch limit
ACT	Annual catch target
AMs	Accountability measures
Collaborative	Gulf of Mexico Headboat Collaborative
Council	Gulf of Mexico Fishery Management Council
CZMA	Coastal Zone Management Act
EEZ	Exclusive Economic Zone
EFH	Essential fish habitat
EFP	exempted fishing permit
EIS	Environmental Impact Statement
EJ	Environmental justice
E.O.	Executive Order
ESA	Endangered Species Act
F	fishing mortality
FMP	Fishery Management Plan
GMFMC	Gulf of Mexico Fishery Management Council
Gulf	Gulf of Mexico
gw	Gutted weight
HAPC	Habitat area of particular concern
IFQ	Individual Fishing Quota
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
mp	Million pounds
MRFSS	Marine Recreational Fisheries Survey and Statistics
MRIP	Marine Recreational Information Program
MSST	Minimum stock size threshold
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OFL	Overfishing level
RIR	Regulatory impact review
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
SRHS	Southeast Region Headboat Survey
SSB	spawning stock biomass
SSC	Scientific and Statistical Committee
SPR	Spawning potential ratio
TAC	Total allowable catch
TL	Total length

TPWD	Texas Parks and Wildlife Department
VMS	vessel monitoring system
ww	whole weight
$Y_{rebuild}$	maximum rebuilding yield

CHAPTER 1. INTRODUCTION

1.1 Background

The 2007 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) established new requirements to end and prevent overfishing through the use of annual catch limits (ACLs) and accountability measures (AMs). For red snapper, the National Marine Fisheries Service (NMFS) determined the existing commercial and recreational quotas are functionally equivalent of sector ACLs, and the sum of the quotas is functionally equivalent of the stock ACL for red snapper. Additionally, the individual fishing quota (IFQ) program for the commercial sector and an in-season closure based on annual projections of the season length for the recreational sector are the red snapper AMs.

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 (http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/) and is in the 14th year of a 31-year rebuilding plan. The Gulf of Mexico Fishery Management Council (Council) has worked toward rebuilding the red snapper stock since 1990. The current rebuilding plan (implemented in 2001) was modified in 2007 to use a constant fishing mortality rate to determine each year's acceptable biological catch (ABC). This type of rebuilding plan allows the ABC to increase with increasing stock size. Therefore, it has been possible to increase both the commercial and recreational quotas since 2010 as part of the current rebuilding plan (Table 1.1.1). Overfishing was projected to have ended in 2009, but 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 ACL and AM Amendment[1] was implemented (GMFMC 2011b).

Table 1.1.1. Red snapper landings and overage/underage by sector, 1986-2012. Landings are in million pounds (mp) whole weight (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 ABC for 2010-2012. Values highlighted in red are those where landings exceed quotas.

	Recreational			**Commercial**			**Total**		
Year	**Alloc-ation Quota**	**Actual landings**	**Difference**	**Quota**	**Actual landings**	**Difference**	**TAC/ ABC**	**Actual landings**	**Difference**
1986	na	2.770	na	na	3.700	na	na	6.470	na
1987	na	1.814	na	na	3.069	na	na	4.883	na
1988	na	2.568	na	na	3.960	na	na	6.528	na
1989	na	2.656	na	na	3.098	na	na	5.754	na
1990	na	1.614	na	3.1	2.650	-0.450	na	4.264	na

[1] The maximum fishing mortality threshold method will be used to determine overfishing for stocks or stock complexes which have stock assessments and estimates of current fishing mortality rates and maximum fishing mortality threshold only in years in which a stock assessment is conducted. For other years, and for stocks or stock complexes without stock assessments or without estimates of fishing mortality and maximum fishing mortality threshold, the overfishing level method will be used to determine overfishing.

1991	1.96	2.358	+0.398	2.04	2.213	+0.173	4.0	4.571	+0.571
1992	1.96	3.899	+1.939	2.04	3.106	+1.066	4.0	7.005	+3.005
1993	2.94	5.687	+2.747	3.06	3.374	+0.314	6.0	9.061	+3.061
1994	2.94	5.299	+2.359	3.06	3.222	+0.162	6.0	8.521	+2.521
1995	2.94	4.814	+1.874	3.06	2.934	-0.126	6.0	7.748	+1.748
1996	4.47	4.346	-0.124	4.65	4.313	-0.337	9.12	8.659	-0.461
1997	4.47	6.008	+1.538	4.65	4.810	+0.160	9.12	10.818	+1.698
1998	4.47	4.258	-0.212	4.65	4.680	+0.030	9.12	8.938	-0.182
1999	4.47	3.999	-0.471	4.65	4.876	+0.226	9.12	8.875	-0.245
2000	4.47	3.932	-0.538	4.65	4.837	+0.187	9.12	8.769	-0.351
2001	4.47	4.468	-0.002	4.65	4.625	-0.025	9.12	9.093	-0.027
2002	4.47	5.383	+0.913	4.65	4.779	+0.129	9.12	10.162	+1.042
2003	4.47	4.847	+0.377	4.65	4.409	-0.241	9.12	9.256	+0.136
2004	4.47	4.996	+0.526	4.65	4.651	+0.001	9.12	9.647	+0.527
2005	4.47	4.084	-0.386	4.65	4.096	-0.554	9.12	8.180	-0.940
2006	4.47	4.021	-0.449	4.65	4.649	-0.001	9.12	8.670	-0.450
2007	3.185	4.440	+1.255	3.315	3.183	-0.132	6.5	7.623	+1.123
2008	2.45	3.712	+1.262	2.55	2.484	-0.066	5.0	6.196	+1.196
2009	2.45	4.625	+2.175	2.55	2.484	-0.066	5.0	7.109	+2.109
2010	3.403	2.239	-1.164	3.542	3.392	-0.150	6.945	5.631	-1.314
2011	3.866	4.602	+0.736	3.664	3.594	-0.070	7.53	8.196	+0.666
2012	3.959	5.146	+1.187	4.121	4.036	-0.085	8.08	9.182	+1.102
2013	5.390	8.827	+3.437	5.610	5.449	-0.161	11.00	14.326	+3.326

Sources: For recreational landings, the Southeast Fisheries Science Center's ACL database includes landings from the Marine Recreational Information Program, Texas Parks and Wildlife Department, and the Southeast Region Headboat Survey (May 2013). Commercial landings were obtained from the Southeast Data Assessment and Review (SEDAR) 31 Data Workshop Report (1990-2011) and the National Marine Fisheries Service /Southeast Regional Office IFQ landings website (2012-2013).

The commercial and recreational sectors are managed differently. Each sectors' quota is based on a 51% commercial:49% recreational allocation of the ABC. The commercial sector is managed under an IFQ program that began in 2007. An IFQ program distributes allocation to participating fishermen based on the number of shares they have of the quota and gives fishermen flexibility in how they decide to use their allocation. This system allows for the potential of a year-round season, and because of strict reporting requirements of landings, has consistently kept the commercial harvest below its quota since its implementation.

Until 1997, the recreational fishing season for red snapper in the Gulf was open year-round, with fishing effort controlled through bag limits and size limits (Table 1.1.2). However, the Sustainable Fisheries Act of 1996 required that the recreational red snapper allocation be treated as a quota. Beginning in 1997, the recreational season was monitored for in-season closures, and from 1997 to 1999, the recreational fishing season for red snapper became progressively shorter (Table 1.1.2). Due to the economic disruptions that resulted from short-term in-season announcements of quota closures, in 2000 NMFS projected in advance when the quota would be met and set a fixed season of April 21 through October 31. That season was maintained through 2007. In 2008, following a substantial reduction in the quota, NMFS began projecting the starting and ending dates of the recreational season on an annual basis. The 2008 season length was shortened due to the quota reduction and Florida and Texas maintaining longer state water

seasons, but then increased in 2009 and 2010. From 2010 to present, the season has become progressively shorter despite annual increases in the quota. In addition, overharvests have occurred in every year but one since 2007 (Table 1.1.2). The recreational sector exceeded its quota by 1.26 million pounds (mp) whole weight (ww) in 2008 and by 2.17 mp ww in 2009. In 2010, even with an emergency reopening in the fall, the recreational sector underharvested its quota by 1.16 mp ww. The underharvest in 2010 is believed to be due to fisheries closures that were implemented as a result of the Deepwater Horizon MC252 oil spill. Information on the oil spill and the subsequent closures can be found in Chapter 3 and on the Southeast Regional Office's website: (http://sero.nmfs.noaa.gov/deepwater_horizon_oil_spill.htm). In 2011, the recreational sector exceeded the quota by 0.736 mp ww.

Table 1.1.2. Red snapper recreational landings vs. allocation/quota and days open, bag limit, and minimum size limits from 1986-2013. Landings are in mp ww. Minimum size limits are in inches total length. Recreational allocations began in 1991, and became quotas in 1997. Values highlighted in red are those where landings exceed quotas.

Year	Allocation/ Quota	Actual landings	Difference	% over or under	Days open	Bag limit	Minimum size limit
1986	na	2.770	na		365	none	13
1987	na	1.814	na		365	none	13
1988	na	2.568	na		365	none	13
1989	na	2.656	na		365	none	13
1990	na	1.614	na		365	7	13
1991	1.96	2.358	+0.398	+20%	365	7	13
1992	1.96	3.899	+1.939	+99%	365	7	13
1993	2.94	5.687	+2.747	+93%	365	7	13
1994	2.94	5.299	+2.359	+80%	365	7	14
1995	2.94	4.814	+1.874	+64%	365	5	15
1996	4.47	4.346	-0.124	-3%	365	5	15
1997	4.47	6.008	+1.538	+34%	330	5	15
1998	4.47	4.258	-0.212	-5%	272	4	15
1999	4.47	3.999	-0.471	-11%	240	4	15
2000	4.47	3.932	-0.538	-12%	194	4	16
2001	4.47	4.468	-0.002	0%	194	4	16
2002	4.47	5.383	+0.913	+20%	194	4	16
2003	4.47	4.847	+0.377	+8%	194	4	16
2004	4.47	4.996	+0.526	+12%	194	4	16
2005	4.47	4.084	-0.386	-9%	194	4	16
2006	4.47	4.021	-0.449	-10%	194	2	16
2007	3.185	4.440	+1.255	+39%	194	2	16
2008	2.45	3.712	+1.262	+52%	65	2	16
2009	2.45	4.625	+2.175	+89%	75	2	16
2010	3.403	2.239	-1.164	-34%	53 + 24 = 77	2	16
2011	3.866	4.602	+0.736	+19%	48	2	16

2012	3.959	5.146	+1.187	+30%	46	2	16
2013	5.390	8.827	+3.437	+64%	28 + 14 = 42	2	16

Sources: Southeast Fisheries Science Center ACL database including landings from the Marine Recreational Information Program, Texas Parks and Wildlife Department, and the Southeast Headboat Survey (May 2013).

Recreational and commercial quotas continued to increase in 2012 and 2013 as part of the rebuilding plan (Table 1.1.1). The 2012 Red Snapper Fall Season and Quota Regulatory Amendment (GMFMC 2012) established a schedule of increasing quotas for 2012 and 2013, but included a provision that stated if the ABC was exceeded in 2012, the ABC and sector quotas would remain at the 2012 levels unless the best scientific information available determined maintaining the quotas from the previous year is unnecessary. The 2012 ABC was 8.08 mp ww, with a commercial quota of 4.121 mp ww and a recreational quota of 3.959 mp ww. Because the recreational sector overharvested the 2012 quota by 1.187 mp ww, the Council's Scientific and Statistic Committee (SSC) met in November 2012 to review that overage and updated projections (GMFMC 2013a). The SSC determined the ABC could increase for 2013, but recommended a revised 2013 ABC of 8.46 mp ww, resulting in a commercial quota of 4.315 mp ww and a recreational quota of 4.145 mp ww. The 2013 quotas were put in place through a framework action was put in place in the spring of 2013 (GMFMC 2013a).

A benchmark assessment for red snapper was conducted in 2012 and 2013 by the SEDAR process (SEDAR 31 2013). The SSC reviewed the assessment in May 2013, and determined the ABC could be increased to 13.5 mp ww for 2013, the highest level in recent history (GMFMC 2013b). However, this ABC was set only 200,000 lbs less than the maximum rebuilding yield ($Y_{Rebuild}$) accepted by the SSC. The buffer between $Y_{Rebuild}$ and ABC was based only on scientific uncertainty. The SSC indicated during their discussions that the Council should include an additional buffer between the ABC and the combined quotas to account for management uncertainty. The SSC's recommendation was a 20% buffer. The SSC also recommended reduced ABCs for 2014 and 2015 of 11.9 and 10.6 mp ww, respectively. The reason for the decreasing ABCs was because the assessment indicated some upcoming years of poor recruitment entering the fishery, resulting in lower abundances of fish.

In response to this new scientific information, the Council requested a framework action in the fall of 2013 to increase the red snapper quotas for the commercial and recreational sectors of the reef fish fishery (GMFMC 2013b). They determined red snapper fishermen would be better served by constant quotas over the next three years to maintain stability in the fishery, rather than decreasing quotas as recommended by the SSC. Projections from the Southeast Fisheries Science Center (SEFSC) showed that an 11 mp ww ABC for 2013 could allow the quotas in 2014 and 2015 to remain constant or increase. In August 2013, the SSC met again and recommended new allowable harvest levels for 2013-2015 based on a constant catch scenario of 11 mp ww per year for 2013 and 2014. This level was less than the 2013-2014 ABCs originally recommended by the SSC. However, it was the maximum possible constant ABC and higher than the original 2015 ABC. A secondary result of setting the total allowable catch at 11 mp ww is that for 2013 it created a buffer between $Y_{Rebuild}$ and the total allowable catch of 2.5 mp ww and a buffer of 4.7 mp ww between the ABC and the total allowable catch for 2013.

Because of the increase in the 2013 stock ACL from 8.46 mp ww to 11 mp ww, the Council requested an increase in the commercial and recreational quotas and that the recreational season re-open in October 2013, to allow recreational fishermen to harvest the additional quota. The regular recreational season of June 1 – June 28 was based on the original 2013 recreational quota (NMFS 2013). Preliminary catch estimates produced by the Marine Recreational Information Program (MRIP) for the June season were unexpectedly high relative to previous years, indicating the private and for-hire components of the recreational sector landed 5.8 mp. Landings available through June, including both MRIP and headboat landings, totaled 6.13 mp versus the original 4.145 mp-quota.

The new MRIP catch estimates were thought more accurate and less biased than those produced in past years because MRIP redesigned the Access Point Angler Intercept Survey (APAIS) in March 2013 to provide much better coverage of the variety of fishing trips ending at different times of day. However, as discussed in the final rule setting the October season (78 FR 57313), if the new survey methodology did eliminate past biases, then the new estimates may not be directly comparable to the 2013 quota or other red snapper management reference points, which were based on historical catch estimates using the prior methodology. Therefore, NMFS did not have a sufficient understanding of how to use the new MRIP landing estimates without better understanding how they fit into the broader scientific basis for red snapper management. Therefore, to determine a fall season length, the SEFSC recommended using the 4.145-mp ww quota that was projected to be caught during the 2013 28-day season as an estimate of what was caught in June. Available data supported this assumption by showing there was only a small increase in fishing effort Gulf-wide, no significant changes in catch rates, and an average size of red snapper for 2013 consistent with the aforementioned projections. Additionally, headboat landings through June 2013 were slightly less than landings through June 2012. Thus, NMFS determined the best available science on which to base a decision on whether to proceed with a fall season was to use projections to determine the number of days available for a supplemental season using the 1.245 mp increase in the recreational quota. There was uncertainty in the projection, because it was based on assumptions about effort levels, catch-per-unit effort, and average weights for landed fish. Because the SEFSC could not anchor these assumptions with actual estimates, due to the issues outlined above, they recommended that this uncertainty be factored into decisions about season length for the fall season.

The initial fall supplemental season length was projected to be 21 days based on assuming catch rates during fall would be 50% less than the catch rates projected for summer (78 FR 57313). However, during public testimony at the Council's August 2013 meeting, for-hire business owners stated they were booked for the supplemental season. Additionally, comments received on the proposed rule indicated many private anglers were planning fishing trips during October, leading NMFS to determine there may be greater participation during a fall season than would be expected based on previous years. Given questions about the new data, the past performance of the fishery, the increase in fishing effort in June, and the expectation of higher than normal effort during the fall, NMFS, as a precaution, assumed catch rates to be 75% of summer catch rates and implemented an additional 14-day fishing season (October 1-14, 2013).

To estimate a 2014 season, NMFS had built upon the 2013 projections by providing both a retrospective analysis of season-length projections and projected 2014 federal season-length

estimates for Gulf recreational red snapper (NMFS 2013). The analyses accounted for a variety of projection scenarios by incorporating uncertainty in the historical time series and 2013 data were used to inform projections when possible. The MRIP 2013 catch data were excluded from these projections due to the changes in the APAIS, which resulted in landings potentially not being comparable across years. The 2014 season length was projected to be 40 days beginning June 1. This season was announced on December 17, 2013 (78 FR 76758).

In September 2013, individual commercial fishermen and two commercial fishing interest groups filed a lawsuit challenging the rules implementing red snapper quotas for the 2013 fishing year and setting 2013 recreational red snapper fishing season. In March 2014, the Court ruled in favor of the plaintiffs (*Guindon v. Pritzker*, 2014 WL 1274076; D.D.C. Mar. 26, 2014), finding in pertinent part that NMFS failed to require adequate AMs to prohibit the retention of fish after the recreational quota had been harvested and failed to use the best scientific information available by not to using the 2013 MRIP numbers to determine whether there should be a fall season.

By using the 2013 MRIP landings data, the recreational sector exceeded its 2013 quota by 3.437 mp ww in 2013 (Table 1.1.2). Combined with commercial landings, the total landings exceed the combined quotas by 3.326 mp ww (Table 1.1.1). To address the court's decision and reduce the probability that the recreational sector exceeds its quota, the projected season length for 2014 needs to be revised to incorporate MRIP landings and additional AMs need to be implemented. NMFS has determined that including the 2013 MRIP landings data results in a 15-day federal season. During the April 2014 meeting, the Council requested NMFS implement an emergency rule establishing an annual catch target (ACT) that is determined by applying a 20% buffer to the recreational quota (which is equivalent to the recreational ACL) to take into account uncertainty in recreational landings estimates. Using this ACT to set the season length results in 9-day federal season, thereby reducing the probability that recreational sector will exceed the quota. The reduction in the Federal fishing season length (15 to 9 days) is not proportional to the buffer applied (20%) because the Federal fishing season has to be further reduced to account for landings that will continue to occur from state waters when Federal waters are closed.

In late 2013, NMFS approved of an exempted fishing permit (EFP) for the Gulf Headboat Collaborative (Collaborative) in late-2013. The EFP alloted 286,457 pounds ww (5.3146%) of the red snapper recreational annual catch limit to the Collaborative based on historical landings. The Collaborative distributed its quota pounds to participating vessels beginning January 1, 2014, with a small portion held back (5%) in the Collaborative manager's account. Vessels participating in the EFP are exempted from the recreational red snapper closed seasons. The EFP authorizes participating headboats to harvest red snapper beginning January 1. All headboats fishing under the EFP are equipped with vessel monitoring systems (VMS) and must hail out before departing on a fishing trip. They also must hail in at least one hour prior to returning to port and indicate the time and location of landing and number of red snapper on board the vessel. After a trip, participating vessels are also required to submit an electronic logbook to the SEFSC. NMFS and the Florida Fish and Wildlife Conservation Commission validate trip reports through dockside monitoring and collect biological data, such as fish weights. When a vessel has used all of its red snapper allocation, it must cease targeting and retaining red snapper.

The Council did not discuss whether the buffer should apply to the Collaborative. However, NMFS believes sufficient management measures and reporting requirements (i.e., daily reporting, dockside validation, VMS, etc.) are in place to constrain the Collaborative to its allotted quota. In addition to the Collaborative setting aside 5% of the allotted quota to ensure overages do not occur, NMFS is estimating monthly landings in pounds based on dockside samples (see https://ifq.sero.nmfs.noaa.gov/ifqgt/main.html# and select Additional Information). If at any time NMFS estimates the Collaborative's allotment in pounds has been harvested, then retention of red snapper by Headboat Collaborative vessels will be prohibited for the remainder of the fishing year. Additionally, the EFP does not exempt the Collaborative's participating vessels from Section 407(d) of the Magnuson-Stevens Act. Section 407(d) requires that if NMFS determines the Gulf of Mexico red snapper recreational quota has been met, harvest must be prohibited for the remainder of the fishing year, even if the Collaborative has allotted quota remaining. NMFS will receive landings estimates through June by mid-August. If NMFS determines the recreational red snapper quota has been met at that time, including any additional harvest estimated to come from state waters after the federal season closes, then retention of red snapper by Collaborative vessels would be prohibited for the remainder of the fishing year.

Need for an emergency rule

NOAA's policy guidelines for the use of emergency rules (62 FR 44421, August 21, 1997) list three criteria for determining whether an emergency exists.

1. Results from recent, unforeseen events or recently discovered circumstances; and
2. Presents serious conservation or management problems in the fishery; and
3. Can be addressed through emergency regulations for which the immediate benefits outweigh the value of advance notice, public comment, and deliberative consideration of the impacts to the same extent as would be expected under the normal rulemaking process.

NMFS is promulgating these emergency regulations under the authority of the Magnuson-Stevens act, consistent with these three criteria. For the first criterion for an emergency rule, the recent unforeseen event is the decision in *Guindon v. Pritzker*, which was issued on March 26, 2014. In that decision, the Court found, in pertinent part, that NMFS failed to require adequate recreational AMs and to prohibit the retention of fish after the recreational quota had been harvested, and failed to use the best scientific information available by not using the 2013 MRIP landings data to determine whether the harvest during the June 2013 fishing season exceeded the recreational quota. Therefore, based on the Council's request, NMFS is implementing additional recreational AMs for red snapper to better constrain harvest to the recreational quota during the 2014 fishing season, which opens on June 1, 2014. In addition, NMFS is including the 2013 MRIP landings data in the projections used to set the 2014 fishing season. The second emergency criterion is that the situation presents serious conservation or management problems in the fishery. The 2014 recreational fishing season was previously projected to be 40 days. This presents serious conservation and management problems because the 40-day season could perpetuate continued overages of the recreational quota. This emergency rule is expected to help NMFS constrain recreational red snapper harvest within the quota, as required by sections 303(a)(15) and 407(d) of the Magnuson-Stevens Act (16 U.S.C. 1853(a)(15); 16 U.S.C.

1883(d)). Under the third criterion for an emergency rule, the immediate benefit of implementing the emergency rule must outweigh the value of advance notice and public comment. NMFS previously announced the Federal red snapper recreational fishing season would be 40 days. However, the need to incorporate the 2013 MRIP landings data into the season length projections and to establish additional AMs to ensure that the recreational harvest is constrained to the recreational quota has resulted in a 9-day Federal fishing season. The Federal red snapper recreational fishing season opens June 1, 2014. Delaying announcement of this emergency rule to accommodate prior public notice and comment would result in less advance notice of the revised Federal red snapper recreational fishing season and could be very disruptive to the fishery. Such a delay would decrease the time available for for-hire businesses to adjust their business plans and private anglers to change their fishing plans, especially if they are visiting from out-of-state.

1.2 Purpose and Need

The purpose of this action is to establish additional accountability measures for the 2014 Gulf red snapper recreational fishing season that reduces the probability that the recreational sector will exceed its quota and is consistent with the decision in *Guindon v. Pritzker*, 2014 WL 1274076 (D.D.C. Mar. 26, 2014), specifically with respect to implementing accountability measures that constrain catch to the quota and use the best scientific information available. The underlying need for this action is driven by the Magnuson-Stevens Act, which requires NMFS and the regional fishery management councils to prevent overfishing while achieving, on a continuing basis, the optimum yield from federally managed fish stocks and to rebuild stocks that have been determined to be overfished.

1.3 History of Management

This history of management only covers events pertinent to recreational fishing seasons for red snapper. A complete history of management for the Reef Fish FMP is available on the Council's website: http://www.gulfcouncil.org/fishery_management_plans/reef_fish_management.php

Prior to 1997, recreational fishing for all reef fish was open year round in the Gulf exclusive economic zone (EEZ). Catch levels were controlled through minimum size limits and bag limits. The Sustainable Fisheries Act of 1996 required the establishment of quotas for recreational red snapper fishing and commercial fishing that, when reached, result in a prohibition on the retention of fish caught for each sector, respectively, for the remainder of the fishing year. From 1997 through 1999, NMFS implemented the recreational red snapper quota requirement through an in-season monitoring process by establishing a quota monitoring team that, through monitoring landings data that were available, plus projecting landings based on past landings patterns, projected closing dates a few weeks in advance. Additional details regarding the seasons and regulation changes for red snapper are presented in Hood et al. (2007).

For the years 1997 through 1999, the recreational season for red snapper was closed on November 27, October 1, and August 29, respectively. In 1999, an emergency rule temporarily raised the recreational red snapper minimum size limit from 15 to 18 inches total length (TL) during the season from June 4 to August 29 in an attempt to slow down the retained harvest rate. Without this emergency rule, the season would have closed on August 5. However, the rule resulted in a large increase in dead discards, and the size limit was allowed to revert back to 15 inches TL the following year. Since quota closures have been implemented in the EEZ, Texas has chosen to continue to leave its state waters open year round with a 4-fish bag limit and a 15-inch TL minimum size limit.

A February 2000 regulatory amendment (GMFMC 2000) replaced the system of in-season monitoring and closure projections for red snapper with a fixed season based on a pre-season projection of when the recreational quota would be reached. The season for 2000 and beyond was initially set at April 15 through October 31, with a 16-inch TL minimum size limit, a 4-fish bag limit, and a zero bag limit of red snapper by the captain and crew of for-hire vessels. Shortly before the regulatory amendment was submitted to NMFS, the Council, at the request of representatives of the for-hire industry, withdrew the zero bag limit proposal for captain and crew. NMFS recalculated the season length under the revised proposal, and as a result, the regulatory amendment was implemented with a recreational fishing season of April 21 through October 31. Florida had already implemented an April 15 starting date in state waters based on the draft regulatory amendment, and declined to modify their state season a second time. These recreational red snapper fishing seasons remained in effect through 2007.

In 2008, Amendment 27/Shrimp Amendment 14 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico (GMFMC 2007) revised the rebuilding plan for red snapper. For the recreational sector, the rule implemented a June 1 through September 30 fishing season in conjunction with a 2.45 mp recreational quota, 16-inch TL minimum size limit, 2-fish bag limit, and zero bag limit for captain and crew of for-hire vessels. The implementing regulations for this amendment created the June 1 through September 30 season by establishing fixed closed seasons of January 1 through May 31 and October 1 through December 31.

Florida adopted a compatible 2-fish bag limit, but maintained its state red snapper fishing season of April 15 through October 31, 78 days longer than the federal fishing season. Texas also maintained its 4-fish bag limit and year-round fishing season in its state waters. Prior to the start of the 2008 season, NMFS recalculated its projections for recreational red snapper catches in light of the state regulations, and projected that there would be a 75% probability that the recreational quota would not be exceeded if the season closed on August 5. As a result, NMFS took action to set the 2008 season to be June 1 to August 5. In 2009, NMFS again recalculated its projections for the season length prior to the start of the recreational season, and announced that the recreational season would be June 1 to August 15.

An interim rule, implemented January 2009, created temporary measures to address overfishing of gag, as well as red snapper, greater amberjack, and gray triggerfish until more permanent measures could be implemented through Amendments 30A and 30B. The interim rule established new regulations for grouper and required operators of federally permitted Gulf commercial and for-hire reef fish vessels to comply with the more restrictive of federal or state

reef fish regulations when fishing in state waters for red snapper, greater amberjack, gray triggerfish, and gag.

Amendment 30B (GMFMC 2008b), implemented in May 2009, replaced the interim rule regulations with new regulations that included a requirement that vessels with federal commercial or charter reef fish permits comply with more restrictive federal reef fish regulations when fishing in state waters.

A February 2010 regulatory amendment (GMFMC 2010) increased the red snapper TAC from 5.0 mp to 6.945 mp, which increased the recreational quota from 2.45 mp to 3.403 mp. However, NMFS estimated that in 2009, the recreational sector overharvested its quota by approximately 75%. In recalculating the number of days needed to fill the recreational quota, even with the quota increase, NMFS projected that the 2010 season would need to be shortened to June 1 through July 24, and published notice of those dates prior to the start of the recreational fishing season.

In April 2010, the Deepwater Horizon MC252 deep-sea drilling rig exploded and sank off the coast of Louisiana. Because of the resulting oil spill, approximately one-third of the Gulf was closed to fishing for much of the summer months. The direct loss of fishing opportunities due to the closure, plus the reduction in tourism throughout the coastal Gulf, resulted in a much lower catch than had been projected. After the recreational season closed on July 24, NMFS estimated that 2.3 mp of the 3.4 mp recreational quota remained unharvested (NMFS 2010). However, due to the fixed October 1 to December 31 closed season, NMFS could not reopen the recreational season without an emergency rule to suspend the closure. Consequently, the Council requested an emergency rule to provide the Regional Administrator with the authority to reopen the recreational red snapper season. After considering various reopening scenarios, the Council requested that the season be reopened for eight consecutive weekends (Friday, Saturday, and Sunday) from October 1 through November 21 (24 fishing days).

In January 2011, the Council submitted a regulatory amendment (GMFMC 2011a) to NMFS to increase the red snapper TAC to 7.185 mp, with a 3.521 mp recreational quota and a 3.664 mp commercial quota. The final rule implemented the increase and established a 48-day recreational red snapper season, June 1 through July 19.

On August 12, 2011, NMFS published an emergency rule that, in part, increased the recreational red snapper quota by 345,000 lbs for the 2011 fishing year 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 Parks and Wildlife Department (TPWD) survey data, NMFS estimated that 4.4 mp 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 increase the commercial and recreational quotas and establish the 2012 recreational red snapper fishing season. 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, NMFS extended the season by six days and closed on July 17.

A framework action, implemented May 29, 2013 (GMFMC 2013a), increased the 2013 commercial red snapper quota from 4.121 mp to 4.315 mp ww and the recreational red snapper quota from 3.959 mp to 4.145 mp ww. The framework action considered a reduction in the bag limit to either 1 fish per person or 1 fish per 2 persons per day, but left the limit at the status quo 2 fish per person per day. Initially, the seasons were state specific based on an emergency rule published in March 2013. On May 31, 2013, the U.S. District Court in Brownsville, Texas vacated the emergency rule. As a result of this Court decision, a temporary rule in June established a Gulf-wide federal recreational red snapper season from June 1 through June 28. Louisiana established its own state recreational red snapper season as weekends only (Friday through Sunday plus Memorial Day and Labor Day) from March 23 through September 29, with a 3-fish bag limit. During the federal recreational season, Louisiana adopted the same 7-days per week, 2-fish bag limit regulations as in federal waters.

A framework action, implemented October 1, 2013 (GMFMC 2013c), increased the 2013 commercial red snapper quota from 4.315 mp to 5.610 mp ww and the recreational red snapper quota from 4.145 mp to 5.390 mp ww. Commercial fishermen received additional allocation in their IFQ accounts proportional to their IFQ shares, and the recreational red snapper season was re-opened from October 1 through October 14 to allow the additional quota to be harvested. Florida re-opened its state waters from October 1 through October 21.

A temporary rule published on December 19, 2013, setting the 2014 federal recreational red snapper season from June 1 through July 10, 2014, based on the same projection methods used for 2013.

On March 26, 2014 the U. S. District Court for the District of Columbia ruled in favor of the plaintiffs in the case of *Guindon v. Pritzker*, 2014 WL 1274076 (D.D.C. Mar. 26, 2014) and found that the 2013 May Final Rule, June Temporary Rule, and October Final Rule challenged in this action were arbitrary and capricious, and not in accordance with the Magnuson-Stevens Act. The same plaintiffs have filed a suit challenging the December temporary rule.

CHAPTER 2. MANAGEMENT ALTERNATIVES

Action 1. Set 2014 accountability measures for the Gulf of Mexico red snapper recreational sector to include a buffer on the recreational quota (the functional equivalent of an annual catch limit [ACL]) that results in an annual catch target (ACT). The 2014 season length would be calculated based on the ACT.

Alternative 1: No action. Do not apply a buffer to the recreational quota.

Preferred Alternative 2: Apply a 20% buffer to the recreational quota based on the ACL/ACT control rule established in the Generic ACL/AM amendment. The 2014 ACT would be 4.312 mp.

Alternative 3: Apply a 30% buffer to the recreational quota based on the 2012 overage. The 2014 ACT would be 3.773 mp.

Alternative 4: Apply a 40% buffer to the recreational quota based on the average percent overage for 2011-2013. The 2014 ACT would be 3.234 mp.

Alternative 5: Apply a 60% buffer to the recreational quota based on the 2013 overage. The 2014 ACT would be 1.889 mp.

	Quota	Buffer	Recreational ACT (mp)	Federal Season (# days)	Probability of exceeding the quota
Alternative 1	5.390	0%		15	50%
Preferred Alternative 2	5.390	20%	4.312	9	15%
Alternative 3	5.390	30%	3.773	6	5%
Alternative 4	5.390	40%	3.234	3	<1%
Alternative 5	5.390	60%	1.889	0	<1%

Discussion: The Southeast Data, Assessment, and Review (SEDAR) process conducted a benchmark stock assessment on Gulf of Mexico (Gulf) red snapper in 2012 and 2013 (SEDAR 31). The Gulf of Mexico Fishery Management Council's (Council's) Scientific and Statistical Committee reviewed the assessment and produced recommendations for the overfishing limit (OFL) and a series of decreasing acceptable biological catch (ABC) levels for 2013-2015. The Council accepted these recommendations as the basis for setting the combined commercial and recreational quota, as well as the sector quotas. Previously, the Council had set the red snapper quotas equal to the sector allocations of the ABC; however, in 2013 the Council determined constant quotas for at least the next three years would bring stability to the fishery. By foregoing some catch in 2013, higher quotas could be set for 2014-2015 and catch could be held relatively

constant. Therefore, the Council set the total allowable catch for red snapper at 11 mp, which was allocated 51% to the commercial sector and 49% to the recreational sector.

Alternative 1, No Action, would retain the recreational quota of 5.390 mp set by the Council for 2014 and not set an ACT. Although the Council considered including a buffer for the recreational sector when setting the new quota, they chose not to do so because the combined quota was already set much lower than the OFL. They also expected the probability of recreational quota overages to be lower in the future because of improvements in the system for collecting recreational data.

Landings collected through the Marine Recreational Information Program (MRIP) showed a substantial quota overage in 2013. Originally, NMFS did not use the 2013 catch rates and projected a 40-day season for 2014. However, when the 2013 catch rates are used, the federal season is reduced to 15 days (Appendix B). Even with this shortened season, the probability of exceeding the 5.390-mp quota is 50%. Thus, an equal chance exists of landings going over the quota as there is of remaining below the quota.

Alternatives 2-5 retain the same recreational quota but also set a recreational ACT based on a buffer. The ACT would be used to set the season length and, therefore, would act as an accountability measure to decrease the probability of landings exceeding the quota. As the buffer increases, the ACT decreases, as does the length of the recreational fishing season. The probability of exceeding the quota also decreases. Other factors considered when calculating the recreational fishing season include landings from each state's waters when the federal season is closed (Appendix B).

At their April 2014 meeting, the Council voted to recommend an emergency rule to apply a 20% buffer to the recreational quota. They determined this level of buffer provided a reasonably high probability of success in constraining landings at or below the quota. At the time of the meeting, an ACT based on a 20% buffer was projected to result in an 11-day season; however, immediately following the meeting, Louisiana announced a change to their regulations that would allow fishing on both weekdays and weekends throughout the rest of the year (previously they allowed fishing on weekends only). Because NMFS must account for the expected increased catch in state waters due to this change, the federal season for each buffer level was reduced by two days.

In the Generic ACL/AM Amendment[2] (GMFMC 2011b), the Council developed an ACL/ACT control rule to determine buffers between the ABC and ACL for multiple species. The ACL/ACT control rule applies buffers to create target catch levels that account for management uncertainty in maintaining catches at or below the ABC. The control rule is intended to be applied separately to the recreational and commercial sectors because each sector has different levels of management uncertainty. The control rule recommends a 0% buffer for the red snapper commercial sector because the sector is managed by an individual fishing quota program, has accurate landings data, and has not exceeded its quota in the last six years. The recommended red snapper recreational buffer is 20% (**Preferred Alternative 2**), primarily because of the quota

[2] Full title: 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.

overages in recent years. The resulting ACT would be 4.312 mp, which would allow for a 9-day season. With the ACT in **Preferred Alternative 2**, the probability of exceeding the quota is reduced to 15%.

Between 2012 and 2013, the methods used by MRIP to estimate landings changed. The program includes new procedures for conducting dockside intercepts and new statistical methods for estimating catch. The ACT set in **Alternative 3** is based on the recreational red snapper overage of 30% in 2012, the last year before the change in methodology. The ACT set in **Alternative 5** is based on the recreational red snapper overage of 57% (rounded to 60%) in 2013, after the change in methodology. Estimated catch rates were higher in 2013 than 2012; therefore, the overage was higher and the resulting buffer is higher for **Alternative 5** versus **Alternative 3**. **Alternative 4** is based on the average overages from those two years and 2011 (19%), which is 36% (rounded to 40%). The probability of exceeding the quota with the ACT set in **Alternative 3** is 5%, and with the ACTs in **Alternatives 4** and **5** the probability is less than 1%. The length of the federal recreational fishing season would decrease from **Alternative 3** to **Alternative 4**, and no federal season is possible with **Alternative 5**. There is still a low probability of landings exceeding the quota even with **Alternative 5** because some, if not all, of the Gulf states would be expected to set a red snapper recreational season in state waters.

CHAPTER 3. AFFECTED ENVIRONMENT

3.1 Description of the Physical Environment

The Gulf of Mexico (Gulf) has a total area of approximately 600,000 square miles (1.5 million km^2), including state waters (Gore 1992). It is a semi-enclosed, oceanic basin connected to the Atlantic Ocean by the Straits of Florida and to the Caribbean Sea by the Yucatan Channel (Figure 3.1.1). Oceanographic conditions are affected by the Loop Current, discharge of freshwater into the northern Gulf, and a semi-permanent, anti-cyclonic gyre in the western Gulf. The Gulf includes both temperate and tropical waters (McEachran and Fechhelm 2005). Gulf water temperatures range from 54º F to 84º F (12º C to 29º C) depending on time of year and depth of water. Mean annual sea surface temperatures ranged from 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 environmental impact statement (EIS) for the Generic Essential Fish Habitat (EFH) Amendment and the Generic Annual Catch Limits/Accountability Measures (ACL/AM) Amendment (refer to GMFMC 2004b; GMFMC 2011b) and are incorporated here by reference.

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) and is incorporated here by reference.

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

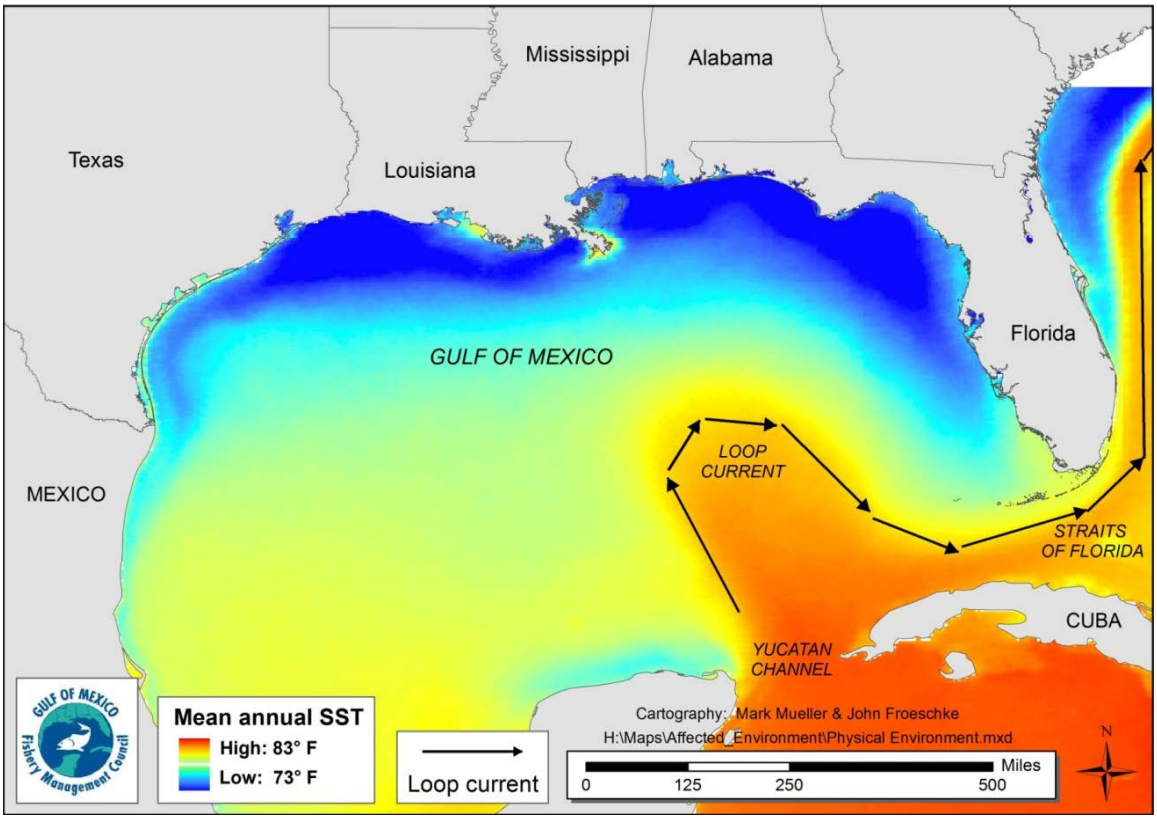

Figure 3.1.1. Physical environment of the Gulf including major feature names and mean annual sea surface temperature as derived from the Advanced Very High Resolution Radiometer Pathfinder Version 5 sea surface temperature data set (http://accession.nodc.noaa.gov/0072888)

3.2 Description of the Biological/Ecological Environment

The biological environment of the Gulf, including the species addressed in this amendment, is described in detail in the final EIS for the Generic EFH Amendment (GMFMC 2004b) and is incorporated here by reference.

Definition of Overfishing

In January 2012, the Generic ACL/AM Amendment (GMFMC 2011b) became effective. One of the provisions in this amendment was to redefine overfishing. In years when there is a stock assessment, overfishing is defined as the fishing mortality rate exceeding the maximum fishing mortality threshold. In years when there is no stock assessment, overfishing is defined as the catch exceeding the overfishing limit (OFL). Note that, because the overfishing threshold is now re-evaluated each year instead of only in years when there is a stock assessment, this status for red snapper, gag, and other reef fish could change on a year-to-year basis.

Red Snapper Life History and Biology

Red snapper demonstrate the typical reef fish life history pattern (Table 3.2.1). 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. Adult females mature as early as two years and most are mature by four years (Schirripa and Legault 1999). Red snapper have been aged up to 57 years. Until recently, 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 2004b).

Status of the Red Snapper Stock

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

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 National Marine Fisheries Service (NMFS) in 1986 suggested that the stock was in decline (Parrack and McLellan 1986) and since 1988 (Goodyear 1988) the stock biomass has been found to be below threshold levels.

The most recent red snapper stock assessment was completed in 2013 (SEDAR 31 2013). The primary assessment model selected for the 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. The results of the SEDAR 31 assessment, including an assessment addendum that was prepared after a review of the SEDAR Assessment Panel Report by the SEDAR Review Panel, was presented to the Scientific and Statistical Committee (SSC) in May 2013. Under the base model, it was estimated that the red snapper stock has been overfished since the 1960s.

Although the red snapper stock continues to recover, spawning stock biomass was estimated to remain below both the minimum stock size threshold and the spawning stock size associated with maximum sustainable yield proxy of a biomass level corresponding to a spawning stock biomass of 26% spawning potential ratio. Therefore, the SSC concluded that the stock remains overfished. With respect to overfishing, the current fishing mortality rate (geometric mean of 2009-2011) was estimated to be below both fishing mortality at the 26% spawning potential ratio proxy. Therefore, the SSC concluded the stock is not currently experiencing overfishing.

Even though the red snapper recreational harvest exceeded its quota in 2012, the total catch (recreational and commercial combined) remained below the OFL. Therefore, as of 2012, overfishing is not occurring in the red snapper stock.

A red snapper update assessment scheduled for 2014 is expected to re-evaluate the acceptable biological catch (ABC) for 2015 and beyond.

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 Southeast Area Monitoring and Assessment Program, 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 Table 3.2.1 and can be found in more detail in GMFMC (2004b). 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 (SAV). 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 1981).

Table 3.2.1. 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	
Wenchman	Pelagic	Pelagic			Hard bottoms, Shelf edge/slope	Shelf edge/slope
Vermilion Snapper	Pelagic		Hard bottoms, Reefs	Hard bottoms, Reefs	Hard bottoms, Reefs	

Common name	Eggs	Larvae	Early Juveniles	Late juveniles	Adults	Spawning adults
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	
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	

Common name	Eggs	Larvae	Early Juveniles	Late juveniles	Adults	Spawning adults
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 2004b) and consolidated in this document.

Status of Reef Fish Stocks

The Reef Fish FMP currently encompasses 31 species (Table 3.2.2). Eleven other species were removed from the FMP in 2012 through the Generic ACL/AM Amendment (GMFMC 2011b). 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)
- Vermilion Snapper (Porch and Cass-Calay 2001; SEDAR 9 2006a; 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 2006b; SEDAR 9 Update 2011b)
- Greater Amberjack (Turner et al. 2000; SEDAR 9 2006c; SEDAR 9 Update 2010)
- Hogfish (Ault et al. 2003; SEDAR 6 2004a)
- Red Grouper (NMFS 2002; SEDAR 12 2007; SEDAR 12 Update 2009)
- Gag (Turner et al. 2001; SEDAR 10 2006; SEDAR 10 Update 2009)
- Black Grouper (SEDAR 19 2010)
- Yellowedge Grouper (Cass-Calay and Bahnick 2002; SEDAR 22 2011a)
- Tilefish (Golden) (SEDAR 22 2011b)
- Atlantic Goliath Grouper (Porch et al. 2003; SEDAR 6 2004b; 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/statusoffisheries/SOSmain.htm). The status of both assessed and unassessed stocks as of the writing of this report is shown in Table 3.2.2.

Table 3.2.2. Species of the Reef Fish FMP grouped by family.

Common Name	Scientific Name	Stock Status
Family Balistidae – Triggerfishes		
Gray Triggerfish	*Balistes capriscus*	Overfished, no overfishing
Family Carangidae – Jacks		
Greater Amberjack	*Seriola dumerili*	Overfished, no overfishing
Lesser Amberjack	*Seriola fasciata*	Unknown
Almaco Jack	*Seriola rivoliana*	Unknown
Banded Rudderfish	*Seriola zonata*	Unknown
Family Labridae – Wrasses		
Hogfish	*Lachnolaimus maximus*	Unknown
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*	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
Gray Snapper	*Lutjanus griseus*	Unknown
Lane Snapper	*Lutjanus synagris*	Unknown
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 29 different species of marine mammals that may occur in the Gulf. All 29 species are protected under the Marine Mammal Protection Act and seven are also listed as endangered under the Endangered Species Act (ESA) (i.e., sperm, sei, fin, blue, humpback, and North Atlantic right whales and the West Indian manatee). Other species protected under the ESA occurring in the Gulf include five sea turtle species (Kemp's ridley, loggerhead, green, leatherback, and hawksbill); two fish species (Gulf sturgeon and smalltooth sawfish), and two coral species (elkhorn coral and staghorn coral). Information on the distribution, biology, and abundance of these protected species in the Gulf is included in the final EIS to the Generic EFH Amendment (GMFMC 2004b) and the February 2005, October 2009, and September 2011 ESA biological opinions on the reef fish fishery (NMFS 2005; NMFS 2009; NMFS 2011b). Marine Mammal Stock Assessment Reports and additional information are also available on the NMFS Office of Protected Species website: http://www.nmfs.noaa.gov/pr/species/.

The Gulf reef fish fishery is classified in the Marine Mammal Protection Act 2014 List of Fisheries as a Category III fishery (79 FR 14418, April 14, 2014). 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.

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 on commercial and federally permitted for-hire vessels to minimize post-release mortality.

Smalltooth sawfish are also 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.

On September 30, 2011, the Protected Resources Division released a biological 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 2011b). 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 measures to reduce take in the reef fish fishery's longline component in Amendment 31 (GMFMC 2009). Other listed species and designated critical habitat in the Gulf were determined not likely to be adversely affected.

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 memo dated February 13, 2013, NMFS determined that the information contained in the proposed rule did not require reinitiation of the previous section 7 consultation because the new information does not suggest the fishery is affecting *Acropora* in a manner or to an extent not previously considered. NMFS has also determined that because all of the species proposed for listing that occur in the Gulf of Mexico occur in same locations as elkhorn and staghorn coral, that the continued authorization of the Gulf of Mexico reef fish fishery is not likely to jeopardize the continued existence of any species proposed for listing and a conference opinion for these species is not required.

On July 28, 2013, NMFS published a proposed rule to designate 36 occupied marine areas within the Atlantic Ocean and Gulf as critical habitat for the Northwest Atlantic Ocean loggerhead sea turtle Distinct Population Segment. These areas contain one or a combination of nearshore reproductive habitat, winter area, breeding areas, and migratory corridors. The proposed rule is also considering whether to include as critical habitat in the final rule some areas that contain foraging habitat and two large areas that contain *Sargassum* habitat. The public comment period for the proposed rule ended on November 29, 2013. The proposed action is currently under review by the NMFS Office of Protected Resources. However, the proposed action is not likely to change the status quo impacts to any threatened or endangered species.

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.

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.[3]

In addition to the crude oil, 1.4 million gallons of the dispersant, Corexit 9500A®, was applied to the ocean surface and an additional 770,000 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. 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 2011b).

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

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

3.3 Description of the Economic Environment

3.3.1 Commercial Sector

A description of the commercial sector of the red snapper component of the Gulf reef fish fishery is contained in GMFMC (2013b) and is incorporated herein by reference. Because this emergency action would only change management of the recreational sector, updates of the information on the commercial sector are not provided.

3.3.2 Recreational Sector

3.3.2.1 Angler Effort

Recreational effort derived from the Marine Recreational Fisheries Statistics Survey/Marine Recreational Information Program (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 catch trips (the number of individual angler trips that catch 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. Estimates of the number of red snapper target trips for the shore, charter, and private/rental boat modes in the Gulf for 2011-2013 are provided in Table 3.3.2.1.1. 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.

Table 3.3.2.1.1. Red snapper recreational target trips, by mode, 2011-2013*.

	Alabama	West Florida	Louisiana	Mississippi	Total
	Shore Mode				
2011	808	0	0	0	808
2012	1,639	0	0	0	1,639
2013	434	0	0	0	434
Average	960	0	0	0	960
	Charter Mode				
2011	19,011	29,642	1,424	0	50,077
2012	16,610	24,653	7,203	74	48,540
2013	21,965	32,864	7,240	38	62,107
Average	19,195	29,053	5,289	37	53,575
	Private/Rental Mode				
2011	116,886	113,021	19,900	16,790	266,597
2012	72,031	136,595	43,547	13,515	265,688
2013	224,078	457,519	24,496	21,434	727,527
Average	137,665	235,712	29,314	17,246	419,937
	All Modes				
2011	136,705	142,663	21,324	16,790	317,482
2012	90,280	161,248	50,750	13,589	315,867
2013	246,477	490,383	31,736	21,472	790,068
Average	157,821	264,765	34,603	17,284	474,472

* Texas information unavailable. 2013 estimates are preliminary.
Source: Personal communication from the NMFS, Fisheries Statistics Division April 8, 2014.
Note: these estimates may vary from those derived from other sources or estimation methodologies.

Headboat data do not support the estimation of target effort because target intent is not collected. Table 3.3.2.1.2 contains estimates of the number of headboat angler days for all Gulf states for 2011-2013. Estimates from previous years are available in GMFMC (2013) and are incorporated herein by reference.

Table 3.3.2.1.2. Headboat angler days.

Year	West Florida/Alabama	Louisiana/Mississippi	Texas	Total
2011	157,025	3,657	47,284	207,966
2012	161,975	3,680	51,776	217,431
2013	174,800	3,406	55,749	233,955
Average	164,600	3,581	51,603	219,784

Source: Southeast Region Headboat Survey.

3.3.2.2 Permits

The for-hire sector is comprised of charter vessels and headboats (party boats). Although charter vessels 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 8, 2014, there were 1,348 valid (non-expired) or renewable Gulf 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 permit itself does not identify the permitted vessel as either a headboat or a charter vessel and vessels may operate in both capacities. However, only federally permitted headboats are required to submit harvest and effort information to the NMFS Southeast Region Headboat Survey (SRHS). Participation in the SRHS is based on determination by the Southeast Fishery Science Center (SEFSC) that the vessel primarily operates as a headboat. Sixty-seven vessels were registered in the SHRS as of April 8, 2014 (K. Brennen, NMFS SEFSC, pers. comm.).

Information on Gulf charter boat and headboat operating characteristics 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 action. (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 action.)

3.3.2.3 Economic Value

Economic value can be measured in the form of consumer surplus per red snapper trip for anglers (the amount of money that an angler would be willing to pay for a fishing trip in excess of the cost of the trip) and producer surplus per passenger trip for for-hire vessels (the amount of money that a vessel owner earns in excess of the cost of providing the trip). The estimated value of the consumer surplus per red snapper angler trip for a trip on which the angler is allowed to harvest two red snapper is $58.43 (GMFMC 2010; value updated to 2013 dollars). Estimates of the consumer surplus per fish, instead of per angler trip, for red snapper and other saltwater species are provided in Carter and Liese (2012).

Estimates of the producer surplus per for-hire passenger trip are not available. Instead, net operating revenues, which are the return used to pay all labor wages, returns to capital, and owner profits, are used as the proxy for producer surplus. The estimated net operating revenue is $160.13 per target charter angler trip and $53.01 (2013 dollars) per target headboat angler trip regardless of species targeted or catch success (C. Liese, NMFS SEFSC, pers. comm.). Estimates of net operating revenue per red snapper target trip are not available.

3.3.2.4 Business Activity

The desire for recreational fishing generates economic activity as consumers spend their income on various goods and services needed for recreational fishing. This spurs economic activity in the region where recreational fishing occurs. It should be clearly noted that, in the absence of the opportunity to fish, the income would presumably be spent on other goods and services and these expenditures would similarly generate economic activity in the region where the expenditure occurs. As such, the analysis below represents a distributional analysis only.

Estimates of the business activity (economic impacts) associated with recreational angling for 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 the average expenditures by recreational anglers are also provided in NMFS (2011a) and are incorporated herein by reference.

Recreational fishing generates business activity (economic impacts). Business activity for the recreational sector is characterized in the form of full-time equivalent jobs, output (sales) impacts (gross business sales), and value-added impacts (difference between the value of goods and the cost of materials or supplies). Estimates of the average red snapper target effort (2011-2013) and associated business activity (2013 dollars) are provided in Table 3.3.2.4.1.

The estimates provided in Table 3.3.1 only apply at the state-level. These numbers are not additive across the region. Addition of the state-level estimates to produce a regional (or national total) could either under- or over-estimate the actual amount of total business activity because of the complex relationship between different jurisdictions and the expenditure/impact multipliers. Neither regional nor national estimates are available at this time.

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

Table 3.3.2.4.1. Summary of red snapper target trips (2011-2013 average) and associated business activity (thousand 2013 dollars). Output and value added impacts are not additive.

	Alabama	**West Florida**	**Louisiana**	**Mississippi**	**Texas**
	Shore Mode				
Target Trips	960	0	0	0	*

Output Impact	$75,991	$0	$0	$0	*
Value Added Impact	$40,879	$0	$0	$0	*
Jobs	1	0	0	0	*
	Private/Rental Mode				
Target Trips	137,665	235,712	29,314	17,246	*
Output Impact	$8,666,295	$11,579,138	$2,586,528	$532,155	*
Value Added Impact	$4,744,600	$6,885,390	$1,272,145	$255,047	*
Jobs	84	107	22	4	*
	Charter Mode				
Target Trips	19,195	29,053	5,289	37	*
Output Impact	$10,813,363	$9,870,872	$2,724,291	$12,439	*
Value Added Impact	$5,952,394	$5,852,411	$1,546,848	$7,009	*
Jobs	134	94	26	0	*
	All Modes				
Target Trips	157,820	264,765	34,603	17,283	*
Output Impact	$19,555,648	$21,450,010	$5,310,819	$544,594	*
Value Added Impact	$10,737,872	$12,737,801	$2,818,992	$262,056	*
Jobs	219	201	49	4	*

*Because target information is unavailable, associated business activity cannot be calculated.
Source: effort data from the MRFSS/MRIP, economic impact results calculated by NMFS SERO using the model developed for NMFS (2011).

3.4 Description of the Social Environment

Recreational fishing in the Gulf is an important past time for some coastal residents and often is an important recreational activity for tourists that visit the Gulf States. For some residents and tourists, catching red snapper is an important part of that fishing experience. Although, red snapper may not account for a majority of recreational fishing trips overall, it does seem to have developed the status of cultural icon in certain parts of the Gulf that other species do not share. Red snapper are also not typically targeted by shore anglers, so its status is primarily held among fishermen who either fish from private boats or use the for-hire sector to fish. Nevertheless, it is one species that seems to have generated a long history of cultural importance within the Gulf. That status, once due to its declining stock, is today due to a successful rebuilding program; it is the renewed abundance of this species and increasing effort that has sparked controversy over management and the status of this stock.

Because there are little to no data on recreational red snapper fishermen individually, it is difficult to describe their fishing activities or place them within a particular fishing community.

For that reason, the description of the social environment will have to be in general terms with descriptions of fishing communities focused on the broader category of reef fish.

3.4.1 Recreational Fishing Communities

While there are no landings data at the community level for the recreational sector, Table 3.4.1 offers a ranking of communities based upon the number of reef fish charter permits and the same permits divided by population of homeport location. As seen in Table 3.4.1, communities with numerous reef fish charter permits are spread throughout the Gulf with some smaller communities gaining a higher rank due to their smaller population. The combined ranking offers a measure that includes both the absolute measure of number of permits and that number divided by the population to get a more relative measure of the number of permits. The majority of communities are in Florida, and it should be noted that communities in the Southeastern Gulf and Florida Keys were not included as red snapper does not contribute as much to the community total landings in those areas. So, the communities included in this table are where red snapper are typically caught and important to the local fishing economy. Again, the assumption is that these communities are where reef fish permits exist and red snapper fishing is an important aspect of both the private and for-hire fishing experience.

To establish whether red snapper is an important species for the for-hire sector, websites of several charter operations within the top communities in Table 3.4.1 were visited to establish that red snapper were indeed targeted. In almost all cases, the charter websites that were visited did list red snapper as a target species and often featured accompanying photos of customer catches of red snapper along with other species. Overall, many of the communities within Table 3.4.1 have for hire vessels that highlight red snapper as an important target species, but do offer other species as alternate target

Table 3.4.1. 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

To better capture how Gulf fishing communities are engaged and reliant on recreational fishing overall, indices were created using secondary data from permit information for the recreational sectors (Jepson and Colburn 2013). Fishing engagement is primarily the absolute numbers of permits, landings and value within a community. 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 within a given community.

Using a principal component and single solution factor analysis each community receives a factor score for each index to compare to other communities. Using the communities in Table 3.4.1 factor scores of both engagement and reliance for commercial fishing were plotted onto a bar graph. Factor scores are represented by colored bars and are standardized, therefore the mean is zero and a score above 1 is also above one standard deviation. Two trend lines of 1 and ½ standard deviation are plotted onto the graphs to help determine a threshold for significance. A score above ½ standard deviation is considered moderately engaged or reliant; while over 1 standard deviation is considered very engaged or reliant

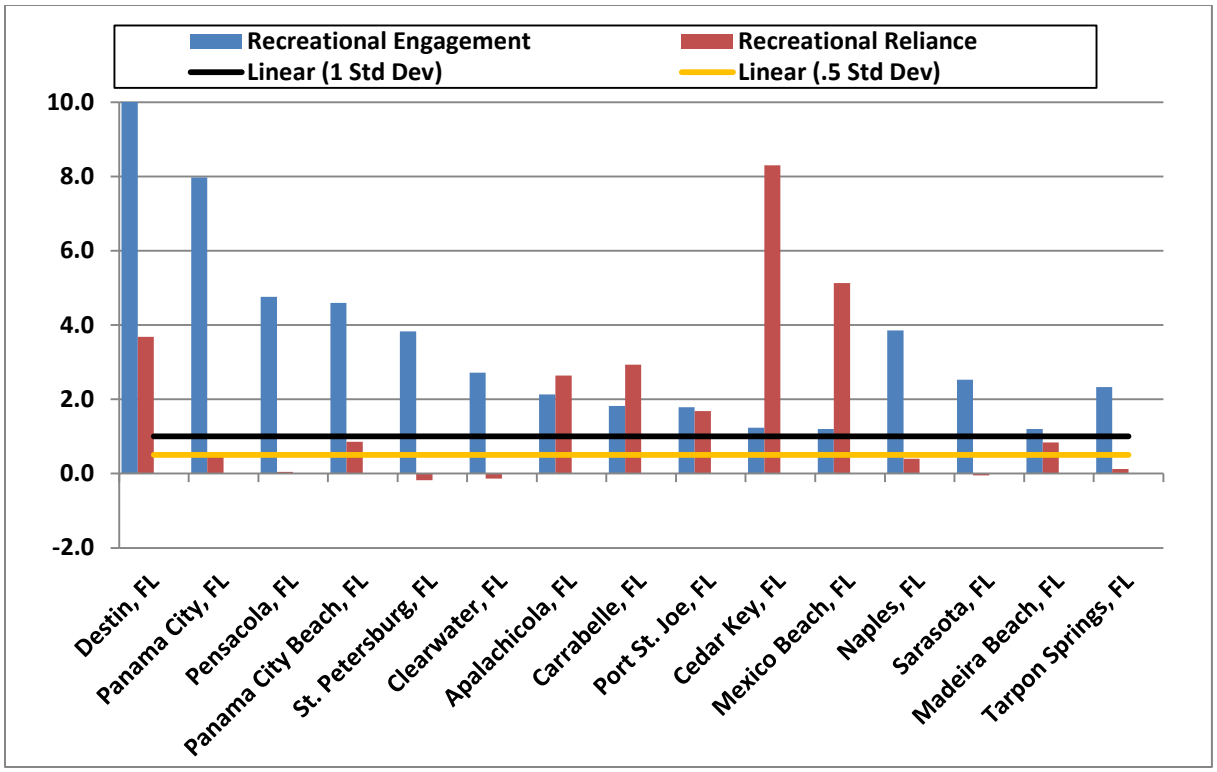

Figure 3.4.1. Top 15 Florida red snapper fishing communities' recreational engagement and reliance.
Source: SERO Social indicators database (2014)

The communities from Florida depicted in Figure 3.4.1 that are highly engaged and reliant are Destin, Apalachicola, Carabelle, Port St. Joe, Cedar Key, and Mexico Beach. Other communities that are highly engaged and moderately reliant are Panama City, Panama City Beach, Naples and Madeira Beach. All communities from Florida are highly engaged in recreational fishing.

The communities outside of Florida are captured in Figure 3.4.2 and there are several that are both highly engaged and reliant upon recreational fishing: Orange Beach, AL; Dauphin Island, AL; Grand Isle, LA; Chauvin, LA and Port Aransas, TX. All of the communities are highly engaged in recreational fishing.

It should be noted again that these measures only give us a general idea of the importance of recreational fishing within these communities and is not specific to red snapper. However, it is likely that of all the coastal communities along the Gulf Coast, these communities would be affected the most by the actions within this amendment because of their engagement and reliance upon recreational fishing.

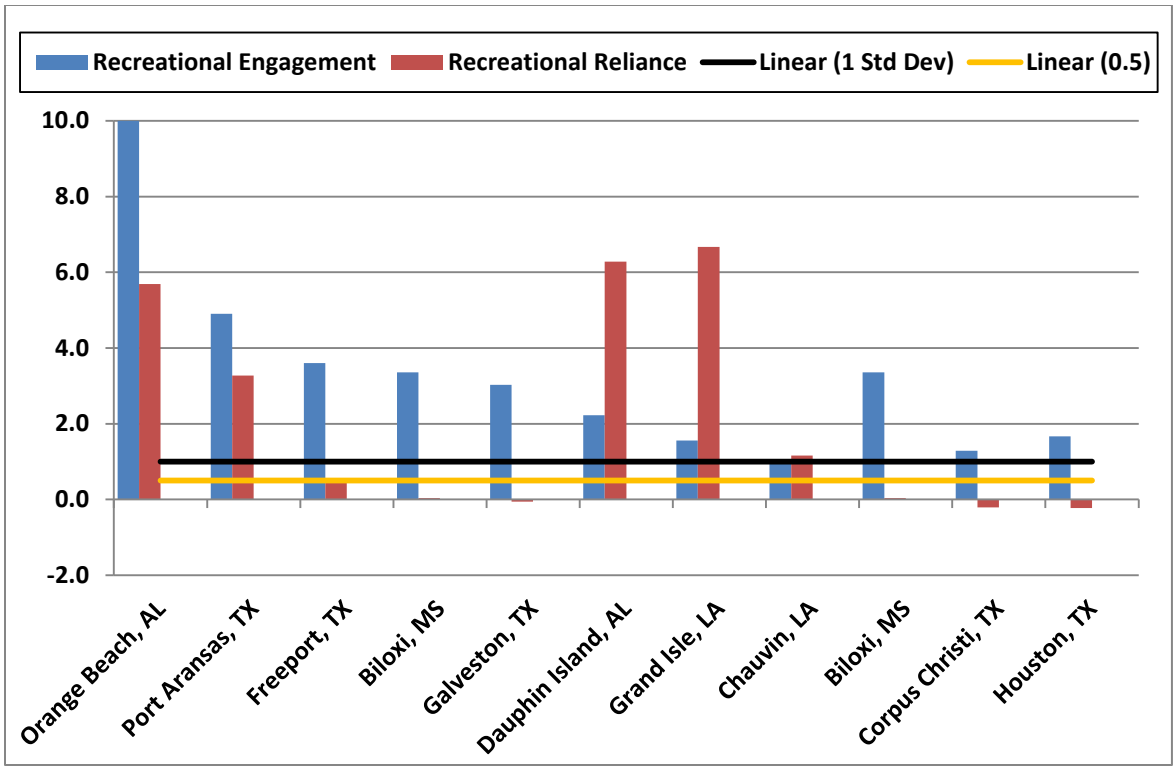

Figure 3.4.2. Other Gulf red snapper fishing communities' recreational engagement and reliance
Source: SERO Social indicators database (2014)

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).

A suite of indices was created to examine the social vulnerability of coastal communities and is closely aligned with measures of EJ (Jepson and Colburn 2013). The three indices depicted in Figures 3.4.3 and 3.4.4 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 can 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 5, disruptions such as higher separation rates, higher crime rates and unemployment all are signs of populations experiencing vulnerabilities. These

vulnerabilities signify that it may be difficult for someone living in these communities to recover from significant social disruption that might stem from a change in their ability to work or maintain a certain income level.

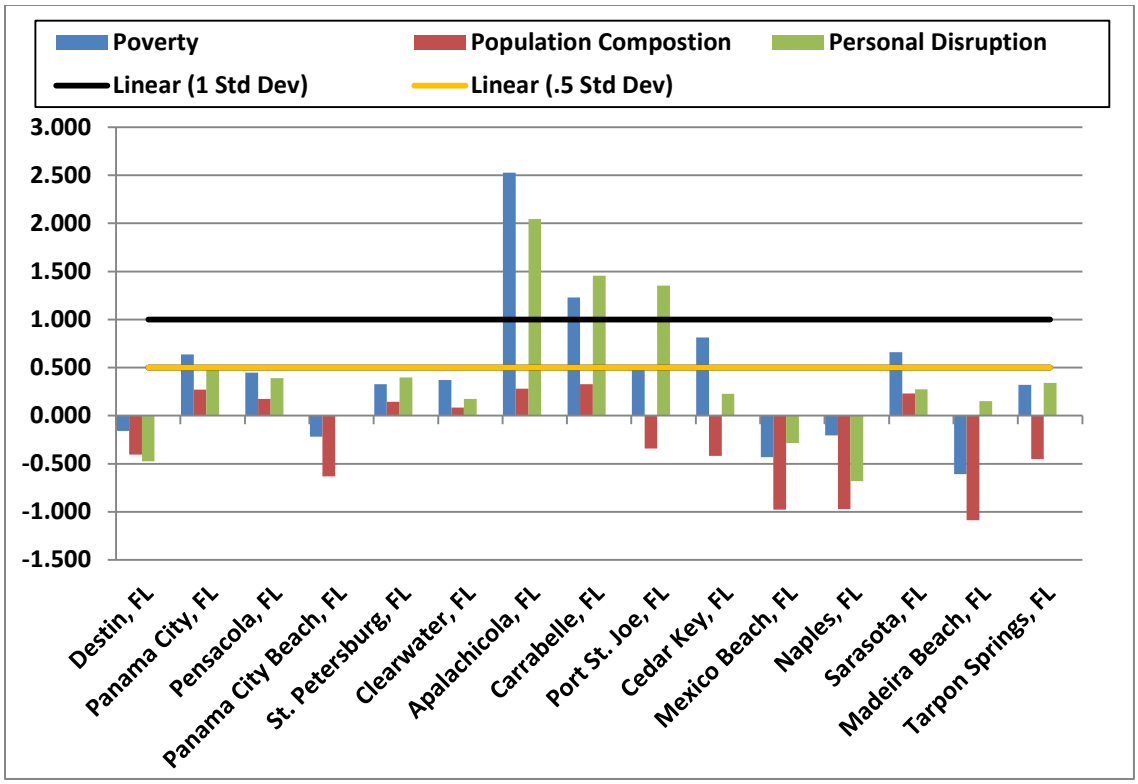

Figure 3.4.3. Social vulnerability indices for Florida red snapper recreational fishing communities
Source: SERO Social indicators database (2014)

Of the Florida communities depicted in Figure 3.4.3, only Apalachicola, Carrabelle and Port St. Joe have more than one index that exceeds the thresholds. For these three communities which exceed the threshold for both poverty and personal disruption, it could be expected that any negative effects from regulatory action may have a larger impact as these three communities also exhibited high engagement and reliance on recreational fishing.

As shown in Figure 3.4.4 the communities of Freeport, TX, Chauvin, LA and Houston, TX all have more than one index above both thresholds. The communities of Galveston and Corpus Christi, TX, have three indices above the lower threshold and one above the upper threshold. All of these communities could be susceptible to negative effects from regulatory change, although Chauvin is the only community among the group that is both engaged and reliant upon recreational fishing.

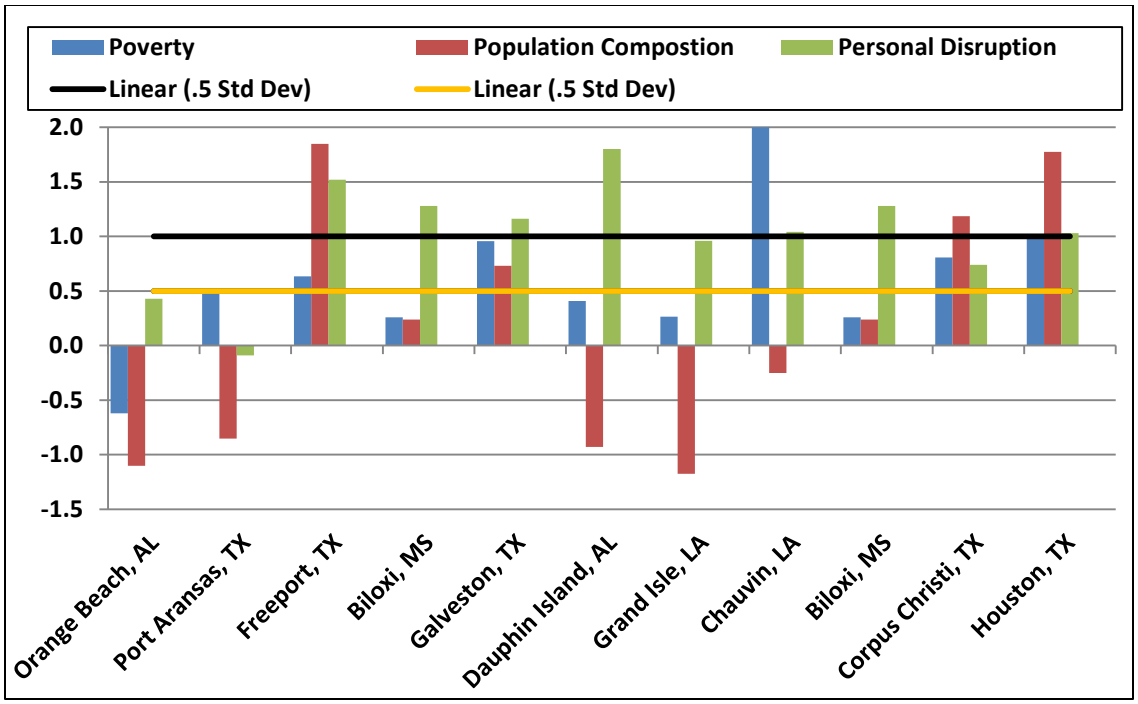

Figure 3.4.4. Social vulnerability indices for other red snapper recreational fishing communities
Source: SERO Social indicators database (2014)

3.5 Description of the Administrative Environment

3.5.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 *et seq.*). 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 involved in the fishery management process through participation on advisory panels, public hearings, and through Council meetings. The regulatory process is 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.

3.5.2 State Fishery Management

The purpose of state representation at the Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters. The state governments of Texas, Louisiana, Mississippi, Alabama, and Florida have the authority to manage their respective state fisheries. Each of the five 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 2004a).

CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

4.1 Effects on the Physical Environment

Direct and indirect effects on the physical environment resulting from the harvest of reef fish in the Gulf of Mexico (Gulf) have been discussed in detail in Reef Fish Amendment 22, Reef Fish Amendment 27/Shrimp Amendment 14 (GMFMC 2004a and 2007), and in the February 2010 Regulatory Amendment (GMFMC 2010) and are incorporated here by reference. The primary gear used by the recreational sector is hook-and-line. Hook-and-line gear has the potential to snag and entangle bottom structures. Each individual set has a very small footprint and thus only a small potential for impact, but the cumulative impacts from recreational fishing could result in a large amount of gear being placed in the water, increasing the potential for impact. The line and weights used by this gear type also can cause abrasions on reefs and other structures (Barnette 2001). Additionally, vessels used for hook-and-line fishing often anchor, adding to the potential damage of the bottom at fishing locations. If hook-and-line gear is lost, long-term indirect effects to habitat may occur if marine life becomes entangled in the gear or the gear is overgrown with algae (Hamilton 2000; Barnette 2001). Circle hooks are required in the reef fish fishery. Because of the design of circle hooks, this gear is less likely to snag bottom habitat than other hook types.

The direct and indirect effects on the physical environment from this action would be related to changes in fishing effort. The direct and indirect effects on the physical environment from **Alternative 1**, No Action, would not change the current fishing conditions. No change in fishing effort is expected to occur because no new fishing regulations would be implemented; therefore, habitat-gear interactions are estimated to remain unchanged. **Preferred Alternative 2, Alternative 3, Alternative 4,** and **Alternative 5** would be expected to decrease physical effects to the environment with the implementation the annual catch limit (ACL) and the shorter federal fishing season. However, if the fishing effort shifts geographically from the federal to state waters where states (Florida, Louisiana, and Texas) have inconsistent regulations, it is reasonable that the spatial concentration of the effects to the physical environment could occur in state waters. If the federal season for harvesting red snapper is shortened to prevent exceeding the quota, then the adverse effects on the physical environment would likely be less in **Preferred Alternative 2, Alternative 3, Alternative 4,** and **Alternative 5**, than that of **Alternative 1**. **Preferred Alternative 2** (20% buffer) would likely have more negative effects on the physical environments compared to **Alternative 3** (30% buffer), **Alternative 4** (40% buffer), and **Alternative 5** (60% buffer) because to the increasing the buffer between the annucal catch target (ACT) and the red snapper quota is anticipated to lead to decreases in fishing effort in federal waters.

In summary, the most restrictive alternative is **Alternative 5,** followed by **Alternative 4, Alternative 3**, **Preferred Alternative 2,** and **Alternative 1**. **Alternative 1,** No Action, alternative is the least restrictive and could result in negative impacts to the physical environment if the harvest is not constrained to the quota for red snapper. The direct and indirect effects on the physical environment would be based on the amount of fishing activity in a given area, but are not expected to be overall significant.

4.2 Effects on the Biological/Ecological Environment

Direct and indirect effects on the biological/ecological environment from the harvest of red snapper and from changes in total allowable catch (sector quotas) have been discussed in detail in Amendment 22 and Amendment 27/Shrimp Amendment 14 to the Reef Fish Resources to the Gulf of Mexico (GMFMC 2004a and 2007) and in the February 2010 Regulatory Amendment (GMFMC 2010) and are incorporated here by reference. Potential impacts of the 2010 Deepwater Horizon MC252 oil spill on the biological/ecological environment are discussed in the January 2011 Regulatory Amendment (GMFMC 2011a) and the cumulative effects analysis.

The direct effects on the biological/ecological environment for red snapper would be expected to decrease with the increasing buffer. As the buffer increases, the probability of exceeding the quota would decrease. However, the reduction of season length could also have negative effects to red snapper. The 2014 season was previously announced as 40 days. Reducing the season length through this emergency action could create a derby fishing situation. If anglers only have a few days to harvest red snapper, they may run multiple trips in a day. This increase in fishing effort may not be reflected in the estimates of season length that are based on the 2013 Marine Recreational Information Program (MRIP) landings estimate. The increase in fishing effort could also impact the ecological co-occurring reef fish species that may be harvested as bycatch. In addition, the occurrence of high-grading may increase. High-grading is throwing back a previously caught fish and keeping a larger fish in its place. This could negatively affect the red snapper stock by increasing discard mortality.

Additional effects on the biological/ecological environment may be attributed to the increased fishing effort in state waters while the federal season is closed. A redistribution of fishing effort between federal and state waters would occur off of states that adopt inconsistent regulations. At present, Mississippi and Alabama have consistent regulations, while Texas, Louisiana, and Florida have inconsistent regulations. The harvest of red snapper is year round in Texas and Louisiana has just extended the red snapper season in state waters through the rest of 2014. Florida intends to open for 52 days inclusive of the federal season. It is difficult to assess the impacts and fishing effort of red snapper in the state waters. It is possible that the harvest in state waters alone could exceed the recreational red snapper quota which would negatively impact the red snapper stock. The redistribution of effort may disproportionately affect younger red snapper which often inhabit more shallow waters. This could negatively affect the younger year classes of the red snapper stock. However, red snapper harvested in more shallow waters may have lower release mortality due to the reduced risk of barotrauma.

An analysis of the projected recreational season lengths for red snapper is presented in Appendix B. As discussed in Section 2, **Alternative 1**, No Action, would not set a buffer on the recreational red snapper quota. **Preferred Alternatives 2, Alternative 3, Alternative 4,** and **Alternative 5** would apply buffers between the ACTs and the recreational quota (Table 2.1.1). The greater the buffers, the shorter the recreational red snapper season would be in federal waters. None of the alternatives are likely to allow the recreational harvest of red snapper to exceed the overfishing limit (OFL) as the Gulf of Mexico Fishery Management Council (Council) set the combined quotas much lower than the OFL to allow for a constant catch rate

over the next few years. However, adding a buffer, **Alternatives 2-5**, would reduce the probability of exceeding the quota.
In summary, **Alternative 1**, No Action, would be the least restrictive and have the highest probability of exceeding the quota. **Alternatives 2-5** would be increasingly restrictive, respectively. As the buffer percentage increases, the probability of exceeding the quota decreases. **Alternative 5** would have the least probability of exceeding the quota. Although not the most restrictive, using the 20% buffer in **Preferred Alternative 2**, would have only a 15% probability of exceeding the quota.

Indirect effects of these alternatives on the biological and ecological environment are not well understood. Changes in the population size structure, as a result of shifting 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. Another effect of an expanding red snapper population could be a continuation of the reestablishment of red snapper populations in historical areas of occurrence in the eastern Gulf. As the red snapper stock continues to rebuild, one effect is that the average size of a red snapper caught from recreational fishing is also increasing. As a result, the recreational quota is being reached faster with a smaller number of fish, resulting in shorter seasons even with quota increases. As a result, fishermen who are unable to target red snapper during the closed season may choose to target other species. Species likely to be affected by changes in red snapper abundance the most include vermilion snapper, gray triggerfish, and gag, which all co-occur with red snapper.

The proposed action is designed to decrease the likelihood of the recreational sector exceeding the red snapper quota through an in-season accountability measure for the harvest of an indigenous species in the Gulf. Changing allowable harvest may pose the potential to shift fishing effort to other species in the Gulf. However, the activity being altered does not itself introduce non-indigenous species, and is not reasonably expected to facilitate the spread of such species through depressing the populations of native species. Additionally, it does not propose any activity, such as increased ballast water discharge from foreign vessels, which is associated with the introduction or spread on non-indigenous species.

4.3 Effects on the Economic Environment

Methodology
As discussed in GMFMC (2013b), examination of the recreational effort response to changes in the allowable harvest of red snapper by recreational anglers has not identified a reliable pattern to use in the estimation of the effects expected to occur in response to proposed changes in allowable harvest. As a result, this assessment assumes that the change in recreational red snapper target effort, and associated economic effects, expected to occur under the alternatives considered in this action will be proportionate to the change in the number of days the red snapper fishing season is projected to be open. This approach assumes that, if the length of the

red snapper season is reduced, all red snapper target trips that would normally be taken on the days during which red snapper may no longer be kept are not taken rather than re-directed to the remaining open season, or taken when they would normally occur, but re-directed to an alternative species. The implications of this assumption are discussed below.

The projection estimates in this assessment are based on the average number of red snapper target trips taken per day during the June 2013 recreational red snapper season in areas that would be expected to be directly affected by the proposed buffers to establish the ACT. These areas include the Exclusive Economic Zone (EEZ) throughout the Gulf, state waters in Alabama and Mississippi (red snapper harvest is prohibited in territorial waters by state law for these states when red snapper harvest in the EEZ is prohibited), and state waters throughout the Gulf for federally permitted for-hire vessels (charter and headboat). Data issues and the methodological approach taken may result in over- or under-estimation of the actual effects of the proposed alternatives for several reasons including, but not limited to:

- MRIP red snapper target effort estimates for 2013 were higher than the average for 2011 and 2012 (approximately 26% higher for the charter mode and approximately 273% higher for the private/rental (hereafter referred to as simply "private") mode). If future effort returns to pre-2013 levels, then the use of 2013 data results in overestimation of the expected effects. Use of the three-year average (2011-2013) would result in intermediate results, lower than those based solely on 2013 data, but higher than those based on 2011-2012 data. The effects of this issue would be expected to be invariant to the buffer selected, the ACT, and the length of the red snapper open season because the average value used (red snapper target trips per day) functions only as a scalar (to be multiplied times the change in days in the red snapper season) and the value of the scalar would not change as the proposed buffer changes.
- The Florida territorial jurisdiction extends to 9 miles, whereas the data estimates encompass effort from greater than 10 miles (MRIP area category "Ocean, > 10 miles"). This may result in an underestimation of the expected effects (more trips may be affected than are estimated). The effects of this issue would be expected to be invariant to the buffer selected, the ACT, and the length of the red snapper open season (scalar effect; see the first bullet).
- Estimates of Texas private and charter red snapper target effort are unavailable. As a result, starting estimates of red snapper target effort are underestimated even before potential behavioral changes (i.e., changing when to fish or what species to target; see discussion below) are considered. The effects of this issue would be expected to be invariant to the buffer selected, the ACT, and the length of the red snapper open season (scalar effect; see the first bullet).
- The measure of headboat effort (angler day) is a normalized estimate based on a 12-hour trip (for comparison, the effort estimates from MRIP have no time component; they represent individual trips regardless of trip duration). For example, two 6-hour trips would be equivalent to one angler day. As a result, utilizing angler days to represent individual angler trips will underestimate the actual number of individual trips and associated effects on the headboat sector. The effects of this issue would be expected to be invariant to the buffer selected, the ACT, and the length of the red snapper open season (scalar effect; see the first bullet).

- Target information for headboat fishing is not collected and must be estimated based on assumptions (related to when and where headboat trips are taken). This may result in under- or overestimation of the actual effects on the headboat sector (more or less trips may be affected than are estimated). The effects of this issue would be expected to be invariant to the buffer selected, the ACT, and the length of the red snapper open season (scalar effect; see the first bullet).
- Estimates of effort for the for-hire mode (charter and headboat) cannot be disaggregated between vessels with and without a federal charter/headboat permit. This assessment assumes all red snapper target effort occurs on vessels that possess a federal charter/headboat permit and, as a result, anglers on these vessels are prohibited from harvesting red snapper in state waters when harvest in the EEZ is prohibited. This may result in overestimation of the expected effects (fewer trips may be affected than are estimated). The effects of this issue would be expected to be invariant to the buffer selected, the ACT, and the length of the red snapper open season (scalar effect; see the first bullet).
- Weather effects are not quantified. Adverse weather may prevent fishing during the open season. This may result in underestimation of the expected effects (more trips may be affected than are estimated). The effects of this issue would be expected to increase as the buffer increases, the ACT is reduced, and the red snapper open season becomes shorter (the shorter the season, the more restricted the opportunity to fish on a different day).
- The methodology employed does not model effort shift from newly "closed" days to days when red snapper harvest in the EEZ is allowed. This may result in overestimation of the expected effects (fewer trips may be affected than are estimated; fishing quality, and other satisfaction levels, may also be adversely affected). The effects of this issue would be expected to increase as the buffer increases, the ACT is reduced, and the red snapper open season becomes shorter (the shorter the season, the greater the incentive to shift, but the lower the opportunity, to fish on a different day).
- The methodology employed does not model target effort shift to other species. This may result in overestimation of the expected effects (fewer trips may be affected than are estimated; however, the value per trip would be expected to decrease because of the shift to a secondary species). The effects of this issue would be expected to increase as the buffer increases, the ACT is reduced, and the red snapper open season becomes shorter (the shorter the season, the greater the incentive to shift target intent to an alternative species).
- The methodology employed does not model effort shift from the EEZ to state waters, where allowed (Florida, Louisiana, and Texas, private mode). This may result in overestimation of the expected effects (fewer trips may be affected than are estimated; however, fishing quality, and associated value, would be expected to decline for trips that shift into state waters because, otherwise, the angler would already routinely fish in state waters instead of in the EEZ). The effects of this issue would be expected to increase as the buffer is increased, the ACT is reduced, red snapper open season becomes shorter (the shorter the season, the greater the incentive to, where allowed, shift effort to state waters).

The combined effect of these data and/or methodological issues, and others that may apply but have not been described, on the estimates of the expected effects of the proposed alternatives is unknown; the actual effects could be greater than, or less than, the estimates provided below. This assessment does not attempt to determine which of, or to what degree, these contrasting factors would be expected to dominate and, thereby, support a conclusion that the estimates provided are expected to be more than, or less than, the estimates provided.

Results

The red snapper recreational ACT, EEZ red snapper recreational season length, and associated expected change in angler trips (individual trips, regardless of duration), consumer surplus to anglers (all modes), and net operating revenue to for-hire businesses are provided in Table 4.3.1. Consumer surplus is the amount of money that an angler would be willing to pay for a fishing trip in excess of the cost of the trip. The estimated changes in consumer surplus were computed based on an average consumer surplus of $58.43 (2013 dollars) per angler trip (David Carter, SEFSC, pers. comm.). Estimates of the consumer surplus by mode are not available at the time of this assessment. As a result, a common surplus value is applied to trips in all modes. Because anglers in different modes may not value a red snapper fishing trip equally, the use of a common estimate may result in under- or overestimation of the actual effects.

The comparable measure of economic benefits for for-hire vessels is producer surplus; producer surplus is the amount of money that a vessel owner earns in excess of the cost of providing the trip. Net operating revenue, which is the return used to pay all labor wages, returns to capital, and owner profits, are used as the proxy for producer surplus. For the charter boat and the headboat industries, the estimated changes in producer surplus were calculated based on average net operating revenue of $160.13 per target charter angler trip and $53.01 (2013 dollars) per target headboat angler trip (Christopher Liese, SEFSC, pers. comm.).

The estimated number of red snapper target trips that would be expected to be affected per day and utilized in this assessment are 14,312 trips by private, charter, and headboat anglers combined (used in the estimation of the change in consumer surplus to anglers), 1,942 trips by charter anglers (used in the estimation of the change in net operating revenue to charter vessels), and 1,324 trips by headboat anglers (used in the estimation of the change in net operating revenue to headboats).

Table 4.3.1. Proposed red snapper recreational ACT (million pounds whole weight), EEZ red snapper recreational season length (days), and associated estimated changes in red snapper target trips, consumer surplus, and net operating revenue. Consumer surplus and net operating revenues in thousand 2013 dollars.

Alternative	Recreational ACT	Season Length	Mode	# of Trips	Consumer Surplus	Net Operating Revenue
Pref 2	4.312	9	Private	66,278	$3,873	NA*
			Charter	11,649	$681	$1,865
			Headboat	7,944	$464	$421
			Total	85,871	$5,017	$2,286
3	3.773	6	Private	99,417	$5,809	NA

			Charter	17,474	$1,021	$2,798
			Headboat	11,916	$696	$632
			Total	128,807	$7,526	$3,430
4	3.234	3	Private	132,556	$7,745	NA
			Charter	23,298	$1,361	$3,731
			Headboat	15,887	$928	$842
			Total	171,742	$10,035	$4,573
5	1.889	0	Private	165,695	$9,682	NA
			Charter	29,123	$1,702	$4,663
			Headboat	19,859	$1,160	$1,053
			Total	214,678	$12,544	$5,716

*NA = not applicable.
Source: National Marine Fisheries Service Southeast Regional Office.

Potential Business Activity Associated with the Estimated Economic Effects
This section provides estimates of the business activity that may be associated with the potential changes in recreational angler trips that may occur as a result of the proposed alternatives. This business activity is characterized in the form of full time 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). The methods used and assumptions made to estimate the changes in business activity reported in this section are detailed in GMFMC (2010) and are incorporated herein by reference.

These estimates are provided to inform the decision process of the potential consequences of the proposed management changes. It is important to note that changes in business activity are distributional effects (a dollar spent for one activity, good, or service is a dollar not spent for another) and are not equivalent to changes in economic value. Caution should be used in the interpretation and use of these results because the method of calculation does not allow for behavioral or substitution changes. For example, instead of resulting in a change in the number of fishing trips, a reduction in the length of the red snapper recreational season may, as previously discussed, result in redirection of target effort to another species, or to another area of the Gulf, instead of trip cancellation. Thus, total effort, and associated business activity, may not change as much as expected, though there could be distributional effects (i.e., fishing in another part of the state or in a different state). Additionally, these results do not reflect the net change in total business activity that would be expected to occur across the entire business community (e.g., an angler who takes fewer fishing trips would be expected to spend more money on other activities, goods, or services, inducing an increase in business activity associated with these activities).

Tables 4.3.2-4.3.5 contain estimates of the potential changes in business activity associated with the estimated changes in recreational trips that may occur as a result of the proposed alternatives. These estimates only cover private and charter anglers. Red snapper are not typically targeted by shore anglers and, as discussed in Section 3.3, estimates of business activity are not available for the headboat sector in the Gulf.

Table 4.3.2. Potential change in business activity associated with the estimated change in recreational angler trips (private and charter modes) for **Preferred Alternative 2**. Income and output impacts in 2013 dollars.

	Alabama	West Florida	Louisiana	Mississippi	Texas*
	Shore Mode				
Target Trips	0	0	0	0	
Output Impact	$0	$0	$0	$0	
Value Added Impact	$0	$0	$0	$0	
Jobs	0	0	0	0	
	Private Mode				
Target Trips	40,592	23,838	4,505	4,100	
Output Impact	$2,555,350	$1,171,020	$397,500	$126,513	
Value Added Impact	$1,398,996	$696,333	$195,504	$60,634	
Jobs	25	11	3	1	
	Charter Mode				
Target Trips	4,073	7,453	1,311	0	
Output Impact	$2,294,495	$2,532,186	$675,278	$0	
Value Added Impact	$1,263,043	$1,501,326	$383,422	$0	
Jobs	28	24	7	0	
	All Modes				
Target Trips	44,665	31,291	5,816	4,100	
Output Impact	$4,849,845	$3,703,206	$1,072,778	$126,513	
Value Added Impact	$2,662,039	$2,197,658	$578,926	$60,634	
Jobs	53	35	10	1	

*NA = not available.
Source: National Marine Fisheries Service Southeast Regional Office.

Table 4.3.3. Potential change in business activity associated with the estimated change in recreational angler trips (private and charter modes) for Alternative 3. Income and output impacts in 2013 dollars.

	Alabama	West Florida	Louisiana	Mississippi	Texas*
	Shore Mode				
Target Trips	0	0	0	0	
Output Impact	$0	$0	$0	$0	
Value Added Impact	$0	$0	$0	$0	
Jobs	0	0	0	0	
	Private Mode				
Target Trips	60,887	35,758	6,757	6,150	
Output Impact	$3,832,962	$1,756,579	$596,206	$189,769	

Value Added Impact	$2,098,460	$1,044,528	$293,235	$90,951	
Jobs	37	16	5	2	
	Charter Mode				
Target Trips	6,109	11,180	1,966	0	
Output Impact	$3,441,460	$3,798,449	$1,012,659	$0	
Value Added Impact	$1,894,409	$2,252,089	$574,986	$0	
Jobs	43	36	10	0	
	All Modes				
Target Trips	66,996	46,938	8,723	6,150	
Output Impact	$7,274,422	$5,555,029	$1,608,865	$189,769	
Value Added Impact	$3,992,868	$3,296,617	$868,221	$90,951	
Jobs	80	52	15	2	

*NA = not available.
Source: National Marine Fisheries Service Southeast Regional Office.

Table 4.3.4. Potential change in business activity associated with the estimated change in recreational angler trips (private and charter modes) for Alternative 4. Income and output impacts in 2013 dollars.

	Alabama	**West Florida**	**Louisiana**	**Mississippi**	**Texas***
	Shore Mode				
Target Trips	0	0	0	0	
Output Impact	$0	$0	$0	$0	
Value Added Impact	$0	$0	$0	$0	
Jobs	0	0	0	0	
	Private Mode				
Target Trips	81,183	47,677	9,009	8,199	
Output Impact	$5,110,637	$2,342,089	$794,911	$252,994	
Value Added Impact	$2,797,958	$1,392,694	$390,965	$121,253	
Jobs	50	22	7	2	
	Charter Mode				
Target Trips	8,146	14,906	2,621	0	
Output Impact	$4,588,989	$5,064,373	$1,350,041	$0	
Value Added Impact	$2,526,085	$3,002,651	$766,551	$0	
Jobs	57	48	13	0	
	All Modes				
Target Trips	89,329	62,583	11,630	8,199	
Output Impact	$9,699,626	$7,406,462	$2,144,952	$252,994	
Value Added Impact	$5,324,043	$4,395,346	$1,157,516	$121,253	
Jobs	106	70	20	2	

*NA = not available.

Source: National Marine Fisheries Service Southeast Regional Office.

Table 4.3.5. Potential change in business activity associated with the estimated change in recreational angler trips (private and charter modes) for Alternative 5. Income and output impacts in 2013 dollars.

	Alabama	West Florida	Louisiana	Mississippi	Texas*
	Shore Mode				
Target Trips	0	0	0	0	
Output Impact	$0	$0	$0	$0	
Value Added Impact	$0	$0	$0	$0	
Jobs	0	0	0	0	
	Private Mode				
Target Trips	101,479	59,596	11,262	10,249	
Output Impact	$6,388,312	$2,927,599	$993,705	$316,251	
Value Added Impact	$3,497,456	$1,740,860	$488,739	$151,570	
Jobs	62	27	9	3	
	Charter Mode				
Target Trips	10,182	18,633	3,276	0	
Output Impact	$5,735,955	$6,330,636	$1,687,422	$0	
Value Added Impact	$3,157,451	$3,753,415	$958,115	$0	
Jobs	71	60	16	0	
	All Modes				
Target Trips	111,661	78,229	14,538	10,249	
Output Impact	$12,124,267	$9,258,235	$2,681,128	$316,251	
Value Added Impact	$6,654,907	$5,494,276	$1,446,854	$151,570	
Jobs	133	87	25	3	

*NA = not available.
Source: National Marine Fisheries Service Southeast Regional Office.

Discussion

The results provided in Tables 4.3.1 through 4.3.5 are based on a comparison with the 15-day season that would occur in the absence of this proposed action and not the 40-day season that was originally forecast for the 2014 season, as discussed in Chapter 2. Because of the requirement, as a result of the court ruling, to incorporate 2013 catch rates in the season determination analysis, the 2014 red snapper season in the EEZ will be substantially shorter than both previous seasons and previously projected. This reduction in the length of the red snapper season (25 days), and the associated reduction in recreational effort and associated economic benefits, is outside the scope of this proposed action. As a result, the expected economic effects are not provided in this assessment. However, similar to the analysis provided in this assessment of the alternative proposed buffers, estimation of the effects of the reduction in the length of the red snapper season in the EEZ from 40 days (or any other period) to the current baseline could be performed by the reader through use of the same scalars provided (reds snapper target trips per

day, consumer surplus per trip, etc.), and consideration of the caveats and issues discussed in this assessment.

Because of the time available to conduct this analysis, models could not be developed to project potential behavioral changes by recreational anglers or for-hire businesses in response to the proposed alternatives. As a result, the proposed changes in the ACT were quantitatively evaluated using fixed relationships – the proposed harvest buffers translated into a specific ACT, which translated into a specific allowable number of days for the red snapper recreational season in the EEZ, and each day of change in the length of the open season induced a fixed change in angler effort (and associated change in economic benefits). Thus, the quantitative economic estimates provided in Tables 4.3.1 through 4.3.5 uniformly change in magnitude and direction with the proposed change in buffer and associated change in the ACT and the number of days in the open season. Stated differently, using this methodology, a larger buffer will always result in proportionately lower ACT, shorter season, and less recreational effort in federal waters, consumer surplus, net operating revenue, and business activity, than a smaller buffer.

From this narrow perspective, the proposed alternatives would be ranked from the least economic losses (most economic benefits) to the most economic losses (least economic benefits) according to simply the amount of ACT provided and subsequent length of season allowed: **Alternative 1**, **Preferred Alternative 2** would be expected to result in the least economic losses, followed by **Alternative 3**, **Alternative 4**, **Alternative 5**. As previously discussed, these effects are all expected to be short-term effects due to the limited duration of the proposed changes. However, the more severe the short-term economic losses, the greater the likelihood that the survival of businesses associated with the recreational fishing industry beyond the current season is jeopardized. If businesses are forced to close, additional longer-term economic losses would occur. However, the potential rate of business closure and associated economic loss is unknown.

In reality, as previously discussed, the relationship modeled (red snapper target trips per day) would not be expected to remain constant as the harvest buffer and associated season length changes. The incentive for behavioral change – stop fishing, fish for other species, or fish in other waters – may vary substantially across anglers and areas of the Gulf. Texas anglers may be more willing (and able) to shift to state waters due to a longer history of non-compatible seasons (and a 365-day red snapper open season in state waters), whereas Florida anglers may be more willing (and able) to target different species due to access to a potentially wider range of species choices. The likelihood of change may also not uniformly change with the rate of change in the season length; an angler may be more flexible to select an option which keeps them fishing only up to a certain point, beyond which dissatisfaction with the general management environment may cause complete exit from the fishery. Alternatively, one strategy may be more rational to an angler when faced with one seasonal window (e.g., re-scheduling a late-June trip to early-June under a 15-day season), but another strategy (e.g., switching species instead of switching days) preferred under a different seasonal window. Thus, although using a fixed relationship may suffice on average, actual response strategies would be expected to vary by angler and the assumption that all affected trips would be cancelled is recognized as extreme; in reality, while some, even many, of the trips expected to be affected may be cancelled, it is not logical to conclude that cancellation would be the universal response. As a result, aside from the other factors previously discussed that may result in over- or underestimation of the expected effects of

the proposed alternatives, the assumption that all affected trips will be canceled results in overestimation of the expected effects.

Two additional factors that may affect the ranking of the alternatives should be considered. The first factor to consider is the potential for the alternative proposed buffers and associated ACTs/seasons to affect the biological status of red snapper. Specifically, the issue is will the alternatives adversely affect the rebuilding plan and associated economic benefits. Because of the short-term duration of the proposed alternatives – one fishing season – none of the alternatives would be expected to adversely affect the health of the resource or progress towards the current rebuilding plan. As a result, no reduction in the long-term economic benefits accruing to a rebuilt and sustainable red snapper resource would be expected to occur under any of the proposed alternatives. One caveat to this conclusion is noted, however. Resource health is dependent on total mortality and not just directed mortality (the mortality of harvested (kept) fish). The intent of the proposed action is to reduce the likelihood the recreational quota is exceeded. Thus, although the target for determining the season length is the ACT, which is less than the quota, the expected total harvest during the resultant season (and associated seasons in state waters) is the quota and not the ACT. In addition to harvest mortality, red snapper mortality occurs as fish are released either through predation or injury (inability to return to the bottom as a result of damage to the swim bladder is included in the injury category). Because all fish that are caught are not kept, and release mortality is not zero, total red snapper mortality will exceed the harvest mortality. The amount of red snapper that die as a result of release mortality would be expected to increase as angler effort increases, regardless of whether harvest is allowed or not. Thus, the more effort is adversely affected (reduced) as a result of the proposed alternatives, the lower the number of red snapper that will die due to release mortality, and vice versa, although total red snapper mortality (absent, perhaps, 100% release mortality) should remain lower under a shorter season with more releases than under a longer season and higher direct harvest. This creates a potentially conflicting situation in that, if trips are not reduced when red snapper harvest is prohibited, which would reduce short-term economic losses, the total reduction in red snapper mortality may not be as large as desired (due to increased release mortality). Stated a different way, short-term economic loss (as a result of cancelled trips) may be required to meet biological targets. Transferring these considerations to the proposed alternatives to support comparison is difficult, particularly in light of the data and methodological issues discussed above. This assessment assumes, however, that despite the likelihood of increased release mortality, long-term harvest and associated economic benefits will not be compromised. As a result, the more effort that continues (for red snapper or any other species), the smaller the economic losses. Available data, however, does not support definitive ranking of the proposed alternatives incorporating any mortality-related feedback beyond that already provided above.

The second factor to consider is the potential effects of effort shifting. This consideration has been previously discussed, partially, with respect to anglers experiencing reduced value from fishing for an alternative, lower valued species, or shifting their effort to fish for red snapper in state waters, where catch/harvest success would not be expected to be as high as in the EEZ. In addition to these considerations, the quality of fishing for these species (red snapper or other species) may further decline as a result of increased harvest pressure. A large influx of re-directed effort could result in excessive pressure on the stocks in these areas, localized

depletions, and harvest overages. These effects would reduce the economic benefits to both anglers who traditionally targeted these species in these areas as well as the new "displaced" red snapper anglers. This assessment assumes that the likelihood of these effects occurring and the magnitude of the associated economic losses would be expected to increase the higher the buffer and shorter the resultant red snapper ACT and EEZ red snapper season.

Finally, the results provided above do not incorporate consideration of the distributional effects and economic dependence on red snapper effort. The distribution of effects relates to how the expected economic effects might vary across sectors and states, whereas economic dependence considers the significance of red snapper target effort within the context of all fishing effort. Among the states covered by MRIP, for the private mode, Alabama fishermen are projected to account for approximately 56% of affected red snapper target trips, followed by Florida (33%), Louisiana (6%), and Mississippi (6%). For the charter mode, Florida leads (approximately 58%), followed by Alabama (32%), Louisiana (10%), and Mississippi (0%). However, state waters in both Florida and Louisiana will remain open longer than the season in the EEZ. As a result, although the quality of red snapper fishing may decline, private anglers in these states will have the opportunity to continue fishing for red snapper in state waters after harvest in the EEZ is prohibited. Thus, private anglers in Alabama and Mississippi, where closures compatible with the EEZ season will occur, may be expected to bear a greater portion (approximately 91% and 9%, respectively) of the economic effects than the percentages provided above imply if anglers in the other states shift their effort to state waters. Similar concerns do not apply for charter or headboat anglers because of the assumption previously stated that all red snapper fishing occurs from federally permitted vessels, which are prohibited, as a condition of their permit, from harvesting red snapper when fishing in state waters if harvest is prohibited in the EEZ. However, when red snapper harvest in the EEZ is prohibited, for-hire vessels that do not have a federal charter/headboat permit would be allowed to continue to harvest red snapper in states where harvest is allowed (Florida, Louisiana, and Texas). Thus, similar to private anglers, for-hire anglers in Alabama and Mississippi may bear a larger portion of the economic burden of the proposed alternatives than the percentages provided above imply.

This assessment examines the issue of dependence from the perspective of, at the state and mode level, the proportion of effort that occurs during the normal red snapper season (essentially, June, depending on the year of comparison) relative to total effort for the year. Because the estimates of effort from the MRIP are tabulated by wave and not month, the following results should be used with caution (to generate the following estimates, the appropriate wave estimates were apportioned equally across both months in the wave). Additionally, the red snapper season coincides with the peak period of fishing activity in general due to the coincidence with summer, school dismissals, etc. Thus, some portion of the fishing activity during this period is likely due simply coincidence with "vacation season" rather than the ability to harvest red snapper. Nevertheless, in 2013, for the private sector, angler effort (total trips, regardless of target intent) during the red snapper open season in the EEZ accounted for approximately 43% of annual EEZ effort in Alabama, followed by 32% in Louisiana, 30% in Mississippi, and 26% in Florida (the comparison using 2011-2013 data reverses the Florida and Mississippi rankings). For the charter sector, the perspective of the analysis included all waters, not just the EEZ, because of the previously stated assumption that all for-hire vessels were federally permitted. This assumption is maintained in the examination of potential dependence because, unlike private anglers,

federally permitted vessels would be constrained regardless of where they fished. In 2013, charter angler effort in Louisiana during the red snapper federal open season comprised the highest proportion of annual effort (approximately 27%), followed by Alabama (25%), Mississippi (24%), and Florida (17%) (the comparison using 2011-2013 data resulted in the following order: Alabama, Mississippi, Louisiana, and Florida). For the headboat sector, the examination of potential dependence is simpler because Southeast Region Headboat Survey produces monthly effort estimates. Additionally, the examination can be more comprehensive because Texas is in the survey. For the headboat sector in 2013, headboat effort during the red snapper open season in the EEZ accounted for the highest proportion of annual effort in Louisiana/Mississippi (approximately 33%; states combined for confidentiality), followed by Alabama (32%), Texas (27%), and Florida (17%). These results, for all sectors, do not transfer directly to a comparison of the alternatives. However, they may suggest that the more dependent a states' fishing industry is on fishing during a specific time (or area), as demonstrated by the proportions of total activity provided, the greater the likelihood that restrictions, as they increase in severity, can compromise the ability of associated businesses to survive. As a result, the economic effects quantified or described above may understate the total effects because they do not include any consideration of the potential loss of services/business for the rest of the year.

4.4 Effects on the Social Environment

The social effects of Action 1 are inextricably tied to the number of days that will accrue as a result of the buffer to the quota that is chosen as an effective ACT. Because the recreational season has continually been reduced over the past few years, there has been considerable frustration within the recreational sector, especially because the red snapper component of the reef fish fishery has seen a successful rebuilding program produce more and larger red snapper than in the recent past. However, this success has also confounded management of this species as recreational red snapper fishermen are meeting their quota sooner as a result of this larger average size of fish and in combination with differing state regulations that allow for continued harvest after the closure of federal waters. Although NMFS has closed federal waters using the best available harvest rate data, there continues to be overages, therefore the need for a buffer between the quota and harvest threshold. The negative social effects of the alternatives will increase respectively from **Preferred Alternative 2** to **Alternative 5** as the season length decreases. Although, **Alternative 1** with no buffer would allow the most fishing days, it would not be consistent with the court decision, requiring sufficient AMs to constrain the recreational sector to the recreational quota The **Preferred Alternative 2** provides a 15% probability that the quota will be exceeded and offers the most days of the three other alternatives, **Alternative 3**, **Alternative 4** and **Alternative 5**. Of the negative social effects that might occur, species substitution would have the least negative effects as fishermen can target other fish and if successful, it is only their desire to harvest a red snapper that is unfulfilled. Although the ability to switch, especially for the for-hire sector, may depend on whether other species are available during that time period and if customers are willing to fish for other species. It is likely that some customers prefer to target red snapper; as mentioned before, it does have cultural meaning for some recreational fishermen and they may defer any fishing trips if they are unable to fish for red snapper. The extent to which fishermen will choose to not fish is unknown, for most recreational fishermen do not fish specifically for a particular species, but target whatever they can catch. But for some fishermen, red snapper has significance and is particularly prized. This desire to fish for red snapper with an especially short season can also create a derby-like atmosphere where everyone will be seeking to catch red snapper during the short time period available. This can create safety at sea issues if there is a tendency to fish during inclement weather during the open season. It can also cause overcrowding on common fishing locations. If for-hire operations do cancel fishing trips, then the effects of shortened season are more negative. For those fishing communities that were highlighted as being recreationally engaged and reliant in combination with experiencing social vulnerabilities, these negative social effects could be more acute. The communities of Apalachicola, Carrabelle and Port St. Joe in Florida and Chauvin, Louisiana were all experiencing social vulnerabilities and engaged and reliant on recreational fisheries. This is not to say that individual fishing operations may not experience negative social effects that could have further impacts in other communities, but the data available are not refined enough to demonstrate those types of impacts.

Although this is a temporary rule, the choice of any buffer will still incur an overall reduction in the season. This reduction in season length while the average size of red snapper is increasing is particularly frustrating for many recreational fishermen. To them the rebuilding plan is succeeding and they have said they are seeing more red snapper than previous years, thus there is a contradiction in a fishing season that continues to get shorter. This frustration has led many

recreational fishermen to lobby their state management agencies to offer more days in state waters as they see federal management as being contrary to what they see on the water. The willingness of state management agencies to remain open after the closure of the federal season is especially frustrating for those fishermen in states that comply with the federal closure in their state waters. Their for-hire fishermen experience more negative social effects as they are precluded from any red snapper fishing after a federal closure.

Therefore, it is likely that the negative perceptions from any of these alternatives will likely persist, as long as fishermen are catching large red snapper in abundance and no other constraints on catch are developed; the shortened fishing season for red snapper will continue to have negative social effects. This temporary rule may place a buffer on the recreational catch and constrain the harvest within the quota, but until the Council can develop a more long term solution to the problem of managing the red snapper recreational sector, there will likely be continued frustration within the recreational sector and dissatisfaction with management.

4.5 Effects on the Administrative Environment

This action is not likely to have direct or indirect effects on the administrative environment; however, it may further complicate enforcement and safety at sea issues. **Alternative 1,** no action, would not result in changes to the direct or indirect effects on enforcement or safety at sea issues. Of the other alternatives, **Preferred Alternative 2** would result in the least effects to the administrative environment followed by **Alternative 3, Alternative 4,** and **Alternative 5** as associated with the decreasing season length. The enforcement issues include the increased likelihood of non-compliance and poaching by anglers who oppose the decreased season length. In addition, enforcement is further complicated by the states of Florida, Louisiana, and Texas establishing non-consistent seasons. In these states, enforcement of fishing in federal waters while state waters are open would not be practical at the landing locations. Thus, it would be necessary to increase enforcement at sea. As the season length decreases, the likelihood of a derby-fishing situation increases. In this case, anglers may attempt to fish during sub-optimal weather conditions or embark on multiple trips in the same day. These situations could decrease their safety at sea with increasing risks for injury.

4.6 Cumulative Effects Analysis

The affected area of this proposed action encompasses the state and federal water of the Gulf and recreational sector of the reef fish fishery. This includes the physical and biological/ecological environments, and economic and social environments of the Gulf fishing communities. This action is an emergency rule, and as such any impacts would be expected to be short-term. **Preferred Alternative 2**, would set a 20% buffer resulting in an ACT of 4.312 million pounds (mp) whole weight (ww) for the recreational quota for red snapper. This accountability measure would reduce the probability of exceeding the recreational quota. The proposed action would not likely cause significant cumulative impacts to the physical or biological/ecological environments. If the recreational harvest is constrained to the quota, then the effects be more

beneficial than status quo, which has experienced continued overages. However, the negative effects on the economic and social environments from the proposed action in conjunction with the Court decision could cumulatively result in significant economic loses to the fishing communities. In addition, the federally-permitted for-hire anglers fishing in waters off states that do not have consistent regulations would experience a shorter season than the private anglers, and likely experience more significant economic and social impacts.

In consideration of the past, present, and reasonably foreseeable actions, this action is not likely to have long-term substantive cumulative effects, particularly due to its temporary nature. However, the implications of this emergency action should be considered in management decisions and in determining the resilience of the recreational sector of the reef fish fishery. The cumulative effects from the red snapper rebuilding plan have been analyzed in Amendments 22 (GMFMC 2004a) and 27/14 (GMFMC 2007), and cumulative effects to the reef fish fishery have been analyzed in Amendments 30A (GMFMC 2008a), 30B (GMFMC 2008b) and 31 (GMFMC 2009), and are incorporated here by reference. Additional pertinent actions are summarized in the history of management in Section 1.3. Currently three actions are being considered by the Council concerning the allocation of red snapper quota between the recreational and commercial sectors including long-term AMs (Amendment 28), revisions to the red snapper commercial individual fishing quota program (Amendment 36), and potential sector separation for the for-hire vessels (Amendment 40). If the recreational sector was allocated more red snapper quota through Amendment 28, then the negative economic and social effects of this action may decrease as the fishing effort increases. In addition, the AM in this emergency action combined with the AMs in Amendment 28 could have more long-term effects.

Additional considerations for cumulative effects may include the impacts of the Deepwater Horizon MC252 oil spill and potential climate change issues. Impacts from the Deepwater Horizon MC252 oil spill may not be known for several years. If there has been a reduction in spawning success in 2010, the impacts may not begin to manifest themselves until several years later when the fish that would have spawned in 2010 would have become large enough to enter the adult spawning population and be caught by anglers. For example, the stock assessment for red snapper (SEDAR 31) was completed in May 2013 and detected a slight reduction of recruitment for 2010. Recruitment occurs at approximately 3 years of age, so a year class failure in 2010 may have begun to be detected in the spawning populations for this assessment. However, it is more likely to be detected in the next stock assessment. Eventually, the impacts would result in reduced fishing success and reduced spawning potential, and would need to be taken into consideration in future assessments and actions. The combination of relieving the restrictions in the current action and the recent increase in the red snapper quota, and the short-term increase in natural mortality to the stock from the oil spill, could negatively impact the stock. In a recent study, 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 with lesions and other deformities. The overall impact of the oil spill may not be realized for quite some time and the studies are just now being published.

There is a large and growing body of literature on past, present, and future impacts of global climate change induced by human activities. Some of the likely effects commonly mentioned are sea level rise, increased frequency of severe weather events, and change in air and water

temperatures. The Environmental Protection Agency's climate change web page provides basic background information on these and other measured or anticipated effects. In addition, the Intergovernmental Panel on Climate Change has numerous reports addressing their assessments of climate change (http://www.ipcc.ch/publications_and_data/publications_and_data.shtml). Global climate changes could affect the 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). 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. 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. While climate change may impact Gulf reef fish species in the future, the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts would occur. Actions from this amendment are not expected to significantly contribute to climate change through the increase or decrease in the carbon footprint from fishing.

The effects of the proposed action are, and will continue to be, monitored through collection of landings data by NMFS, stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations. Landings data for the recreational sector in the Gulf are collected through MRFSS, SRHS, and the Texas Marine Recreational Fishing Survey. MRFSS is currently being replaced by the MRIP, a program designed to improve the accuracy of monitoring of recreational fishing. Commercial data are collected through trip ticket programs, port samplers, and logbook programs, as well as dealer reporting through the individual fishing quota program.

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 that this action would be expected to have on the red snapper component of the Gulf of Mexico (Gulf) reef fish fishery.

5.2 Problems and Objectives

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

5.3 Description of Fisheries

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

5.4 Impacts of Management Measures

A detailed discussion of the expected economic effects of each alternative for this action is provided in Chapter 4.

This is expected to result in short-term reductions in consumer surplus (the amount of money that an angler would be willing to pay for a fishing trip in excess of the cost of the trip) to recreational anglers and net operating revenue (the return used to pay all labor wages, returns to capital, and owner profits) to for-hire businesses (charter and headboats) of approximately $5.017 million and $2.286 million (2013 dollars), respectively. These estimates do not include the expected economic effects of the action on private/rental or charter anglers in Texas because of the lack of data appropriate data. However, the estimates provided are based on the assumption that all recreational red snapper target trips in the affected areas will be cancelled as a result of the action. This assumption does not allow redirection of affected fishing effort to other time periods, areas, or species, in lieu of trip cancellation. As a result, these estimates are expected to exceed the actual economic effects in the areas and sectors modeled. Other data and methodological issues may individually result in under-and overestimation of the expected

economic effects. The net effect of these issues, including the absence of Texas private/rental or charter data, is unknown. However, available data does not support a conclusion that the actual economic effects could approach the economic threshold for a significant regulatory action.

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…….. $0

NMFS administrative costs of document preparation, meetings and review ….....$10,000

TOTAL ….....$10,000

Because this is a temporary action wholly undertaken by NMFS, no Council costs will be incurred outside normal costs associated with Council discussion of the issues addressed by this action and requesting NMFS to take action. The federal costs of document preparation are based on staff time, travel, printing, and any other relevant items where funds were expended directly for this specific action. 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 state.

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. LIST OF PERSONS AND AGENCIES CONSULTED

Name	Expertise	Responsibility	Agency
Cynthia Meyer, Ph.D.	Biologist	Document development, review	SERO
Susan Gerhart	Biologist	Document development, background, and effects analysis	SERO
Stephen Holiman, Ph.D.	Economist	Socio-economic analyses and RIR	SERO
Michael Jepson, Ph.D.	Anthropologist	Social analysis	SERO
Mara Levy	Attorney	Legal compliance and review	NOAA GC
Andrew Strelcheck	Biologist	Data analyses and review	SERO
Steve Branstetter, Ph.D.	Biologist	Review	SERO
Nick Farmer, Ph.D.	Biologist	Data analyses	SERO
Noah Silverman	Natural Resource Management Specialist	NEPA compliance	SERO

SERO = National Marine Fisheries Service Southeast Regional Office, GC = General Counsel.

Agencies Consulted

Gulf of Mexico Fishery Management Council
National Marine Fisheries Service
- Southeast Fisheries Science Center
- Southeast Regional Office

NOAA General Counsel
U.S. Coast Guard

CHAPTER 7. REFERENCES

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

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 Tech. Memo. NMFS-SEFSC-449. National Marine Fisheries Service. St. Petersburg, FL.

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.
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.

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.

GMFMC. 2000. Regulatory amendment to the reef fish fishery management plan to set total allowable catch and management measures for red snapper for the 2000 and 2001 seasons. Gulf of Mexico Fishery Management Council, Tampa, FL.
http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/RF%20RegAmend%20-%202000-02.pdf

GMFMC. 2004a. 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, FL.
http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Amend%2022%20Final%2070204.pdf

GMFMC. 2004b. 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, FL.
http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20EFH%20EIS.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, FL. 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, FL. 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. 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 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, FL. 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, FL. http://www.gulfcouncil.org/docs/amendments/Final%20Red%20Snapper%20Regulatory%20Amendment%203_26_10.pdf

GMFMC. 2011a. 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, FL. http://www.gulfcouncil.org/docs/amendments/Red%20Snapper%202011%20Regulatory%20Amendment%20-%201-11.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, FL.

http://www.gulfcouncil.org/docs/amendments/Final%20Generic%20ACL_AM_Amendment-September%209%202011%20v.pdf

GMFMC. 2011c. 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, FL. http://www.gulfcouncil.org/docs/amendments/Final%20RF32_EIS_October_21_2011[2].pdf

GMFMC. 2012. 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, including environmental assessment, regulatory impact review, and Regulatory Flexibility Act analysis. 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. 2013a. Final framework action to the fishery management plan for the reef fish resources of the Gulf of Mexico; set the 2013 red snapper quotas and modify recreational bag limits, including environmental assessment, regulatory impact review, and Regulatory Flexibility Act analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida.

GMFMC. 2013b. Framework action for a red snapper 2013 quota increase and supplemental recreational season. Gulf of Mexico Fishery Management Council, Tampa, Florida. 87 p. http://www.gulfcouncil.org/docs/amendments/Final%20Red%20Snapper%20Framework%20Action%20Set%202013%20Quotas%2008-01-13.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, C.H. 1992. The Gulf of Mexico. Pineapple Press Inc. Sarasota, Fl. 384 pp.

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

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.

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.

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.

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.

Linton, B. 2011. Population projections for Gulf of Mexico red snapper with preliminary 2011 landings estimates. National Marine Fisheries Service, Southeast Fisheries Science Center, Miami, FL.

Linton, B. 2012. Population projections for Gulf of Mexico red snapper with preliminary 2012 landings estimates. National Marine Fisheries Service, Southeast Fisheries Science Center, Miami, FL.

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

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 .

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

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. 2010. 2010 Recreational Red Snapper Quota Closure Analysis – Fall Reopening. SERO-LAPP-2010-04. Southeast Regional Office, National Marine Fisheries Service. St. Petersburg, Florida. Available at: http://sero.nmfs.noaa.gov/sf/pdfs/2010_Recreational_Red_Snapper_Quota_Closure_Analysis_Fall_Reopening.pdf

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

NMFS. 2011b. 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. 2013. 2014 Gulf of Mexico Red Snapper Recreational Season Length Estimates. Southeast Regional Office, National Marine Fisheries Service, St. Petersburg, Florida. SERO-LAPP-2013-10, 15 p

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.

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 p.

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.

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.

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. http://www.laseagrant.org/pdfs/Gulf-RFH-Survey-Final-Report-2012.pdf

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, SC. 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, SC. 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 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 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. SEDAR 31 – Gulf of Mexico Red Snapper Stock Assessment Report. SEDAR, North Charleston, SC. 1103 pp. http://www.sefsc.noaa.gov/sedar/download/SEDAR%2031%20SAR-%20Gulf%20Red%20Snapper_sizereduced.pdf?id=DOCUMENT

SERO. 2013. Southeast commercial quotas/catch allowances (all years). http://sero.nmfs.noaa.gov/sf/ifq/CommercialQuotasCatchAllowanceTable.pdf

SERO-LAPP-2012-10. Southeast Regional Office National Marine Fisheries Service. 2013 Recreational Red Snapper Quota Closure Analysis. Southeast Regional Office, St. Petersburg, FL.

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.

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.

Tampa Bay Times article: USF study finds more sick fish in oil spill area than rest of Gulf of Mexico, January 14, 2012. Available at: http://www.tampabay.com/news/environment/wildlife/article1210495.ece

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.

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. http://www.sciencedirect.com/science/article/pii/S0967064514000356

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

APPENDIX A. OTHER APPLICABLE LAW

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.) provides the authority for management of stocks included in fishery management plans in federal waters of the exclusive economic zone. However, management decision-making is also affected by a number of other federal statutes designed to protect the biological and human components of U.S. fisheries, as well as the ecosystems that support those fisheries. Major laws affecting federal fishery management decision-making are summarized below.

Administrative Procedures Act

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

Coastal Zone Management Act

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

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

Data Quality Act

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

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

Scientific information and data are key components of FMPs and amendments and the use of best available information is the second national standard under the Magnuson-Stevens Fishery Conservation and Management 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 an action for managed stocks 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. NMFS, as part of the Secretarial review process, will make a determination regarding the potential impacts of the proposed actions.

Fish and Wildlife Coordination Act

Fish and Wildlife Coordination Act of 1934 (16 U.S.C. 661-667e) provides the basic authority for the Fish and Wildlife Service's (FWS) involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It also requires federal agencies that construct, license or permit water resource development projects to first consult with FWS (and the NMFS in some instances) and state fish and wildlife agency regarding the impacts on fish and wildlife resources and measures to mitigate these impacts.

The fishery management actions in the Gulf of Mexico are not likely to affect wildlife resources pertaining to water resource development as the economic exclusive zone is from the state water boundary extending to 200 nm from shore.

National Historic Preservation Act

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

Typically, fishery management actions in the Gulf of Mexico are not likely to affect historic places with exception of 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 above previous years. Thus, no additional impacts to the *U.S.S. Hatteras* would be expected.

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 fishing activities, and studies of pinniped-fishing activity interactions.

Under section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries that places all U.S. commercial fishing activities into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishing activity. The categorization of a fishing activity in the List of Fisheries determines whether participants in that fishing activity may be required to comply with certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements.

The Gulf reef fish fishery is classified in the Marine Mammal Protection Act 2014 List of Fisheries as a Category III fishery (79 FR 14418, April 14, 2014). 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.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (16 U.S.C. 703) protects migratory birds. The responsibilities of Federal agencies to protect migratory birds are set forth in Executive Order 13186. FWS is the lead agency for migratory birds. The birds protected under this statute are many of our most common species, as well as birds listed as threatened or endangered. A memorandum of understanding (MOU) between NMFS and FWS, as required by Executive Order 13186 (66 FR 3853, January 17, 2001), is to promote the conservation of migratory bird populations. This MOU focuses on avoiding, or where impacts cannot be avoided, minimizing to the extent practicable, adverse impacts on migratory birds and strengthening migratory bird conservation through enhanced collaboration between NMFS and FWS by identifying general responsibilities of both agencies and specific areas of cooperation. Given NMFS' focus on marine resources and ecosystems, this MOU places an emphasis on seabirds, but does not exclude other taxonomic groups of migratory birds.

Typically, fishery management actions in the Gulf of Mexico are not likely to affect migratory birds. The proposed actions are not likely to change the way in which the fishery is prosecuted. Thus, no additional impacts are reasonably expected.

Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (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 Act requires NMFS to obtain approval from the Office of Management and Budget before requesting most types of fishing activity information from the public.

Prime Farmlands Protection and Policy Act

The Farmland Protection and Policy Act of 1981 (7 U.S.C. 4201) was enacted to minimize the loss of prime farmland and unique farmlands as a result of Federal actions by converting these lands to nonagricultural uses. It assures that federal programs are compatible with state and local governments, and private programs and policies to protect farmland.

The fishery management actions in the Gulf of Mexico are not likely to affect farmlands as the economic exclusive zone is from the state water boundary extending to 200 nm from shore.

National Wild and Scenic Rivers System

The National Wild and Scenic Rivers System of 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.) preserves certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Act safeguards the special character of these rivers, while also recognizing the potential for their appropriate use and development. It encourages river management that crosses political boundaries and promotes public participation in developing goals for river protection.

The fishery management actions in the Gulf of Mexico are not likely to affect wetland habitats as the economic exclusive zone is from the state water boundary extending to 200 nm from shore.

North American Wetlands Conservation Act

The North American Wetlands Conservation Act of 1989 (Public Law 101-233) established a wetlands habitat program, administered by the United States Fish and Wildlife Service, to protect and manage wetland habitats for migratory birds and other wetland wildlife in the United States, Mexico, and Canada.

The fishery management actions in the Gulf of Mexico are not likely to affect wetland habitats as the economic exclusive zone is from the state water boundary extending to 200 nm from shore.

Executive Orders (E.O.)

E.O. 12630: Takings

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

E.O. 12866: Regulatory Planning and Review

E.O. 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 regulatory actions that either implement a new fishery management plan or significantly amend an existing plan. 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: 1) 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; 2) creates a serious inconsistency or otherwise interferes with an action taken or planned by another agency; 3) materially alters the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or 4) raises novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order. An RIR is included in this action.

E.O. 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations

This E.O 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. An analysis of environmental justice issues is included in the environmental assessment for this action.

E.O. 12962: Recreational Fisheries

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

E.O. 13089: Coral Reef Protection

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

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

E.O. 13132: Federalism

The E.O. on Federalism requires agencies in formulating and implementing policies, to be guided by the fundamental Federalism principles. The 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).

No Federalism issues have been identified relative to the proposed action. Therefore, consultation with state officials under Executive Order 12612 is not necessary.

E.O. 13158: Marine Protected Areas

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

Essential Fish Habitat

The amended Magnuson-Stevens Fishery Conservation and Management Act included a new habitat conservation provision that requires each existing and any new FMPs to describe and

identify essential fish habitat (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 2004b) to address the new EFH requirements contained within the Act. Section 305(b)(2) requires federal agencies to obtain a consultation for any action that may adversely affect EFH.

This action is not expected to change the way in which the fisheries are conducted in regard to the impact of the fisheries on the environment. The actions, considered in the context of the fisheries as a whole, will not have an adverse impact on EFH; therefore, an EFH consultation is not required.

APPENDIX B. RED SNAPPER SEASON LENGTH ESTIMATES REPORT 2014

2014 Gulf of Mexico Red Snapper Recreational Season Length Estimates
NOAA Fisheries Service, Southeast Regional Office
and Gulf of Mexico Fishery Management Council Staff
Revised and Updated April 21, 2014

Introduction

On October 1, 2013, NOAA Fisheries published a final rule (Federal Register 57314, V. 78, No. 181) implementing an 11 million pound whole weight (mp ww) total allowable catch for Gulf of Mexico red snapper. This catch level was the highest ever for red snapper and was allocated 51% to the commercial sector (5.61 mp ww) and 49% to the recreational sector (5.39 mp ww). The catch level is expected to remain at 11 mp through the 2014 season, but will be updated following the next stock assessment, which is scheduled for completion in late 2014.

The red snapper recreational fishing season opens each year on June 1 and closes when the recreational quota is met or projected to be reached. Prior to June 1 each year, NOAA Fisheries projects the season closing date based on previous years of data, and notifies the public of the closing date for the upcoming season. If subsequent data indicate that the quota has not been reached, NOAA Fisheries may re-open the season. In 2013, the red snapper federal season was open for 42 days, from June 1-June 28 and October 1-October 14. Additionally, the state of Texas had a year round state waters season with a 4-fish bag limit and 15-inch minimum size limit (MSL). The state of Louisiana had a weekend-only (Fri-Sun + some holidays) state water season with a 3-fish bag limit (2-fish during the federal season) and a 16-inch MSL from mid-April through the end of September. The state of Florida had a 68-day state water season (Jun 1-Jul 14, Oct 1-Oct 14) with a 2-fish bag limit and a 16-inch MSL. The states of Alabama and Mississippi implemented state seasons consistent with the federal season.

Preliminary 2013 catch estimates produced by the Marine Recreational Information Program (MRIP) using a new dockside intercept sampling methodology indicated private and for-hire components of the recreational sector landed 8.90 mp ww. Preliminary 2013 total landings, including estimates from MRIP, Texas Parks and Wildlife Department (TPWD), and the Southeast Headboat Survey (HBS), totaled 9.54 mp ww (**Table 1**). TPWD landings for 2013 were only available through mid-May 2013, so 2012 landings for May through December were used as a proxy to generate the 2013 landings estimate.

Table 1. 2013 preliminary totals for Gulf of Mexico recreational red snapper landings, by wave (pounds whole weight).

Source	1	2	3	4	5	6	Total
MRIP	0	0	6,414,790	31,828	2,454,446	0	8,901,063
TPWD	34,660	3,952	*70,621*	*61,138*	*21,419*	*2,938*	194,728
HBS	14,093	10,848	323,397	5,128	87,650	4,418	445,535

Total	**48,753**	**14,800**	**6,748,632**	**98,094**	**2,563,515**	**7,357**	**9,541,326**

Note: TPWD landings for 2013 are not available for Waves 4-6; 2012 used as proxy.

Overall, the new MRIP catch estimates are more accurate and less biased than those produced in past years because MRIP redesigned the Access Point Angler Intercept Survey in March 2013 to provide better coverage of the variety of fishing trips ending at different times of day. Because these estimates may not be directly comparable to how the 2014 quotas or other red snapper management reference points were estimated, NOAA Fisheries previously estimated the 2014 red snapper recreational season length by excluding 2013 MRIP catch estimates. However, a recent federal court ruling concluded that NOAA Fisheries could not disregard the new and improved MRIP survey estimates when projecting the red snapper season length. The court ruling also indicated accountability measures for the recreational sector were insufficient to reasonably prevent the quota from being exceeded. At this time, NOAA Fisheries must consider the MRIP 2013 estimates, along with other available data, when projecting how long it will take the recreational sector to harvest the quota in 2014.

The purpose of this report is to project the length of the 2014 recreational red snapper season length based on various quota buffers and using historical data and 2013 MRIP estimates. This report provides projected 2014 federal season-length estimates for Gulf of Mexico recreational red snapper. Analyses account for a variety of projection scenarios by incorporating uncertainty in the historical time series.

State Regulations

In 2014, as in previous years, Texas will have a 365-day state waters red snapper season with 4-fish bag limit and a 15-inch total length minimum size limit. In 2014, Louisiana will have a 286-day season from February 21 through December 31 with a 2-fish bag limit and a 16-inch total length minimum size limit. In February 2014, the Louisiana Division of Wildlife and Fisheries (LDWF) opened state waters on weekends only from February 21 through April 13. Beginning April 14, LDWF announced state waters would be open year round to the harvest of red snapper. On April 16, the Florida Fish and Wildlife Commission approved a 52-day state waters fishing season beginning Memorial Day weekend (May 24) and ending on July 14. This analysis assumes Alabama and Mississippi will implement regulations consistent with the federal season implemented by NOAA Fisheries, and that seasons, bag limits, and size limits for other Gulf states will be consistent with those summarized in **Table 2** below.

Table 2. Proposed Gulf state water recreational red snapper regulations for 2014. Cells highlighted in gray indicate regulations incompatible with 2014 federal regulations.

State	Size Limit	Bag Limit	Season	Days Open
Florida*	16” TL	2-fish	May 24-July 14*	52
Alabama	16” TL	2-fish	Same as federal season	Same as federal season
Mississippi	16” TL	2-fish	Same as federal season	Same as federal season
Louisiana	16” TL	2-fish	Feb 21-Apr 13 (3-day weekends), Apr 14-Dec 31	286
Texas	15” TL	4-fish	Jan 1-Dec 31	365

Data Sources

Recreational red snapper landings were obtained from four data sources:

1. Marine Recreational Information Program (MRIP), including the For-hire charter survey;
2. Southeast Headboat survey (HBS);
3. LDWF Recreational Creel survey (LA Creel); and,
4. Texas Parks and Wildlife Department (TPWD) charter and private/rental creel survey.

MRIP and For-hire red snapper landings are estimated using a combination of dockside intercepts (landings data) and phone surveys (effort data). Landings are estimated in both numbers and whole weight (lbs) by two-month wave (e.g., Wave 1 = Jan/Feb, …, Wave 6 = Nov/Dec), area fished (inland, state, and federal waters), mode of fishing (charter, private/rental, shore), and state (west Florida, Alabama, Mississippi, and Louisiana). Uncertainty in MRIP mean estimates in average weights, numbers of fish landed, and pounds of fish landed are expressed as percent standard error (PSE). MRIP has replaced the Marine Recreational Fisheries Statistics Survey (MRFSS) program as the primary methodology for collecting and estimating recreational catches in the Gulf of Mexico.

Headboat landings are collected through logbooks completed by headboat operators. Landings (lbs ww) are reported by vessel, day/month, and statistical reporting area (i.e., area 18 = Dry Tortugas off west coast of Florida, …, area 27 = Southeast Texas). Landings from vessels participating in the 2014 Headboat Collaborative Exempted Fishing Permit were deducted from the projection inputs, and their harvest was also deducted from the overall recreational quota (http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/reef_fish/2013/headboat_efp/). No estimates of uncertainty are generated by the HBS.

Louisiana's quota monitoring survey was designed to estimate the number of red snapper landed in Louisiana during the 2013 recreational season. Dockside interviews were conducted by state personnel at sites commonly reporting offshore species. To estimate fishing effort of private anglers, LDWF personnel contacted a random portion of those anglers holding a Louisiana Recreational Offshore Landing Permit by phone and/or email on a weekly basis. Permit holders were asked if they fished offshore, how many trips were taken the previous week, if they landed at a public site, what time they returned to the dock, and whether they fished on a paid charter. The randomly selected permit holders were notified by e-mail each Wednesday of their selection to be surveyed. Those selected permit holders had the option to answer the effort survey questions by reply e-mail. If an e-mail was not received, they were contacted by phone. Charter captains holding a Louisiana Recreational Offshore Landing Permit were also contacted by LDWF weekly to collect information on the total number of red snapper caught the previous week. Charter captains had the option to respond via email prior to LDWF personnel contacting them via phone. Estimated landings were produced based on observed catch rates, average weights, and estimated fishing effort (as adjusted for persons not possessing an offshore landing permit). Weekly estimates of uncertainty in LA Creel average weights, numbers of fish

landed, and pounds of fish landed are expressed as PSE. Because this survey was designed specifically to estimate red snapper harvest in Louisiana, it is used as a projection input for these modeling runs.

The TPWD creel survey generates estimates of landings in numbers for private/rental boats and charter vessels fishing off Texas. Landings are reported in numbers by high (May 15-November 20) and low-use time periods (November 21-May 14), area fished (state vs. federal waters), and mode of fishing (private vs. charter). To convert TPWD landings in numbers to landings in pounds, red snapper average lengths by mode, wave, and area fished are converted to weights using a length-weight conversion formula. High- and low-use estimates of uncertainty in TPWD numbers of fish landed are expressed as PSE and were obtained from NOAA Fisheries' Southeast Fisheries Science Center for this analysis.

Methods

2014 Projections: Average Weights and Catch Rates

A tiered projection approach was taken for forecasting recreational red snapper average weight and in-season catch rates in the Gulf of Mexico for 2014. Average weights and in-season catch rates were computed using the same methodology as 2013 projections (see SERO-LAPP-2013-02 Addendum). Estimates of landings per day were computed instead of modeling landings to account for shorter and shorter fishing seasons implemented in recent years. Since 2007, the recreational fishing season has decreased from 194 days to 42 days (2013 season length). Because the most recent red snapper stock assessment treated red snapper as separate Eastern and Western Gulf of Mexico subpopulations, and because the Eastern and Western Gulf states have differing data collection programs, average weights and catch rates were projected separately for the Eastern and Western Gulf of Mexico. Different projections were done for Headboat and the Private/Charter sectors to account for differences in the effort dynamics of these sectors and the availability and completeness of data. This differed from previous projections, which aggregated data across Headboat and Private/Charter sectors.

Generalized linear regression models were implemented using R (R Core Team 2014). The best-fitting models for each of the model scenarios in SERO-LAPP-2013-10 were identified based on significance of parameter terms, AICc (Burnham & Anderson 2002), BIC (Schwarz 1978), and R-square goodness of fit. In this report, additional steps were taken to extend previous projection methodologies, utilizing parametric bootstrapping techniques where the mean and variance per year were used to define a distribution of possible values at each observed point. This extension allowed different variance estimates at each point, directly incorporating variance estimates from the surveys (e.g., MRIP and TPWD PSEs) into the projection framework.

To generate a mean estimate with variance for 2014 Eastern and Western Gulf of Mexico private/charter average weights, 1000 bootstrapped time series were generated around the mean in-season average weights for the Eastern and Western Gulf of Mexico. These bootstrapped time series incorporated uncertainty using weighted mean East and West PSEs. For the East, state-specific average weight PSE estimates were obtained from the MRIP website (countmyfish.noaa.gov) and weighted by landings in pounds. No PSE for TPWD average weight

was available, so the Louisiana MRIP estimate of PSE was used as a proxy for the whole Western Gulf average weight PSE. Generalized linear model regressions with a Gaussian distribution were fit to each of the 1000 bootstrapped time series and forecast to 2014. Residual diagnostics were used to verify goodness-of-fit. For the East, input years for the regression were 2007-2013. For the West, input years for the regression were 2005-2013. To generate a mean estimate with variance for 2014 Eastern and Western Gulf of Mexico private/charter catch rates in numbers of fish, 1000 bootstrapped time series were generated around the mean in-season catch rates in numbers for the Eastern and Western Gulf of Mexico. These bootstrapped time series incorporated uncertainty using weighted mean East MRIP and West MRIP/TPWD PSEs. For the East, state-specific PSE estimates for landings (in numbers) were obtained from the MRIP website (countmyfish.noaa.gov) and weighted by landings in numbers. For the West, MRIP and TPWD survey estimates of landed (numbers of fish) PSE were weighted by landings in numbers. Generalized linear model regressions with a log-linked negative binomial distribution were fit to each of the 1000 bootstrapped time series and forecast to 2014. Residual diagnostics were used to verify goodness of fit. For the East and West, input years for the regression were 2007-2013.

Mean and variance estimates for 2014 East/West Gulf of Mexico private/charter catch per day (in pounds per day) were computed by running summary statistics on the product of the 1000 bootstrapped forecasts for 2014 average weight and the 1000 bootstrapped forecasts for 2014 catch rate in numbers for both the Eastern and Western Gulf of Mexico.

Uncertainty estimates are not generated for headboat survey catches. Due to differences in observed trends, it was still useful to project the changes in average weight and catch rate in numbers separately, then combine them for a forecast of catch rate in pounds.

To generate a mean estimate with variance for 2014 East/West Gulf of Mexico headboat average weights, a generalized linear regression model with a Gaussian distribution was fit to input data for 2007-2013 and forecast to 2014 for both regions. To generate a mean estimate with variance for 2014 East/West Gulf of Mexico headboat catch rate in numbers, a generalized linear regression model with a Gaussian distribution was fit to input data for 2007-2013 and forecast to 2014 for both regions, using spawning stock biomass as a predictor (**Figure 1**). Landings from Headboat Collaborative vessels were excluded from input data before fitting regression models. Spawning stock biomass (SSB) was included to potentially account for changes in stock size (and corresponding availability) as the population rebuilds. To appropriately express the combined uncertainty in the projected average weight and catch rate in numbers to generate a catch rate in pounds per day, 1000 bootstrapped time series were generated around the mean projected 2014 average weight and catch rate in numbers for the East and West Gulf of Mexico. These bootstrapped time series incorporated uncertainty using the standard error in the forecast as output from the regression model.

Mean and variance estimates for 2014 East/West Gulf of Mexico headboat catch per day (in pounds per day) were computed by running summary statistics on the product of the 1000 bootstrapped forecasts for 2014 average weight and the 1000 bootstrapped forecasts for 2014 catch rate in numbers for both the Eastern and Western Gulf of Mexico.

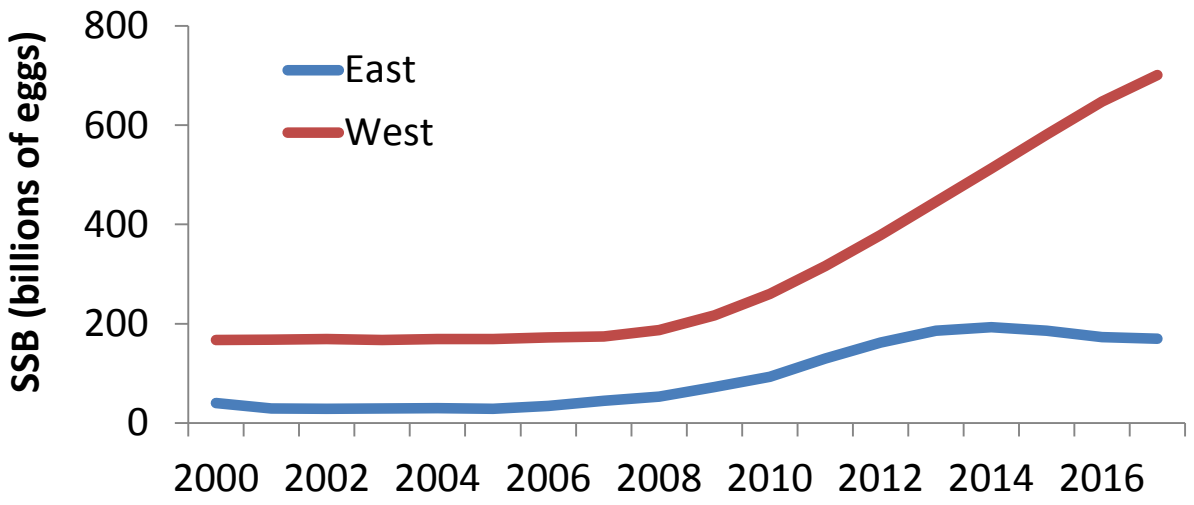

Figure 1. Spawning stock biomass (SSB) estimates, in billions of eggs, from SEDAR-31 (2013) stock assessment model for Eastern and Western Gulf of Mexico red snapper stock, used as covariate predictor variable for projections as a measure of underlying stock productivity.

Separate out-of-season Western Gulf catch rates for charter/private vessels were computed using 2012-2013 Texas out-of-season landings and 2013 Louisiana out-of-season landings. Estimates were generated both prior to and after the federal season. For Texas, landings were summed from January through mid-May 2013 and divided by the number of days that state waters were open prior to the federal season to generate estimates of pre-season catch rates per day (325 lbs/day). Similarly, landings from August-December 2012 were summed and divided by the number of days state waters were open after the federal season to calculate post-federal season state water catch rates per day (145 lbs/day). For Louisiana, landings from mid-March through May 31, 2013 were summed and divided by the number of days that state waters were open to estimate pre-season catch rates (1,839 lbs/day). Louisiana post-season state water catch rates were computed using two different time periods. Catch rates during summer months were calculated by summing July 12-August 11, 2013 landings and dividing by the number of days state waters were open (4,333 lbs/day). Fall and winter catch rates were computed by summing landings from mid-August through September 30, 2013, and then dividing those landing by the number of days state waters were open (1,541 lbs/day). Similar computations were also done for headboats and for landings occurring when both state and federal waters were closed.

Florida state water private landings per day on weekends and holidays were assumed to be equal to the private landings per day when the federal season is open. Private landings on weekdays were assumed to equal the average catch per day from state waters when the federal season is open. On a weekly basis, average catch per day by Florida private anglers was computed to be 28,965 lbs per day.

Additionally, in 2014 NOAA Fisheries approved the Gulf of Mexico Headboat Collaborative exempted fishing permit (EFP). This EFP allotted 286,465 lbs of the red snapper quota to 17 headboat vessels. The Collaborative allocated the pounds of quota received amongst the vessels in the collaborative. Headboats participating in the program could harvest red snapper beginning January 1. NOAA Fisheries is actively tracking landings (in numbers) in near real time and

landings are being converted to pounds based on dockside sampling estimates. Projections accounted for the red snapper to be landed by the Headboat Collaborative. When estimating 2014 catch rates and average weights for headboats, historical landings by Collaborative vessels were removed from catch per day and average weight computations.

2014 Projections: Season Length

Forecasts of catch rates and average weights from best-fitting models were incorporated, along with their variance, into an Excel-based season length projection model that utilized Solver to determine the federal season length under each scenario with the 2014 recreational quota of 5.39 mp ww. This model accounted for out-of-season catch rates and state incompatibility with federal season length as described previously.

To account for management uncertainty in constraining recreational red snapper landings below the quota, the Gulf Council recommended implementing an Annual Catch Target (ACT) through emergency rule, which would serve as a buffer. The recreational season length under various buffers was computed in the Excel-based season length projection model. The probability of overfishing at various buffer levels was determined by identifying the confidence interval for the projected catch (in pounds) per day that corresponded to the federal in-season catch rate that would result in a season of that length under the non-buffered 5.39 mp ww quota.

The base runs for this analysis assume a 2-fish bag limit in federal waters, that each Gulf state will implement seasons as summarized in Table 2, and that historical state water catch rates for Texas and Louisiana are representative of future state water catch rates. Additionally, the analysis assumes that Florida private mode catch rates will be ~60% of Florida private mode catch rates when the federal season is open. Because catch rates in state waters are uncertain, a sensitivity run was performed assuming that Florida private catch rates would be equal to Florida private catch rates during the federal season. An additional sensitivity run was performed using LA Survey landings per day in place of MRIP landings to calculate federal season catch rates.

Results

2014 Projections: In-Season Catch Rates

The bootstrapped distribution of private/charter average weights input into the projection model is shown in **Figure 2**. Generalized linear regression model fits to mean average weights, by region, are shown in **Figure 3**.

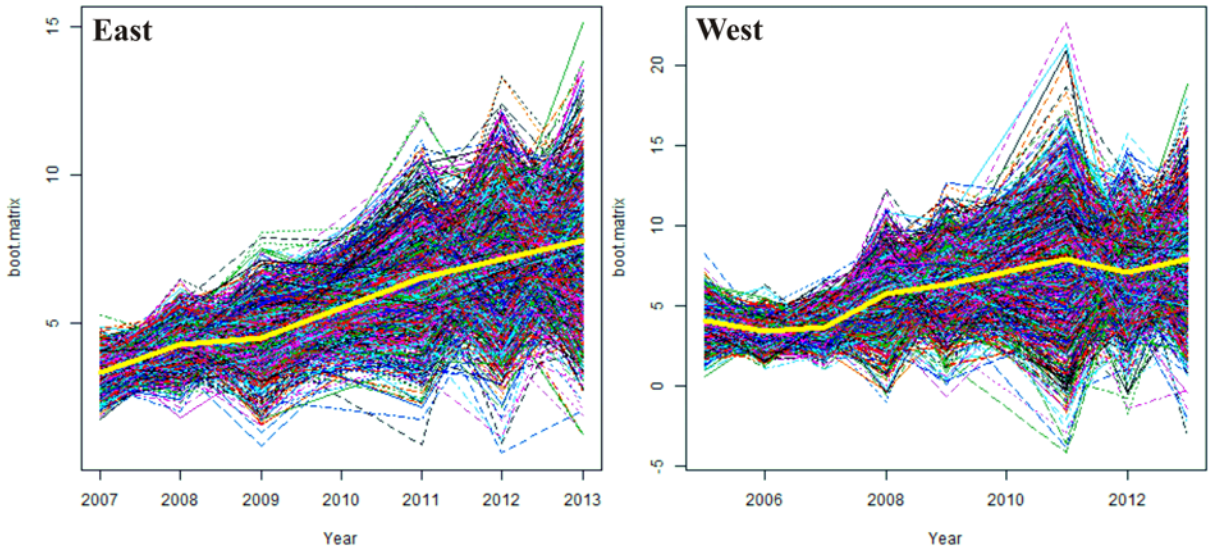

Figure 2. Bootstrapped distribution of average weights for recreational red snapper sampled by MRIP/LA Survey/TPWD in the Eastern and Western Gulf of Mexico, with mean denoted by yellow line and time series generated using PSE denoted by other colors.

In 2013, average weights for private/charter and headboat in the Eastern Gulf were 7.77 and 4.85 lbs ww, respectively. Projected average weights for 2014 for private/charter and headboat in the Eastern Gulf were 8.60 and 5.73 lbs ww, respectively (**Figure 3**: Left). In 2013, average weights for private/charter (including LA Survey 2013 data) and headboat in the Western Gulf were 7.94 and 5.41 lbs ww, respectively. Projected average weights for 2014 for private/charter and headboats in the Western Gulf were 8.82 and 7.75 lbs ww, respectively (**Figure 3**: Right).

The bootstrapped distribution of private/charter catch per day (in numbers) input into the projection model is shown in **Figure 4**. Generalized linear regression model fits to mean catch per day (in numbers), by region, are shown in **Figure 5**.

In 2013, in-season catch per federal day (in numbers) for private/charter and headboats in the Eastern Gulf were 24,725 and 699 fish/day, respectively. Projected 2014 catch (in numbers) per day for Eastern Gulf private/charter and headboats were 22,746 and 976 fish/day, respectively (**Figure 5**: Left). In 2013, catch rates for private/charter (including LA Survey 2013 data) and headboat in the Western Gulf were 1,593 and 677 fish/day, respectively. Projected 2014 catch (in numbers) per day for Western Gulf private/charter and headboats were 2,176 and 724 fish/day, respectively (**Figure 5**: Right).

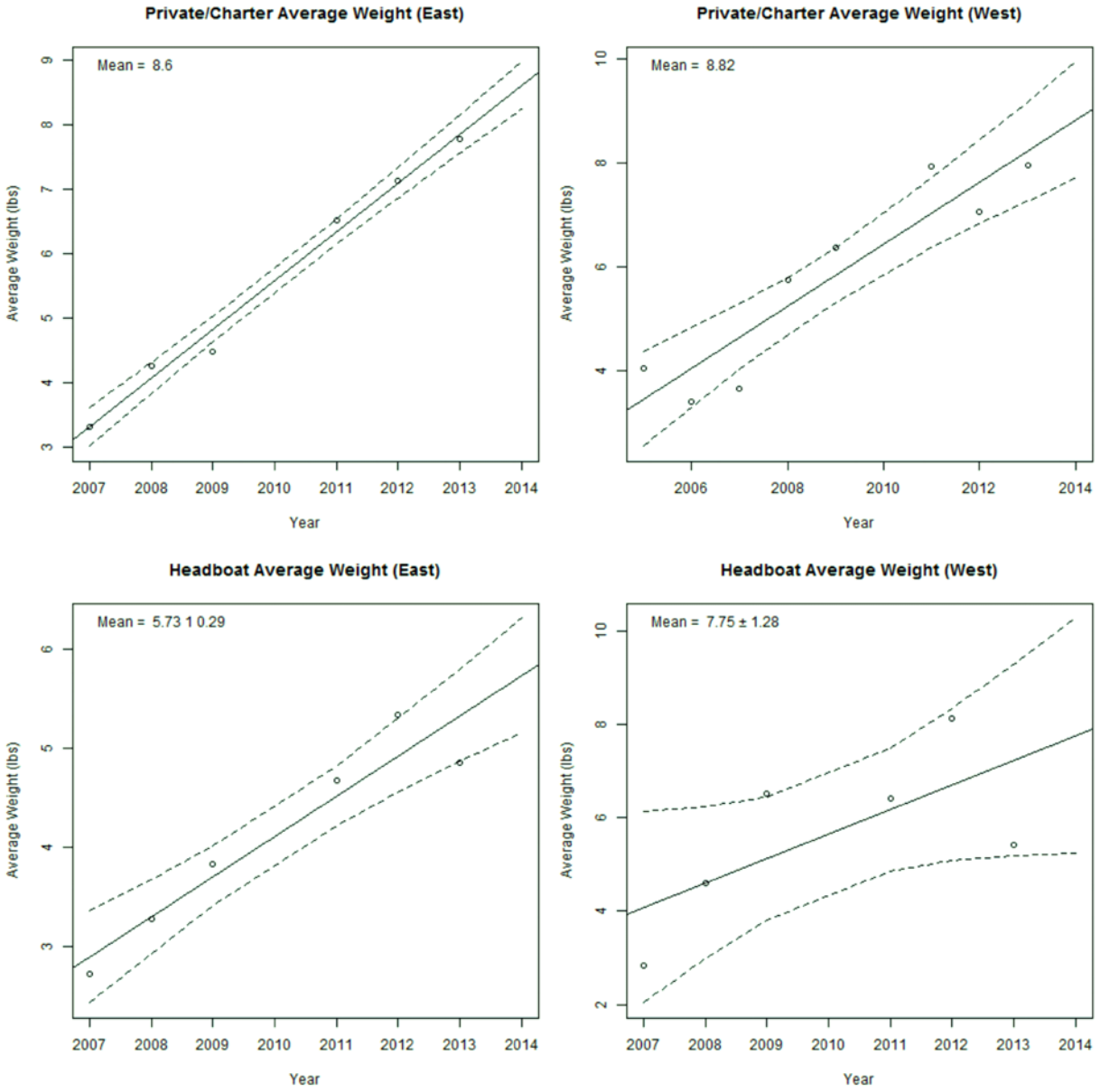

Figure 3. Generalized linear regression fits to mean average weights for recreational red snapper sampled by MRIP/LA Survey/TPWD in the Eastern and Western Gulf of Mexico. Dashed lines denote 95% confidence limits.

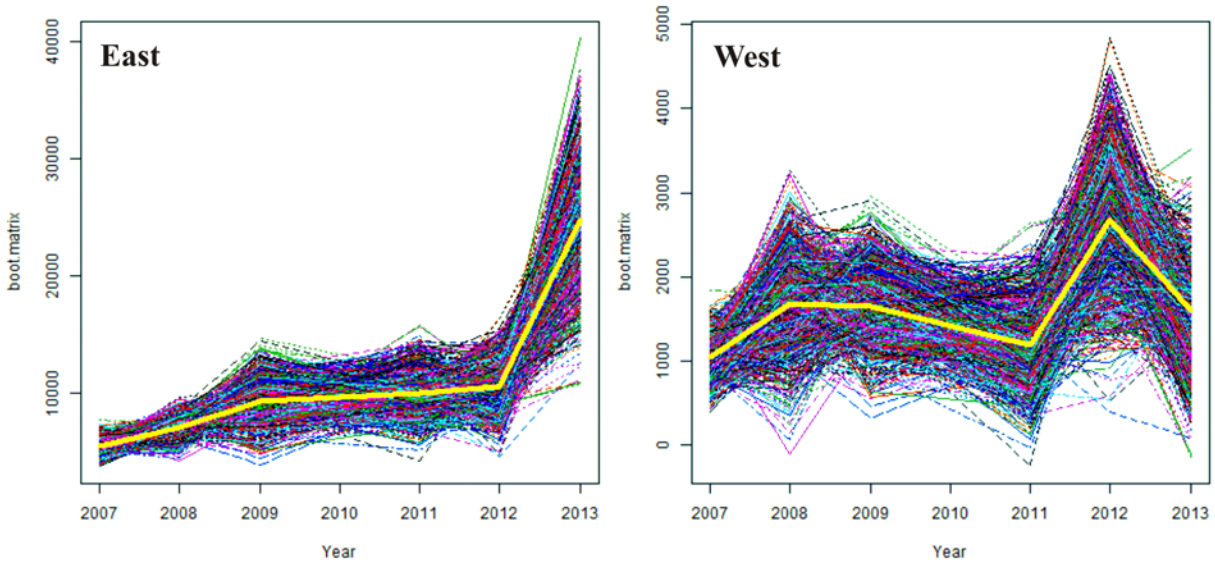

Figure 4. Bootstrapped distribution of catch (in numbers) per day, for recreational red snapper sampled by MRIP/LA Survey/TPWD in the Eastern and Western Gulf of Mexico, with mean denoted by yellow line and time series generated using PSE denoted by other colors.

In general, the Eastern Gulf of Mexico model fits were the most statistically robust (lower AICc, lower BIC, and/or better r^2), and SSB was not useful as a predictor because the rate of change in SSB is slower in the Eastern Gulf and the trend in the stock is swamped by the rapidly increasing interannual trends in average weight and catch rate. Model fits for the Western Gulf of Mexico private/charter catch rate were the least robust due to the low 2011 landings per day estimate followed by the high 2012 landings per day estimate. Several sensitivity runs were performed in SERO-LAPP-2013-10 to evaluate the influence of changes in Western Gulf of Mexico landings per day on season length.

The product of the bootstrapped distributions for average weights and catch (in numbers) per day yielded a distribution of projected catch (in pounds) per day. The distribution of projected 2014 catch (in pounds) per day for the private/charter sector in the Eastern and Western Gulf of Mexico is shown in **Figure 6**. **Table 3** summarizes estimated federal season catches per day based various confidence limits generated from bootstrapped forecasts.

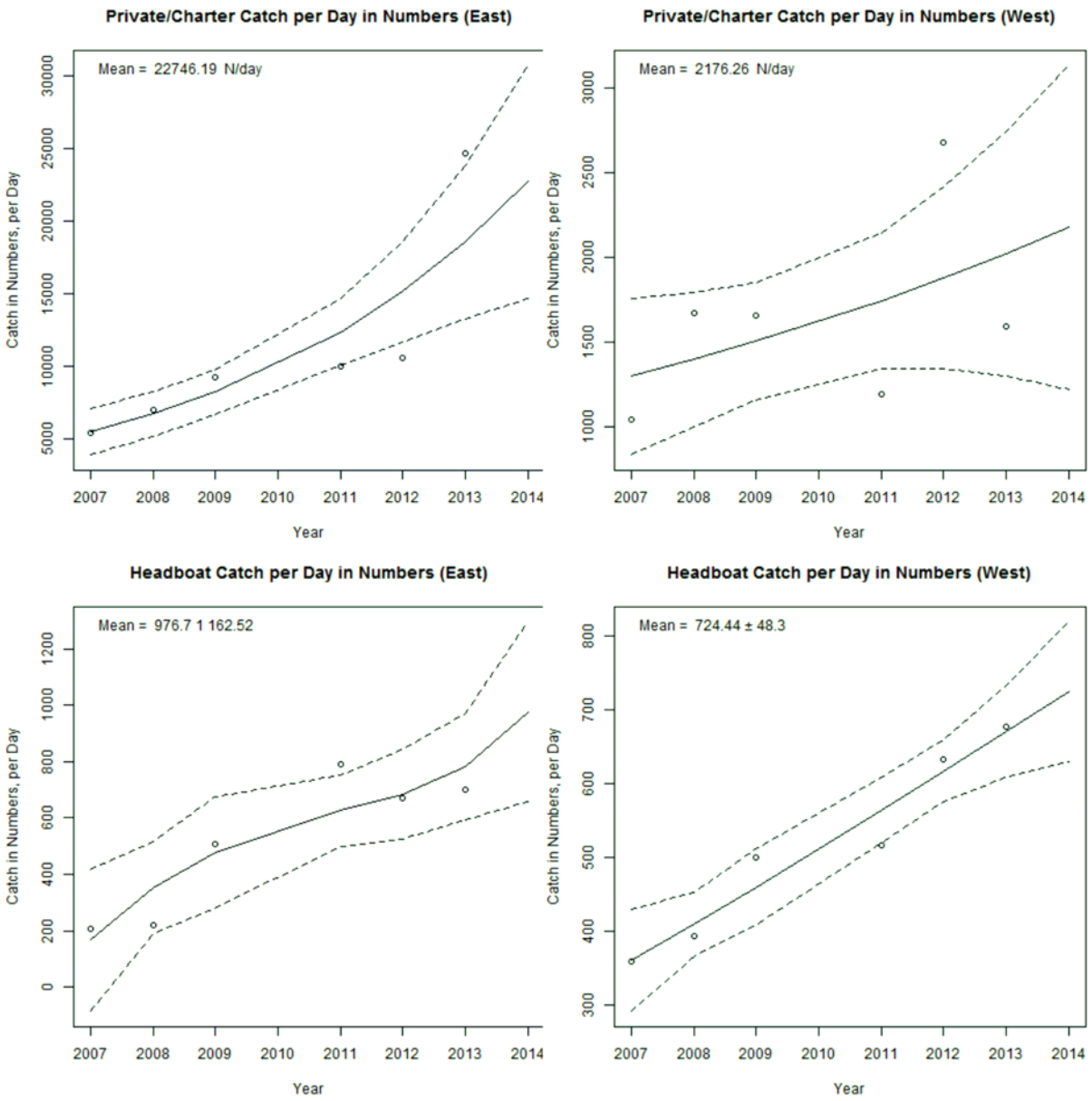

Figure 5. Generalized linear regression fits to mean catch (in numbers) per day for recreational red snapper sampled by MRIP/LA Survey/TPWD in the Eastern and Western Gulf of Mexico. Note that headboat regressions incorporate spawning stock biomass as a predictive covariate. Dashed lines denote 95% confidence limits.

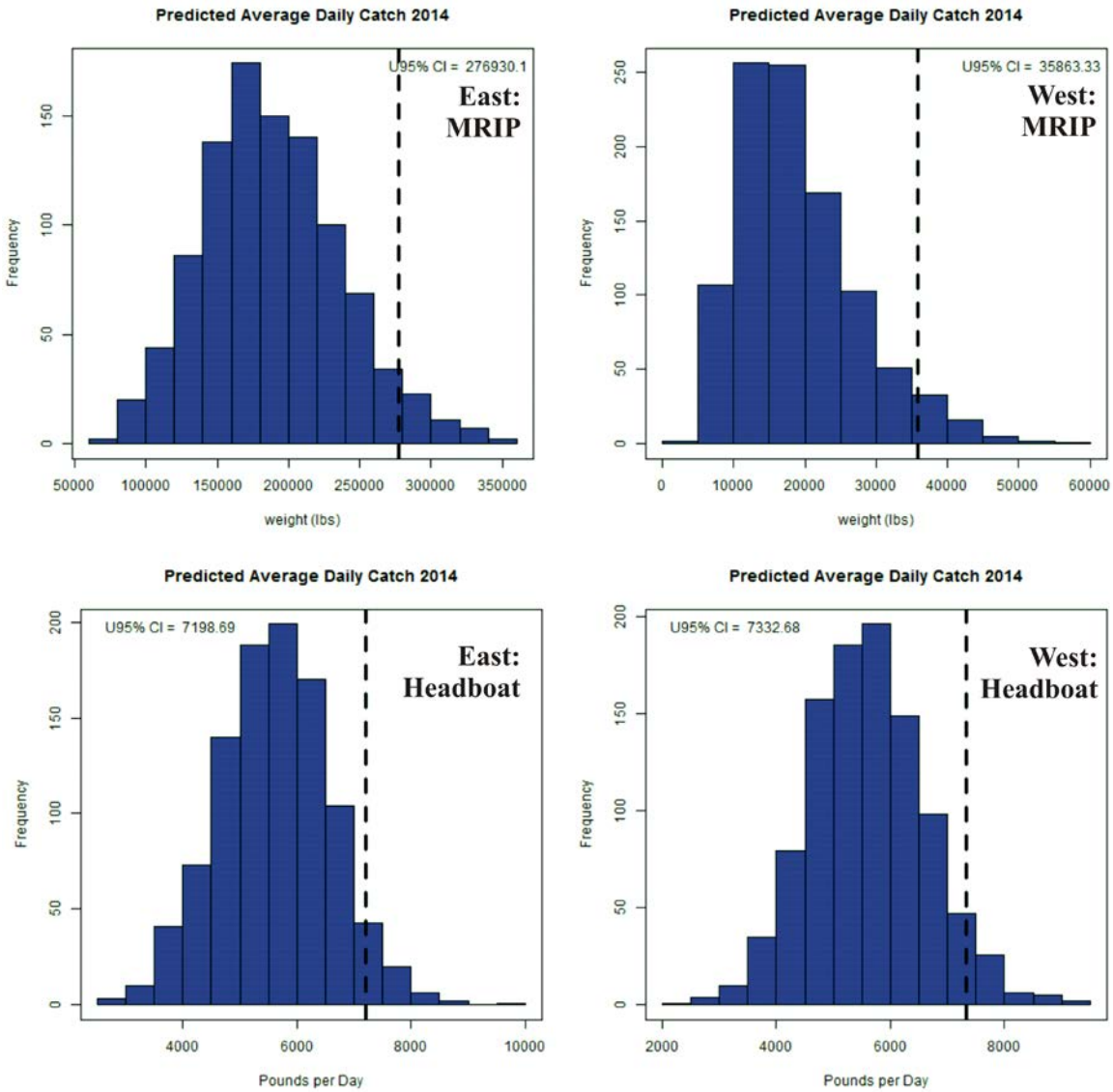

Figure 6. Catch (in pounds) per day from generalized linear regression fits to 1000 bootstrapped distributions of average weight and catch (in numbers) per day for recreational red snapper in the Eastern and Western Gulf of Mexico. Dashed lines denote 95% confidence limits.

Table 3 – Federal season catch rates (lbs/day) associated with various confidence limits generated from bootstrap forecasts. Note: federal season catch rates do not incorporate additional landings from extended state seasons.

Confidence Limit	Federal Catch/Day (lbs ww)
50% (Mean)	219,489
75%	255,770
85%	279,866
95%	327,325

2014 Projections: Season Length

Incorporation of the 2013 MRIP Eastern Gulf of Mexico catch rate as an input variable in the regressions resulted in much higher in-season catch rates than projected in SERO-LAPP-2013-10. Under the base run with no buffer and assuming a 2-fish bag limit and state fishing seasons as summarized in **Table 2**, the federal season would be 15 days, with a 50% chance of exceeding the quota (**Table 4**). Season lengths summarized in **Table 4** assume Florida private catch rates will be approximately 60% of catch rates observed during the federal season. Under a 20% buffer, the ACT would be 4.312 mp ww, and would result in a 9 day season, with a 15% probability of a quota overage. A 30% probability of exceeding the quota would correspond to a 12 day season, or a quota buffer of 10%.

If Florida state water private catch rates are equal to Florida private catch rates during the federal season rather than 60% of federal season catch rates, then the federal season length would be reduced by 6 days from the base run (**Table 5**). Replacing western Gulf projected landings per day with LA survey federal season landings per day in 2013 resulted in no change in the number of days the federal season would be open.

Table 4. Federal season length assuming Florida private catch rates would be approximately 60% of Florida private catch rates during the federal season.

Buffer (%)	Rec ACT (lbs ww)	Federal Season (days)	Prob. of Exceeding Quota
0%	5.39	15	50%
10%	4.851	12	30%
20%	4.312	9	15%
30%	3.773	6	5%
40%	3.234	3	<1%
60%	1.889	0	<1%

Table 5. Federal season length assuming Florida private catch rates would be equal to Florida private catch rates during the federal season.

Buffer (%)	Rec ACT (lbs ww)	Federal Season (days)	Prob. of Exceeding Quota
0%	5.39	9	50%
10%	4.851	6	30%
20%	4.312	3	15%
30%	3.773	0	5%
40%	3.234	0	<1%

Discussion

Past recreational quota overages have occurred for a variety of reasons, including challenges with predicting angler behavior and landing rates, inconsistent state regulations, and rapidly increasing fish sizes. As a result, projection assumptions in more recent years, including this analysis, have been refined to better account for increases in landings per day and changes in average weights. These refinements have led to increasingly conservative and more accurate predictions as described in SERO-LAPP-2013-10.

As with any projection model, the approaches discussed herein are dependent upon assumptions that historical data are accurately estimated and that historical trends are representative of future dynamics. Previous evaluations of Gulf of Mexico recreational red snapper catch rates have indicated that effort compression (i.e., fishing pressure intensifies during open days as the season shortens) is occurring in the fishery (SERO-LAPP-2012-01). These dynamics are implicitly incorporated into the generalized linear regression approaches described by this document. Additionally, the red snapper stock is recovering, leading to changes in abundance and age structure of the exploited stock. This dynamic is explicitly incorporated into our regression approaches as the highly-correlated predictive covariate, SSB. By separating projections by mode of fishing (headboat vs. private/charter) and stock unit (Eastern vs. Western Gulf), inherent differences in rates of fishing between modes and stock recovery between areas are made more explicit, which may continue the trend towards improved forecasting methods revealed by our retrospective analysis.

Estimating the red snapper season for 2014 is additionally complicated due to the substantial changes that took place in 2013 and 2014, with several states adopting much longer fishing seasons and MRIP modifying their dockside sampling methodology. These changes make it difficult to ascertain whether the quota was exceeded in 2013, whether the quota is accurately specified to be consistent with the new MRIP methodology, and what impacts shifting more harvest into state waters in 2013 will have upon catch rates and average weights in 2014.

Setting the season length based on shorter season estimates or incorporating a buffer for management uncertainty in the form of an ACT will reduce the risk of a quota overage (assuming states do not decide to adopt inconsistent regulations beyond those outlined), but increases the likelihood the quota may not be harvested. The mean projected season length is 15 days. A 20% buffer would decrease this season length by 6 days and decrease the probability of overfishing from 50% to 15%.

References

Burnham, K. P., Anderson, D. R. 2002. *Model Selection and Multimodel Inference: A Practical Information-Theoretic Approach* (2nd ed.), Springer-Verlag, ISBN 0-387-95364-7.

R Core Team. 2014. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria, available from www.R-project.org, Version 3.0.2.
Schwarz, G.E. 1978. Estimating the dimension of a model. Annals of Statistics 6 (2): 461–464. doi:10.1214/aos/1176344136. MR 468014.
SEDAR-31. 2013. Gulf of Mexico Red Snapper: Stock Assessment Report. SEDAR, North Charleston, SC.
SERO-LAPP-2009-02. 2009. 2009 Gulf of Mexico Red Snapper Recreational Season Length Estimates. NOAA Fisheries Service, Southeast Regional Office, St. Petersburg, FL.
SERO-LAPP-2011-03. 2011. 2011 Gulf of Mexico Red Snapper Recreational Season Length Estimates. NOAA Fisheries Service, Southeast Regional Office, St. Petersburg, FL.
SERO-LAPP-2012-01. 2012. 2012 Gulf of Mexico Red Snapper Recreational Season Length Estimates. NOAA Fisheries Service, Southeast Regional Office, St. Petersburg, FL.
SERO-LAPP-2012-10. 2012. 2013 Gulf of Mexico Red Snapper Recreational Season Length Estimates. NOAA Fisheries Service, Southeast Regional Office, St. Petersburg, FL.
SERO-LAPP-2013-02 Addendum. 2013. Updated 2013 Gulf of Mexico Red Snapper Recreational Season Length Estimates. NOAA Fisheries Service, Southeast Regional Office, St. Petersburg, FL, May 21, 2013; updated June 4, 2013.
SERO-LAPP-2013-10. 2013. 2014 Gulf of Mexico Red Snapper Recreational Season Length Estimates. NOAA Fisheries Service, Southeast Regional Office, St. Petersburg, FL, December 10, 2013.