Amendment 43 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region

November 20, 2017

Environmental Assessment Regulatory Impact Review Regulatory Flexibility Analysis Fishery Impact Statement

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Abbreviations and Acronyms Used in the FMP

ABC	acceptable biological catch
ACL	annual catch limits
AM	accountability measures
ACT	annual catch target
B	a measure of stock biomass in either weight or other appropriate unit
B_{MSY}	the stock biomass expected to exist under equilibrium conditions when fishing at F_{MSY}
B_{OY}	the stock biomass expected to exist under equilibrium conditions when fishing at F_{OY}
B_{CURR}	the current stock biomass
CPUE	catch per unit effort
DEIS	draft environmental impact statement
EA	environmental assessment
EEZ	exclusive economic zone
EFH	essential fish habitat
F	a measure of the instantaneous rate of fishing mortality
$F_{30\%SPR}$	fishing mortality that will produce a static SPR = 30%
F_{CURR}	the current instantaneous rate of fishing mortality
F_{MSY}	the rate of fishing mortality expected to achieve MSY under equilibrium conditions and a corresponding biomass of B_{MSY}
F_{OY}	the rate of fishing mortality expected to achieve OY under equilibrium conditions and a corresponding biomass of B_{OY}
FMP	fishery management plan
FMU	fishery management unit
M	natural mortality rate
MARMAP	Marine Resources Monitoring Assessment and Prediction Program
MFMT	maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistics Survey
MRIP	Marine Recreational Information Program
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OFL	overfishing limit
OY	optimum yield
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
SAFMC	South Atlantic Fishery Management Council
SEDAR	Southeast Data Assessment and Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
SIA	social impact assessment
SPR	spawning potential ratio
SSC	Scientific and Statistical Committee

Amendment 43 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region

Proposed action:	Revise the Process to Determine the Annual Catch Limits for Red Snapper
Lead agency:	Fishery Management Plan Actions – South Atlantic Fishery Management Council Environmental Assessment – National Marine Fisheries Service (NMFS) Southeast Regional Office
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Why is the South Atlantic Fishery Management Council considering action?

The South Atlantic Fishery Management Council is considering action to allow fishermen to harvest red snapper while preventing overfishing and allowing the stock to rebuild. Harvest of red snapper from federal waters was not allowed from 2014 until November 2017 and the closure caused negative economic and social impacts to those who fish for red snapper. The harvest of red snapper has been closed due to the total removals of red snapper (landings plus dead discards) exceeding the acceptable biological catch established in Amendment 28 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Amendment 28) (SAFMC 2013). Amendment 28 established a process that would set the annual catch limit to zero (no mini-season) if total removals (landings plus dead discards) exceeded the acceptable biological catch in the previous year. Dead discards were included in the process to determine the annual catch limit because a portion of red snapper released die as a result of hooking injuries, barotrauma and/or predation. The total removals exceeded the acceptable biological catch in 2014, 2015, and 2016 and the annual catch limit was set to zero in 2015, 2016, and 2017. A mini-season was allowed established in 2017 through an emergency rule.

The health of the stock was investigated using a benchmark stock assessment completed in 2016 and revised in 2017 with data through 2014 (Southeast Data Assessment and Review (SEDAR) 41 2017). SEDAR 41 (2017) was presented in May 2016 to the South Atlantic Fishery Management Council's Scientific and Statistical Committee, an advisory body to the South Atlantic Fishery Management Council that recommends acceptable biological catch levels, and was deemed the best scientific information available. The results of SEDAR 41 indicated that the stock was overfished and overfishing was occurring over the last 20 years of the assessment (1994-2014). In April 2017, the Scientific and Statistical Committee was presented a revised SEDAR 41 (2017) due to changes made in the headboat at-sea discard index (SEDAR 2017). The changes in the index did not result in changes to the stock status, but they did result in changes to spawning stock biomass, minimum stock size threshold, and maximum sustainable yield.

On January 18, 2017, the South Atlantic Fishery Management Council requested the Southeast Fishery Science Center provide red snapper projections under the assumption that all fish caught are subsequently discarded. The Southeast Fishery Science Center stated on February 15, 2017, that providing an acceptable biological catch based on discard-only projections was not possible due to the length of time since 2014 (the terminal year of data in SEDAR 41 2017), uncertainty in estimated recreational landings and discards associated with the Marine Recreational Information Program, and future changes to Marine Recreational Information Program estimates due to methodology revisions (results of which are anticipated to be available in mid-2018). The Southeast Fishery Science Center also stated that the uncertainty

in SEDAR 41 (2017) inhibits the ability to set an acceptable biological catch that can be effectively monitored. The South Atlantic Fishery Management Council discussed this response at their March 2017 meeting and requested that the Scientific and Statistical Committee and Southeast Fishery Science Center work together to recommend an appropriate acceptable biological catch estimate for red snapper.

In April 2017, the Scientific and Statistical Committee considered a request from the South Atlantic Fishery Management Council to consider approaches for deriving acceptable biological catch recommendations for red snapper, but they did not provide an acceptable biological catch recommendation at their meeting. The National Marine Fisheries Service's Southeast Fisheries Science Center and Southeast Regional Office further cautioned the South Atlantic Fishery Management Council on using estimates of discards in their management of red snapper in a series of letters (see **Appendix J**). The National Marine Fisheries Service stated that the use of an acceptable biological catch value based primarily on recreational discard estimates is likely ineffective for monitoring red snapper removals due to uncertainty in the estimate of discards and that there are upcoming changes to the effort estimation for calculating recreational effort (see **Appendix J**). Until the changes to the recreational survey are complete, the Scientific and Statistical Committee at their April 25-27, 2017 meeting recommended that Marine Recreational Information Program discard estimates from private recreational and charter vessels should not be used for managing red snapper (April 25-27, 2017SAFMC 2017).

While the estimates from Marine Recreational Information Program for the private recreational and charter vessel components of the red snapper portion of the snapper grouper fishery are calibrated and an index-based approach to monitoring the red snapper stock is developed, the South Atlantic Fishery Management Council is considering conservative measures beginning in 2018 to allow some harvest in a mini-season by revising the method to set an annual catch limit. Such measures would remain in place until modified. The alternatives the South Atlantic Fishery Management Council are considering are based on red snapper landings that occurred in 2012, 2013, and 2014 with some of the alternatives adjusted based on potential increases in red snapper abundance observed through the fishery-independent Southeast Reef Fish Survey, which includes the Marine Resources Monitoring, Assessment, and Prediction Program and the Southeast Fishery Independent Survey. The landings used in the analysis included commercial logbook data, headboat logbook data, South Carolina charter vessel logbook data, a Georgia charter vessel survey, a survey of vessels using methods in Sauls et al. (2017), and other sources (see **Appendix N** and **O**).

The Southeast Reef Fish Survey has been conducted with fish traps and other methods since 1990 (see **Appendix L**).[1] In 2015, the survey (using the time series recommended in SEDAR 41 (2017)) indicated that the red snapper stock increased by 35% compared to 2014. The population increased by another 12% in 2016 and is at the highest observed point since 1990. This increase in the population size is an encouraging sign that management has been effective in addressing overfishing and rebuilding the stock (see **Appendix J**). The Scientific and Statistical Committee stated at their April 2017 meeting that although estimates of discards may be highly uncertain, a continuing upward trend in the fishery-independent index has a high probability of

[1] Video data were not available through 2016 when developing this amendment.

reflecting increases in population size (SAFMC 2017). Additionally, since the population size appears to be larger based on the fishery-independent index (**Appendix L**), the risk of overfishing is likely reduced if annual catch limits are limited to recent harvest levels. Overfishing is essentially a ratio of landings compared to population size. If landings are limited to recent levels and the population has grown, then the resulting fishing mortality and risk of overfishing is decreased.

The overfishing determination in the SEDAR 41 (2017) assessment came from 2012-2014 when a small amount of red snapper harvest was allowed to occur. However, discards during this period of time were very high due to fishermen targeting co-occurring species, which likely contributed to the overfishing determination. Since recent red snapper data from the long-term fishery-independent index of abundance collected by the Southeast Reef Fish Survey program suggests the South Atlantic red snapper population has increased substantially since 2014; the South Atlantic Fishery Management Council's Scientific and Statistical Committee indicated that the trends in Southeast Reef Fish Survey relative abundance supported a population increase in their April 2017 report; and red snapper relative abundance from Southeast Reef Fish Survey is currently the highest observed in the entire time series (1990-2016), allowing limited harvest of red snapper is neither expected to result in overfishing, nor prevent continued stock rebuilding.

Additional information was provided by the Florida Fish and Wildlife Commission regarding recent studies on red snapper at the September 2017 South Atlantic Fishery Management Council meeting. Although the information was primarily qualitative, it supported the conclusions above that the relative abundance of red snapper has continued to increase and the stock is rebuilding (more red snapper reaching older ages).

To further reduce the fishing mortality rate, the South Atlantic Fishery Management Council encourages fishermen to use best fishing practices. These are voluntary actions that fishermen can take to reduce the number of red snapper discarded and improve the survivorship of discarded fish. The South Atlantic Fishery Management Council:

- Encourages fishermen to avoid red snapper if they have caught their limit or they are out of season;
- Encourages use of single hook rigs;
- Encourages fishermen to return fish back to the water as quickly as possible; and
- Encourages fishermen to use a descending device if releasing red snapper with signs of barotrauma.

The South Atlantic Fishery Management Council has developed website of best fishing practices based on a workshop held in June 2017 (http://safmc.net/electronic-reporting-projects/red-snapper-reporting/).

Red snapper is an iconic species and many fishermen perceive the discards as a waste of the resource. Allowing a limited amount of harvest of red snapper would be expected to reduce the negative social and economic impacts of a year-round closure. Also, allowing some harvest would enable the collection of additional scientific information on the red snapper portion of the snapper grouper fishery. Regulations for red snapper changed substantially in 2010 and fishery-dependent information (data collected from landed fish) has been absent during the closed years.

During the open seasons, scientists can collect information on the size of fish harvested, age of fish harvested, fishery selectivity, and fishermen's behavior on recreational and commercial vessels to be considered in future stock assessments and management plans. As recommended by the Scientific and Statistical Committee, plans for developing a data collection program have already begun. State representatives from North Carolina, South Carolina, Georgia, and Florida have agreed to collect data on red snapper during open seasons. This data collection program should ensure needed age samples and landings data for future red snapper assessments are available. Fishermen will be able to use MyFishCount, a voluntary reporting webportal, to report private recreational catch information including data on length of fish, release method, hook type, hook location, and fishing location.

What action is being proposed in this amendment?

Amendment 43 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Amendment 43) proposes the following action for red snapper:

Revise the Process to Determine the Annual Catch Limits for Red Snapper.

Alternative 1 (No Action). The commercial and recreational annual catch limits for red snapper are zero. The process and formula established in Amendment 28 to the Fishery Management Plan of the Snapper Grouper Fishery of the South Atlantic Region (Amendment 28) specifies current fishing year annual catch limits if the National Marine Fisheries Service determines that the previous year's estimated red snapper landings and dead discards are less than the acceptable biological catch.

Alternative 2. Remove the process and equation used to determine the red snapper annual catch limit as specified in Snapper Grouper Amendment 28. Specify a total annual catch limit equal to 23,623 fish. Commercial annual catch limit equals 69,360 pounds (whole weight) and recreational annual catch limit equals 16,480 fish.

Alternative 3. Remove the process and equation used to determine the red snapper annual catch limit as specified in Snapper Grouper Amendment 28. Specify a total annual catch limit equal to 44,411 fish. Commercial annual catch limit equals 130,396 pounds (whole weight) and recreational annual catch limit equals 30,982 fish.

Preferred Alternative 4. Remove the process and equation used to determine the red snapper annual catch limit as specified in Snapper Grouper Amendment 28. Specify a total annual catch limit equal to 42,510 fish. Commercial annual catch limit equals 124,815 pounds (whole weight) and recreational annual catch limit equals 29,656 fish.

Alternative 5. Remove the process and equation used to determine the red snapper annual catch limit as specified in Snapper Grouper Amendment 28. Specify a total annual catch limit equal to 79,919 fish. Commercial annual catch limit equals 234,652 pounds (whole weight) and recreational annual catch limit equals 55,753 fish.

Note: In Alternatives 2 through 5, the sector annual catch limits were calculated using the established allocation in the Comprehensive ACL Amendment to the Snapper Grouper Fishery Management Plan for the South Atlantic Region (SAFMC 2011). The allocation is 28.07% commercial and 71.93% recreational based on weight.

The current red snapper annual catch limit is set in numbers of fish to account for discards (SAFMC 2010). The sector annual catch limits are apportioned based on allocation percentages determined by the South Atlantic Fishery Management Council established in the Comprehensive Annual Catch Limit Amendment (SAFMC 2011). The methods used to develop the commercial and recreational sector allocations are included in **Appendix K**. Annual catch limits for the recreational sector are specified in numbers of fish because it is a more reliable estimate for the sector than weight of fish. Surveys that estimate recreational landings collect information on the numbers of fish and convert those numbers to weights using limited biological samples. The commercial sector's annual catch limit is set in pounds of fish because that is how the commercial sector reports landings and thus weight is a more accurate representation of commercial landings.

Proposed annual catch limits in **Alternative 2** through **Alternative 5** are based on landings from 2012 to 2014, when mini-seasons were open for red snapper. **Alternative 2** is based on the average landings from 2012 to 2014. **Alternative 3** is based on the average of landings from 2012 to 2014, multiplied by an adjustment factor intended to account for the potential population growth since 2012-2014. The adjustment factor is based on the observed increase in numbers of red snapper from the Southeast Reef Fish Survey. The scientific survey indicated the average population of red snapper increased by 1.88 when comparing the time period 2012 to 2014 to the time period 2015 to 2016 (**Figure S-1** and **Appendices K** and **L**). **Preferred Alternative 4** is based on the highest observed landings (42,510 red snapper) that occurred in a single year from 2012 to 2014. **Alternative 5** is the highest landings that occurred in a single year from 2012 to 2014, multiplied by the adjustment factor (described above).

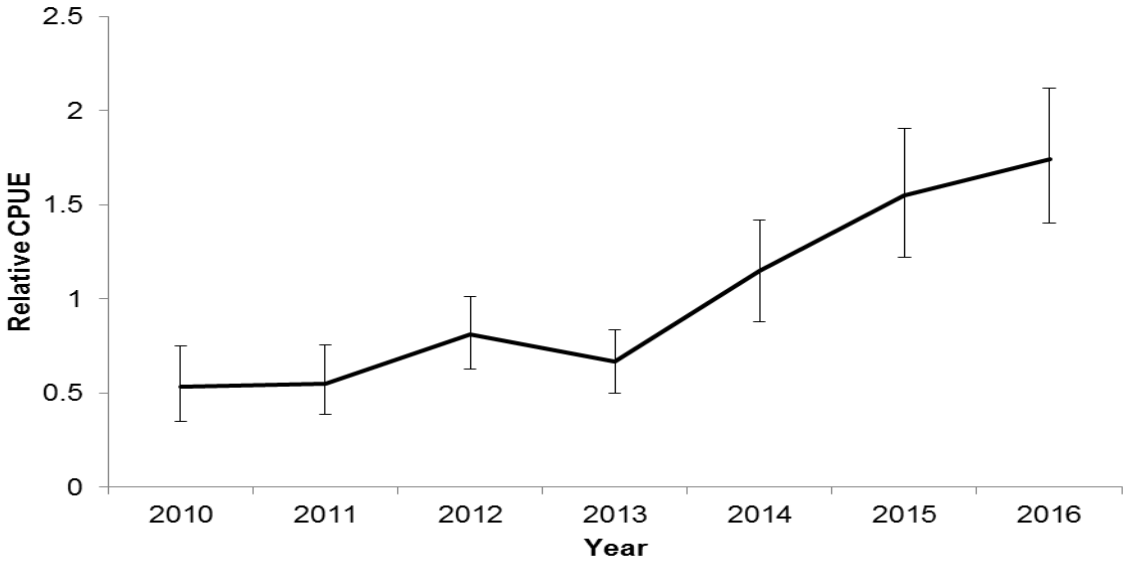


Figure S.1. Relative catch per unit effort with error bars from a scientific study of red snapper abundance in the South Atlantic region, 2010 to 2016 (as discussed in **Sections 1.7** and **2.1.1**).

Purpose for Action

The *purpose* of Snapper Grouper Amendment 43 is to revise annual catch limits for red snapper to provide fishing access.

Need for Action

The *need* for Snapper Grouper Amendment 43 is to prevent overfishing, continue to rebuild the stock, and, to the extent practicable, reduce adverse social and economic effects as per the Magnuson-Stevens Fishery Conservation and Management Act.

Chapter 1.
Introduction

1.1 What action is being proposed in this amendment?

The South Atlantic Fishery Management Council (Council) is considering revising the process to determine the annual catch limits (ACL) for South Atlantic red snapper to enable a season beginning in 2018.

1.2 Who is proposing the amendment?

The Council develops the amendment and submits it to the National Marine Fisheries Service (NMFS) who, on behalf of the Secretary of Commerce, ultimately approves, disapproves, or partially approves the amendment. NMFS implements the actions in the amendment through the development of regulations through rulemaking. NMFS is an office of the National Oceanic and Atmospheric Administration. The Council and NMFS are also responsible for making this document available for public comment.

The South Atlantic Fishery Management Council

- Responsible for conservation and management of fish stocks in the South Atlantic Region
- Consists of 13 voting members who are appointed by the Secretary of Commerce, 1 representative from each of the 4 South Atlantic states, the Southeast Regional Administrator of NMFS, and 4 non-voting members
- Responsible for developing fishery management plans and amendments under the Magnuson-Stevens Act; recommends actions to NMFS for implementation
- Management area is from 3 to 200 nautical miles off the coasts of North Carolina, South Carolina, Georgia, and east Florida through Key West, with the exception of Mackerel which is from New York to Florida, and Dolphin-Wahoo, which is from Maine to Florida

1.3 Where is the Project Located?

Management of the federal snapper grouper fishery located off the southeastern United States (South Atlantic) in the 3-200 nautical miles U.S. Exclusive Economic Zone (EEZ) is conducted under the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP) (SAFMC 1983) (**Figure 1.3.1**). Red snapper is one of 55 species managed by the Council under the Snapper Grouper FMP.

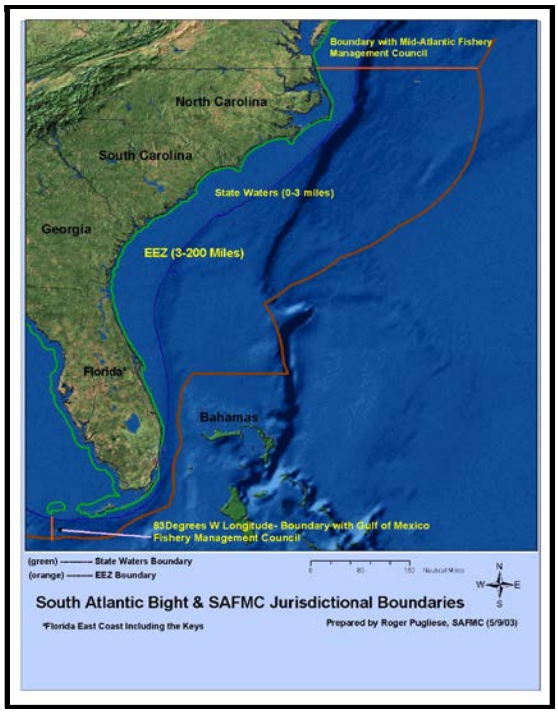


Figure 1.3.1. Jurisdictional boundaries of the Council.

1.4 Why is this action being considered (Purpose and Need)?

The Council intends to specify recreational and commercial ACLs for red snapper beginning in 2018, while long-term ACLs and management measures are being developed in Amendment 46 to the Snapper Grouper FMP. The Council's goal is to minimize adverse socio-economic effects to fishermen and fishing communities that utilize red snapper as part of the snapper grouper fishery (see **Section 3.3**) while preventing overfishing from occurring and continuing to rebuild the stock (see **Section 1.7**).

Purpose for Action

The *purpose* of Snapper Grouper Amendment 43 is to revise annual catch limits for red snapper to allow fishing access.

Need for Action

The *need* for Snapper Grouper Amendment 43 is to prevent overfishing, continue to rebuild the red snapper stock, and, to the extent practicable, reduce adverse social and economic effects as per the Magnuson-Stevens Fishery Conservation and Management Act.

1.5 What are annual catch limits and accountability measures and why are they required?

The reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) in 2007 required implementation of ACLs and accountability measures (AM) to end and/or prevent overfishing to achieve the optimum yield (OY) from a fishery. An ACL is the level of annual catch of a stock that, if met or exceeded, triggers some corrective action. The AMs are the corrective actions, and they are management controls to prevent ACLs from being exceeded and to correct for overages of ACLs if they occur. An example of an AM is implementation of an in-season closure if catch is projected to reach the ACL. Amendment 43 includes alternatives that would revise the current ACLs for red snapper.

1.6 What are the current red snapper ACLs and how are fishing seasons determined?

Amendment 28 to the Snapper Grouper FMP (SAFMC 2013) established a process for setting fishing seasons to allow limited harvest of red snapper in the South Atlantic EEZ as long as the acceptable biological catch (ABC) was not exceeded in the previous fishing year. Amendment 28 also included a formula to determine the ACL for each sector; as well as management measures (limited fishing seasons, no minimum size limit, one fish per person per day recreational bag limit, and 75 pounds (lbs) commercial trip limit), if fishing were allowed. The current red snapper ABC specified in Amendment 28 was recommended by the Council's Scientific and Statistical Committee (SSC) in November 2010 (SAFMC 2010) and is based on rebuilding projections in the Southeast Data Assessment and Review (SEDAR 24 2010) red snapper stock assessment.

Limited red snapper landings were allowed in 2012, 2013, and 2014 in federal waters. However, combined landings and estimated dead discards in 2014, 2015, and 2016 have exceeded the ABC for those years and no red snapper harvest was allowed in 2015 and 2016 (**Table 1.6.1**). An emergency action enabled limited harvest in 2017.

Table 1.6.1. Red snapper ABCs recommended by the SSC from projections included in SEDAR 24 (2010). Red snapper landings and estimates of dead discards from the South Atlantic region since 2012, including during mini-seasons from 2012 to 2014. Bold values indicate landings plus dead discards exceeded the ABC.

Year	Total ABC (Numbers of Fish)	Landings (Numbers of Fish)	Landings + Dead Discards* (Numbers of Fish)
2012	86,000	16,591	80,516
2013	96,000	11,767	72,881
2014	106,000	42,510	**205,859**
2015	114,000	2,850	**276,729**
2016	121,000	830	**407,079**

*Values were reported in the NMFS Southeast Fisheries Science Center's (SEFSC) annual report on red snapper landings. Reports were presented at June Council meetings from 2013-2016.

Process implemented by Snapper Grouper Amendment 28

The annual ABCs for red snapper were recommended by the SSC in numbers of fish based on projections in SEDAR 24 (2010). If NMFS determines that the estimated landings and dead discards that occurred in the previous year were equal to or greater than the projected ABC, no harvest would be allowed in upcoming fishing season. If NMFS determined that the estimated landings and dead discards that occurred in the previous year were less than the ABC, harvest *might* be allowed. (Note: The commercial and recreational fishing seasons would not open if the projected season length is three days or less.)

NMFS calculates the total ACL following the formula implemented through the amendment and the sector ACLs based on the Council's approved allocations. NMFS projects the length of the commercial and recreational fishing seasons.

If harvest is allowed, NMFS announces the pre-determined commercial and recreational fishing year start dates. The commercial red snapper season closes when the commercial sector ACL is met or projected to be met. The recreational red snapper season is projected and announced before the start of the season. The NMFS Regional Administrator has the authority to delay the opening of red snapper fishing seasons in the event of a tropical storm or hurricane affecting the Council's area of authority. The recreational fishing season will not open if the projected season length is three days or less.

The process would be repeated each year unless modified.

1.7 Will the Action Prevent Overfishing and Continue to Rebuild the Stock?

In 2009, NMFS notified the Council that the red snapper stock was overfished and undergoing overfishing based on the results of the SEDAR 15 benchmark stock assessment, using data through 2006 (SEDAR 2009). SEDAR is a cooperative process by which stock assessment projects are conducted in Southeast Region. In response to the stock assessment, the Council approved, and NMFS implemented, a 35-year rebuilding plan for South Atlantic red snapper in 2010. The stock was reassessed in 2010 using data through 2009 (SEDAR 24 2010). SEDAR 24 (2010) determined that the red snapper stock was overfished and undergoing overfishing; however, the rate of overfishing was less than the rate of overfishing found in the previous assessment (SEDAR 15 2009).

The most recent stock assessment for South Atlantic red snapper was completed in 2016, through SEDAR 41 (2017)[2]. SEDAR 41 (2017) evaluated data from 1950 to 2014, and determined that overfishing was occurring from 2012 to 2014 because the estimated fishing mortality (based on the average over the last three years represented in the model) exceeded the maximum fishing mortality threshold. The red snapper overfishing determination in the assessment came from 2012-2014 when only a small amount of harvest was allowed to occur. However, discards during this time period were very high due to fishermen targeting species that co-occur with red snapper, which likely contributed to the overfishing determination. SEDAR 41 (2017) stated "during the most recent years of the stock assessment series (i.e., the 2010-2014 moratorium), recreational discards were one of the most important and most uncertain sources of information." However, despite small fishing seasons that occurred during 2012-2014, the Southeast Reef Fish Survey (SERFS) showed a steep increase in the relative abundance of red snapper following 2014 (**Figure 1.7.1**), suggesting that the limited amount of harvest during 2012-2014 did not negatively affect the red snapper stock. Further, at the June 2016 Council meeting, the SSC chair stated that when taking all of the available information into account, particularly the fishery-independent data, the progress in rebuilding of red snapper was unquestionable.

In May 2016, the SSC accepted the results from SEDAR 41 (2017) as providing information useful for management and adequate to support fishing level recommendations (SAFMC 2016). However, the SSC noted there was high uncertainty in the degree of overfishing (i.e., the actual numerical value of the current fishing mortality estimate). The SSC indicated that the most significant sources of uncertainty include: the stock-recruitment relationship, natural mortality at age, the age structure of the unfished population, the composition and magnitude of recreational discards (where dead discards vastly outnumbered the landings during 2012-2014; **Table 2.1.2**), potential changes in catch per unit effort catchability, and the selectivities for the different fishery fleets (SAFMC 2017).

[2] Subsequent to completion of the assessment, the SEFSC made a small correction to the base run, and the SSC provided review in April 2017. The change to the assessment did not change the stock status conclusions.

On January 18, 2017, the Council requested the SEFSC provide red snapper projections under the assumption that all fish caught are subsequently discarded. The SEFSC reported in a letter dated February 15, 2017, that the proposed projections were not appropriate for management use because the uncertainty with the assessment was already large (**Appendix J**) and would increase due to Marine Recreational Information Program (MRIP) discard data. The SEFSC noted that the Council's SSC had indicated that overfishing was occurring but could not quantify by how much, and stated that the fishing mortality rates in the last few years of the assessment are very sensitive to 2014 data and retrospective analyses indicate the fishing mortality rates are considerably lower if these data are excluded. The SEFSC stated in their February 15, 2017, letter that the uncertainty in the stock assessment inhibits the ability to set an ABC that can be effectively monitored. The SEFSC further stated in an April 21, 2017, letter, that the use of an ABC based primarily on fishery discards for monitoring the effectiveness of management action is likely ineffective due to the high level of uncertainty in measures of discards and the change in the effort estimation methodology that will be implemented in the MRIP survey.

NMFS informed the Council in a letter dated March 3, 2017 (**Appendix J**), that based on the results of SEDAR 41 (2017) the red snapper stock was still overfished, but was rebuilding in accordance with the rebuilding plan, and that adequate management action has been taken to address overfishing of red snapper and continue to rebuild the stock through harvest prohibitions in 2015 and 2016. This determination is supported by an increase in stock biomass since 2010 and increasing abundance of older age classes (ages greater than six) (SEDAR 41 2017).

The abundance of snapper grouper species, including red snapper, has been monitored by the Marine Resources Monitoring Assessment and Prediction (MARMAP) Program since 1978. MARMAP[3] is the only existing long-term program off the Atlantic coast of the southeastern U.S. that monitors reef fish length frequency, abundance, and life history based on fishery-independent data. These data provide critical input for the assessments of stock status conducted through the SEDAR process.

Southeast Reef Fish Survey (SERFS)

- Includes three fishery independent sampling surveys.
  - MARMAP – since 1978
  - SEAMAP-SA – since 1986
  - SEFIS – since 2010
- Continuous sampling since 1972.
- Gear Used:
  - Fish traps (chevron)
  - Longlines
  - Rod and reel
  - Video
- Surveys conducted from April to October

Figure 1.7.1 shows the relative abundance of red snapper collected in chevron traps in the South Atlantic Region calculated using methods developed in SEDAR 41 (2017). SEDAR 41 (2017) included both the fishery-independent trap index and the video index (2010-2014);

[3] The NMFS SEFSC SouthEast Fishery-Independent Survey (SEFIS) was established in 2010 to complement MARMAP with identical gear types and sampling methodology, and to expand the sample size and spatial distribution of the ongoing MARMAP trap survey. The fishery-independent survey will be attributed to SERFS through the remainder of the document.

however, the video index data subsequent to 2014 are not currently available. The long-term fishery-independent survey shows a steep upward trend in relative abundance, reaching the

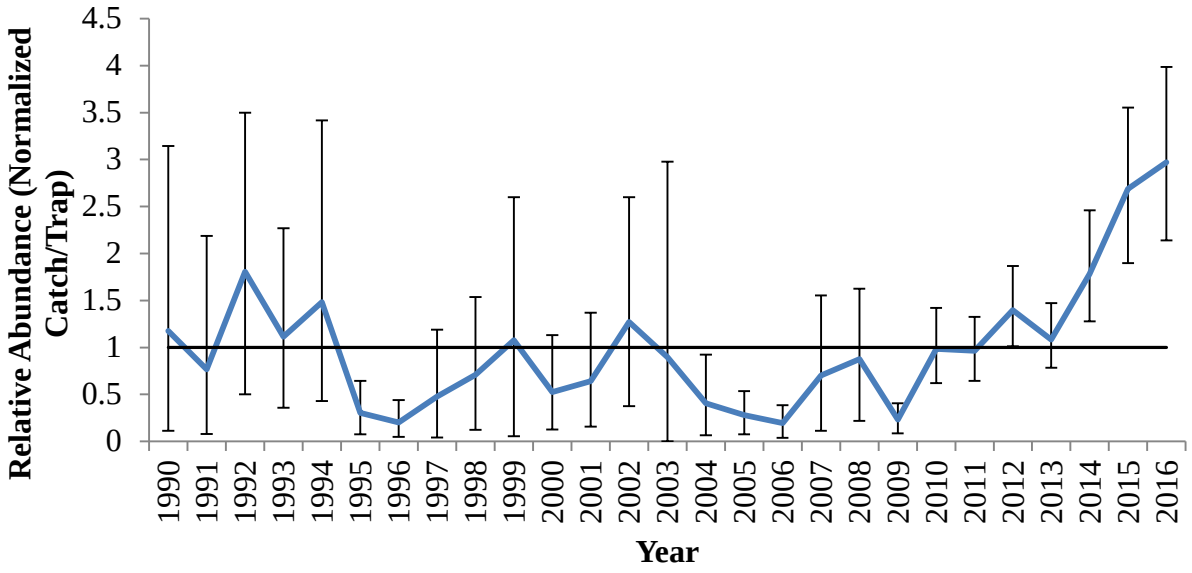


Figure 1.7.1. Relative abundance of red snapper collected in chevron traps in the South Atlantic Region calculated using methods developed in SEDAR 41 (2017) and 95% confidence interval of the relative abundance index based on 10,000 bootstraps. The solid black line indicates a relative index of one. See **Appendix J** for more details. **Note: Figure 1.7.1 does not include the video index. The video index is only available for the years 2010-2014 and was provided in SEDAR 41 (2017). Video data after 2014 are not yet available.** Source: SERFS

highest levels to date in 2016 (**Figure 1.7.1, Appendix L**). The increase in relative abundance has occurred despite landings that occurred during the 2012-2014 mini-seasons, and despite the large number of dead discards that have occurred (see **Table 2.1.2**) since harvest was restricted for red snapper in 2010. The SSC was presented trends data from the sampling completed by SERFS at their April 2017 meeting. The SSC stated at their April 2017 meeting that, "Although estimates of discards may be highly uncertain, a continuing upward trend in the fishery independent index has a high probability of reflecting increases in population size" (SAFMC 2017). This is important because the determination of overfishing is based on the level of removals and the population size. If the population increases, as is indicated from the survey, then the fishing mortality estimate associated with a given level of removals is decreased. Overfishing is defined in the Magnuson-Stevens Act as "a rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce the maximum sustainable yield on a continuing basis" (16 U.S. C. 1802(10)). The removal levels of red snapper in 2014 (highest since 2010) did not appear to jeopardize the stock because the population increased substantially after 2014 landings occurred.

Data from the long-term fishery-independent index of abundance collected by the SERFS program suggests the South Atlantic red snapper population has increased substantially since 2014; the Council's SSC indicated that the trends in SERFS relative abundance supported a population increase in their April 2017 report; and red snapper relative abundance from SERFS is currently the highest observed in the entire time series (1990-2016), allowing a small amount of harvest of red snapper beginning in 2018 at the highest landings observed during the limited

openings in 2012-2014 is neither expected to result in overfishing, nor prevent continued stock rebuilding.

The Florida Fish and Wildlife Commission presented preliminary data on their red snapper data collection programs at the September 2017 Council meeting. Although the information was mostly qualitative, the surveys also observed increases in relative red snapper abundance since 2014. It was also noted that older red snapper were observed in hook-and-line studies compared to trap surveys, and collection of older red snapper is important for tracking rebuilding of the population age structure.

The SSC provided annual ABCs for the years of 2012-2019 following a review of SEDAR 24 (2010). These ABCs were the basis of management advice for Amendment 28 (SAFMC 2013). As previously discussed, in response to the Council request to provide red snapper projections under the assumption that all fish caught are subsequently discarded, the SEFSC stated (in their February 15, 2017, letter, **Appendix J**) that uncertainty in SEDAR 41 (2017) is already large and will increase due to the MRIP discard data, and future changes to MRIP estimates due to the new effort survey (results of which are anticipated to be available in mid-2018). The SEFSC also stated in their January 18, 2017, letter that uncertainty in SEDAR 41 (2017) inhibits the ability to set an ABC that can be effectively monitored. Additionally, on April 21, 2017, the SEFSC stated that the use of an ABC based primarily on fishery discards for monitoring the effectiveness of management action is likely ineffective due to uncertainty in measures of discards and changes in the MRIP effort estimation methodology.

In April 2017, the SSC considered a request from the Council to explore approaches for deriving ABC recommendations for red snapper in light of the recent guidance of the agency regarding red snapper projections and uncertainties as detailed above (SAFMC 2017). The following statements were provided by the SSC:

- *Clarification was provided by NMFS to the SSC that the assessment is still considered BSIA (Best Scientific Information Available). However, the data available to monitor the landings and discards are too uncertain to track any projected ABC. Therefore, an index-based approach is being proposed to track and monitor the condition of red snapper.*
- *The current projected yield streams are still considered BSIA, but are not useful for management and monitoring because of the uncertainty in the catch data (as most of the catch is discarded).*
- *The SSC acknowledged that at this point it is unable to provide an ABC recommendation for red snapper.*
- *Although estimates of discards may be highly uncertain, a continuing upward trend in the fishery-independent index has a high probability of reflecting increases in population size.*

Since the SEFSC indicates that uncertainty in SEDAR 41 (2017) inhibits the ability to set an ABC that can be effectively monitored and that the SERFS fishery-independent index shows a

continued upward trend in red snapper relative abundance, further investigation of an index based approach as an alternative approach for monitoring red snapper is warranted.

The Council is developing amendments to address ACLs and management actions for red snapper. Amendment 46 to the Snapper Grouper FMP is being developed and it would revisit red snapper management reference points, commercial and recreational management measures, recreational permitting and reporting, and best fishing practices. Additionally, the SEFSC is exploring alternative methods to develop future ABCs for red snapper.

1.8 What is the history of management for red snapper?

The snapper grouper fishery is highly regulated and regulations have been in place for red snapper since the initial development of the Snapper Grouper FMP in 1983. A detailed history of management for all species in the snapper grouper fishery management unit may be found in **Appendix C**. Below is an annotated list of fishery management plan/amendments that contained actions specifically related to red snapper.

Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (1983)

The original Snapper Grouper FMP included provisions to prevent growth overfishing in thirteen species in the snapper grouper complex and established a procedure for preventing overfishing in other species; established minimum size limits for red snapper, yellowtail snapper, red grouper, Nassau grouper, and black sea bass; established a 4-inch trawl mesh size to achieve a 12-inch total length minimum size limit for vermilion snapper; and included additional harvest and gear limitations.

Definitions

Acceptable Biological Catch (ABC)
Maximum amount of fish stock that can be harvested without adversely affecting recruitment of other components of the stock.

Annual Catch Limits (ACL)
The level of annual catch (pounds or numbers) that triggers accountability measures to ensure that overfishing is not occurring.

Annual Catch Targets (ACT)
The level of annual catch (pounds or numbers) that is the management target of the fishery, and accounts for management uncertainty in controlling the actual catch at or below the ACL.

Accountability Measures (AM)
Management controls to prevent ACLs, including sector ACLs, from being exceeded, and to correct or mitigate overages of the ACL if they occur.

Allocations
A division of the overall ACL among sectors (e.g., recreational and commercial) to create sector ACLs.

Maximum Sustainable Yield (MSY)
Largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions.

Optimum Yield (OY)
The amount of catch that will provide the greatest overall benefit to the nation, particularly with respect to food production and recreational opportunities and taking into account the protection of marine ecosystems.

Minimum Stock Size Threshold (MSST)
A status determination criterion. If current stock size is below MSST, the stock is overfished.

Amendment 4 (1991)

Amendment 4 to the Snapper Grouper FMP prohibited the use of various gear, including fish traps, the use of bottom longlines for wreckfish, and powerheads in special management zones off South Carolina; established bag limits and minimum size limits for several species (20 inch total length minimum size limit and two fish bag limit for red snapper); required permits (commercial and for-hire) and specified data collection regulations; and required that all snapper grouper species possessed in the South Atlantic EEZ must have heads and fins intact through landing.

Amendment 11 (1998)

Amendment 11 amended the Snapper Grouper FMP to make definitions of maximum sustainable yield (MSY), OY, overfishing, and overfished consistent with National Standard Guidelines. Amendment 11 also identified and defined fishing communities, addressed bycatch management measures, and defined the red snapper F_{MSY} proxy as $F_{30\%SPR}$.

Interim Rule for Red Snapper (2009)

In 2008, the Council received notification (letter dated July 8) that the South Atlantic red snapper stock was undergoing overfishing and was overfished. In March 2009, the Council requested that the NMFS establish interim measures to reduce overfishing and fishing pressure on the red snapper stock. Interim measures became effective on January 4, 2010. The interim rule was effective until June 2, 2010, but was extended for an additional 186 days since the Council was developing long-term management measures in Amendment 17A to the Snapper Grouper FMP to end overfishing of red snapper and rebuild the stock.

Amendment 17A (2010)

Actions in Amendment 17A (SAFMC 2010) included a harvest prohibition for red snapper and an area closure for all snapper grouper species. The area closure was 4,827 square miles and extended from southern Georgia to northern Florida where harvest and possession of all snapper grouper species would be prohibited (except when fishing with black sea bass pots or spearfishing gear for species other than red snapper). The red snapper prohibition was effective on January 3, 2011; however, NMFS delayed the effective date of the area closure until June 1, 2011, via an emergency rule, to allow time to review the results of a new red snapper stock assessment (SEDAR 24 2010).

The results of SEDAR 24 showed red snapper to be overfished and undergoing overfishing; however, the rate of overfishing found in SEDAR 24 was less than the rate of overfishing found in the previous stock assessment (SEDAR 15 2008). Based on the results from SEDAR 24, evidence of decreased effort in the recreational sector, and recommendations from their SSC, the Council determined that the snapper grouper area closure approved in Amendment 17A, in addition to the harvest prohibition, was more conservative than what was necessary to end overfishing of red snapper.

Amendment 17A also required the use of non-stainless steel circle hooks when fishing for snapper grouper species with hook-and-line gear and natural baits in the South Atlantic EEZ north of 28 degrees North latitude and specified a fishery-independent monitoring program for red snapper.

Comprehensive ACL Amendment (Amendment 25) (2011b)

The Comprehensive ACL Amendment established sector allocations for many snapper grouper species, including red snapper, using an allocation formula based on historic and recent average landings. The commercial allocation for red snapper was set at 28.07% and the recreational allocation was set at 71.93%.

Regulatory Amendment 10 (2011a)

In December 2010, the Council approved Regulatory Amendment 10 for review by the Secretary of Commerce by a unanimous vote. The action in Regulatory Amendment 10 eliminated the snapper grouper area closure approved in Amendment 17A. Regulatory Amendment 10 was implemented and became effective on May 31, 2011.

Emergency Rule (2012)

The rule established red snapper seasons for the commercial and recreational sectors in the South Atlantic EEZ in 2012.

Amendment 28 (2013)

The amendment set the commercial and recreational ACLs and seasons to allow limited harvest of red snapper in 2013. In addition, the amendment established a process to determine whether limited commercial and recreational fishing seasons in the South Atlantic EEZ could occur during a given fishing year, and specified management measures should limited harvest be allowed.

Regulatory Amendment 21 (2014)

The amendment changed the Minimum Stock Size Threshold (MSST) definition for eight snapper grouper species including red snapper from MSST = [(1-M) or 0.5 whichever is greater]*B_{MSY} to 0.75*$B_{MSY.}$

Emergency Rule (2017)

The rule established red snapper seasons for the commercial and recreational sectors in the South Atlantic EEZ in 2017.

Chapter 2. Proposed Actions and Alternatives

2.1 Revise the Process to Determine the Annual Catch Limits for Red Snapper

Alternative 1 (No Action). The commercial and recreational annual catch limits for red snapper are zero. The process and formula established in Amendment 28 to the Fishery Management Plan of the Snapper Grouper Fishery of the South Atlantic Region (Amendment 28) specifies current fishing year annual catch limits if the National Marine Fisheries Service determines that the previous year's estimated red snapper landings and dead discards are less than the acceptable biological catch.

Alternative 2. Remove the process and equation used to determine the red snapper annual catch limit as specified in Snapper Grouper Amendment 28. Specify a total annual catch limit equal to 23,623 fish. Commercial annual catch limit equals 69,360 pounds (whole weight) and recreational annual catch limit equals 16,480 fish.

Alternative 3. Remove the process and equation used to determine the red snapper annual catch limit as specified in Snapper Grouper Amendment 28. Specify a total annual catch limit equal to 44,411 fish. Commercial annual catch limit equals 130,396 pounds (whole weight) and recreational annual catch limit equals 30,982 fish.

Preferred Alternative 4. Remove the process and equation used to determine the red snapper annual catch limit as specified in Snapper Grouper Amendment 28. Specify a total annual catch limit equal to 42,510 fish. Commercial annual catch limit equals 124,815 pounds (whole weight) and recreational annual catch limit equals 29,656 fish.

Alternative 5. Remove the process and equation used to determine the red snapper annual catch limit as specified in Snapper Grouper Amendment 28. Specify a total annual catch limit equal to 79,919 fish. Commercial annual catch limit equals 234,652 pounds (whole weight) and recreational annual catch limit equals 55,753 fish.

Note: In Alternatives 2 through 5, the sector annual catch limits (ACL) were calculated using the South Atlantic Fishery Management Council's (Council) established sector allocations from the Comprehensive ACL Amendment to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Comprehensive ACL Amendment, SAFMC 2011b). The sector allocations are 28.07% commercial and 71.93% recreational.

NMFS would announce the pre-determined commercial and recreational fishing year start dates. The commercial fishing season would begin at 12:01 am on the second Monday in July. The recreational fishing season (weekends) would begin 12:01 am on the first Friday in July. The commercial red snapper season would close when the commercial sector ACL is met or projected to be met. The end of the recreational red snapper season would be projected and announced before the start of the recreational season. The NMFS Southeast Regional Administrator has the authority to delay the opening of red snapper fishing seasons in the event of a tropical storm or hurricane affecting the Council's area of authority. The recreational fishing season will not open if the projected season length is three days or less.

2.1.1 Comparison of Alternatives

Under **Alternative 1 (No Action)**, harvest of red snapper would not be expected to occur in 2018 for either the commercial or recreational sector because preliminary landings and dead discards to date (January 1 to July 22 for commercial; January 1 to April 30 for recreational) are greater than the acceptable biological catch (ABC) in 2017 as per the process established in Amendment 28 (**Table 2.1.1**). The existing management measures such as season start dates, commercial trip limit, minimum size limit, and recreational bag limit would remain unchanged in **Alternatives 1 (No Action)** and **Alternatives 2** through **5** from those implemented by the final rule for Amendment 28 (see text box above; 78 FR 44461, July 24, 2013). The overall red snapper ACL in **Alternative 1 (No Action)** and **Alternatives 2** through **5** is set in numbers of fish. The sector ACLs are apportioned to each sector based on allocation percentages determined by the Council (see **Appendix K** for calculation of ACLs). ACLs for the recreational sector are specified in numbers of fish because numbers of fish is a more reliable estimate for that sector than specifying the ACL in weight of fish. Surveys that estimate recreational landings collect information on numbers of fish and convert those numbers to weights using limited biological samples, so there is considerable uncertainty in estimates of recreational landings by weight. The commercial sector's ACL is set in pounds of fish because the commercial sector reports landings in weight and thus weight is a more accurate representation of commercial landings.

Table 2.1.1. ABC recommendation from SSC based on SEDAR 24 (2010) and estimated landings and dead discards by sector equaling total removals for South Atlantic red snapper in 2017 based on commercial logbooks, Marine Recreational Information Program, and Southeast Region Headboat Survey.

Variable	Number of Fish
	2017
ABC	128,000
Commercial Landings	93
Recreational Headboat Landings	3
Recreational Charter Dead Discards	12,806
Recreational Private Dead Discards	139,557
Total Removals	152,459

Alternatives 2 through **Alternative 5** are based on landings from 2012 to 2014, when mini-seasons were open for red snapper (**Tables 2.1.2** and **2.1.3**). **Alternative 2** is the average of landings from 2012 to 2014. **Alternative 3** is the average of landings from 2012 to 2014, multiplied by an adjustment factor (1.88) intended to account for the observed population growth since 2012-2014 (**Figure 2.1.2**, **Appendices K** and **L**). The adjustment factor is based on the observed increase in numbers of red snapper from a long-term scientific Southeast Reef Fish Survey (SERFS). The SERFS indicated the average population of red snapper increased by 1.88 when comparing the time period 2012 to 2014 to the time period 2015 to 2016 (**Figure 2.1.1**, see **Appendices K** and **L**).

Preferred Alternative 4 is based on the highest observed landings that occurred in a single year from 2012 to 2014. The highest landings occurred in 2014 with 42,510 red snapper being landed. **Alternative 5** is the highest landings that occurred in a single year from 2012 to 2014, multiplied by the adjustment factor (described above). Proposed ACLs under each alternative are shown in **Table 2.1.3**.

Process implemented by Amendment 28 (Alternative 1, No Action)

NMFS would announce the pre-determined commercial and recreational fishing season start dates. The commercial red snapper season would close when the commercial ACL is met or projected to be met. The recreational red snapper season would be projected and announced before the start of the recreational season based on catch rates from previous years. The NMFS Regional Administrator would have the authority to delay the opening of red snapper fishing seasons in the event of a tropical storm or hurricane affecting the Council's area of authority. The recreational fishing season will not open if the projected season length is three days or less.

- The commercial fishing season would begin at 12:01 am on the second Monday in July.
- The recreational fishing season (weekends) would begin 12:01 am on the first Friday in July.
- There would be no minimum size limit for either the commercial or recreational sector.
- The commercial trip limit would be 75 pounds gutted weight (lbs gw).
- The recreational bag limit would be one fish per person per day.

Table 2.1.2. Red snapper ABCs recommended by the SSC from projections included in SEDAR 24 (2010). Landings and estimates of dead discards of red snapper from the South Atlantic region since 2012, including during mini-seasons from 2012 to 2014.

Year	Total ABC (Numbers of Fish)	ACL for Landings only (Numbers of Fish)	Landings (Numbers of Fish)	Landings + Dead Discards* (Numbers of Fish)
2012	86,000	13,067	16,591	80,516
2013	96,000	13,325	11,767	72,881
2014	106,000	31,387	42,510	205,859
2015	114,000	0	2,850	276,729
2016	121,000	0	830	407,079
2017	128,000	42,510**		
Average 2012 to 2014			23,623	
Max observed 2012 to 2014			42,510	

*Values were reported in the SEFSC annual report on red snapper landings. Reports were presented at June Council meetings from 2013-2016.
**NMFS approved an emergency action to establish an ACL of 42,510 fish

Table 2.1.3. Proposed total, commercial, and recreational red snapper ACLs calculated in numbers of fish and whole weight.

Alternative	ACL Numbers of Fish	ACL Weight (ww) *	Commercial ACL Weight (ww) **	Recreational ACL Numbers of Fish***
Alt 1	TBD			
Alt 2	23,623	247,097	69,360	16,480
Alt 3	44,411	464,539	130,396	30,982
Preferred Alt 4	**42,510**	**444,655**	**124,815**	**29,656**
Alt 5	79,919	835,953	234,652	55,753

*Allocations are based on weight. ACL numbers of fish is converted to ACL weight by using the projected average weight for 2018 from four different projection scenarios (10.46 lbs) from SEDAR 41 (2017).
**The conversion factor used to derive numbers of fish from commercial weight is 9.71 pounds and is based on the average weight of commercially caught red snapper from 2012 to 2014 (SEDAR 41, 2017).
***The recreational ACL is the difference between total ACL number and commercial number.

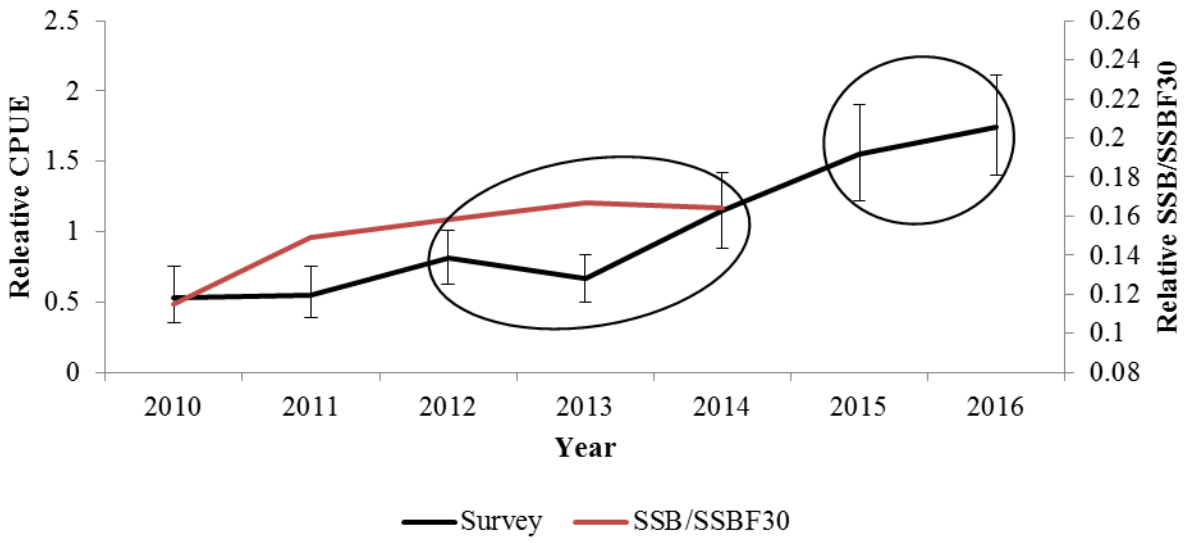


Figure 2.1.1. Relative catch per unit effort (CPUE) from the MARMAP and SEFIS chevron trap survey standardized with the ratio of annual spawning stock biomass compared to spawning stock biomass at $F_{30\%}$ from SEDAR 41 (2017). Circles represent the two time periods that were compared to develop the adjustment factor. See **Appendix L** for more information on the index.

While allowing no harvest for red snapper under **Alternative 1 (No Action)** might be biologically beneficial to a stock, those benefits are easily lost to discard mortality in mixed species fisheries such as South Atlantic snapper grouper. If the red snapper population continues to increase as predicted in the rebuilding plan and indicated in the recent fishery-independent survey values, it is expected that the level of dead discards would continue to increase. **Alternative 1 (No Action)** would result in foregone short-term economic benefits to the commercial and recreational sectors and could result in continued distrust in science and management due to inconsistency in what fishermen see on the water versus the scientific models. Because population assessments rely heavily on fishery-dependent data, the inability to collect data from fisheries and their harvest due to closures creates additional assessment uncertainty.

Alternatives 2 through **5** would allow harvest of red snapper and provide social and economic benefits associated with providing access to the resource and to restore important fishery-dependent data streams such as catch observations and biological sampling. **Alternatives 3** and **5** propose ACLs that are adjusted to account for observed recent population growth by a factor of 1.88. Therefore, these alternatives scale up the harvest allowed based on population growth and could scale up the risk of continued overfishing. **Alternative 2** and **Preferred Alternative 4** would be less likely to result in negative biological effects than **Alternatives 3** and **5** since **Alternative 2** and **Preferred Alternative 4** propose ACLs based on 2012-2014 average catch levels, and abundance survey data suggests the average red snapper abundance since 2014 has increased (**Figure 2.1.1**; **Appendix L**). For the commercial sector,

Alternative 2 would have lower positive direct economic effects than **Alternative 3**, **Preferred Alternative 4**, and **Alternative 5** because the ACL is projected to be met and would be lower than estimated landings under the other alternatives. Using higher predicted landings that are adjusted for stock growth, the positive economic effects relative to **Alternative 1 (No Action)** would be greatest for **Alternative 5**, followed by **Alternative 3**, **Preferred Alternative 4**, and **Alternative 2**. For the recreational sector, **Alternative 5** would be expected to have the largest economic benefit and most social benefits followed by **Alternative 3**, **Preferred Alternative 4**, and **Alternative 2**. **Alternative 1 (No Action)** would be expected to have the least economic and social benefits and a continued administrative burden to calculate the ACL each year when compared with **Alternative 2, Alternative 3, Preferred Alternative 4**, and **Alternative 5**. Apart from **Alternative 1 (No Action)**, **Alternative 2** would be the least likely of the alternatives considered to result in long-term indirect negative economic effects, because it has the most biologically conservative ACL, followed by **Preferred Alternative 4**, **Alternative 3,** and **Alternative 5**.

Table 2.1.4. A summary and comparison of the effects of the alternatives. Alternative 4 is the preferred alternative.

Alternatives		Effects			
		Biological	**Economic**	**Social**	**Administrative**
1	No Action ACL would be 0 in 2018	+ lowest risk of overfishing -Bycatch of red snapper continued	Commercial Ex-Vessel Revenue: $0 Recreational Consumer surplus=$0	-No allowable harvest	No change. -Continued process to calculate ACL each year.
2	Revise and set ACL =23,623 fish	-2nd lowest risk of overfishing + Some red snapper bycatch would be converted to landings.	Commercial Ex-Vessel Revenue: $318,362 Recreational Consumer surplus=$1,334,880	+ Allows red snapper harvest	-Rule-making, data monitoring, outreach, and enforcement
3	Revise and set ACL =44,411 fish	-2nd Highest risk of overfishing + Some red snapper bycatch would be converted to landings.	Commercial Ex-Vessel Revenue: $545,981 to $598,518 Recreational Consumer surplus=$2,509,542	+ Allows red snapper harvest	-Rule-making, data monitoring, outreach, and enforcement
4	**Revise and set ACL =42,510 fish**	**-3rd lowest risk of overfishing + Some red snapper bycatch would be converted to landings.**	**Commercial Ex-Vessel Revenue: $545,981 to $572,901 Recreational Consumer surplus=$2,402,136**	**+ Allows red snapper harvest**	**-Rule-making, data monitoring, outreach, and enforcement**
5	Revise and set ACL =79,919 fish	-Highest risk of overfishing + Some red snapper bycatch would be converted to landings.	Commercial Ex-Vessel Revenue: $545,981 to $731,614 Recreational Consumer surplus=$4,515,993	+Allows red snapper harvest	-Rule-making, data monitoring, outreach, and enforcement

Chapter 3. Affected Environment

This section describes the affected environment in the proposed project area. The affected environment is divided into four major components:

- **Habitat environment** (Section 3.1)
- **Biological and Ecological environment** (Section 3.2)
- **Economic and Social environment** (Sections 3.3)
- **Administrative environment** (Section 3.4)

3.1 Habitat Environment

3.1.1 Inshore/Estuarine Habitat

Many snapper grouper species utilize both pelagic and benthic habitats during several stages of their life histories; larval stages of these species live in the water column and feed on plankton. Most juveniles and adults are demersal (bottom dwellers) and associate with hard structures on the continental shelf that have moderate to high relief (e.g., coral reef systems and artificial reef structures, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings). Juvenile stages of some snapper grouper species also utilize inshore seagrass beds, mangrove estuaries, lagoons, oyster reefs, and embayment systems. In many species, various combinations of these habitats may be utilized during daytime feeding migrations or seasonal shifts in cross-shelf distributions. Additional information on the habitat utilized by species in the Snapper Grouper Complex is included in Volume II of the Fishery Ecosystem Plan[4] (FEP; SAFMC 2009) and incorporated here by reference. The life history of red snapper is summarized in **Section 3.2.1**.

3.1.2 Offshore Habitat

Predominant snapper grouper offshore fishing areas are located in live bottom and shelf-edge habitats where water temperatures range from 11º to 27º C (52º to 81º F) due to the proximity of the Gulf Stream, with lower shelf habitat temperatures varying from 11º to 14º C (52º to 57º F).

[4] http://safmc.net/ecosystem-management/fishery-ecosystem-plan/

Water depths range from 16 to 55 meters (54 to 180 ft) or greater for live-bottom habitats, 55 to 110 meters (180 to 360 ft) for the shelf-edge habitat, and from 110 to 183 meters (360 to 600 ft) for lower-shelf habitat areas.

The exact extent and distribution of productive snapper grouper habitat in South Atlantic continental shelf habitats is unknown. Current data suggest from 3% to 30% of the shelf is suitable habitat for these species. These live-bottom habitats may include low relief areas, supporting sparse to moderate growth of sessile (permanently attached) invertebrates, moderate relief reefs from 0.5 to 2 meters (1.6 to 6.6 ft), or high relief ridges at or near the shelf break consisting of outcrops of rock that are heavily encrusted with sessile invertebrates such as sponges and sea fan species. Live-bottom habitat is scattered irregularly over most of the shelf north of Cape Canaveral but is most abundant offshore from northeastern Florida. South of Cape Canaveral the continental shelf narrows from 56 to 16 kilometers (35 to 10 mi) wide off the southeast coast of Florida and the Florida Keys. The lack of a large shelf area, presence of extensive, rugged living fossil coral reefs, and dominance of a tropical Caribbean fauna are distinctive benthic characteristics of this area.

Rock outcroppings occur throughout the continental shelf from Cape Hatteras, North Carolina to Key West, Florida (MacIntyre and Milliman 1970; Miller and Richards 1979; Parker et al. 1983), which are principally composed of limestone and carbonate sandstone (Newton et al. 1971), and exhibit vertical relief ranging from less than 0.5 to over 10 meters (33 ft). Ledge systems formed by rock outcrops and piles of irregularly sized boulders are also common. Parker et al. (1983) estimated that 24% (9,443 km^2) of the area between the 27 and 101 meter (89 and 331 ft) depth contours from Cape Hatteras, North Carolina to Cape Canaveral, Florida is reef habitat. Although the bottom communities found in water depths between 100 and 300 meters (328 and 984 ft) from Cape Hatteras, North Carolina to Key West, Florida is relatively small compared to the whole shelf, this area, based upon landing information of fishers, constitutes prime reef fish habitat and probably significantly contributes to the total amount of reef habitat in this region.

Artificial reef structures are also utilized to attract fish and increase fish harvests; however, research on artificial reefs is limited and opinions differ as to whether or not these structures promote an increase of ecological biomass or merely concentrate fishes by attracting them from nearby, natural un-vegetated areas of little or no relief. There are several notable shipwrecks along the southeast coast in state and federal waters including *Lofthus* (eastern Florida), *SS Copenhagen* (southeast Florida), *Half Moon* (southeast Florida), *Hebe* (Myrtle Beach, South Carolina), *Georgiana* (Charleston, South Carolina), *U.S.S. Monitor* (Cape Hatteras, North Carolina), *Huron* (Nags Head, North Carolina), and *Metropolis* (Corolla, North Carolina).

The distribution of coral and live hard bottom habitat as presented in the Southeast Marine Assessment and Prediction Program (SEAMAP) bottom mapping project is a proxy for the distribution of the species within the snapper grouper complex. Maps are available on the South Atlantic Council's Habitat and Ecosystem Atlas[5].

[5] http://ocean.floridamarine.org/safmc_atlas/

Plots of the spatial distribution of offshore species were generated from the Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP) data. The plots serve as point confirmation of the presence of each species within the scope of the sampling program. These plots, in combination with the hard bottom habitat distributions previously mentioned, can be employed as proxies for offshore snapper grouper complex distributions in the South Atlantic region. Maps of the distribution of snapper grouper species by gear type based on MARMAP data can also be generated through the Council's Internet Mapping System at the above address.

Additional information on the habitat utilized by snapper grouper species is included in Volume II of the Fishery Ecosystem Plan (FEP; SAFMC 2009).

3.1.3 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S. C. 1802(10)). Specific categories of EFH identified in the South Atlantic Bight, which are utilized by federally managed fish and invertebrate species, include both estuarine/inshore and marine/offshore areas. Specifically, estuarine/inshore EFH includes: estuarine emergent and mangrove wetlands, submerged aquatic vegetation, oyster reefs and shell banks, intertidal flats, palustrine emergent and forested systems, aquatic beds, and estuarine water column. Additionally, marine/offshore EFH includes: live/hard bottom habitats, coral and coral reefs, artificial and manmade reefs, *Sargassum* species, and marine water column.

EFH utilized by snapper grouper species in this region includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs, and medium to high profile outcroppings on and around the shelf break zone from shore to at least 183 meters [600 ft (but to at least 2,000 ft for wreckfish)] where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical fish complex. EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including *Sargassum*, required for survival of larvae and growth up to and including settlement. In addition, the Gulf Stream is also EFH because it provides a mechanism to disperse snapper grouper larvae.

For specific life stages of estuarine-dependent and near shore snapper grouper species, EFH includes areas inshore of the 30 meter (100-ft) contour, such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (saltmarshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom habitats.

3.1.4 Habitat Areas of Particular Concern

Areas which meet the criteria for Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPC) for species in the snapper grouper management unit include medium to high profile offshore hard bottoms where spawning normally occurs; localities of known or likely

periodic spawning aggregations; near shore hard bottom areas; The Point, The Ten Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump (South Carolina); mangrove habitat; seagrass habitat; oyster/shell habitat; all coastal inlets; all state-designated nursery habitats of particular importance to snapper grouper (e.g., Primary and Secondary Nursery Areas designated in North Carolina); pelagic and benthic *Sargassum*; Hoyt Hills for wreckfish; the Oculina Bank Habitat Area of Particular Concern; all hermatypic coral habitats and reefs; manganese outcroppings on the Blake Plateau; Council-designated Artificial Reef Special Management Zones (SMZs); and deep-water Marine Protected Areas (MPAs). Areas that meet the criteria for EFH-HAPC include habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages).

In addition to protecting habitat from fishing related degradation though fishery management plan regulations, the Council, in cooperation with NMFS, actively comments on non-fishing projects or policies that may impact EFH. With guidance from the Habitat Advisory Panel, the Council has developed and approved policies on: energy exploration, development, transportation and hydropower re-licensing; beach dredging and filling and large-scale coastal engineering; protection and enhancement of submerged aquatic vegetation; alterations to riverine, estuarine and near shore flows; offshore aquaculture; and marine and estuarine invasive species.

The potential impacts the action in this amendment may have on EFH and EFH-HAPC, are discussed in **Chapter 4** of this document.

3.2 Biological and Ecological Environment

3.2.1 Fish Populations Affected by this Amendment

The reef environment in the South Atlantic management area affected by actions in this environmental assessment is defined by two components (**Figure 3.2.1**). Each component will be described in detail in the following sections.

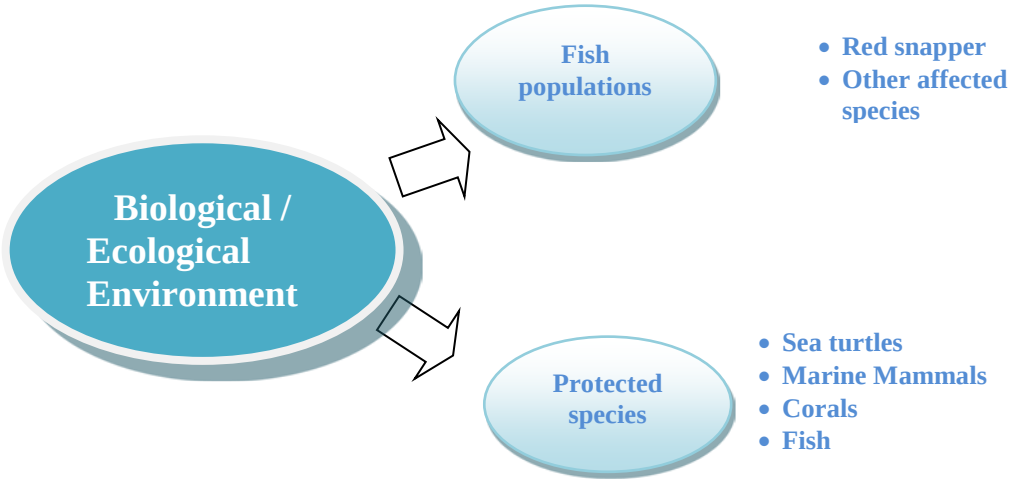


Figure 3.2.1. Two components of the biological environment described in this document.

The waters off the South Atlantic coast are home to a diverse population of fish. The snapper grouper fishery management unit contains 55 species of fish, many of them neither "snappers" nor "groupers." These species live in depths from a few feet (typically as juveniles) to hundreds of feet. As far as north/south distribution, the more temperate species tend to live in the upper reaches of the South Atlantic management area (e.g., black sea bass, red porgy) while the tropical species' core residence are in the waters off south Florida, Caribbean Islands, and northern South America (e.g., black grouper, mutton snapper). These are reef-dwelling species that live amongst each other. These species rely on the reef environment for protection and food. There are several reef tracts that follow the southeastern coast. The fact that these fish populations congregate dictates the nature of the fishery (multi-species) and further forms the type of management regulations proposed in this document.

Red Snapper

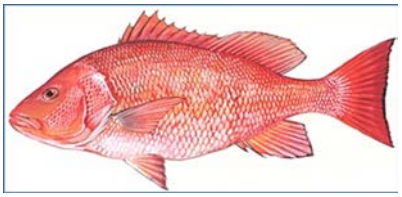
The red snapper is found from North Carolina to the Florida Keys and throughout the Gulf of Mexico to the Yucatan Peninsula (Robins and Ray 1986). It can be found at depths from 10 to 190 m (33-623 ft). Adults usually occur over rocky bottoms. Juveniles inhabit shallow waters and are common over sandy or muddy bottom habitat (Allen 1985).

Juvenile (Age 0) red snapper are rarely encountered in the U.S. South Atlantic. SEAMAPs fishery-independent trawling survey collected three in 1999, two in 2000, seven in 2013, and four in 2014 in nearshore (<30 ft deep) habitat. A headboat fisherman landed one age-0 red

snapper during the 2012 mini-season. One age-0 fish was landed in the commercial fishery in 1980. Fishermen have reported observing juvenile red snapper on artificial reefs in shallow water. Estimates of juvenile red snapper mortality have been developed in the Gulf of Mexico; however, little information is available for the U.S. South Atlantic (SEDAR 41 2017).

The maximum size reported for this species is 100 cm (40 in) total length (TL) (Allen 1985; Robins and Ray 1986) and 22.8 kg (50 lbs) (Allen 1985). For samples collected from North Carolina to eastern Florida, maximum reported age is 45 years (White and Palmer 2004). The most recent maximum observed age for red snapper is 51 years. This fish was a 904 mm (36 in) TL female, and was caught in 2003 at 67 meters depth off Florida by a charter boat fisherman (SEDAR 41 2017).

Red snapper Life History
An Overview



- Extend from North Carolina to the Florida Keys, and throughout the Gulf of Mexico to the Yucatan Peninsula
- Waters ranging from 33-623 feet
- Red snapper do not migrate but can move long distances
- The spawning season extends from May to October, peaking in July through September.
- Can live for at least 51 years

In the U.S. South Atlantic, recent analyses (SEDAR 41 2017) estimate that 50% of female red snapper are mature at 1.3 years old and 325 mm (12.8 in) TL. Fifty percent of male red snapper are mature at 166 mm (6.5 in) TL (SEDAR 41 2017). Grimes (1987) found that the spawning season of this species varies with location, but in most cases occurs nearly year round. Farmer et al. (2017 and references therein) report spawning activity in the South Atlantic occurring from May through October peaking in June through September. According to SEDAR 41 (2017) spawning along the Atlantic coast of the southeastern U.S. generally occurs from April through October and peaks during June through August based on the presence of females with spawning indicators (i.e., the occurrence of hydrated oocytes and/or postovulatory follicles).

Red snapper eat fishes, shrimps, crabs, worms, cephalopods, and some planktonic items (Szedlemayer and Lee 2004).

3.2.2 Bycatch

The snapper grouper fishery is a multi-species fishery, which uses mostly hook-and-line gear although some trips use other gear such as pots/traps and spears. While the red snapper component of the snapper grouper fishery has been closed, red snapper have been bycatch in the fishery. Bycatch of red snapper is commonly associated with catches of black sea bass, red grouper, gag, scamp, greater amberjack, vermilion snapper, and gray triggerfish. The action in this amendment is not expected to result in significant changes in bycatch of red snapper and

may reduce bycatch of red snapper during limited open seasons (**Appendix D**). In addition, the Council, the NMFS, and the SEFSC have implemented and plan to implement numerous management measures and reporting requirements that have improved, or are likely to improve, monitoring efforts of discards and discard mortality in the snapper grouper fishery. See **Appendix D** for detailed descriptions of bycatch when fishing for red snapper.

3.2.3 Other Species Affected

For details on the life histories and ecology of co-occurring species, the reader is referred to Volume II of the Fishery Ecosystem Plan (SAFMC 2009)[6].

3.2.4 The Stock Assessment Process

The Southeast Data, Assessment, and Review (SEDAR) process is a cooperative Fishery Management Council initiative to improve the quality and reliability of fishery stock assessments in the South Atlantic, Gulf of Mexico, and U.S. Caribbean. The Caribbean, Gulf of Mexico, and South Atlantic Fishery Management Councils manage SEDAR in coordination with the NMFS and the Atlantic and Gulf States Marine Fisheries Commissions. SEDAR seeks improvements in the scientific quality of stock assessments, constituent and stakeholder participation in assessment development, transparency in the assessment process, and a rigorous and independent scientific review of completed stock assessments.

SEDAR is organized around three workshops. First is the Data Workshop, during which fisheries monitoring and life history data are reviewed and compiled. Second is the Assessment Workshop, which may be conducted via a workshop and several webinars, during which assessment models are developed and population parameters are estimated using the information provided from the Data Workshop. Third and final is the Review Workshop, during which independent experts review the input data, assessment methods, and assessment products. The completed assessment, including the reports of all three workshops and all supporting documentation, are then forwarded to the Council's Scientific and Statistical Committee (SSC). The SSC considers whether the assessment represents the best available science and develops fishing level recommendations for Council consideration.

SEDAR workshops are public meetings organized by SEDAR. Workshop participants appointed by the lead Council are drawn from state and federal agencies, non-government organizations, Council members, Council advisors, and the fishing industry with a goal of including a broad range of disciplines and perspectives. All participants are expected to contribute to this scientific process by preparing working papers, contributing data, providing

[6] http://safmc.net/ecosystem-management/fishery-ecosystem-plan/

assessment analyses, evaluating and discussing information presented, and completing the workshop report.

3.2.5 Red snapper Stock Status

Manooch et al. (1998) conducted the first formal assessment of red snapper in the South Atlantic. The authors concluded that the status of the stock was not ideal but seemed to be responding to management action. Potts and Brennan (2001) revisited the results of that assessment and suggested a broader range of reduction in fishing mortality (F), from 30% to 80%.

The red snapper stock in the South Atlantic was assessed through the SEDAR process in 2007-2008. That assessment applied a statistical catch-age model using data through 2006 (SEDAR 15 2009). The assessment found that overfishing had been occurring since the 1960s and the red snapper stock was overfished. Although quantitative results varied, the qualitative results of overfishing a depleted stock were consistent across all catch-age model configurations examined during and after the assessment process (approximately 40 sensitivity runs), as well as with an alternative model formulation (surplus-production model).

In 2010, a benchmark assessment using the Beaufort Assessment Model (BAM) with data through 2009 was completed (SEDAR 24 2010). BAM is a statistical catch-age model developed by the analysts at the Beaufort, North Carolina, NMFS SEFSC laboratory, and is customizable to the data available. A surplus production model called ASPIC (Prager 1994; Prager 2004) was used as a complement for comparison purposes. Based on the assessment provided from the BAM, the SEDAR Review Panel concluded that the red snapper stock was overfished and overfishing was occurring. Similar to SEDAR 15 (2009), more than 40 sensitivities were run, all of which resulted in the same status determinations.

A benchmark assessment was completed in 2016 (SEDAR 41 2017) with data through 2014. Although the SEDAR Review Panel concluded that assessment results represent the best scientific information available, the Panel identified several areas of uncertainty including the composition and magnitude of recreational discards, the stock-recruitment relationship, potential changes in CPUE catchability, and the selectivities for the different fishery fleets. The SSC reviewed the assessment and provided fishing level recommendations at their May 2016 meeting based on $F_{30\%SPR}$ as a proxy for F_{MSY}. The base assessment run suggested that in the terminal year of 2014 the stock remained overfished. The SSC did not have confidence in the terminal fishing mortality estimates; however, they recommended that the assessment results suggested overfishing was likely occurring in the terminal years of the assessment (2012-2014) although the degree to which overfishing was occurring at that time could not be reliably quantified from the assessment results (see May 2016 Final SSC report).

SEDAR 41 (2017) estimated the long-term maximum sustainable yield (MSY) to be about 25% of what it was estimated to be in SEDAR 24 (2010), and projected catch levels from SEDAR 41 at the fishing mortality level predicted to rebuild the stock in the specified timeframe ($F_{Rebuild}$) were approximately 21% of the catch levels projected for 2017 based on SEDAR 24

(2010). Given this, and the various sources of uncertainty in the SEDAR 41 (2017) assessment, the Council sought the SSC's recommendations on additional projection runs and reference point criteria, reliability of MRIP estimates for red snapper (landings and discards), and the risk associated with using different values of MSY (see October 2016 Final SSC Report, **Appendix M**). In addition, the Council requested that projections under a discards-only scenario be provided for discussion at their March 2017 meeting. However, the SEFSC indicated (via letter dated February 15, 2017, and included in **Appendix J**) the projections could not be completed due to the length of time since the completion of the assessment, uncertainty in the landings since most landings are coming from discards, and the change in MRIP methodology for estimating landings and discards. Moreover, the Council received a letter from NMFS (dated March 3, 2017, and included in **Appendix J**) stating the Council has likely taken sufficient action to address overfishing of red snapper in the South Atlantic and should focus efforts on a methodology to obtain an ABC for red snapper. SEDAR 41 was updated due to revisions in the headboat index and presented to the SSC in April 2017. Due to the issues laid out by the SEFSC, the Council requested that the SEFSC and the SSC collaborate to explore approaches to arrive at an ABC for red snapper that can be applied to a long-term management approach.

3.2.6 Protected Species

There are at least 51 species, or distinct population segments (DPSs) of species, protected by federal law that may occur in the exclusive economic zone (EEZ) of the South Atlantic Region. Thirty-one of these species are marine mammals protected under the Marine Mammal Protection Act (MMPA) (Wynne and Schwartz 1999; Waring et al. 2013). The MMPA requires that each commercial fishery be classified by the number of marine mammals they seriously injure or kill. NMFS's List of Fisheries (LOF)[7] classifies U.S. commercial fisheries into three categories based on the number of incidental mortality or serious injury they cause to marine mammals.

Five of the marine mammal species (sperm whales, sei whales, fin whales, blue whales, and North Atlantic right whales (NARW)) protected by the MMPA, are also listed as endangered under the Endangered Species Act (ESA). In addition to those five marine mammals, six species or DPSs of sea turtles (green North Atlantic and South Atlantic DPSs, hawksbill, Kemp's ridley, leatherback, and the loggerhead Northwest Atlantic (NWA) DPS); the smalltooth sawfish; five DPSs of Atlantic sturgeon; Nassau grouper, and seven species of coral [elkhorn coral (*Acropora palmata*), staghorn coral (*A. cervicornis*) ("*Acropora*" collectively); lobed star coral (*Orbicella annularis*), mountainous star coral (*O. faveolata*), boulder star (*O. franksi*); rough cactus coral (*Mycetophylia ferox*), and pillar coral (*Dendrogyra cylindrus*)] are also protected under the ESA and occur within the action area of the snapper grouper fishery. Portions of designated critical habitat for NARW, the NWA DPS of loggerhead sea turtles, and *Acropora* corals occur within the South Atlantic Council's jurisdiction.

[7] More information about the LOF can be found at http://www.nmfs.noaa.gov/pr/interactions/fisheries/2017_list_of_fisheries_lof.html

NMFS has conducted specific analyses ("Section 7 consultations") to evaluate the potential adverse effects from the South Atlantic snapper grouper federal fishery on species and critical habitat protected under the ESA. On December 1, 2016, NMFS completed its most recent biological opinion on the snapper grouper federal fishery of the South Atlantic Region (NMFS 2016). In this biological opinion, NMFS concluded that this fishery's continued authorization is likely to adversely affect but is not likely to jeopardize the continued existence of the NARW, loggerhead sea turtle Northwest Atlantic DPS, leatherback sea turtle, Kemp's ridley sea turtle, green sea turtle North Atlantic DPS, green sea turtle South Atlantic DPS, hawksbill sea turtle, smalltooth sawfish U.S. DPS, or Nassau grouper. NMFS also concluded that designated critical habitat and other ESA-listed species in the South Atlantic Region were not likely to be adversely affected. Summary information on the species that may be adversely affected by the snapper-grouper fishery and how they are affected is presented below. The 2016 biological opinion provides additional information on these species, how they are affected by the snapper grouper fishery, and the authorized incidental take levels of these species in the snapper grouper fishery.

3.2.6.1 North Atlantic Right Whales

The NARW, *Eubalaena glacialis* (Rosenbaum et al. 2000), is a large baleen whale. NARWs feed on larger species of zooplankton and almost exclusively on copepods. Feeding takes place subsurface (subsurface feeding) or at the water's surface (surface skim feeding), depending on the vertical distribution of their food species. NARW dive as deep as 306 m (1,003 ft) (Mate et al. 1992).

The coastal waters of the southeastern United States are a wintering and sole known calving area for NARW. NARW generally occur off South and North Carolina from November 1 through April 30 (NMFS 2008d) and have been sighted as far as about 30 nm offshore (Knowlton et al. 2002; Pabst et al. 2009). Sighting records of NARW spotted in the core calving area off Georgia and Florida consist of mostly mother-calf pairs and juveniles but also some adult males and females without calves (Kraus and Rolland 2007; Parks et al. 2007a; Cole et al. 2013). Based on preliminary photo-identification analysis of right whale photographs collected in the southeastern U.S., the median number of NARWs (including calves, but excluding reported or assumed calf mortalities) documented in the southeastern U.S. from the 2009-2013 calving seasons is 165 (Pettis and Hamilton 2014; K. Jackson, personal communication, July 21, 2016; Waring et al. 2016). Right whale concentrations are highest in the core calving area from November 15 through April 15 (71 FR 36299, June 26, 2006); on rare occasions, right whales have been spotted as early as September and as late as July (Taylor et al. 2010). Most calves are likely born early in the calving season. NARW distribution off Georgia and Florida is restricted to the south and east by the warm waters of the Gulf Stream, which serves as a thermal limit for NARW (Keller et al. 2006). Water temperature, bathymetry, and surface chop are factors in the distribution of calving NARW in the southeastern U.S. (Good 2008; Keller et al. 2012). Systematic surveys conducted off the coast of North Carolina during the winters of 2001 and 2002 sighted eight calves, suggest the calving grounds may extend as far north as Cape Fear. Four of the calves were not sighted by surveys conducted further south. One of the cows photographed was new to researchers, having effectively eluded identification over the period of its maturation (McLellan et al. 2003).

Commercial and recreational fishermen in the South Atlantic snapper grouper fishery use hook-and-line gear, spear/powerheads, and pot/traps to target black sea bass. The black sea bass pot component of the snapper grouper fishery is the only component of the fishery that NMFS determined may adversely affect NARWs; NMFS discounted effects from all the other gear types in the biological opinion. NMFS estimated that the number of annual lethal takes for NARWs from black sea bass trap/pot gear ranged from an estimated minimum of 0.005 to a maximum of 0.08. This equates to 1 estimated lethal entanglement approximately every 25 to 42 years.

3.2.6.2 ESA-Listed Sea Turtles

Green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles are all highly migratory and travel widely throughout the South Atlantic. This section includes a brief overview of the general life history characteristics of the sea turtles found in the South Atlantic region. Several volumes exist that cover the biology and ecology of these species more thoroughly (i.e., Lutz and Musick (eds.) 1997; Lutz et al. (eds.) 2002).

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

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

Kemp's ridley hatchlings are also pelagic during the early stages of life and feed in surface waters (Carr 1987; Ogren 1989). Once the juveniles reach approximately 20 cm carapace length

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

Leatherbacks are the most pelagic of all ESA-listed sea turtles and spend most of their time in the open ocean. Although they will enter coastal waters and are seen over the continental shelf on a seasonal basis to feed in areas where jellyfish are concentrated. Leatherbacks feed primarily on cnidarians (medusae, siphonophores) and tunicates. Unlike other sea turtles, leatherbacks' diets do not shift during their life cycles. Because leatherbacks' ability to capture and eat jellyfish is not constrained by size or age, they continue to feed on these species regardless of life stage (Bjorndal 1997). Leatherbacks are the deepest diving of all sea turtles. It is estimated that these species can dive in excess of 1,000 m (Eckert et al. 1989) but more frequently dive to depths of 50 m to 84 m (Eckert et al. 1986). Dive times range from a maximum of 37 minutes to more routines dives of 4 to 14.5 minutes (Standora et al. 1984; Eckert et al. 1986; Eckert et al. 1989; Keinath and Musick 1993). Leatherbacks may spend 74% to 91% of their time submerged (Standora et al. 1984).

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

Sea turtles are vulnerable to capture by bottom longline and vertical hook-and-line gear. Hook-and-line gear used in the fishery includes commercial bottom longline gear and commercial and recreational vertical line gear (e.g., handline, bandit gear, and rod-and-reel). The magnitude of the interactions between sea turtles and the South Atlantic snapper grouper fishery was most recently evaluated in the 2016 biological opinion (i.e., NMFS (2016a). In **Table 3.2.6.1** the 3-year estimated captures and mortalities authorized for the fishery in the 2016

biological opinion are specified. Section 5.2 of the 2016 biological opinion presents a summary of the data sources considered for the sea turtle analyses, estimation methods, and data limitations and assumptions associated with the estimates for each fishery component. Loggerhead sea turtles are the species most affected by the proposed action. The majority of estimated sea turtle captures appear to occur in the recreational vertical lines targeting snapper grouper species due to the large amount of recreation fishing effort. However, it is also important to recognize that the sea turtle capture estimates for the recreational vertical line are also likely the most uncertain.

Table 3.2.6.1. Estimated 3-year sea turtle (T) and mortalities (M) estimates in the South Atlantic Snapper Grouper Fishery by fishery component and overall.

Fishery Component	**Loggerhead**		**Kemp's ridley**		**Green**		**Hawksbill**		**Leatherback**	
	T	M	T	M	T	M	T	M	T	M
Commercial Bottom Longline*	9	5	1	1	1	1	1	1	3	2
Commercial Vertical Line**	62	26	18	8	11	5	1	1	1	1
Recreational Vertical Line ***	546	165	159	48	96	30	2	1	1	1
All Components Combined	617	196	178	57	108	36	5	3	5	4

*Only 10 hardshell sea turtles combined are estimated to be captured every 3 years; only 1 hawksbill, Kemp's ridley or green sea turtle is expected to be captured and killed every 3 years in this component. **No more than 90 hardshell sea turtles combined are estimated for this component. ***No more than 801 hardshell sea turtle combined are estimated for this component.

Regulations implemented through Amendment 15B to the Snapper Grouper FMP (74 FR 31225; June 30, 2009; SAFMC 2008) require all commercial or charter/headboat vessels with a South Atlantic snapper grouper permit, carrying hook-and-line gear on board, to possess required literature and release gear to aid in the safe release of incidentally caught sea turtles. Comprehensive Ecosystem-Based Amendment 2 modified these requirements (76 FR 82183; December 30, 2011; SAFMC 2011e) by requiring different gear for vessels with different freeboard heights, mirroring the requirements in the Gulf of Mexico. These regulations are thought to decrease the mortality associated with accidental interactions with sea turtles.

Snapper grouper vessels transiting to and from fishing areas and moving during fishing activity also pose a potential threat to sea turtles (NMFS 2016a). As explained in the 2016 biological opinion, it is very difficult to definitively or even approximately evaluate the potential risk to sea turtles stemming from specific vessel traffic from any action because of the numerous variables (e.g., vessel type, speed, traffic, environmental conditions, sea turtle abundance in area transited) that may impact vessel strike rates. This difficulty is compounded by a general lack of information on vessel use trends, particularly in regard to offshore vessel traffic.

3.2.6.3 ESA-Listed Marine Fish

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

On June 29, 2016, NMFS published a final rule in the *Federal Register* listing Nassau grouper as threatened under the Endangered Species Act due to a decline in its population (81 FR 42268). The final rule became effective on July 29, 2016. The Nassau grouper's confirmed distribution currently includes “Bermuda and Florida (USA), throughout the Bahamas and Caribbean Sea” (e.g., Heemstra and Randall 1993; Hill and Sadovy de Mitcheson, 2013). The Nassau grouper is primarily a shallow-water, insular fish species that has long been valued as a major fishery resource throughout the wider Caribbean, South Florida, Bermuda, and the Bahamas (Carter et al. 1994). As larvae, Nassau grouper are planktonic. After an average of 35-40 days and at an average size of 32 millimeters total length (TL), larvae recruit from an oceanic environment into demersal habitats (Colin 1992; Eggleston 1995). Juvenile Nassau grouper (12-15 centimeters TL) are relatively solitary and remain in specific areas (associated with macroalgae, and both natural and artificial reef structure) for months (Bardach 1958). As juveniles grow, they move progressively to deeper areas and offshore reefs (Tucker et al. 1993; Colin et al. 1997). Smaller juveniles occur in shallower inshore waters (3.7-16.5 meters [m]) and larger juveniles are more common near deeper (18.3-54.9 m) offshore banks (Bardach et al. 1958; Cervigón 1966; Silva Lee 1974; Radakov et al. 1975; Thompson and Munro 1978). Adult Nassau grouper also tend to be relatively sedentary and are commonly associated with high-relief coral reefs or rocky substrate in clear waters to depths of 130 m. Generally, adults are most common at depths less than 100 m (Hill and Sadovy de Mitcheson 2013) except when at spawning aggregations where they are known to descend to depths of 255 m (Starr et al. 2007). Nassau grouper form spawning aggregations at predictable locations around the winter full moons, or between full and new moons (Smith 1971; Colin 1992; Tucker et al. 1993; Aguilar-Perera 1994; Carter et al. 1994; Tucker and Woodward 1994). The most serious threats to the status of Nassau grouper today are fishing at spawning aggregations and inadequate law enforcement protecting spawning aggregations in many foreign nations. There are no known spawning aggregations within the South Atlantic Region.

Of the three basic types of gear used in the South Atlantic snapper grouper fishery by commercial and/or recreational fishers (i.e., hook-and-line gear, spear/powerheads, and black sea bass pots), NMFS believes only snapper grouper hook-and-line gear may adversely affect

smalltooth sawfish and Nassau grouper. Interactions with smalltooth sawfish are limited to off of Florida; and are quite rare. In the 2016 biological opinion, NMFS anticipates only eight smalltooth sawfish interactions every three years in all snapper-grouper hook-and-line-gear components combined and they are anticipated to all be non-lethal. Nassau grouper incidental captures appear to be more frequent. Farmer (2016) estimated that over the last 10 years, a total of approximately 1,387 Nassau grouper have been captured annually in the fishery. Based on an estimated 20% mortality rate, Farmer (2016) estimated an annual average expected mortality of approximately 282 fish. Future anticipated captures and mortalities are expected to remain at these same levels.

3.3 Economic and Social Environment

3.3.1 Economic Environment

Details on red snapper, and the South Atlantic snapper grouper fishery in general, can be found in Snapper Grouper Amendment 17A (SAFMC 2010) and the Comprehensive ACL Amendment for the South Atlantic Region (SAFMC 2011b), respectively.

3.3.1.1 Economic Description of the Commercial Sector

The major sources of data summarized in this description are the NMFS SERO Permits Information Management System (PIMS) and the SEFSC Social Science Research Group (SSRG) Socioeconomic Panel[8] data set. Inflation adjusted revenues and prices are reported in 2016 dollars.

Permits

Any fishing vessel that harvests and sells any of the snapper grouper species from the South Atlantic EEZ must have a valid South Atlantic commercial snapper grouper permit, which is a limited access permit. As of July 10, 2017, there were 544 valid or renewable South Atlantic Snapper Grouper Unlimited Permits and 114 valid or renewable 225-lb Trip-limited Permits. After a permit expires, it can be renewed or transferred up to one year after the date of expiration. The number of valid or renewable snapper grouper permits declined steadily from 2012 through 2016 (**Table 3.3.1**).

[8] This data set is compiled by the SEFSC SSRG from Federal Logbook System (FLS) data, supplemented by average prices calculated from the Accumulated Landings System (ALS). Because these landings are self-reported, they may diverge slightly from dealer-reported landings presented elsewhere.

Table 3.3.1. Number of valid or renewable South Atlantic commercial snapper grouper permits.

	Unlimited	225-lb Trip-limited
2012	604	132
2013	592	129
2014	584	125
2015	571	121
2016	565	116
Average	583	125

Source: NMFS SERO Permits Dataset, 2017.

Landings, Value, and Effort

The number of federally permitted commercial vessels that landed South Atlantic red snapper increased from 2012 through 2014 and then dropped sharply in 2015 and 2016, during which time there was no federal commercial red snapper season (**Table 3.3.2**). Landings of red snapper followed a similar pattern. The landings reported in 2015 and 2016 are either from state water catches or misreported/out-of-season harvests. On average (2012 through 2016), vessels that landed red snapper did so on approximately 9% of their South Atlantic trips and red snapper accounted for only 2% of their annual all species revenue, including revenue from Gulf trips (**Table 3.3.2** and **Table 3.3.3**). Average all species vessel-level revenue for these vessels rose steadily from 2012 through 2016, increasing by approximately 45% overall. During this time period, the average annual price per pound gutted weight (gw) of red snapper ranged from $4.21 to $5.28 (2016 dollars) (**Table 3.3.3**).

Table 3.3.2. Number of vessels, number of trips, and landings (lbs gw) by year for South Atlantic red snapper, 2012-2016.

Year	# of vessels that caught red snapper (> 0 lbs gw)	# of trips that caught red snapper	Red snapper landings (lbs gw)	Other species' landings jointly caught w/ red snapper (lbs gw)	# of South Atlantic trips that only caught other species	Other species' landings on South Atlantic trips w/o red snapper (lbs gw)	All species landings on Gulf trips (lbs gw)
2012	74	171	14,668	111,275	1,997	1,452,577	285,312
2013	137	477	27,640	265,754	3,348	2,715,941	295,712
2014	164	999	60,881	538,255	5,046	3,354,953	504,522
2015	24	30	4,334	45,323	927	418,223	244,482
2016	24	29	13,662	22,078	736	467,136	254,278
Average	85	341	24,237	196,537	2,411	1,681,766	316,861

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017

Table 3.3.3. Number of vessels and ex-vessel revenue by year (2016 dollars) for South Atlantic red snapper, 2012-2016.

Year	# of vessels that caught red snapper (> 0 lbs gw)	Dockside revenue from red snapper	Dockside revenue from 'other species' jointly caught w/ red snapper	Dockside revenue from 'other species' caught on South Atlantic trips w/o red snapper	Dockside revenue from 'all species' caught on Gulf trips	Total dockside revenue	Average total dockside revenue per vessel
2012	74	$68,560	$335,372	$4,109,121	$930,464	$5,443,517	$73,561
2013	137	$142,152	$895,319	$8,071,918	$1,049,147	$10,158,536	$74,150
2014	164	$321,452	$1,850,626	$9,867,241	$1,877,779	$13,917,098	$84,860
2015	24	$18,909	$176,013	$1,267,443	$935,197	$2,397,562	$99,898
2016	24	$57,463	$69,436	$1,424,709	$1,013,682	$2,565,290	$106,887
Average	85	$121,707	$665,353	$4,948,086	$1,161,254	$6,896,401	$87,871

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017

Imports

Imports of seafood products compete in the domestic seafood market and have in fact dominated many segments of the seafood market. Imports aid in determining the price for domestic seafood products and tend to set the price in the market segments in which they dominate. Seafood imports have downstream effects on the local fish market. At the harvest level for snapper species, including red snapper, imports affect the returns to fishermen through the ex-vessel prices they receive for their landings. As substitutes to domestic production of snappers, imports tend to cushion the adverse economic effects on consumers resulting from a reduction in domestic landings. The following describes the imports of fish products that directly compete with domestic harvest of snappers, including red snapper.

Imports[9] of fresh snapper were 22.7 million lbs product weight (pw) in 2012. They increased steadily to 30.5 million lbs pw in 2016. Total revenue from fresh snapper imports increased from $69.4 million (2016 dollars[10]) in 2012 to a five-year high of $90.2 million in 2016. Imports of fresh snappers primarily originated in Mexico or Central America, and entered the U.S. through the port of Miami. Imports of fresh snapper were highest on average (2012 through 2016) during the months of March through July.

Imports of frozen snapper were substantially less than imports of fresh snapper from 2012 through 2016. The annual value of frozen snapper imports ranged from $25 million (2016 dollars) to $38 million during the time period, with a peak in 2016. Imports of frozen snapper primarily originated in South America (especially Brazil), Indonesia, Mexico, and Central America. The majority of frozen snapper imports entered the U.S. through the ports of Miami, New York, and San Juan. Imports of frozen snappers tended to be lowest during March through May when fresh snapper imports were high.

Business Activity

The commercial harvest and subsequent sales and consumption of fish generates business activity as fishermen expend funds to harvest the fish and consumers spend money on goods and services, such as red snapper purchased at a local fish market and served during restaurant visits. These expenditures spur additional business activity in the region(s) where the harvest and purchases are made, such as jobs in local fish markets, grocers, restaurants, and fishing supply establishments. In the absence of the availability of a given species for purchase, consumers would likely spend their money on substitute goods, such as other finfish or seafood products, and services, such as visits to different food service establishments. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic effects may be distributed through regional markets and should not be interpreted to represent the impacts if these species are not available for harvest or purchase.

[9] NOAA Fisheries Service purchases fisheries trade data from the Foreign Trade Division of the U.S. Census Bureau. Data are available for download at http://www.st.nmfs.noaa.gov/st1/trade/index.html.

[10] Converted to 2016 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

Estimates of the U.S. average annual business activity associated with the commercial harvest of red snapper, and all species harvested by the vessels that harvested these red snapper, were derived using the model[11] developed for and applied in NMFS (2017) and are provided in **Table 3.3.4**. This business activity is characterized as jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), output (sales) impacts (gross business sales), and value-added impacts, which represent the contribution made to the U.S. Gross Domestic Product (GDP). These impacts should not be added together because this would result in double counting. It should be noted that the results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species. Separate models to address individual species are not available. For example, the results provided here apply to a general reef fish category rather than just red snapper, and a harvester job is "generated" for approximately every $32,000 (2016 dollars) in ex-vessel revenue. These results contrast with the number of harvesters (vessels) with recorded landings of red snapper presented in **Table 3.3.2**.

Table 3.3.4. Average annual business activity (2012 - 2016) associated with the commercial harvest of red snapper and the harvest of all species by vessels that landed red snapper. All monetary estimates are in 2016 dollars.*

Species	Average Ex-vessel Value ($ thousands)	Total Jobs	Harvester Jobs	Output (Sales) Impacts ($ thousands)	Income Impacts ($ thousands)	Value Added ($ thousands)
Red snapper	$122	16	4	$1,207	$443	$626
All species harvested by vessels that landed red snapper.	$6,896	921	219	$68,390	$25,115	$35,485

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).
*Converted to 2016 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

3.3.1.2 Economic Description of the Recreational Sector

The South Atlantic recreational sector is comprised of the private and for-hire modes. The private mode includes anglers fishing from shore (all land-based structures) and private/rental boats. The for-hire mode is composed of charter boats and headboats (also called partyboats). Charter boats generally carry fewer passengers and charge a fee on an entire vessel basis, whereas headboats carry more passengers and payment is per person. The type of service, from a vessel- or passenger-size perspective, affects the flexibility to search different fishing locations

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

during the course of a trip and target different species since larger concentrations of fish are required to satisfy larger groups of anglers.

Angler Effort

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

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

A target trip may reveal an angler's preference for a certain species, and thus may carry more relevant information when assessing the economic effects of regulations on the subject species than the other two measures of recreational effort. The majority of red snapper target trips in the South Atlantic, as estimated by MRIP, were recorded in Florida on private vessels from 2012 through 2016 (**Table 3.3.5**). Estimates of red snapper target effort for additional years, and other measures of directed effort, are available online.[12]

During the short red snapper seasons that occurred in 2012, 2013, and 2014, both Florida and Georgia also collected some recreational effort data as part of their state-run survey programs.[13] Florida estimated the total number of private recreational boat trips that targeted red snapper and these estimates are incorporated herein by reference (Sauls et al. 2017). Direct comparison of these estimates to the MRIP estimates is not possible because MRIP data are recorded at the angler level rather than the vessel level. Georgia conducted telephone surveys of for-hire (charter vessel and headboat) captains to collect catch and effort data during the 2012-2014 recreational red snapper seasons and also administered a voluntary, private angler electronic catch survey during that time. These estimates are also incorporated herein by reference (Knowlton 2015). The number of for-hire red snapper target trips recorded by Georgia was greater than what was estimated by MRIP, but the number of voluntarily reported private angler trips was significantly lower than the MRIP estimate (**Table 3.3.6**). North Carolina and South Carolina did not collect target red snapper effort data in 2012-2014.

[12] http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/queries/index.

[13] These survey programs were designed to maximize sampling opportunities during the mini-seasons.

Table 3.3.5. South Atlantic red snapper target trips, by mode and state, 2012-2016.*

	Florida	Georgia	North Carolina	South Carolina	Total
	Charter Mode				
2012	0	65	727	0	792
2013	673	0	0	0	673
2014	3,743	0	0	0	3,743
2015	0	0	0	0	0
2016	0	0	0	0	0
Average	883	13	145	0	1,042
	Private/Rental Mode				
2012	16,215	1,215	0	586	18,016
2013	32,154	345	0	0	32,500
2014	64,397	2,219	0	1539	68,155
2015	1,408	0	0	0	1,408
2016	1,013	0	0	0	1,013
Average	23,037	756	0	425	24,218
	All Modes				
2012	16,215	1,280	727	586	18,807
2013	32,827	345	0	0	33,173
2014	68,141	2,219	0	1539	71,898
2015	1,408	0	0	0	1,528
2016	1,013	0	0	0	1,013
Average	23,921	769	145	425	25,284

Source: MRIP database, SERO, NMFS.
*Headboat data are unavailable.

Table 3.3.6. Georgia estimates of angler trips that targeted red snapper, 2012-2014.

Year	For-hire (charter and headboat) angler trips*	Private angler trips
2012	100	31
2013	70	53
2014	312	120

Source: Knowlton (2015).
*There were 76, 47, and 180 charter angler trips targeting red snapper in 2012, 2013, and 2014, respectively.

Similar analysis of recreational angler trips (with the exception of the Georgia-based telephone survey) is not possible for the headboat mode because headboat data are not collected at the angler level. Estimates of effort by the headboat mode are provided in terms of angler

days, or the total number of standardized full-day angler trips.[14] Headboat effort in the South Atlantic, in terms of angler days, increased substantially in Florida through Georgia from 2012 through 2014, and then leveled off through 2016. In North Carolina and South Carolina, it was mostly stable during this time period (**Table 3.3.7**). Headboat effort was the highest, on average, during the summer months of June through August (**Table 3.3.8**).

Table 3.3.7. South Atlantic headboat angler days and percent distribution by state, 2012-2016.

	Angler Days			Percent Distribution		
	FL/GA*	NC	SC	FL/GA	NC	SC
2012	139,623	20,743	41,003	69.33%	10.31%	20.36%
2013	165,679	20,766	40,963	72.86%	9.13%	18.01%
2014	195,890	20,547	42,025	75.79%	7.95%	16.26%
2015	194,979	22,691	39,702	75.76%	8.82%	15.43%
2016	196,660	22,716	42,207	75.18%	8.68%	16.14%
Average	178,566	21,497	41,180	74%	9%	17%

*East Florida and Georgia are combined for confidentiality purposes.
Source: NMFS Southeast Region Headboat Survey (SRHS).

Table 3.3.8. South Atlantic headboat angler days and percent distribution by month, 2012-2016.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Headboat Angler Days											
2012	9,230	9,663	17,307	19,587	18,232	27,819	35,115	25,052	15,894	8,677	6,564	8,252
2013	10,182	10,892	14,541	16,129	20,969	33,079	39,463	33,830	16,335	14,534	6,698	10,537
2014	8,748	13,512	19,808	22,570	25,764	39,115	44,066	32,886	15,203	15,235	9,088	14,611
2015	12,661	11,148	21,842	25,128	25,172	36,907	42,558	30,772	15,649	13,375	9,623	12,562
2016	9,818	12,243	23,872	22,217	27,374	37,454	45,744	29,223	17,061	9,202	12,820	13,404
Avg	10,128	11,492	19,474	21,126	23,502	34,875	41,389	30,353	16,028	12,205	8,959	11,873
	Percent Distribution											
2012	5%	5%	9%	10%	9%	14%	17%	12%	8%	4%	3%	4%
2013	4%	5%	6%	7%	9%	15%	17%	15%	7%	6%	3%	5%
2014	3%	5%	8%	9%	10%	15%	17%	13%	6%	6%	3%	6%
2015	5%	4%	8%	10%	10%	14%	17%	12%	6%	5%	4%	5%
2016	4%	5%	9%	9%	11%	14%	18%	11%	7%	4%	5%	5%
Avg	4%	5%	8%	9%	10%	14%	17%	13%	7%	5%	4%	5%

Source: NMFS Southeast Region Headboat Survey (SRHS).

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

Permits

For-hire vessels are required to have a for-hire snapper grouper permit to fish for or possess snapper grouper species in the South Atlantic EEZ. As of July 10, 2017, there were 1,649 valid for-hire snapper grouper permits. This sector operates as an open access fishery and not all permitted vessels are necessarily active in the fishery. Some vessel owners may have obtained open access permits as insurance for uncertainties in the fisheries in which they currently operate. The number of for-hire vessel permits issued for the South Atlantic snapper grouper fishery reached a five-year high of 1,867 permits in 2016 (**Table 3.3.9**). The majority of snapper grouper for-hire permitted vessels were home-ported in Florida; a relatively high proportion of these permitted vessels were also home-ported in North Carolina and South Carolina. Many vessels with South Atlantic for-hire snapper grouper permits were home-ported in states outside of the SAFMC's area of jurisdiction. On average (2012 through 2016), these vessels accounted for approximately 11% of the total number of for-hire snapper grouper permits issued.

Table 3.3.9. Number of South Atlantic for-hire snapper grouper permits, by homeport state, 2012-2016.

Home Port	2012	2013	2014	2015	2016	Average
North Carolina	313	308	294	308	331	311
South Carolina	138	150	160	188	212	170
Georgia	26	30	34	45	53	38
Florida	1,121	1,120	1,062	1,071	1,100	1,095
Gulf (AL-TX)	93	91	81	73	69	81
Others	106	100	96	94	102	100
Total	1,797	1,799	1,727	1,779	1,867	1,794

Source: NMFS SERO Permits Dataset, 2017.

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. As of February 17, 2017, 63 South Atlantic headboats were registered in the SRHS (K. Fitzpatrick, NMFS SEFSC, pers. comm.). The majority of these headboats were located in Florida/Georgia (36), followed by North Carolina (16) and South Carolina (11).

There are no specific permitting requirements for recreational anglers to harvest snapper grouper species. Instead, anglers are required to possess either a state recreational fishing permit that authorizes saltwater fishing in general, or be registered in the federal National Saltwater Angler Registry system, subject to appropriate exemptions. As a result, it is not possible to identify with available data how many individual anglers would be expected to be affected by this proposed amendment.

Economic Value

Participation, effort, and harvest are indicators of the value of saltwater recreational fishing. However, a more specific indicator of value is the satisfaction that anglers experience over and above their costs of fishing. The monetary value of this satisfaction is referred to as consumer surplus (CS). The value or benefit derived from the recreational experience is dependent on several quality determinants, which include fish size, catch success rate, and the number of fish kept. These variables help determine the value of a fishing trip and influence total demand for recreational fishing trips. The estimated value of the CS for catching and keeping a second red snapper on an angler trip is approximately $81 (values updated to 2016 dollars[15]), and decreases thereafter (approximately $54 for a third red snapper, $40 for a fourth red snapper, and $31 for a fifth red snapper in 2016 dollars) (Carter and Liese 2012).

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

With regards to for-hire businesses, economic value can be measured by producer surplus (PS) per passenger trip (the amount of money that a vessel owner earns in excess of the cost of providing the trip). Estimates of the PS per for-hire passenger trip are not available. Instead, net operating revenue (NOR), which is the return used to pay all labor wages, returns to capital, and owner profits, is used as a proxy for PS. The estimated NOR value for an average South Atlantic charter angler trip is $165 (2016 dollars) and the estimated NOR value for a South Atlantic headboat angler trip is $45 (2016 dollars) (C. Liese, NMFS SEFSC, pers. comm.). Estimates of NOR per red snapper target trip are not available.

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 South Atlantic red snapper were calculated using average trip-level impact coefficients derived from the 2015 Fisheries Economics of the U.S. report (NMFS 2017) and underlying data provided by the National Oceanic and Atmospheric Administration (NOAA) Office of Science and Technology. Economic impact estimates in 2015 dollars were adjusted to 2016 dollars using

[15] Converted to 2016 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

Business activity (economic impacts) for the recreational sector is characterized in the form of jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), output (sales) impacts (gross business sales), and value-added impacts (contribution to the GDP in a state or region). Estimates of the average annual economic impacts (2012-2016) resulting from South Atlantic red snapper target trips are provided in **Table 3.3.10**. These estimates are low due to the small number of estimated red snapper target trips that occurred during the mini-seasons in 2012-2014 and during the subsequent closed seasons in 2015 and 2016. The average impact coefficients, or multipliers, used in the model are invariant to the "type" of effort and can therefore be directly used to measure the impact of other effort measures such as red snapper catch trips. To calculate the multipliers from **Table 3.3.10**, simply divide the desired impact measure (sales impact, value-added impact, income impact or employment) associated with a given state by the number of target trips for that state.

The estimates provided in **Table 3.3.10** only apply at the state-level. Addition of the state-level estimates to produce a regional (or national) total may underestimate the actual amount of total business activity, because state-level impact multipliers do not account for interstate and interregional trading. It is also important to note, that these economic impacts estimates are based on trip expenditures only and do not account for durable expenditures. Durable expenditures cannot be reasonably apportioned to individual species. As such, the estimates provided in **Table 3.3.10** may be considered a lower bound on the economic activity associated with those trips that targeted red snapper.

Estimates of the business activity associated with headboat effort are not available. Headboat vessels are not covered in 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 3.3.10. Estimated annual average economic impacts (2012-2016) from South Atlantic recreational red snapper target trips, by state and mode, using state-level multipliers. All monetary estimates are in 2016 dollars.

	NC	SC	GA*	FL
	Charter Mode			
Target Trips	145	0	61	883
Value Added Impacts	$50,201	$0	$15,256	$358,425
Sales Impacts	$93,938	$0	$27,913	$647,923
Income Impacts	$34,124	$0	$10,412	$230,365
Employment (Jobs)	1	0	0	5
	Private/Rental Mode			
Target Trips	0	425	756	23,037
Value Added Impacts	$0	$8,627	$15,190	$476,689
Sales Impacts	$0	$15,656	$26,349	$811,147
Income Impacts	$0	$5,169	$9,107	$274,117
Employment (Jobs)	0	0	0	7

Source: effort data from MRIP; economic impact results calculated by NMFS SERO using NMFS (2017) and underlying data provided by the NOAA Office of Science and Technology.
*Georgia estimates of charter angler trips for 2012-2014 from Knowlton (2015) were used in place of the MRIP estimates.

3.3.2 Social Environment

This amendment affects commercial and recreational management of red snapper. This section provides the background for the proposed actions, which will be evaluated in **Chapter 4**. Commercial and recreational landings by state are included to provide information on the geographic distribution of fishing involvement. Descriptions of the top communities involved in commercial red snapper are included along with the top recreational fishing communities based on recreational engagement. Community level data are presented in order to meet the requirements of National Standard 8 of the Magnuson-Stevens Act, which requires the consideration of the importance of fishery resources to human communities when changes to fishing regulations are considered. Lastly, social vulnerability data are presented to assess the potential for environmental justice concerns. Additional information on the South Atlantic recreational and commercial red snapper fishery is provided in the Economic Environment in **Section 3.3**.

3.3.2.1 Landings by State

The South Atlantic red snapper season was closed in 2010, 2011, 2015, and 2016 and was open for a short season during 2012, 2013, and 2014. Landings by state for the years of 2012 through 2014 are described below because these data represent the most recent years that red snapper was open in federal waters. Red snapper were landed during 2015 and 2016; however

because fishing was closed in federal waters and in all state waters except for Florida, the majority of landings were from waters adjacent to Florida with some reported landings from North Carolina and South Carolina (MRIP and SRHS Datasets).

Commercial

The majority of commercial red snapper landings came from waters adjacent to Florida (82.7% on average for years 2012-2014, SERO and SEFSC ACL Files), followed by South Carolina (9%) and North Carolina and Georgia (approximately 8.1%). Data for North Carolina are combined with Georgia in order to maintain confidentiality, but the majority of the landings reported for the combined category occurred in North Carolina. From 2012 to 2014, commercial landings ranged from 7,627 lbs ww to 65,807 lbs ww (SERO and SEFSC ACL Files).

Recreational

The majority of recreational red snapper landings come from waters adjacent to Florida (88.3% on average for years 2012-2014), followed by North Carolina (6.3%), Georgia (4.8%), and South Carolina (0.5%). From 2012 to 2014, recreational landings have ranged from 6,629 fish to 31,069 fish. Recreational landings were a combination of both MRIP and red snapper state surveys done by the individual states of the South Atlantic region. An ad-hoc group reviewed the MRIP and state survey results, and determined the better estimate of recreational red snapper landings for each state and year.

3.3.2.2 Fishing Communities

The descriptions of South Atlantic communities include information about the top communities based on a "regional quotient" (RQ) of commercial landings and value for red snapper. The RQ is the proportion of landings and value out of the total landings and value of that species for that region, and is a relative measure. These communities would be most likely to experience the effects of the proposed actions that could change the red snapper fishery and impact participants, associated businesses, and communities within the region. If a community is identified as a red snapper community based on the RQ, this does not necessarily mean that the community would experience significant impacts due to changes in the fishery if a different species or number of species was also important to the local community and economy. Additional detailed information about communities with the highest RQs can be found for South Atlantic communities at the Southeast Regional Office's Community Snapshots website[16].

In addition to examining the RQs to understand how communities are engaged and reliant on fishing, indices were created using secondary data from permit and landings information for the commercial sector (Jacob et al. 2013; Jepson and Colburn 2013). Fishing engagement is primarily the absolute numbers of permits, landings, and value for all species. For commercial fishing, the analysis used the number of vessels designated commercial by homeport and owner address, value of landings, and total number of commercial permits for each community for all species. Fishing reliance includes the same variables as fishing engagement divided by

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

population to give an indication of the per capita influence of this activity. Fishing engagement and reliance data rely on fishing data up to the year 2014 and population data from the U.S. Census American Community Survey (ACS) 2010 through 2014 five-year estimates.

Using a principal component and single solution factor analysis, each community receives a factor score for each index to compare to other communities. Factor scores of both engagement and reliance were plotted for the communities with the highest RQs. Two thresholds of one and one-half standard deviation above the mean are plotted to help determine a threshold for significance. The factor scores are standardized; therefore, a score above a value of 1.0 is also above one standard deviation. A score above one-half standard deviation is considered engaged or reliant with anything above one standard deviation to be very engaged or reliant.
The reliance index uses factor scores that are normalized. The factor score is similar to a z-score in that the mean is always zero, positive scores are above the mean, and negative scores are below the mean. Comparisons between scores are relative; however, like a z-score, the factor score puts the community on a point in the distribution. Objectively, that community will have a score related to the percent of communities with similar attributes. For example, a score of 2.0 means the community is two standard deviations above the mean and is among the 2.27% most vulnerable places in the study (normal distribution curve). Reliance score comparisons between communities are relative; however, if the community scores greater than two standard deviations above the mean, this indicates that the community is dependent on fishing. Examining the component variables on the reliance index and how they are weighted by factor score provides a measurement of commercial reliance. The reliance index provides a way to gauge change over time in these communities and also provides a comparison of one community with another.

Landings for the recreational sector are not available by species at the community level; therefore, it is not possible with available information to identify communities as dependent on recreational fishing for red snapper. Because limited data are available concerning how recreational fishing communities are engaged and reliant on specific species, indices were created using secondary data from permit and infrastructure information for the southeast recreational fishing sector at the community level (Jacob et al. 2013; Jepson and Colburn 2013). Recreational fishing engagement is represented by the number of recreational permits and vessels designated as “recreational” by homeport and owners address. Fishing reliance includes the same variables as fishing engagement, divided by population. Factor scores of both engagement and reliance were plotted. **Figure 3.4.3** identifies the top communities that are engaged and reliant upon recreational fishing in general.

A description of the social environment, including analysis of communities engaged in red snapper fishing, was provided in Amendment 28 for snapper grouper (SAFMC 2013b) and is incorporated herein by reference. The referenced description focuses on available geographic and demographic data to identify top commercial red snapper communities using 2009 Accumulated Landings System (ALS) data and engagement, reliance, and social vulnerability indicators from 2009. This section has been updated using 2014 ALS data and 2014 community social vulnerability indicators data, the most recent year available.

Commercial Fishing Communities

Figure 3.4.1 includes the top red snapper communities by regional quotient landings and value during 2014, the most recent year with a federal season for red snapper. The majority of the top red snapper communities are located in Florida; however, a few of top communities are located in South Carolina and North Carolina. About 53% of red snapper is landed in the top four communities (Cocoa, Mayport, Port Orange, and Cape Coral, Florida), representing about 52% of the South Atlantic-wide ex-vessel value for the species. The remaining top communities collectively represent about 32% of South Atlantic red snapper landings and 33% of ex-vessel value (including approximately 24% of landings and 24% of value for the Florida communities of Saint Augustine, Titusville, Melbourne, Ormond Beach, Key West, Winter Springs, Sebastian, and Merritt Island and approximatively 8% of landings and 9% of value for the South Carolina and North Carolina communities of Murrells Inlet, South Carolina and Morehead City and Beaufort, North Carolina).

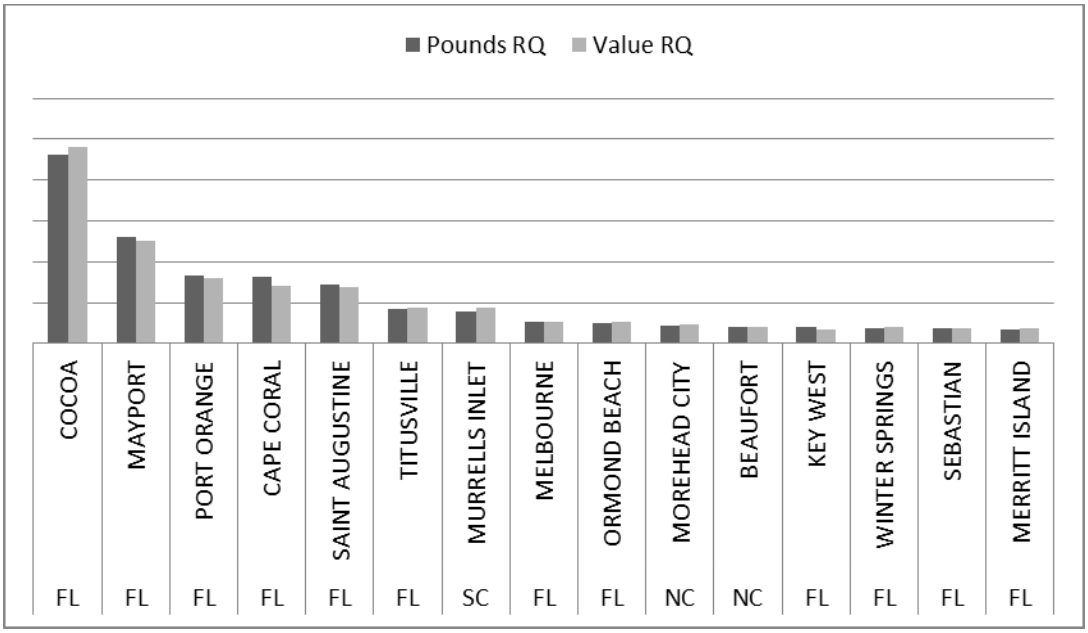


Figure 3.4.1. Top South Atlantic communities ranked by pounds and value regional of quotient (RQ) of red snapper.
The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.
Source: SERO, Community ALS 2014.

The commercial engagement and reliance indices of the top commercial red snapper communities are included in **Figure 3.4.2**. The details of how these indices are generated are explained at the beginning of the Fishing Communities section. Two thresholds of one and one-half standard deviation above the mean were plotted to help determine a threshold for significance. The primary communities that demonstrate high levels of commercial fishing engagement include Mayport, Cape Coral, Saint Augustine, Key West, Sebastian, and Merritt Island, Florida and Morehead City and Beaufort, North Carolina. The community with substantial commercial reliance is Mayport, Florida.

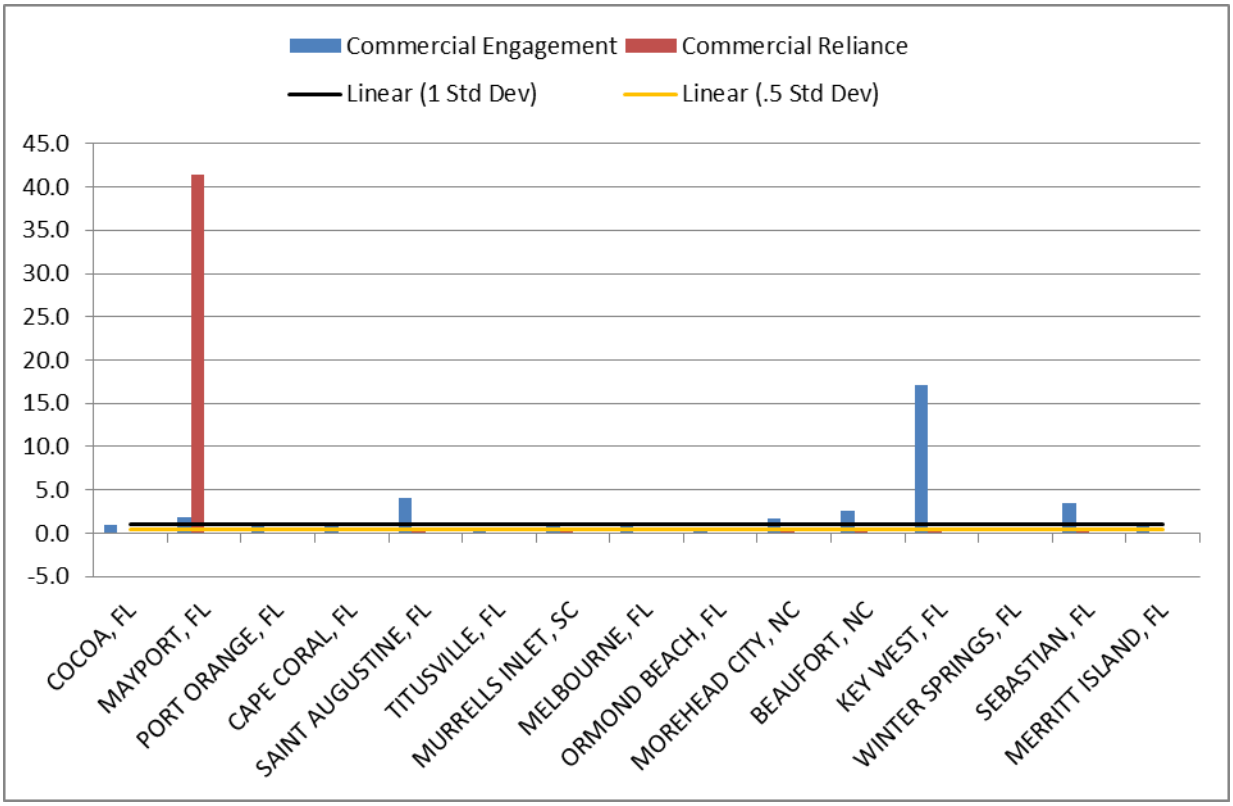


Figure 3.4.2. Commercial engagement and reliance for South Atlantic red snapper fishing communities. Source: SERO, Community Social Vulnerability Indicators Database 2014 (ACS 2010-2014).

Recreational Fishing Communities

Figure 3.4.3 identifies the top 20 recreational communities located in the South Atlantic that are the most engaged and reliant on recreational fishing, in general. All included communities demonstrate high levels of recreational engagement. Six communities (Key West, Florida; Marathon, Florida; Islamorada, Florida; Hatteras, North Carolina; Manteo, North Carolina; and Atlantic Beach, North Carolina) demonstrate high levels of recreational reliance.

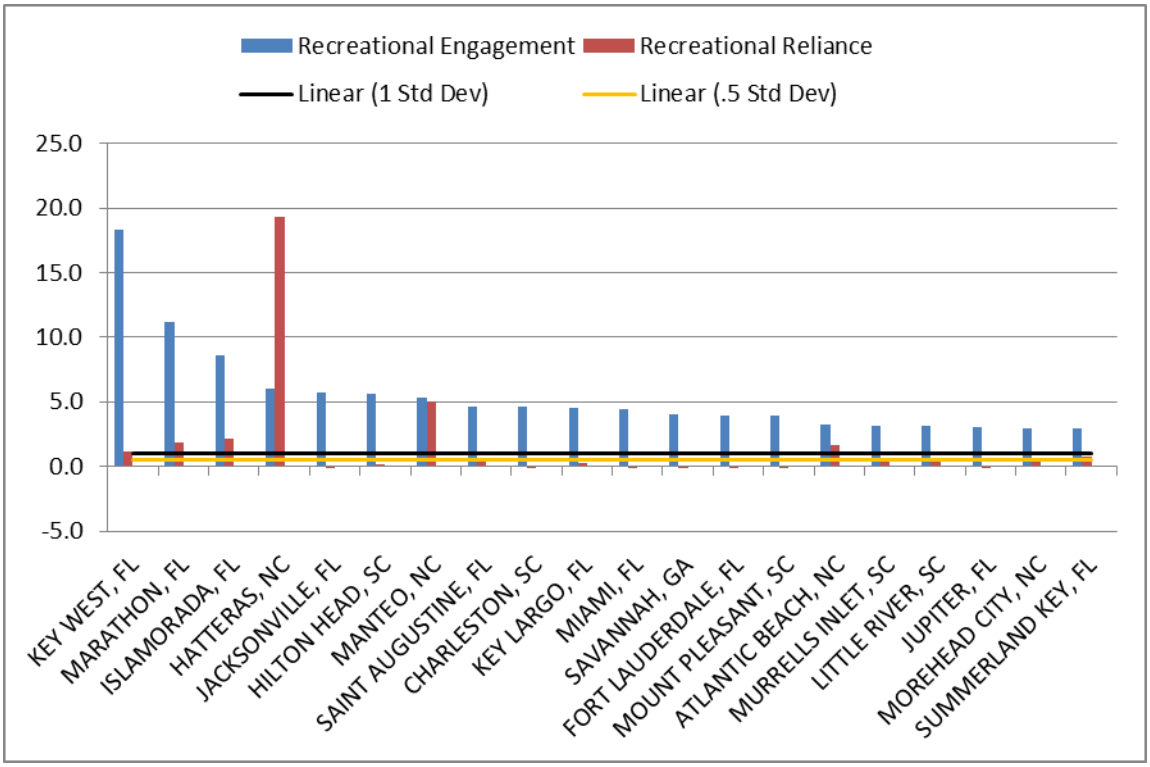


Figure 3.4.3. Top recreational fishing communities' engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators Database 2014 (ACS 2010-2014).

3.3.2.3 Environmental Justice Considerations

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

Commercial and recreational fishermen and associated industries could be impacted by the proposed actions. However, information on the race and income status for groups at the different participation levels (individual fishermen and crew) is not available. Although information is available concerning communities overall status with regard to minorities and poverty (e.g., census data), such information is not available specific to fishermen and those involved in the industries and activities, themselves. To help assess whether any environmental justice concerns arise from the actions in this amendment, a suite of indices were created to examine the social vulnerability of coastal communities. These indices rely on data from the U.S. Census ACS 2010 through 2014 five-year estimates. The three indices are poverty, population composition,

and personal disruptions. The variables included in each of these indices have been identified through the literature as being important components that contribute to a community's vulnerability. Indicators such as increased poverty rates for different groups, more single female-headed households and households with children under the age of five, disruptions such as higher separation rates, higher crime rates, and unemployment all are signs of populations experiencing vulnerabilities. Again, for those communities that exceed the threshold it would be expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

Figure 3.4.4 and **Figure 3.4.5** provide the social vulnerability of the top commercial and recreational communities. Several South Atlantic communities exceed the threshold of one-half standard deviation for at least one of the social vulnerability indices: Cocoa, Marathon, Miami, and St. Augustine, Florida; Savannah, Georgia; and Beaufort, Manteo, and Morehead City, North Carolina. The communities of Cocoa, Florida; Miami, Florida; and Savannah, Georgia exceed the threshold for all three social vulnerability indices. These communities have substantial vulnerabilities and may be susceptible to further effects from any regulatory changes depending upon the direction and extent of that change.

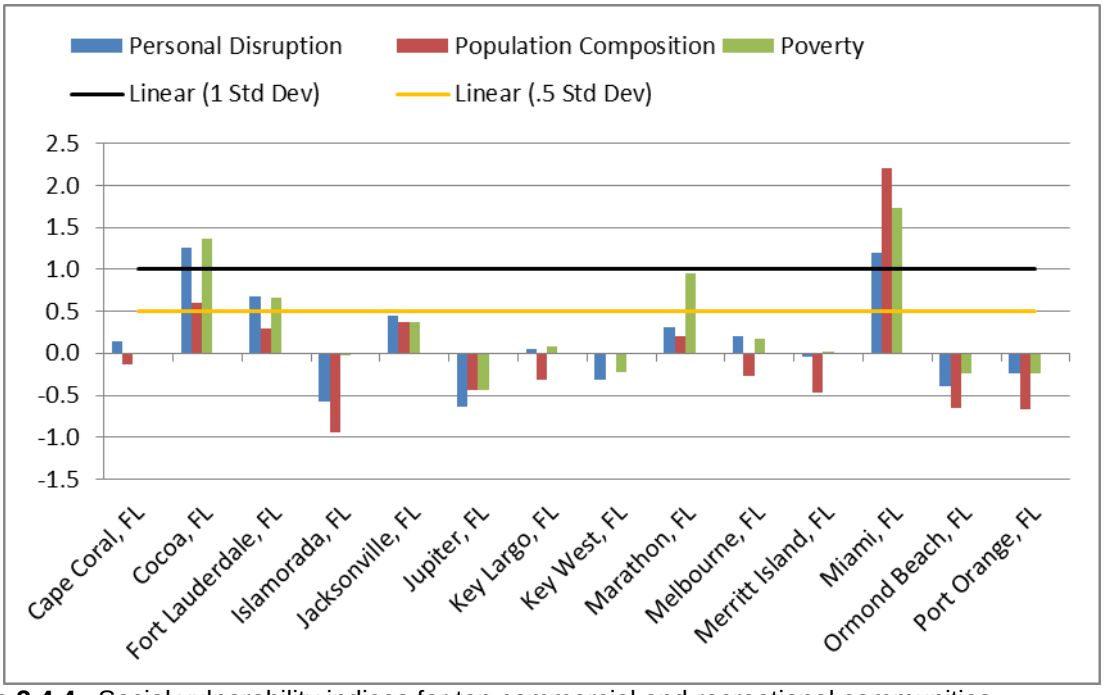


Figure 3.4.4. Social vulnerability indices for top commercial and recreational communities. Source: SERO, Community Social Vulnerability Indicators Database 2014 (ACS 2010-2014).

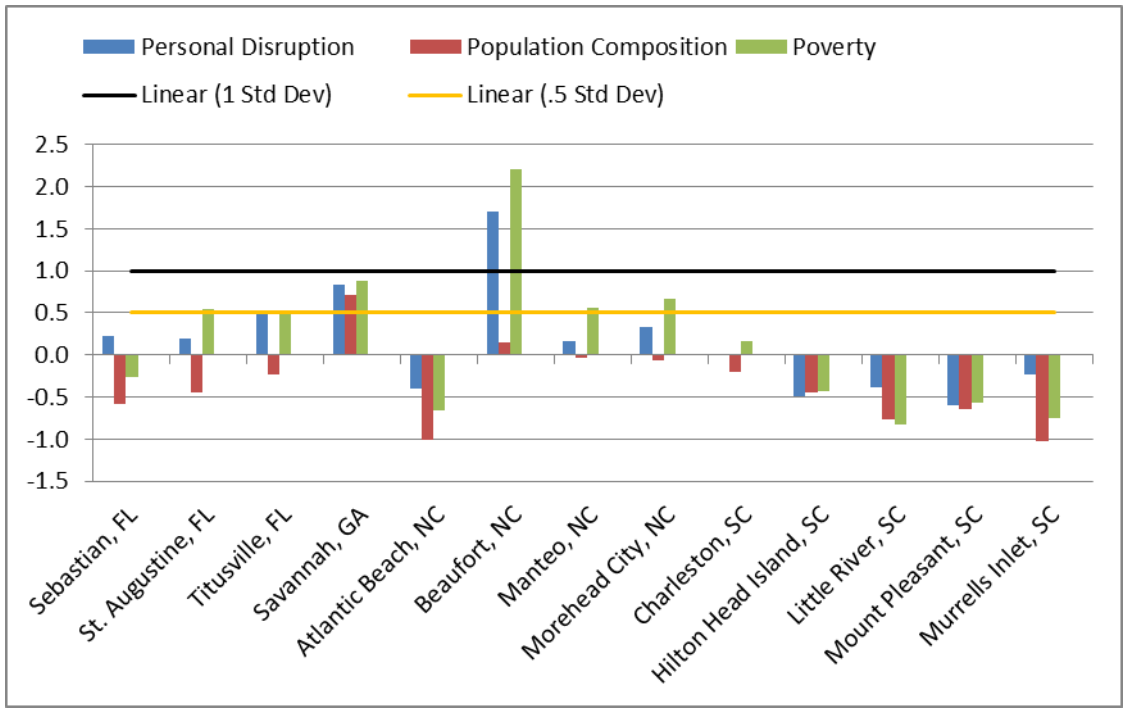


Figure 3.4.5. Social vulnerability indices for top commercial and recreational communities continued. Source: SERO, Community Social Vulnerability Indicators Database 2014 (ACS 2010-2014).

People in these communities may be affected by fishing regulations in two ways: participation and employment. Although these communities may have the greatest potential for EJ concerns, no data are available on the race and income status for those involved in the local fishing industry (employment), or for their dependence on red snapper specifically (participation). Although no EJ issues have been identified, the absence of potential EJ concerns cannot be assumed.

3.4 Administrative Environment

3.4.1 The Fishery Management Process and Applicable Laws

3.4.1.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the EEZ, an area extending 200 nm from the seaward boundary of each of the coastal states, and authority over U.S. anadromous species and continental shelf resources that occur beyond the U.S. EEZ.

Responsibility for federal fishery management decision-making is divided between the U.S. 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 collecting and providing the data necessary for the councils to prepare fishery management plans and for promulgating regulations to implement proposed plans and amendments after ensuring that management measures are consistent with the Magnuson-Stevens Act and with other applicable laws. In most cases, the Secretary has delegated this authority to NMFS.

The Council is responsible for conservation and management of fishery resources in federal waters of the U.S. South Atlantic. These waters extend from 3 to 200 miles offshore from the seaward boundary of North Carolina, South Carolina, Georgia, and east Florida to Key West. The Council has thirteen voting members: one from NMFS; one each from the state fishery agencies of North Carolina, South Carolina, Georgia, and Florida; and eight public members appointed by the Secretary. On the Council, there are two public members from each of the four South Atlantic States. Non-voting members include representatives of the U.S. Fish and Wildlife Service, U.S. Coast Guard, State Department, and Atlantic States Marine Fisheries Commission (ASMFC). The Council has adopted procedures whereby the non-voting members serving on the Council Committees have full voting rights at the Committee level but not at the full Council level. The Council also established two voting seats for the Mid-Atlantic Council on the South Atlantic Mackerel Committee. Council members serve three-year terms and are recommended by state governors and appointed by the Secretary from lists of nominees submitted by state governors. Appointed members may serve a maximum of three consecutive terms.

Public interests also are involved in the fishery management process through participation on Advisory Panels and through council meetings, which, with few exceptions for discussing personnel and legal matters, are open to the public. The Council uses its Scientific and Statistical Committee (SSC) to review the data and science being used in assessments and fishery management plans/amendments. In addition, the regulatory process is in accordance with the Administrative Procedure Act, in the form of "notice and comment" rulemaking.

3.4.1.2 State Fishery Management

The state governments of North Carolina, South Carolina, Georgia, and Florida have the authority to manage fisheries that occur in waters extending three nautical miles from their respective shorelines. North Carolina's marine fisheries are managed by the Marine Fisheries Division of the North Carolina Department of Environmental Quality. The Marine Resources Division of the South Carolina Department of Natural Resources regulates South Carolina's marine fisheries. Georgia's marine fisheries are managed by the Coastal Resources Division of the Department of Natural Resources. The Marine Fisheries Division of the Florida Fish and Wildlife Conservation Commission is responsible for managing Florida's marine fisheries. Each state fishery management agency has a designated seat on the Council. 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 South Atlantic States are also involved through the Atlantic States Marine Fisheries Commission (ASMFC) in management of marine fisheries. This commission was created to coordinate state regulations and develop management plans for interstate fisheries. It has significant authority, through the Atlantic Striped Bass Conservation Act and the Atlantic Coastal Fisheries Cooperative Management Act, to compel adoption of consistent state regulations to conserve coastal species. The ASFMC is also represented at the Council level, but does not have voting authority at the Council level.

NMFS's State-Federal Fisheries Division is responsible for building cooperative partnerships to strengthen marine fisheries management and conservation at the state, inter-regional, and national levels. This division implements and oversees the distribution of grants for two national (Inter-jurisdictional Fisheries Act and Anadromous Fish Conservation Act) and two regional (Atlantic Coastal Fisheries Cooperative Management Act and Atlantic Striped Bass Conservation Act) programs. Additionally, it works with the ASMFC to develop and implement cooperative State-Federal fisheries regulations.

3.4.1.3 Enforcement

Both the NMFS Office for Law Enforcement (NOAA/OLE) and the United States Coast Guard (USCG) have the authority and the responsibility to enforce Council regulations. NOAA/OLE agents, who specialize in living marine resource violations, provide fisheries expertise and investigative support for the overall fisheries mission. The USCG is a multi-mission agency, which provides at sea patrol services for the fisheries mission.

Neither NOAA/OLE nor the USCG can provide a continuous law enforcement presence in all areas due to the limited resources of NOAA/OLE and the priority tasking of the USCG. To supplement at sea and dockside inspections of fishing vessels, NOAA entered into Cooperative Enforcement Agreements with all but one of the states in the Southeast Region (North Carolina), which granted authority to state officers to enforce the laws for which NOAA/OLE has jurisdiction. In recent years, the level of involvement by the states has increased through Joint Enforcement Agreements, whereby states conduct patrols that focus on federal priorities and, in

some circumstances, prosecute resultant violators through the state when a state violation has occurred.

The NOAA Office of General Counsel Penalty Policy and Penalty Schedule is available online[17].

[17] http://www.gc.noaa.gov/enforce-office3.html.

Chapter 4. Environmental Effects and Comparison of Alternatives

4.1 Revise the Process to Determine the Annual Catch Limits for Red Snapper

Under the proposed action, the process for determining the annual catch limits (ACL) for red snapper (total, commercial, and recreational) would be modified to allow harvest beginning in 2018 (see alternatives in text box). Based on the current information available, allowing limited harvest of red snapper beginning in 2018 is not expected to result in overfishing, or prevent continued stock rebuilding (see **Section 1.7**, **Appendices J, L, and M**).

The following outlines the effects of the current red snapper management regime and provide the background for effects analysis of **Alternative 1 (No Action)**[18]:

- Emergency rule to establish a limited 2012 fishing season (NMFS 2012a,b)
- Amendment 28 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Amendment 28) (SAFMC 2013)

The reader is directed to these documents for details on the effects of the current management of red snapper. Amendment 28 is available at www.safmc.net, and hereby incorporated by reference. Additionally, the

Alternatives*

Alternative 1 (No Action): The commercial and recreational annual catch limits for red snapper are zero. Process in place to allow limited harvest based on ABC.

Alternative 2. Remove the process and equation used to determine the red snapper ACL as specified in Snapper Grouper Amendment 28. Specify Total ACL = 23,623 fish. Commercial ACL = 69,360 lbs (whole weight). Recreational ACL = 16,480 fish.

Alternative 3. Remove the process and equation used to determine the red snapper ACL as specified in Snapper Grouper Amendment 28. Specify Total ACL = 44,411 fish. Commercial ACL = 130,396 lbs (whole weight). Recreational ACL = 30,982 fish.

Preferred Alternative 4. Remove the process and equation used to determine the red snapper ACL as specified in Snapper Grouper Amendment 28. Specify Total ACL = 42,510 fish. Commercial ACL = 124,815 lbs (whole weight). Recreational ACL = 29,656 fish.

Alternative 5. Remove the process and equation used to determine the red snapper ACL as specified in Snapper Grouper Amendment 28. Specify Total ACL = 79,919 fish. Commercial ACL = 234,652 lbs (whole weight). Recreational ACL = 55,753 fish.

* Refer to Chapter 2 for detailed language of alternatives

[18] The 2017 emergency action was not included in the effects analysis due to timing. The emergency action did not occur until November 2017 and the amendment was submitted in November 2017.

Bycatch Practicability Analysis (BPA; **Appendix D**) evaluates the practicability of taking additional action to minimize bycatch and bycatch mortality using the ten factors provided at 50 CFR section 600.350(d)(3)(i).

Background

Beginning in 2012, the South Atlantic Fishery Management Council (Council) and National Marine Fisheries Service (NMFS) determined that retention of a limited number of red snapper in 2012, along with appropriate management controls, would not jeopardize the rebuilding of the red snapper stock and established a limited season through emergency action in 2012. In 2013, Amendment 28 implemented a process to determine if a red snapper fishing season would occur each year, including specification of the allowable harvest and season lengths for the commercial and recreational sectors (78 FR 44461, July 24, 2013). Amendment 28 also included a formula to determine the ACL for each sector; as well as management measures (limited fishing seasons, no minimum size limit, one fish per person per day recreational bag limit, and 75 pounds (lbs) commercial trip limit), if fishing were allowed. Following the management measures of Amendment 28, the total removals exceeded the accepted biological catch (ABC) in 2014, 2015, and 2016, and the harvest of red snapper has been prohibited since 2015 (**Table 4.1.1**).

Table 4.1.1. Total removals (landings and dead discards) of red snapper during the limited fishing seasons for the commercial and recreational sectors in 2012, 2013, and 2014.

Year	Allowable Removals (numbers of fish)	Total Removals (numbers of fish)	Commercial Fishing Season	Recreational Fishing Season
2012	86,000	Commercial= 13,317 HB= 4,606 Charter= 9,264 Private= 53,329 Total= 80,516	Sept 17-24; Reopened Nov 13-21 and Dec 12-19 (22 days)	Sept 14-17, and Sept 21-24 (6 days)
2013	96,000	Commercial=16,779 HB=20,683 Charter (FL study)=5,395 Private (FL study)=29,919 Total (FL study)=72,776	Aug 26-Oct 8 (43 days)	Aug 23-Aug 26 (3 days)
2014	106,000	Commercial=24,827 HB=22,063 Charter=20,619 Private=138,350 Total=205,859	Jul 14-Sept 9 (57 days)	Jul 11-14, Jul 18-21, Jul 26-27(8 days)

Under **Alternative 1 (No Action)**, the commercial and recreational ACLs for red snapper would be expected to be zero in 2018 because preliminary data for 2017 show a high level of discards and total removals are likely to exceed the ABC specified in Amendment 28.

Alternatives 2 through **5** would allow limited harvest of red snapper beginning in 2018 (**Table 4.1.2**).

Table 4.1.2. Proposed total, commercial, and recreational red snapper ACLs calculated in numbers of fish and whole weight.

Alternative	ACL Numbers of Fish	ACL Weight (ww) *	Commercial ACL Weight (ww) **	Recreational ACL Numbers of Fish***
Alt 1	TBD			
Alt 2	23,623	247,097	69,360	16,480
Alt 3	44,411	464,539	130,396	30,982
Preferred Alt 4	**42,510**	**444,655**	**124,815**	**29,656**
Alt 5	79,919	835,953	234,652	55,753

*Allocations are based on weight. ACL numbers of fish is converted to ACL weight by using the projected average weight for 2018 from four different projection scenarios (10.46 lbs) from SEDAR 41 (2017).
**The conversion factor used to derive numbers of fish from commercial weight is 9.71 pounds and is based on the average weight of commercially caught red snapper from 2012 to 2014 (SEDAR 41 2017).
***The recreational ACL is the difference between total ACL number and commercial number.

The ACL proposed under **Alternative 2** is based on the average landings from 2012 to 2014 (Table 4.2). The ACL specified for **Alternative 3** is based on the average landings from 2012 to 2014 multiplied by an adjustment factor based on the increase in the average catch rate of red snapper observed in the fishery-independent Southeast Reef Fish Survey (SERFS) index in 2015 and 2016 compared to average catch rate from 2012, 2013, and 2014 (1.88 times, **Figure 2.1.1**).

Preferred Alternative 4 and **Alternative 5** propose using maximum recorded landings to specify the ACL (**Table 4.1.2**). The ACL under **Preferred Alternative 4** is set equal to the maximum landings from 2012 to 2014. For **Alternative 5**, the ACL is the maximum landings multiplied by the adjustment factor discussed above (**Table 4.1.2**). The ACL specified in **Alternative 5** is higher than landings that occurred from 2012 to 2014. The ACLs specified for **Alternatives 3** and **5** reflect NMFS Southeast Fisheries Science Center's (SEFSC) guidance that is more similar to the approach used in SEDAR 41 (2017). The methodology is further described in **Appendix K**.

The existing management measures such as season start dates, commercial trip limit, minimum size limit, and recreational bag limit would remain unchanged from those implemented by the final rule for Amendment 28 (78 FR 44461, July 24, 2013). When possible, the Council prefers specifying the recreational ACL in numbers of fish and the commercial ACL in pounds whole weight (lbs ww). The rationale is that recreational landings are already tracked in numbers of fish while commercial landings are tracked in lbs ww. However, the total ACL is specified in numbers of fish. The sector allocation formula specified in the Comprehensive ACL Amendment (SAFMC 2011b) is 28.07% of the total landings in pounds for the commercial sectors and 71.93% for the recreational sector. To determine sector allocations, the numbers of

fish in the total ACL were converted to weight of red snapper (see **Appendix K** for more details). The commercial and recreational ACLs for each sector under each of the proposed alternatives are provided in **Table 4.1.2.** NMFS would announce the pre-determined commercial and recreational fishing year start dates. The commercial red snapper season would close when the commercial sector ACL is met or projected to be met based on the SEFSC's weekly reporting system. The end of the recreational red snapper season would be projected and announced before the start of the recreational season based on past catch rates. The NMFS Regional Administrator has the authority to delay the opening of red snapper fishing seasons in the event of a tropical storm or hurricane affecting the Council's area of authority.

Recreational landings of red snapper in the South Atlantic exclusive economic zone were not allowed in 2010, 2011, 2015 and 2016, and recreational harvest was only open for short periods of time in 2012 (6 days), 2013 (3 days), and 2014 (8 days). Recreational landings ranged from 6,629 fish to 31,069 during 2012-2014 (**Table 4.1.3**).

The value for total number of red snapper landed in 2014 in **Table 4.1.3** is slightly different than the **Preferred Alternative 4** recreational sector ACL (**Table 4.1.2**). To allocate ACL among the sectors, the total ACL in numbers of fish needed to be converted to weight and then allocated to the recreational and commercial sectors using the formula established in the Comprehensive ACL Amendment (2011b). These conversions led to differences in the reported recreational landings (**Table 4.1.3**) and the recreational sector ACL (**Table 4.1.2**).

Table 4.1.3. Recreational landings (numbers of fish) for red snapper by wave, 2012-2016.

	Jan/Feb	Mar/Apr	May/June	Jul/Aug	Sep/Oct	Nov/Dec	Total
2012	1	478	353	79	14,080	0	14,991
2013	0	2	403	2,050	4,160	14	6,629
2014	1,151	45	722	28,798	19	334	31,069
2015	0	847	467	486	56	14	1,870
2016	0	1	188	205	3	6	403

Note: Landings in Florida state waters is allowed for red snapper.

The short recreational openings in 2012, 2013, and 2014, occurred over different months; therefore, landings from different months and years were combined to predict future landings (see **Appendix O** for more details on the data analysis and projections for the recreational sector). **Table 4.1.4** shows the predicted landings and closure dates in 2018, assuming the recreational sector opens to harvest on July 13, 2018. The "Predicted Landings" scenario is a prediction of future landings, and the "High Landings" scenario is an adjusted prediction using a 1.88 adjustment factor following the assumption of a larger stock size. Under the "Predicted Landings" scenario, the recreational sector would be open for as short as 4 days (**Alternative 2**) and as long as 28 days (**Alternative 5**); and would be open for 7 days under **Preferred Alternative 4** (**Table 4.1.4**). Under the "High Landings" scenario, the recreational sector would be open for as short as 2 days (**Alternative 2**) and as long as 8 days (**Alternative 5**); and would be open for 4 days under **Alternative 3** and **Preferred Alternative 4** (**Table 4.1.4**).

Table 4.1.4. Predicted closure dates (number of open days) for the recreational sector under the different proposed ACL alternatives for 2018.

	Alternative 1	Alternative 2	Alternative 3	Preferred Alternative 4	Alternative 5
ACL	**TBD**	**16,480 Fish**	**30,982 Fish**	**29,656 Fish**	**55,753 Fish**
Predicted Landings	TBD	21-Jul (4)	28-Jul (7)	**28-Jul (7)**	15-Sep (28)
High Landings	TBD	15-Jul (2)	21-Jul (4)	**21-Jul (4)**	29-Jul (8)

Note: These closure dates assume the recreational sector starts on Friday, July 13, 2018. Under the process and formula established in Amendment 28 as specified in **Alternative 1 (No Action),** according to preliminary estimates, the fishery is expected to exceed the ABC in 2017 and the ACL would be set to zero in 2018. See **Appendix O** for more details.

The South Atlantic red snapper commercial sector was closed in 2010, 2011, 2015, and 2016, and was only open for short periods of time in 2012 (22 days, harvesting 6,872 lbs), 2013 (43 days, 27,309 lbs), and 2014 (57 days, 54,887 lbs)[19]. **Figure 4.1.1** shows the pounds per commercial trip harvested for the two most recent years (2013 and 2014) under the 75 pounds gutted weight (lbs gw) trip limit.

The short commercial openings in 2012, 2013, and 2014 occurred over different months; therefore, landings from different months and years were combined to predict future landings (**Table 4.1.5**, see **Appendix N** for more details). **Table 4.1.6** shows the predicted landings and closure dates in 2018, assuming the commercial sector opens to harvest on July 9, 2018. The "Predicted Landings" scenario is a prediction of future landings, and the "High Landings" is the prediction of future landings with a 34% increase in landings following the assumption that more fishermen would meet the trip limit of 75 lbs gw due to an increased stock size. Under **Alternatives 3** through **5** and using the "Predicted Landings" scenario, the commercial sector would not close (**Table 4.1.5**). Under **Alternative 2** and using the "Predicted Landings", the commercial sector would close September 17, 2018. If the "High Landings" scenario is used, the commercial sector would close for all alternatives except **Alternative 5**. Closing dates range from August 23 to October 21.

[19] http://sero.nmfs.noaa.gov/sustainable_fisheries/acl_monitoring/commercial_sa/historical/index.html).

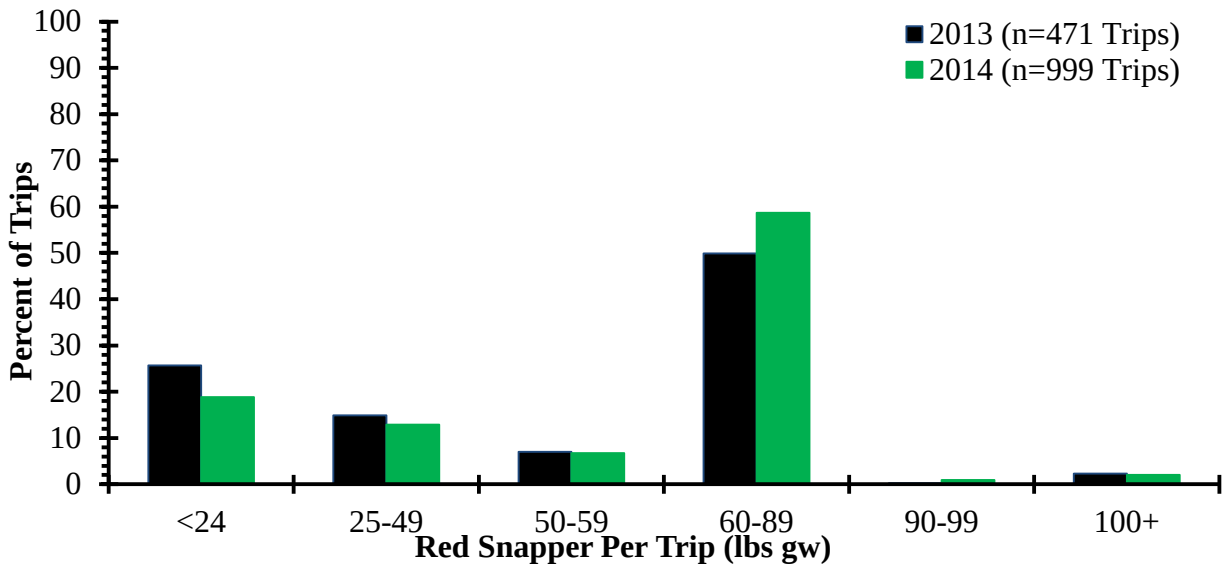


Figure 4.1.1. Distribution of commercial red snapper harvested per trip (lbs gw) in 2013 and 2014. Source: Commercial logbook dataset.

Table 4.1.5. Predicted closure dates for the commercial sector under the different proposed ACL alternatives for 2018.

	Alternative 1	Alternative 2	Alternative 3	Preferred Alternative 4	Alternative 5
ACL		**69,360 lbs ww**	**130,396 lbs ww**	**124,815 lbs ww**	**234,652 lbs ww**
Predicted Landings	TBD	17-Sep	No Closure	**No Closure**	No Closure
High Landings	TBD	23-Aug	26-Nov	**21-Oct**	No Closure

Note: These closure dates assume the recreational sector starts on Monday, July 9, 2018. Under **Alternative 1 (No Action),** according to preliminary estimates, the fishery is expected to exceed the ABC in 2017 and the ACL would be set to zero in 2018. See **Appendix N** for more details.

Alternatives 2 through **5** have the potential benefit of providing fishery-dependent data for future stock assessments. Red snapper are a long-lived fish reaching ages up to 50 years old. Because they are a long-lived fish, age-based stock assessment models, which have been used to assess red snapper in SEDAR 15 (2009), 24 (2010), and 41 (2017), are likely the best type to determine the status of the stock. Ages collected from fishery-independent and fishery-dependent sources are an important component to determine status of the stock and may be more important than other pieces of information because the decline in abundance at age is critical information for determining mortality rates (Yin and Sampson 2004; Siegfried et al. 2016). These age data are informative even when the level of removals is uncertain, as is the case with red snapper. Fishery-dependent age composition data from recreational and commercial catches are unavailable for years after 2014 because there have been no landings to sample. The only available data for red snapper ages is from the SERFS index. While SERFS is a great source of

fishery-independent information, the survey alone may not be sufficient to produce adequate data for an age-based stock assessment. A primary concern is that ages collected from a single survey or fishery have been shown to result in biased age and growth curves (Huse et al. 1999; Binion et al. 2009) as they may only sample a portion of the population. Bias in age composition data can lead to issues with estimating fishery selectivity, fishing levels, and biomass (Bertignac and Pontual 2007; Hulson and Hanselman 2014). While information on the selectivity of the survey can be used to reduce bias, the lack of information on the ages or sizes of fish not represented in the survey can greatly increase assessment uncertainty. Allowing some level of landings through **Alternatives 2** through **5** that facilitate collecting representative age data would be extremely beneficial to future stock assessments needed to track the recovery of red snapper. Ensuring that representative age data are available for future assessments can potentially reduce the chance of inaccurately characterizing the status of the stock.

Observers are collecting red snapper length data on headboats from Florida to North Carolina through the NMFS Headboat Survey and on charter vessels from Florida through an observer program run by the Florida Fish and Wildlife Conservation Commission. These data need to be combined with age data to determine the age structure of the caught fish because it can be difficult to estimate the age of a red snapper based on its length. For example, a red snapper that is 20 inches (508 mm TL; the former minimum size limit) can be anywhere from 2 to 10 years old based on observed data in SEDAR 41 (2017). Therefore, age distributions based on past length distributions alone may not accurately describe the current age distribution of the stock.

Furthermore, as recommended by the Council's Scientific and Statistical Committee (SSC), plans for developing a data collection design have already begun. State representatives from Florida, Georgia, North Carolina, and South Carolina have agreed to collect data on red snapper for the proposed 2018 season. This data collection program should ensure needed age samples and landings data for future red snapper assessments.

4.1.1 Biological Effects

Expected Effects to the Red Snapper Stock and Bycatch of Co-Occurring Species

Allowing no harvest under **Alternative 1 (No Action)** is expected to provide the greatest biological benefit to the stock among the alternatives considered as the alternative would continue the harvest prohibition in 2018. However, it is expected that the current level of dead discards would continue to increase as the population grows due to fishermen targeting species that co-occur with red snapper. In numbers of fish, estimates of discards and dead discards of red snapper in 2016 were 1,018,929 and 406,195, respectively (SEFSC 2017). The estimate of discards from the private recreational and charter components of the recreational sector are highly uncertain (see **Appendix J**) and using the estimates to understand the impact of bycatch should be done with caution.

Allowing red snapper harvest beginning in 2018 (**Alternatives 2-5**) could both increase and decrease occurrences of bycatch of red snapper. Bycatch could decrease when fishermen retain red snapper during the open season that otherwise would have been released under **Alternative 1 (No Action)**. If the season was closed (**Alternative 1, No Action**), these fish would be returned to the water and a portion would not survive. Conversely, bycatch could increase due to increased targeting and high-grading behavior during the open season.

Similar biological effects would be expected between **Alternative 1 (No Action)** and **Alternatives 2** through **5** if the total removals are similar. In other words, red snapper previously killed through the effects of removal from the ocean and returned to the water would now die through retention. Under this scenario, the net loss to the red snapper stock between **Alternative 1 (No Action)** and **Alternatives 2** through **5** would be similar. However, the adverse biological effects to the stock under **Alternatives 2** through **5** would likely be greater than those under **Alternative 1 (No Action)** because total removals would likely be higher. Some fish would be retained under **Alternatives 2** through **5** that otherwise would have been released alive as bycatch. In addition, increased targeting and high-grading behavior may result in higher discards on top of the limited harvest, further increasing total removals, relative to **Alternative 1 (No Action)**.

As changes to bycatch from allowing harvest beginning in 2018 (**Alternatives 2-5**) would largely depend on fishermen's behavior, it is not possible to determine the net change to the bycatch between a closed season (**Alternative 1 (No Action)**) and an open one (**Alternatives 2-5**). The amount of bycatch from 2015-2016 in the commercial sector is 2% of the total bycatch of species associated with red snapper (**Appendix D**). Changes to the commercial sector are likely to have minimal impact on the overall bycatch. The low trip limit of 75 lbs gw for red snapper would likely prevent trips that solely target red snapper. Instead, red snapper would be caught on trips targeting other species and the incidental catch of red snapper would be retained. The commercial sector would have little incentive to high-grade since the trip limit is established on a weight limit.

In the recreational sector, assuming that only a moderate level of high-grading occurs and that overall effort increases minimally due to the short projected season length, the proposed alternatives would not be anticipated to substantially increase bycatch of red snapper and co-occurring species. The management alternatives would change some current bycatch of red snapper into landed catch. If, however, large unexpected increases in effort occur during the red snapper season or high-grading greatly increases discard rates, then negative impacts could be expected for red snapper.

Because **Alternative 2** and **Preferred Alternative 4** are based on previous landings estimates, they are not expected to result in impacts greater than those resulting from the years where limited harvest was previously allowed (2012-2014). However, increasing the red snapper ACL beyond past landings levels could lead to increased impacts (**Alternatives 3** and **5**). **Alternatives 3** and **5** scale up the harvest allowed based on population growth and could scale up the risk of possible overfishing. **Preferred Alternative 4** relies on observed landings levels in

2014 and does not assume an increase in red snapper abundance; thereby, reducing the chances of allowing a level of harvest that would lead to adverse impacts.

The overfishing determination in the SEDAR 41 (2017) assessment came from 2012-2014 when a small amount of red snapper harvest was allowed to occur. However, discards during this period of time were very high due to fishermen targeting co-occurring species, which likely contributed to the overfishing determination. Since recent red snapper data from the long-term fishery independent index of abundance collected by the SERFS program suggests the South Atlantic red snapper population has increased substantially since 2014; the Council's SSC indicated that the trends in SERFS relative abundance supported a population increase in their April 2017 report; and red snapper relative abundance from SERFS is currently the highest observed in the entire time series (1990-2016), allowing a small amount of red snapper harvest at the highest landings observed during the limited openings in 2012-2014 is neither expected to result in overfishing, nor prevent continued stock rebuilding.

Due to the small trip limit and no minimum size limit, commercial harvest of red snapper is expected to be primarily a "bycatch allowance" while targeting other snapper grouper species. The potential for high-grading should be minimal in this sector. Targeting of red snapper by the recreational sector during the limited season could lead to an increase in bycatch of other snapper grouper species and result in high-grading of caught red snapper. However, as stated in **Chapter 2**, the allowed harvest of red snapper beginning in 2018 would likely be relatively limited in magnitude. The proposed alternatives are not anticipated to substantially increase bycatch of red snapper and co-occurring species in the commercial sector and relative change in bycatch in the recreational sector is unknown. Additional analysis on bycatch is provided in the Bycatch Practicability Analysis (BPA; **Appendix D**), which evaluates the practicability of taking additional action to minimize bycatch and bycatch mortality using the ten factors provided at 50 CFR section 600.350(d)(3)(i).

Expected Effects to Protected Species

In the 2016 biological opinion, NMFS analyzed the effects of commercial and recreational hook-and-line gear in the snapper grouper fishery on sea turtles, smalltooth sawfish, and Nassau grouper, assuming the 2012-2015 average hook-and-line effort levels are representative of future effort levels in the snapper grouper fishery (NMFS 2016). The recreational and commercial red snapper component of the snapper grouper fishery was open for short periods of time and effort in the commercial component constrained by the limited ACL during three of the four years (i.e., 2012-2014) that were used to project future average effort levels. The status quo alternative, by continuing to have no season for red snapper, would potentially reduce overall future effort in the snapper grouper fishery in 2018 from 2012-2015 average hook-and-line effort levels and thus potentially decrease bycatch in the fishery in 2018 by some small amount. Overall snapper grouper fishing effort could increase in the commercial and recreational sectors slightly in response to the limited reopening(s) of red snapper under **Alternatives 2** through **5**, and therefore, increase the potential for bycatch, relative to the status quo. However, as stated in **Chapter 2** and analyzed in detail in this chapter, the reopenings would be of short duration in the

recreational sector and the commercial sector would be limited to an incidental catch limit of 75 lbs gw. Consequently, potential increases in overall fishing effort would be expected to be small based on the aforementioned information, and given listed species low capture rates in the snapper grouper fishery, potential increases in incidental captures of listed species from anticipated levels specified in the 2016 biological opinion would be very unlikely.

4.1.2 Economic Effects

As described in **Sections 1.7** and **4.1.1**, it is expected that the red snapper stock would continue to rebuild under the action alternatives despite allowing limited harvest of red snapper. Because no fishing would be expected to occur in 2018, **Alternative 1 (No Action)** would result in foregone short-term economic benefits to the commercial and recreational sectors.

The expected changes in commercial ex-vessel revenue and recreational consumer surplus (CS) relative to the status quo in 2018 (**Alternative 1 (No Action)**) under **Alternative 2**, **Alternative 3**, **Preferred Alternative 4**, and **Alternative 5** are provided in **Table 4.1.2.1**. For the commercial sector, the ex-vessel revenue is presented as a range, using two sets of projected landings. The lower bound is based on predicted landings under the current stock size and the upper bound is based on higher predicted landings that are adjusted for an increased stock size (see **Appendix N** and **Appendix O**). Although some small level of state landings have occurred in recent years during the federal closures, it is not expected that the current action would affect state landings and so they are excluded from this analysis.

Under **Alternative 2**, **Alternative 3**, **Preferred Alternative 4**, and **Alternative 5**, it is estimated that ex-vessel revenue would increase in 2018, relative to the status quo (**Alternative 1 (No Action)**), by a range of approximately $318,000 to $732,000 (2016 dollars; **Table 4.1.2.1**)[20]. Under these alternatives the commercial season would be open for 46 to 176 days in 2018. Estimates vary depending on the alternative being examined and the landings assumption used. With regard to economic effects on the recreational sector, it is estimated that recreational CS and season length would scale up proportionally to the ACL that is implemented. The increase in CS relative to **Alternative 1 (No Action)** is estimated to range from approximately $1.34 million to $4.52 million (2016 dollars).[21] The recreational season is estimated to be open for 2 to 28 days in 2018.

[20] Only 2012-2014 (the years when commercial harvest of red snapper in federal waters of the South Atlantic was open) were used for average price calculations. This is to minimize potential bias from misreported landings or variations in the size and quality of state- versus federally-caught fish during fully-closed years.

[21] The estimates of CS are based on a willingness to pay $81 for a second fish harvested on a trip (Carter and Liese 2012; 2016 dollars) (**Section 3.3.1**). An estimate for the first red snapper harvested on an angler trip is not available. Given the current one fish per person bag limit and the assumption of diminishing marginal utility per fish harvested, the CS estimate provided may potentially underestimate the value of allowing for red snapper harvest beginning in 2018.

Because **Alternatives 2** through **5** each set a constant ACL, it is assumed that the recurring annual economic effects associated with those alternatives in years subsequent to 2018 would be similar to the estimates provided in **Table 4.1.2.1**. Under **Alternative 5**, however, it was estimated that the full commercial ACL would not be reached by the end of the fishing year, so an increase in commercial red snapper catch rates over time could lead to even higher landings and ex-vessel revenue than what was estimated for 2018. If the full commercial ACL specified under **Alternative 5** is landed, it would generate an estimated ex-vessel revenue of approximately $1.08 million (2016 dollars). Conversely, a decrease in catch rates beyond 2018 could result in lower overall commercial landings and ex-vessel revenue under each of the alternatives. [22] It is expected that total recreational sector red snapper landings and CS would be less sensitive to potential changes in catch rates, because the season length could expand accordingly to allow for the full harvest of the ACL.

By allowing for recreational red snapper harvest, there is the potential that angler demand for for-hire (charter and headboat) trips would increase as well, resulting in increased booking rates and for-hire business net operating revenue (NOR). Due to the complex nature of angler behavior and the for-hire industry, it is not possible to quantify these potential economic effects with available data.[23] As such, no estimates of the change in for-hire NOR are provided, although they may exist. The estimates of NOR per charter and headboat trip in the South Atlantic are provided in **Section 3.3.1.2**. It is expected that as the ACL increases, so would the potential for increases in for-hire NOR. This is because a larger ACL would result in a longer red snapper fishing season, affording for-hire businesses greater opportunity to market and sell their services.

Table 4.1.2.1. Estimated change in commercial ex-vessel revenue, recreational consumer surplus (CS), and season length relative to the status quo in 2018.

	Commercial ex-vessel revenue (2016 dollars)	Commercial season length (days)*		Recreational consumer surplus (2016 dollars)	Recreational season length (days)**
Alternative 1 (No Action)	0	0		0	0
Alternative 2	$318,362	46 to 71		$1,334,880	2 to 4
Alternative 3	$545,981 to $598,518	141 to 176		$2,509,542	4 to 7
Preferred Alternative 4	**$545,981 to $572,901**	**105 to 176**		**$2,402,136**	**4 to 7**
Alternative 5	$545,981 to $731,614	176		$4,515,993	8 to 28

Source: SERO LAPP/DM (Appendix N and O) for landings and season length projections; WTP per red snapper from Carter and Liese (2012) (see **Section 3.3.1.1**); Ex-vessel average annual price (2012-2014 only) of $4.59 (2016 dollars) from SERO ACL dataset (May 2017).
*The commercial red snapper season would open on July 9, 2018, until which time the ACL is projected to be met.

[22] This assumes all other South Atlantic red snapper commercial management measures remain constant (i.e. season start date, size limit, trip limit).
[23] Anglers have heterogeneous preferences and may target and/or harvest a diverse mix of snapper grouper and other species on a trip. The absence of the opportunity to fish for any single species may or may not affect their overall desire to take/pay for trips.

**The recreational red snapper season would open on July 13, 2018, for Fridays, Saturdays, and Sundays only.

As discussed in **Section 3.3.1.1** and **Section 3.3.1.2**, commercial and recreational fishing for red snapper spurs business activity (economic impacts) in the region in which it occurs. This action may be reasonably expected to increase such business activity relative to the status quo, by increasing recreational and commercial expenditures on goods and services necessary for fishing and by increasing the supply of red snapper into the seafood value chain. Although retail prices for red snapper would likely be tempered by substitute finfish species and snapper imports, fresh locally-caught red snapper may fetch a price premium in seafood markets and restaurants, resulting in an increase in producer surplus. In addition, because seafood consumers may have strong preferences for locally-caught red snapper over other seafood options, it could result in an increase in consumer surplus as well. These potential economic benefits cannot be quantified with available data.

In addition to the short-term economic effects described above, medium to long-term indirect negative economic effects could ensue from this action as a result of its effects on the red snapper stock, future management decisions, and future catch rates. If future catch limits and/or catch rates are reduced as a result of a declining stock, it could negatively affect profits for commercial and for-hire business, as well as CS for recreational anglers. It is not known if any of the alternatives would be likely to jeopardize the sustainability of the stock but indirect negative economic effects would become more likely with each incremental increase in the ACL. Apart from **Alternative 1 (No Action)**, **Alternative 2** would be the least likely of the alternatives considered to result in indirect negative economic effects, because it has the most biologically conservative ACL, followed by **Preferred Alternative 4**, **Alternative 3**, and **Alternative 5**.

Given the increasing economic benefits associated with higher ACLs for red snapper, **Alternative 5** would be expected to provide the largest positive economic effects, at least in the short-term, followed by **Alternative 3**, **Preferred Alternative 4**, **Alternative 2**, and **Alternative 1 (No Action)**.

4.1.3 Social Effects

The communities with the largest levels of red snapper landings, in addition to communities with highest engagement and reliance on commercial and recreational fishing are described in **Section 3.3.2**. Red snapper is an extremely popular species, especially for participants in the recreational sector. The absence of a fishing season for red snapper in recent years has been highly controversial with negative effects on recreational anglers, for-hire businesses, and commercial vessels, especially when compared to the benefits to fishermen during the allowed seasons in 2012, 2013, and 2014. The social effects of the proposed alternatives are expected to be associated with restricted access to the red snapper resource for several years, combined with distrust in science and management due to inconsistency in what fishermen see on the water versus the scientific models. Additionally, there would be social effects associated with

transforming discards into landings if there is a fishing season, along with social effects of improved data collection during a fishing season.

Alternative 1 (No Action) would keep the current system that determines if red snapper harvest would be allowed each year, based on removals from the previous year. In the most recent years (2015, 2016, and 2017), there has been no red snapper season, even for a few days. The rebuilding plan for red snapper implemented through Amendment 17A (SAFMC 2010) is considered to be working successfully, and this should lead to expected benefits to the fishermen. However, the outcome of the successful rebuilding plan is that interactions with red snapper have become more difficult to avoid, which leads to a discard rate that results in high levels of removals each year. Under current conditions, it is likely that there would be no open fishing seasons for red snapper in the foreseeable future under **Alternative 1 (No Action)**.

Input from fishermen indicates that they are more and more frustrated with the waste of the resource due to discards of red snapper. Additionally, under **Alternative 1 (No Action)**, there is distrust in the science because harvest is prohibited, but fishermen report that there are plenty of red snapper. The current system sends a conflicting message to fishermen in that regulations are intended to protect stocks and rebuild overfished stocks, but there would be no benefit to the fishermen because the Council and NMFS cannot allow any harvest of red snapper.

By allowing harvest under an ACL for red snapper in **Alternatives 2** through **5**, there should be positive social effects as the alternatives would allow fishermen to harvest this popular species, in addition to revenue generated for charter/headboat and commercial businesses when compared to **Alternative 1 (No Action)**. It is assumed that with available ACL, there would be increased fishing opportunities for private, for-hire, and commercial fishermen, and that there would be fewer discards as these fish are landed. Therefore, with the expected ACLs under the proposed alternatives, the most social benefits would be expected under **Alternative 5**, followed by **Alternative 3**, **Preferred Alternative 4**, **Alternative 2,** and then **Alternative 1 (No Action).**

4.1.4 Administrative Effects

Under **Alternative 1 (No Action)**, the administrative burden would continue with enforcement of the current prohibition of red snapper and calculation of the ACL each year. **Alternative 2, Alternative 3, Preferred Alternative 4,** and **Alternative 5** would include the administrative burden of rule-making, data monitoring, outreach, and enforcement of the new ACLs. Therefore, administrative effects would be least under **Alternative 1 (No Action)** when compared with **Alternative 2, Alternative 3, Preferred Alternative 4,** and **Alternative 5.**

Chapter 5. Council's Choice for the Preferred Alternatives

5.1 Revise the Process to Determine the Annual Catch Limits for Red Snapper

5.1.1 Snapper Grouper Advisory Panel Comments and Recommendations

The Snapper Grouper Advisory Panel discussed actions related to red snapper during their April 17-19, 2017, meeting. At that time different actions were considered including an alternative for an annual catch limit that differed from the one currently proposed. Hence, the Snapper Grouper Advisory Panel did not have recommendations for setting the annual catch limits for red snapper. Regarding possible management measures, Advisory Panel members offered the following comments:

- Regarding a possible commercial trip limit, the Advisory Panel stated that specifying it in numbers of fish might lead to high grading. If the allowable harvest results in a low trip limit, then don't consider a minimum size limit.
- Because of the depths where commercial harvest takes place, there shouldn't be a minimum size limit requirement. Consider full retention for the commercial sector.
- Red snapper should continue to be managed as a bycatch fishery in the commercial sector.
- Consider initially allowing a recreational harvest two days per week to make it easier for fishermen to plan trips and for enforcement.

Alternatives*

Alternative 1 (No Action): The commercial and recreational annual catch limits for red snapper are zero. Process in place to allow limited harvest based on ABC.

Alternative 2. Remove the process and equation used to determine the red snapper ACL as specified in Snapper Grouper Amendment 28. Specify Total ACL = 23,623 fish. Commercial ACL = 69,360 lbs (whole weight). Recreational ACL = 16,480 fish.

Alternative 3. Remove the process and equation used to determine the red snapper ACL as specified in Snapper Grouper Amendment 28. Specify Total ACL = 44,411 fish. Commercial ACL = 130,396 lbs (whole weight). Recreational ACL = 30,982 fish.

Preferred Alternative 4. Remove the process and equation used to determine the red snapper ACL as specified in Snapper Grouper Amendment 28. Specify Total ACL = 42,510 fish. Commercial ACL = 124,815 lbs (whole weight). Recreational ACL = 29,656 fish.

Alternative 5. Remove the process and equation used to determine the red snapper ACL as specified in Snapper Grouper Amendment 28. Specify Total ACL = 79,919 fish. Commercial ACL = 234,652 lbs (whole weight). Recreational ACL = 55,753 fish.

* Refer to Chapter 2 for detailed language of alternatives

5.1.2 Law Enforcement Advisory Panel Comments and Recommendations

The Law Enforcement Advisory Panel discussed red snapper actions during their May 18-19, 2017, meeting. At that time different actions were considered including an alternative for an annual catch limit that differed from the one currently proposed. Hence, the Law Enforcement Advisory Panel did not have recommendations for setting the annual catch limit for red snapper. Regarding possible management measures, Law Enforcement Advisory Panel members offered the following comments:

- For small trip limit amounts (i.e., 25 pounds) it would be easier to specify trip limit in numbers of fish.
- High-grading is a concern and not easy to prevent; using numbers instead of weight would be useful for enforcement.

5.1.3 Scientific and Statistical Committee Comments and Recommendations

The Scientific and Statistical Committee discussed red snapper actions during their April 25-27, 2017, meeting. At that time actions for red snapper included bag, trip, and minimum size limits, and seasons for recreational and commercial sectors, as well as potential area and season combinations. Also included were options to establish a permit and reporting requirements for private recreational fishermen and best fishing practices. Alternatives for an annual catch limit differed from the one currently proposed; and therefore, the Scientific and Statistical Committee did not provide recommendations on the current alternatives. Below are summarized comments/recommendations from the meeting report on the red snapper stock assessment:

- The Scientific and Statistical Committee received a presentation from Southeast Fisheries Science Center staff on revisions to the red snapper assessment (SEDAR 41 2017). The revisions addressed the headboat discard index Southeast Fisheries Science Center staff indicated that the differences between the original and corrected assessment were minimal but the new likelihood estimator was not investigated in the corrected assessment. However, the Scientific and Statistical Committee noted that the corrected maximum sustainable yield is 7% lower than in the original assessment, and a side by side comparison was not included in the report. The results of the corrected assessment were not further discussed as the Scientific and Statistical Committee was unable to provide an acceptable biological catch recommendation for red snapper.
- Scientific and Statistical Committee staff clarified that the red snapper assessment is still considered best scientific information available. However, the data available to monitor the landings and discards are too uncertain to track any projected acceptable biological catch. Therefore, an index-based approach is being proposed to track and monitor the condition of red snapper.
- The projected yield streams from SEDAR 41 (2017) are still considered best scientific information available, but are not useful for management and monitoring because of the uncertainty in the catch data (as most of the catch is discarded).

The Scientific and Statistical Committee provided further comments and recommendations on red snapper management that are not directly relevant to the action proposed in Amendment 43. Refer to the April 2017 Scientific and Statistical Committee report for additional details.

5.1.4 Public Comments and Recommendations

The South Atlantic Fishery Management Council held public scoping meetings from January 23 to February 8, 2017, at various locations in the four South Atlantic states. The actions included for scoping at that time differ from what is being considered currently in Amendment 43. A summary of public comments received during those meetings was provided to the Snapper Grouper Committee at the March 2017 South Atlantic Fishery Management Council meeting in Jekyll Island, Georgia. The summary also included written comments received via the online comment form on the South Atlantic Fishery Management Council's Website or other means such as by mail, fax, or email. In total, there were 144 comments provided during the public comment period that ended on February 10, 2017. Of these, 69 were submitted verbally and 77 were submitted in writing. The summary of comments can be found on the March 2017 meeting briefing book available on the South Atlantic Fishery Management Council's Website.

The South Atlantic Fishery Management Council held public hearings on Amendment 43 via webinar on August 3-10, 2017. In total, there were 113 comments for Amendment 43 provided during the public comment period that ended on August 15, 2017. Of these comments, six were submitted verbally and 107 were submitted in writing.

- Three of the six comments on the webinar public hearings were in favor of Alternative 5.
- One comment was written in support of Alternative 1.
- One comment was written in support of Alternative 3.
- Six comments were written in support of Alternative 5.

Several comments not did not specifically support an alternative. The comments are included in the September 2017 South Atlantic Fishery Management Council Briefing Book under Tab 01 in attachment 5a_AM43_PublicComment.pdf. The following is a summary of the comments. Almost all suggested the red snapper population was larger today than in recent history. Some comments were in favor of opening red snapper harvest while other urged caution on opening and recommended delaying the amendment. Some comments suggested the discard mortality estimate was too high while others suggested the discard mortality estimate was too low. Several different options for recreational bag limits were mentioned ranging from one fish vessel to two fish per person. Some fishermen recommended seasons and timing of the season. Some recommended additional restrictions for the commercial sector. Some suggested improvements to management or commented on management and their frustration with it.

Public comments were also taken during the September 25-29, 2017, South Atlantic Fishery Management Council Meeting. There were 10 comments provided during the comment period at the meeting.

- Three commenters were in favor of taking the amendment to the Scientific and Statistical Committee for further review, developing a reporting program, and improve outreach on descending devices. These commenters were not in favor of the amendment.
- Four commenters were in favor of **Alternative 5**.
- Three commenters were in favor of the highest alternative which would produce a sustainable harvest.

5.1.5 South Atlantic Fishery Management Council's Rationale

In general, an annual catch limit cannot exceed the acceptable biological catch recommended by a fishery management council's scientific and statistical committee, and may be set annually or on a multiyear plan basis. Annual catch limits, in coordination with accountability measures, must prevent overfishing. The National Standard 1 guidelines specify that fishery management councils can choose to account for management uncertainty by setting the annual catch limit below the acceptable biological catch, but state that annual catch limits may typically be set very close to the acceptable biological catch. However, in the case of red snapper, there is concern that uncertainty in recreational landings and discards inhibits the ability to set an acceptable biological catch that can be effectively monitored. The South Atlantic Fishery Management Council recognized that developing an acceptable biological catch that can be effectively monitored would require considerable time and would delay development of Amendment 43; therefore, the South Atlantic Fishery Management Council moved actions related to the acceptable biological catch to Amendment 46, which they will work on starting with the December 2017 South Atlantic Fishery Management Council meeting.

National Standard 2 Guidelines urge the development of mandatory actions as quickly as possible. In June 2017, the South Atlantic Fishery Management Council obtained new information from a scientific monitoring program indicating the red snapper stock was recovering. The South Atlantic Fishery Management Council felt this preliminary information from the chevron trap monitoring program conducted by the Southeast Reef Fish Survey program provided sufficient data for the South Atlantic Fishery Management Council to develop a revised annual catch limit for red snapper. This long-term fishery-independent survey shows a steep upward trend in relative abundance, reaching the highest levels to date in 2016. The survey suggests that the South Atlantic red snapper population has increased substantially since 2014. The increase occurred despite landings in 2012 to 2014 during short harvest openings and despite the associated discard mortality from 2012 through 2016. Furthermore, the waste of the resource due to continued discarding of red snapper while targeting co-occurring species represents a serious conservation and management problem that increasingly frustrates fishermen. Allowing limited harvest of red snapper would generate revenue for charter/headboat, commercial, and tackle/retail businesses. The South Atlantic Fishery Management Council recommended setting the red snapper annual catch limit equal to the catch that was reported during the 2014 season (**Preferred Alternative 4**). They considered this approach a simple and transparent way to specify a new red snapper annual catch limit based on the available data. The monitoring program indicates the stock has grown to its highest relative value after the 2014 harvest and the

level of discard mortality that occurred in 2014 onwards, suggesting that setting the annual catch limit at the 2014 level would not result in increased risk of overfishing. **Alternative 3** and **Alternative 5** considered in this amendment used a formula to calculate the annual catch limit; however, annual catch limits for these alternatives are higher than past observed landings levels and the South Atlantic Fishery Management Council did not choose these alternatives because they might increase the risk of overfishing. **Alternative 5** was suggested by many stakeholders as their preferred option; however, this alternative had the highest risk of overfishing.

Although there were numerous stakeholder recommendations to delay the amendment and thus allow the annual catch limit alternatives to be reviewed by the Scientific and Statistical Committee, the South Atlantic Fishery Management Council concluded that a delay could result in no red snapper season in 2018, and setting the annual catch limit at the level in **Preferred Alternative 4** would be sufficiently conservative to prevent overfishing. Based on preliminary estimates of mortality and the current process to determine the annual catch limit for 2018 (established through Amendment 28), red snapper harvest would not be expected in 2018 because total mortality appears to exceed the allowable biological catch. Estimates of recreational discards account for the majority of the total mortality and it has been recognized that there is a considerable degree of uncertainty around the discard estimates from the recreational sector. Moreover, by keeping red snapper closed for an additional season, the positive economic and social impacts to commercial and recreational operations and benefits to associated businesses and communities would not be realized. Further, additional fishery-dependent data would not be collected to provide insight into future red snapper assessments.

While the limited season is open under **Preferred Alternative 4**, the other management measures established in Amendment 28 would remain in place: a recreational bag limit of one red snapper per person, a commercial trip limit of 75 pounds gutted weight, and no minimum size limit. Additionally, fishery-dependent biological sampling would be conducted during the open season to provide needed information for future stock assessments. The Council encouraged staff to develop a webpage on best fishing practices (http://safmc.net/electronic-reporting-projects/red-snapper-reporting/) and to work with Snook and Gamefish Foundation to develop MyFishCount, which is a webportal that allows private recreational an opportunity to report their landed and released fish, length of fish, hook type, hook location, fishing location, and release method.

The amount of harvest provided under **Preferred Alternative 4** is equivalent to the amount of harvest observed in the 2014 fishing season. As discussed above, since 2014, the red snapper population has continued to increase as noted by the long-term fishery-independent survey information presented to the South Atlantic Fishery Management Council in June 2017. In addition, information presented to the South Atlantic Fishery Management Council by the Florida Fish and Wildlife Commission on September 25, 2017, also documented increases in relative abundance of red snapper since 2014. Therefore, the South Atlantic Fishery Management Council has determined that allowing the limited amount of harvest beginning in 2018 is unlikely to result in overfishing or prevent red snapper from rebuilding within the rebuilding timeframe.

The South Atlantic Fishery Management Council was also presented results of different stock assessments developed in SEDAR 41 (2017), which included different stock statuses, sustainable harvest levels, and fishing mortality estimates depending on the model. The model recommended by the Scientific and Statistical Committee and SEDAR reviewers was the age-structured Beaufort Assessment Model (BAM) that indicated the stock was overfished and overfishing was occurring, but a secondary biomass production model (ASPIC) indicated the stock was no longer overfished and overfishing was not occurring. The age-structured model has been the preferred model to determine sustainable harvest when available, but when age data are not available the biomass production model is used for other stocks. Although the South Atlantic Fishery Management Council supports the use of the age-structured model to determine the stock status for red snapper, the biomass model does indicate there is some uncertainty in the conclusions of overfishing and overfished condition.

The South Atlantic Fishery Management Council concluded that **Preferred Alternative 4** was the best alternative to revise the process to determine the annual catch limit for the red snapper component of the snapper grouper fishery and allow limited harvest of red snapper without jeopardizing rebuilding goals or risking overfishing. The preferred alternative also best meets the objectives of the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

5.1.6 How is this Action Addressing the Vision Blueprint for the Snapper Grouper Fishery?

The Vision Blueprint for the Snapper Grouper Fishery was approved in December 2015 and is intended to inform management of the snapper grouper fishery through 2020. As such, the Vision Blueprint serves as a "living document" to help guide future management, builds on stakeholder input and how the South Atlantic Fishery Management Council envisions future management of the fishery, guides the development of new amendments that address priority objectives and strategies, and illustrates actions that could be developed through the regular amendment process. The Vision Blueprint is organized into four strategic goal areas: (1) Science, (2) Management, (3) Communication, and (4) Governance. Each goal area has a set of objectives, strategies, and actions.

The action to revise the annual catch limit for red snapper in the South Atlantic would address Objective 3: "Ensure that management decisions help maximize social and economic opportunity for all sectors" under the Management Goal. Specifically, the Action would respond to Strategy 3.2: "Consider development of management approaches that support recreational fishing and allow increased opportunity for trip satisfaction." Allowing limited recreational harvest of red snapper in the South Atlantic is expected to increase fishing opportunities and trip satisfaction for fishermen who have very limited access to red snapper in recent years. In addition, Action B under Strategy 3.2 to "Consider mechanisms based on abundance and

availability of easily accessible species" is also being addressed through the action in Amendment 43 since allowing a limited harvest of red snapper is being considered based partly on recent increases in abundance as indicated by a scientific survey. As the red snapper stock in the South Atlantic region continues to rebuild, fishermen are interacting with red snapper more frequently as evidenced by the estimates of discarded fish and fishermen's testimony. Further, the action being considered in Amendment 43 to specify the timeframe during which retention of red snapper would be allowed responds to a "hot topic" under Objective 3 to "Set a fishing season at the beginning of the fishing year with known open and close dates."

Chapter 6. Cumulative Effects

6.1 Affected Area

The immediate impact area would be the federal 200-mile limit of the Atlantic off the coasts of North Carolina, South Carolina, Georgia, and east Florida to Key West, which is also the South Atlantic Fishery Management Council's (Council) area of jurisdiction. In light of the available information, the extent of the boundaries would depend upon the degree of fish immigration/emigration and larval transport, whichever has the greatest geographical range. The ranges of affected species are described in **Section 3.2**. For the actions found in Amendment 43, the cumulative effects analysis (CEA) includes an analysis of data from 2012 through 2017.

6.2 Past, Present, and Reasonably Foreseeable Actions Impacting the Affected Area

Fishery managers implemented the first significant regulations pertaining to red snapper in 1983 through the Snapper Grouper FMP (Snapper Grouper FMP; SAFMC 1983). The regulations included a 12-inch total length minimum size limit for red snapper. Listed below are other past, present, and reasonably foreseeable actions occurring in the South Atlantic region. These actions, when added to the proposed management measures, may result in cumulative effects on the biophysical and socio-economic environment. The complete history of management of the snapper grouper fishery can be found in **Appendix C (History of Management)** and **Section 1.8**.

Past Actions

Amendment 28 to the Snapper Grouper FMP set the commercial and recreational red snapper annual catch limits (ACL) at zero and established a process for setting fishing seasons to allow limited harvest of red snapper in the South Atlantic. The regulations were effective on August 23, 2013.

The South Atlantic Headboat Reporting Amendment was implemented on January 27, 2014, and requires that all federally-permitted headboats on the South Atlantic report their landings information electronically, and on a weekly basis to improve the timeliness and accuracy of harvest data.

The Generic Dealer Reporting Amendment, which became effective on August 7, 2014, established one dealer permit for the Gulf of Mexico and South Atlantic regions and increased the reporting frequency requirements for species managed by the Council and Gulf of Mexico Fishery Management Council. This amendment is expected to improve fisheries data collection, through more timely and accurate dealer reporting, and streamline the dealer permit system.

Amendment 29 to the Snapper Grouper FMP, which became effective on July 1, 2015, updated the Council's acceptable biological catch (ABC) control rule to incorporate methodology for determining the ABC of "Only Reliable Catch Stocks"; (2) adjusted ABCs for the affected unassessed species; (3) specified annual catch limits (ACLs) for 7 species based on the updated ABCs; and (4) modified management measures for gray triggerfish in federal waters of the South Atlantic region (SAFMC 2014b).

The Generic Accountability Measures (AM) and Dolphin Allocation Amendment, in part, modified AMs for snapper grouper species (including mutton snapper) to make them more consistent with AMs already implemented for other species and other fishery management plans. The regulations became effective on February 22, 2016.

The final rule for Amendment 37 to the Snapper Grouper FMP modified the hogfish fishery management unit, specify fishing levels for the two South Atlantic hogfish stocks, established a rebuilding plan for the Florida Keys/East Florida stock, and establish/revise management measures for both hogfish stocks in the South Atlantic Region, such as minimum size limits, recreational bag limits, and commercial trip limits. The regulations became effective on August 24, 3017.

An emergency rule, which became effective on November 2, 2017, established red snapper seasons for the commercial and recreational sectors in the South Atlantic EEZ in 2017.

Present Actions

Amendment 41 to the Snapper Grouper FMP updates the maximum sustainable yield, ABC, ACL, optimum yield, and minimum stock size threshold; designates spawning months for regulatory purposes; and revises management measures for mutton snapper. The notice of availability published on September 26, 2017, and the proposed rule published on October 24, 2017.

Reasonably Foreseeable Future Actions

The Vision Blueprint Recreational Amendment (Amendment 26) for the Snapper Grouper FMP considers actions to evaluate and modify the composition of the recreational aggregate snapper bag limit, recreational aggregate grouper bag limit, and the recreational aggregate for species without a bag limit. The amendment would also consider modifying the current recreational prohibition on harvest and possession of shallow water groupers, remove the recreational minimum size limit for deep-water species, modify the recreational minimum size limit for black sea bass, and modify the recreational minimum size limit for gray triggerfish off east Florida.

The Vision Blueprint Commercial Regulatory Amendment (Regulatory Amendment 27) for the Snapper Grouper FMP proposes revisions to commercial management measures such as split

seasons and trip limits and proposes complementary changes to those proposed for the recreational sector in Vision Blueprint Recreational Regulatory Amendment (Regulatory Amendment 26).

The For-Hire Reporting Amendment would require charter vessels with federal permits to regularly report their landings information for snapper grouper, dolphin wahoo, and coastal migratory pelagics electronically. Including charter boats in the recreational harvest reporting system would further improve the agency's ability to monitor recreational catch rates in-season. The amendment has been submitted for review by the Secretary of Commerce.

Amendment 46 to the Snapper Grouper FMP would consider acceptable biological catch levels and adaptive management measures (descending devices, etc.) to reduce discards in the red snapper component of the snapper grouper fishery.

Expected Impacts from Past, Present, and Future Actions

The alternatives for the red snapper segment of the snapper grouper fishery, are not expected to result in significant cumulative adverse biological or socio-economic effects (see **Chapter 4**). The proposed action would allow limited harvest of red snapper in the South Atlantic beginning in 2018, and is expected to reduce, to the extent practicable, existing adverse socio-economic impacts to fishermen and fishing communities that utilize the red snapper portion of the snapper grouper fishery, without overfishing, and while continuing to rebuild the stock as per the Magnuson-Stevens Fishery Conservation and Management Act.

The action (see **Chapter 4** for details) would allow limited harvest of red snapper in the South Atlantic beginning in 2018. Positive socio-economic effects are expected. Fishery-dependent and independent information supports evidence of an increasing red snapper population in the South Atlantic in recent years. Therefore, the limited harvest by the commercial and recreational sectors is expected to prevent overfishing from occurring and continuing to rebuild the stock (see **Section 1.7**).

The red snapper component of the snapper grouper fishery was closed from 2010 to 2017 except for mini-seasons in 2012, 2013, 2014, and 2017 (emergency action in 2017). When combined with the impacts of past, present, and future actions affecting the snapper grouper fishery, specifically red snapper, minor cumulative impacts are likely to accrue, such as monitoring ACLs for the commercial and recreational sectors, and socio-economic benefits associated with improved management strategies. Amendments considered by the Council that are intended to increase the frequency of reporting by dealers and fishermen are likely to benefit the human environment through more timely biological protections and unnecessary delay in data availability, leading to more stable market conditions. Therefore, the likely cumulative socio-economic effects would be improved commercial and recreational fishing opportunities, and benefits to associated businesses and communities.

6.3 Consideration of Climate Change and Other Non-Fishery Related Issues

Climate Change

Global climate changes could have significant effects on South Atlantic fisheries, though the extent of these effects on the snapper grouper fishery is not known at this time. The Environmental Protection Agency's climate change webpage (https://www.epa.gov/climate-indicators/marine-species-distribution), and NOAA's Office of Science and Technology climate webpage (https://www.st.nmfs.noaa.gov/ecosystems/climate/index), provides background information on climate change, including indicators which measure or anticipate effects on oceans, weather and climate, ecosystems, health and society, and greenhouse gases. The United Nations Intergovernmental Panel on Climate Change's Fifth Assessment Report also provides a compilation of scientific information on climate change (November 2, 2014). Those findings are summarized below.

Ocean acidification, or a decrease in surface ocean pH due to absorption of anthropogenic carbon dioxide emissions, affects the chemistry and temperature of the water. Increased thermal stratification alters ocean circulation patterns, and causes a loss of sea ice, sea level rise, increased wave height and frequency, reduced upwelling, and changes in precipitation and wind patterns. Changes in coastal and marine ecosystems can influence organism metabolism and alter ecological processes such as productivity, species interactions, migration, range and distribution, larval and juvenile survival, prey availability, and susceptibility to predators. The "center of biomass," a geographical representation of each species' weight distribution, is being used to identify the shifting of fish populations. Warming sea temperature trends in the southeast have been documented, and animals must migrate to cooler waters, if possible, if water temperatures exceed survivable ranges (Needham et al. 2012). Harvesting and habitat changes also cause geographic population shifts. Changes in water temperatures may also affect the distribution of native and exotic species, allowing invasive species to establish communities in areas they may not have been able to survive previously. The combination of warmer water and expansion of salt marshes inland with sea-level rise may increase productivity of estuarine-dependent species in the short term. However, in the long term, this increased productivity may be temporary because of loss of fishery habitats due to wetland loss (Kennedy et al. 2002). The numerous changes to the marine ecosystem may cause an increased risk of disease in marina biota. An increase in the occurrence and intensity of toxic algae blooms will negatively influence the productivity of keystone animals, such as corals, and critical coastal ecosystems such as wetlands, estuaries, and coral reefs (Kennedy et al. 2002; IPCC 2014).

Climate change may impact snapper grouper species in the future, but the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts will occur.

In the near term, it is unlikely that the management measures contained in Amendment 43 would compound or exacerbate the ongoing effects of climate change on snapper grouper species.

Weather Variables

Hurricane season is from June 1 to November 30, and accounts for 97% of all tropical activity affecting the Atlantic basin. These storms, although unpredictable in their annual occurrence, can devastate areas when they occur. Although these effects may be temporary, those fishing-related businesses whose profitability is marginal may go out of business if a hurricane strikes.

Deepwater-Horizon Oil Spill

On April 20, 2010, an explosion occurred on the Deepwater Horizon MC252 oil rig, resulting in the release of an estimated 4.9 million barrels of oil into the Gulf of Mexico (Gulf). In addition, 1.84 million gallons of Corexit 9500A dispersant were applied as part of the effort to constrain the spill. The cumulative effects from the oil spill and response may not be known for several years. The oil spill affected more than one-third of the Gulf area from western Louisiana east to the panhandle of Florida and south to the Campeche Bank in Mexico. The impacts of the Deepwater Horizon MC252 oil spill on the physical environment are expected to be significant and may be long-term. Oil is dispersed on the surface, and because of the heavy use of dispersants, oil is also documented as being suspended within the water column, some even deeper than the location of the broken well head. Floating and suspended oil washed onto shore in several areas of the Gulf, as well as non-floating tar balls. Whereas suspended and floating oil degrades over time, tar balls are more persistent in the environment and can be transported hundreds of miles. 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. Zooplankton that feed on algae could also be negatively impacted, thus allowing more of the hypoxia-fueling algae to grow.

The highest concern is that the oil spill may have impacted spawning success of species that spawn in the summer months, either by reducing spawning activity or by reducing survival of the eggs and larvae. Effects on the physical environment, such as low oxygen, could lead to impacts on the ability of larvae and post-larvae to survive, even if they never encounter oil. In addition, effects of oil exposure may create sub-lethal effects on the eggs, larva, and early life stages. The stressors could potentially be additive, and each stressor may increase the susceptibility to the harmful effects of the other. The oil from the spill site was not detected in the South Atlantic region, and does not likely pose a threat to the South Atlantic species addressed in this amendment. However, the effects of the oil spill on fish species would be taken into consideration in future Southeast Data Assessment and Review assessments. Indirect and inter-related effects on the biological and ecological environment of the fisheries in concert with the Deepwater Horizon MC252 oil spill are not well understood. Changes in the population size

structure could result from shifting fishing effort to specific geographic segments of populations, combined with any anthropogenically induced natural mortality that may occur from the impacts of the oil spill. The impacts on the food web from phytoplankton, to zooplankton, to mollusks, to top predators may be significant in the future.

6.4 Overall Impacts Expected from Past, Present, and Future Actions

The proposed management actions are summarized in **Chapter 2** of this document. Detailed discussions of the magnitude and significance of the impacts of the alternative on the human environment appear in **Chapter 4** of this document. None of the impacts of the action in this amendment, in combination with past, present, and future actions have been determined to be significant. Although several other management actions, in addition to this amendment, are expected to affect snapper grouper, including red snapper, any additive effects, beneficial and adverse, are not expected to result in a significant level of cumulative impacts.

The proposed actions would not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places as these are not in the South Atlantic exclusive economic zone (EEZ). This action is not likely to result in direct, indirect, or cumulative effects to unique areas, such as significant scientific, cultural, or historical resources, park land, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas as the proposed action is not expected to substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort within the South Atlantic region. The U.S. Monitor, Gray's Reef, and Florida Keys National Marine Sanctuaries are within the boundaries of the South Atlantic EEZ. The proposed action is not likely to cause loss or destruction of these national marine sanctuaries because the actions are not expected to result in appreciable changes to current fishing practices. Additionally, the proposed action is not likely to change the way in which the snapper grouper fishery is prosecuted; therefore, the actions are not expected to result in adverse impacts on health or human safety beyond the status quo.

6.5 Monitoring and Mitigation

Fishery-independent and fishery-dependent data comprise a significant portion of information used in stock assessments. Fishery-independent data for red snapper are being collected through the Southeast Fishery Information Survey and the Marine Resources Monitoring Assessment and Prediction Program. The prohibition on harvest and possession of red snapper beginning in early 2010 reduced the collection of fishery-dependent data. The lack of this information has hindered the ability to assess the stock status of the red snapper population and the progress towards rebuilding to target levels. The retention of red snapper through these alternatives would create an opportunity to collect important life history information that fishery scientists could use in a future SEDAR stock assessment for red snapper. The effects of the proposed action are, and would continue to be, monitored through collection of red snapper landings data by all the four states in the South Atlantic Region (Florida, Georgia,

South Carolina, and North Carolina). The National Marine Fisheries Service would continue to monitor and collect information on red snapper for stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations. The proposed action relates to the harvest of indigenous species in the Atlantic, and the activities/regulations being altered does not introduce non-indigenous species, and is not reasonably expected to facilitate the spread of such species through depressing the populations of native species. Additionally, these alternatives do not propose any activity, such as increased ballast water discharge from foreign vessels, which is associated with the introduction or spread on non-indigenous species.

Chapter 7. List of Interdisciplinary Plan Team (IPT) Members

Name	Agency/Division	Title
Manny Antonaras	SERO/OLE	Deputy Special Agent in Charge
Myra Brouwer	SAFMC	Fishery Biologist
David Carter	SEFSC	Economist
Brian Cheuvront	SAFMC	Deputy Executive Director
Chip Collier	SAFMC	Interdisciplinary plan team (IPT) Lead/ Biologist
Scott Crosson	SEFSC	Economist
David Dale	SERO/HC	EFH Specialist
Rick DeVictor	SERO/SF	Fishery Biologist
Tracy Dunn	SERO/OLE	Assistant Director
Mike Errigo	SAFMC	Data Analyst
Nick Farmer	SERO/SF	Data Analyst
John Hadley	SAFMC	Economist
Frank Helies	SERO/SF	IPT Co-Lead/Fishery Biologist
Mike Larkin	SERO/SF	Data Analyst
Jennifer Lee	SERO/PR	Fishery Biologist
Jack McGovern	SERO/SF	Assistant Regional Administrator
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Scott Sandorf	SERO/SF	Technical Writer and Editor
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Noah Silverman	NMFS/SER	Regional NEPA Coordinator
Monica Smit-Brunello	NOAA GC	General Counsel

NMFS = National Marine Fisheries Service, SAFMC = South Atlantic Fishery Management Council, SF = Sustainable Fisheries Division, PR = Protected Resources Division, SERO = Southeast Regional Office, HC = Habitat Conservation Division, GC = General Counsel

Chapter 8. Agencies and Persons Consulted

Responsible Agency

South Atlantic
South Atlantic Fishery Management Council
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Environmental Assessment:

List of Agencies, Organizations, and Persons Consulted

SAFMC Law Enforcement Advisory Panel
SAFMC Snapper Grouper Advisory Panel
SAFMC Scientific and Statistical Committee
North Carolina Coastal Zone Management Program
South Carolina Coastal Zone Management Program
Georgia Coastal Zone Management Program
Florida Coastal Zone Management Program
Florida Fish and Wildlife Conservation Commission
Georgia Department of Natural Resources
South Carolina Department of Natural Resources
North Carolina Division of Marine Fisheries
North Carolina Sea Grant
South Carolina Sea Grant
Georgia Sea Grant
Florida Sea Grant
Atlantic States Marine Fisheries Commission
Gulf and South Atlantic Fisheries Development Foundation
Gulf of Mexico Fishery Management Council
National Marine Fisheries Service
- Washington Office
- Office of Ecology and Conservation
- Southeast Regional Office
- Southeast Fisheries Science Center

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Appendix A. Considered But Rejected Alternatives

No actions or alternatives were removed from further analysis. Several actions considered in an early version of Amendment 43 were moved into Amendment 46.

Appendix B. Glossary

Allowable Biological Catch (ABC): Maximum amount of fish stock than can be harvested without adversely affecting recruitment of other components of the stock. The ABC level is typically higher than the total allowable catch, leaving a buffer between the two.

ALS: Accumulative Landings System. NMFS database which contains commercial landings reported by dealers.

Biomass: Amount or mass of some organism, such as fish.

B_{MSY}: Biomass of population achieved in long-term by fishing at F_{MSY}.

Bycatch: Fish harvested in a fishery, but not sold or kept for personal use. Bycatch includes economic discards and regulatory discards, but not fish released alive under a recreational catch and release fishery management program.

Caribbean Fishery Management Council (CFMC): One of eight regional councils mandated in the Magnuson-Stevens Fishery Conservation and Management Act to develop management plans for fisheries in federal waters. The CFMC develops fishery management plans for fisheries off the coast of the U.S. Virgin Islands and the Commonwealth of Puerto Rico.

Catch Per Unit Effort (CPUE): The amount of fish captured with an amount of effort. CPUE can be expressed as weight of fish captured per fishing trip, per hour spent at sea, or through other standardized measures.

Charter Boat: A fishing boat available for hire by recreational anglers, normally by a group of anglers for a short time period.

Cohort: Fish born in a given year. (See year class.)

Control Date: Date established for defining the pool of potential participants in a given management program. Control dates can establish a range of years during which a potential participant must have been active in a fishery to qualify for a quota share.

Constant Catch Rebuilding Strategy: A rebuilding strategy where the allowable biological catch of an overfished species is held constant until stock biomass reaches B_{MSY} at the end of the rebuilding period.

Constant F Rebuilding Strategy: A rebuilding strategy where the fishing mortality of an overfished species is held constant until stock biomass reached BMSY at the end of the rebuilding period.

Directed Fishery: Fishing directed at a certain species or species group.
Discards: Fish captured, but released at sea.

Discard Mortality Rate: The % of total fish discarded that do not survive being captured and released at sea.

Derby: Fishery in which the TAC is fixed and participants in the fishery do not have individual quotas. The fishery is closed once the TAC is reached, and participants attempt to maximize their harvests as quickly as possible. Derby fisheries can result in capital stuffing and a race for fish.

Effort: The amount of time and fishing power (i.e., gear size, boat size, horsepower) used to harvest fish.

Exclusive Economic Zone (EEZ): Zone extending from the shoreline out to 200 nautical miles in which the country owning the shoreline has the exclusive right to conduct certain activities such as fishing. In the United States, the EEZ is split into state waters (typically from the shoreline out to 3 nautical miles) and federal waters (typically from 3 to 200 nautical miles).

Exploitation Rate: Amount of fish harvested from a stock relative to the size of the stock, often expressed as a percentage.

F: Fishing mortality.

Fecundity: A measurement of the egg-producing ability of fish at certain sizes and ages.

Fishery Dependent Data: Fishery data collected and reported by fishermen and dealers.

Fishery Independent Data: Fishery data collected and reported by scientists who catch the fish themselves.

Fishery Management Plan: Management plan for fisheries operating in the federal produced by regional fishery management councils and submitted to the Secretary of Commerce for approval.

Fishing Effort: Usually refers to the amount of fishing. May refer to the number of fishing vessels, amount of fishing gear (nets, traps, hooks), or total amount of time vessels and gear are actively engaged in fishing.

Fishing Mortality: A measurement of the rate at which fish are removed from a population by fishing. Fishing mortality can be reported as either annual or instantaneous. Annual mortality is the percentage of fish dying in one year. Instantaneous is that percentage of fish dying at any one time.

Fishing Power: Measure of the relative ability of a fishing vessel, its gear, and its crew to catch fishes, in reference to some standard vessel, given both vessels are under identical conditions.

$F_{30\%SPR}$: Fishing mortality that will produce a static SPR = 30%.

$F_{45\%SPR}$: Fishing mortality that will produce a static SPR = 45%.

F_{OY}: Fishing mortality that will produce OY under equilibrium conditions and a corresponding biomass of B_{OY}. Usually expressed as the yield at 85% of F_{MSY}, yield at 75% of F_{MSY}, or yield at 65% of F_{MSY}.

F_{MSY}: Fishing mortality that if applied constantly, would achieve MSY under equilibrium conditions and a corresponding biomass of B_{MSY}.

Fork Length (FL): The length of a fish as measured from the tip of its snout to the fork in its tail.

Framework: An established procedure within a fishery management plan that has been approved and implemented by NMFS, which allows specific management measures to be modified via regulatory amendment.

Gear restrictions: Limits placed on the type, amount, number, or techniques allowed for a given type of fishing gear.

Growth Overfishing: When fishing pressure on small fish prevents the fishery from producing the maximum poundage. Condition in which the total weight of the harvest from a fishery is improved when fishing effort is reduced, due to an increase in the average weight of fishes.

Gulf of Mexico Fishery Management Council (GFMC): One of eight regional councils mandated in the Magnuson-Stevens Fishery Conservation and Management Act to develop management plans for fisheries in federal waters. The GFMC develops fishery management plans for fisheries off the coast of Texas, Louisiana, Mississippi, Alabama, and the west coast of Florida.

Headboat: A fishing boat that charges individual fees per recreational angler onboard.

Highgrading: Form of selective sorting of fishes in which higher value, more marketable fishes are retained, and less marketable fishes, which could legally be retained are discarded.

Individual Fishing Quota (IFQ): Fishery management tool that allocates a certain portion of the TAC to individual vessels, fishermen, or other eligible recipients.

Longline: Fishing method using a horizontal mainline to which weights and baited hooks are attached at regular intervals. Gear is either fished on the bottom or in the water column.

Magnuson-Stevens Fishery Conservation and Management Act: Federal legislation responsible for establishing the fishery management councils and the mandatory and discretionary guidelines for federal fishery management plans.

Marine Recreational Information Program (MRIP): Survey operated by NMFS in cooperation with states that collects marine recreational data.

Maximum Fishing Mortality Threshold (MFMT): The rate of fishing mortality above which a stock's capacity to produce MSY would be jeopardized.

Maximum Sustainable Yield (MSY): The largest long-term average catch that can be taken continuously (sustained) from a stock or stock complex under average environmental conditions.

Minimum Stock Size Threshold (MSST): The biomass level below which a stock would be considered overfished.

Modified F Rebuilding Strategy: A rebuilding strategy where fishing mortality is changed as stock biomass increases during the rebuilding period.

Multispecies fishery: Fishery in which more than one species is caught at the same time and location with a particular gear type.

National Marine Fisheries Service (NMFS): Federal agency within NOAA responsible for overseeing fisheries science and regulation.

National Oceanic and Atmospheric Administration: Agency within the Department of Commerce responsible for ocean and coastal management.

Natural Mortality (M): A measurement of the rate at which fish are removed from a population by natural causes. Natural mortality can be reported as either annual or instantaneous. Annual mortality is the percentage of fish dying in one year. Instantaneous is that percentage of fish dying at any one time.

Optimum Yield (OY): The amount of catch that will provide the greatest overall benefit to the nation, particularly with respect to food production and recreational opportunities and taking into account the protection of marine ecosystems.

Overfished: A stock or stock complex is considered overfished when stock biomass falls below the minimum stock size threshold (MSST) (e.g., current biomass < MSST = overfished).

Overfishing: Overfishing occurs when a stock or stock complex is subjected to a rate of fishing mortality that exceeds the maximum fishing mortality threshold (e.g., current fishing mortality rate > MFMT = overfishing).

Quota: % or annual amount of fish that can be harvested.

Recruitment (R): Number or percentage of fish that survives from hatching to a specific size or age.

Recruitment Overfishing: The rate of fishing above which the recruitment to the exploitable stock becomes significantly reduced. This is characterized by a greatly reduced spawning stock, a decreasing proportion of older fish in the catch, and generally very low recruitment year after year.

Scientific and Statistical Committee (SSC): Fishery management advisory body composed of federal, state, and academic scientists, which provides scientific advice to a fishery management council.

Selectivity: The ability of a type of gear to catch a certain size or species of fish.

South Atlantic Fisheries Management Council (SAFMC): One of eight regional councils mandated in the Magnuson-Stevens Fishery Conservation and Management Act to develop management plans for fisheries in federal waters. The SAFMC develops fishery management plans for fisheries off North Carolina, South Carolina, Georgia, and the east coast of Florida.

Spawning Potential Ratio (Transitional SPR): Formerly used in overfished definition. The number of eggs that could be produced by an average recruit in a fished stock divided by the number of eggs that could be produced by an average recruit in an unfished stock. SPR can also be expressed as the spawning stock biomass per recruit (SSBR) of a fished stock divided by the SSBR of the stock before it was fished.

% Spawning Per Recruit (Static SPR): Formerly used in overfishing determination. The maximum spawning per recruit produced in a fished stock divided by the maximum spawning per recruit, which occurs under the conditions of no fishing. Commonly abbreviated as %SPR.

Spawning Stock Biomass (SSB): The total weight of those fish in a stock, which are old enough to spawn.

Spawning Stock Biomass Per Recruit (SSBR): The spawning stock biomass divided by the number of recruits to the stock or how much spawning biomass an average recruit would be expected to produce.

Total Allowable Catch (TAC): The total amount of fish to be taken annually from a stock or stock complex. This may be a portion of the Allowable Biological Catch (ABC) that takes into consideration factors such as bycatch.

Total Length (TL): The length of a fish as measured from the tip of the snout to the tip of the tail.

Appendix C. History of Management

South Atlantic Snapper Grouper History of Management
Last Updated: 6/23/17

The snapper grouper fishery is highly regulated; some of the species included in this amendment have been regulated since 1983. The following table summarizes actions in each of the amendments to the original Snapper Grouper Fishery Management Plan (FMP), as well as some events not covered in amendment actions.

*Shaded rows indicate FMP Amendments

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
FMP (1983)	08/31/83	PR: 48 FR 26843 FR: 48 FR 39463	-12" total length (TL) limit – red snapper, yellowtail snapper, red grouper, Nassau grouper; -8" limit – black sea bass; -4" trawl mesh size; -Gear limitations – poisons, explosives, fish traps, trawls; -Designated modified habitats or artificial reefs as Special Management Zones (SMZs).
Regulatory Amendment #1 (1987)	03/27/87	PR: 51 FR 43937 FR: 52 FR 9864	-Prohibited fishing in SMZs except with hand-held hook-and-line and spearfishing gear; -Prohibited harvest of goliath grouper in SMZs.
Amendment #1 (1988a)	01/12/89	PR: 53 FR 42985 FR: 54 FR 1720	-Prohibited trawl gear to harvest fish south of Cape Hatteras, NC and north of Cape Canaveral, FL; -Directed fishery defined as vessel with trawl gear and ≥200 lb s-g on board; -Established rebuttable assumption that vessel with s-g on board had harvested such fish in the exclusive economic zone (EEZ).
Regulatory Amendment #2 (1988b)	03/30/89	PR: 53 FR 32412 FR: 54 FR 8342	-Established 2 artificial reefs off Ft. Pierce, FL as SMZs.
Emergency Rule	8/3/90	55 FR 32257	-Added wreckfish to the fishery management unit (FMU); -Fishing year beginning 4/16/90; -Commercial quota of 2 million pounds; -Commercial trip limit of 10,000 pounds per trip.
Fishery Closure Notice	8/8/90	55 FR 32635	- Fishery closed because the commercial quota of 2 million pounds was reached.
Notice of Control Date	09/24/90	55 FR 39039	-Anyone entering federal wreckfish fishery in the EEZ off S. Atlantic states after 09/24/90 was not assured of future access if limited entry program developed.
Regulatory Amendment #3	11/02/90	PR: 55 FR 28066 FR: 55 FR 40394	-Established artificial reef at Key Biscayne, FL as SMZ;

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(1989)			-Fish trapping, bottom longlining, spear fishing, and harvesting of Goliath grouper prohibited in SMZ.
Amendment #2 (1990a)	10/30/90	PR: 55 FR 31406 FR: 55 FR 46213	-Prohibited harvest/possession of goliath grouper in or from the EEZ; -Defined overfishing for goliath grouper and other species.
Emergency Rule Extension	11/1/90	55 FR 40181	-Extended the measures implemented via emergency rule on 8/3/90.
Amendment #3 (1990b)	01/31/91	PR: 55 FR 39023 FR: 56 FR 2443	-Added wreckfish to the FMU; -Defined optimum yield (OY) and overfishing; -Required permit to fish for, land or sell wreckfish; -Required catch and effort reports from selected, permitted vessel; -Established control date of 03/28/90; -Established a fishing year for wreckfish starting April 16; -Established a process to set annual quota, with initial quota of 2 million pounds; provisions for closure; -Established 10,000 pound trip limit; -Established a spawning season closure for wreckfish from January 15 to April 15; -Provided for annual adjustments of wreckfish management measures.
Notice of Control Date	07/30/91	56 FR 36052	-Anyone entering federal snapper grouper fishery (other than for wreckfish) in the EEZ off S. Atlantic states after 07/30/91 was not assured of future access if limited entry program developed.
Amendment #4 (1991)	01/01/92	PR: 56 FR 29922 FR: 56 FR 56016	-Prohibited gear: fish traps except black sea bass traps north of Cape Canaveral, FL; entanglement nets; longline gear inside 50 fathoms; bottom longlines to harvest wreckfish; powerheads and bangsticks in designated SMZs off S. Carolina. -Defined overfishing/overfished and established rebuilding timeframe: red snapper and groupers ≤ 15 years (year 1 = 1991); other snappers, greater amberjack, black sea bass, red porgy ≤ 10 years (year 1 = 1991); -Required permits (commercial & for-hire) and specified data collection regulations; -Established an assessment group and annual adjustment procedure (framework); -Permit, gear, and vessel id requirements specified for black sea bass traps; -No retention of snapper grouper spp. caught in other fisheries with gear prohibited in snapper grouper fishery if captured snapper grouper had no bag limit or harvest was prohibited. If had a bag limit, could retain only the bag limit; -8" TL limit – lane snapper;

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			-10" TL limit – vermilion snapper (recreational only); -12" TL limit – red porgy, vermilion snapper (commercial only), gray, yellowtail, mutton, schoolmaster, queen, blackfin, cubera, dog, mahogany, and silk snappers; -20" TL limit – red snapper, gag, and red, black, scamp, yellowfin, and yellowmouth groupers; -28" fork length (FL) limit – greater amberjack (recreational only); -36" FL or 28" core length – greater amberjack (commercial only); -Bag limits – 10 vermilion snapper, 3 greater amberjack -Aggregate snapper bag limit – 10/person/day, excluding vermilion snapper and allowing no more than 2 red snappers; -Aggregate grouper bag limit – 5/person/day, excluding Nassau and goliath grouper, for which no retention (recreational & commercial) is allowed; -Spawning season closure – commercial harvest greater amberjack > 3 fish bag prohibited in April; -Spawning season closure – commercial harvest mutton snapper >snapper aggregate prohibited during May and June; -Charter/headboats and excursion boat possession limits extended.
Amendment #5 (1992a)	04/06/92	PR: 56 FR 57302 FR: 57 FR 7886	For wreckfish: -Established limited entry system with individual transferable quotas (ITQs); -Required dealer to have permit; -Rescinded 10,000 lb. trip limit; -Required off-loading between 8 am and 5 pm; -Reduced occasions when 24-hour advance notice of offloading required for off-loading; -Established procedure for initial distribution of percentage shares of total allowable catch (TAC).
Emergency Rule	8/31/92	57 FR 39365	For Black Sea Bass (bsb): -Modified definition of bsb pot; -Allowed multi-gear trips for bsb; -Allowed retention of incidentally-caught fish on bsb trips.
Emergency Rule Extension	11/30/92	57 FR 56522	For Black Sea Bass: -Modified definition of bsb pot; -Allowed multi-gear trips for bsb; -Allowed retention of incidentally-caught fish on bsb trips.

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Regulatory Amendment #4 (1992b)	07/06/93	FR: 58 FR 36155	-For Black Sea Bass: -Modified definition of bsb pot; -Allowed multi-gear trips for bsb; -Allowed retention of incidentally-caught fish on bsb trips.
Regulatory Amendment #5 (1992c)	07/31/93	PR: 58 FR 13732 FR: 58 FR 35895	-Established 8 SMZs off South Carolina, where only hand-held, hook-and-line gear and spearfishing (excluding powerheads) was allowed.
Amendment #6 (1993)	07/27/94	PR: 59 FR 9721 FR: 59 FR 27242	-Set up separate commercial TAC levels for golden tilefish and snowy grouper; -Established commercial trip limits for snowy grouper, golden tilefish, speckled hind, and warsaw grouper; -Included golden tilefish in grouper recreational aggregate bag limits; -Prohibited sale of warsaw grouper and speckled hind; -100% logbook coverage upon renewal of permit; -Creation of the *Oculina* Experimental Closed Area; -Data collection needs specified for evaluation of possible future individual fishing quota system.
Amendment #7 (1994a)	01/23/95	PR: 59 FR 47833 FR: 59 FR 66270	-12" FL – hogfish; -16" TL – mutton snapper; -Required dealer, charter and headboat federal permits; -Allowed sale under specified conditions; -Specified allowable gear and made allowance for experimental gear; -Allowed multi-gear trips in NC; -Added localized overfishing to list of problems and objectives; -Adjusted bag limit and crew specs. for charter and head boats; -Modified management unit for scup to apply south of Cape Hatteras, NC; -Modified framework procedure.
Regulatory Amendment #6 (1994b)	05/22/95	PR: 60 FR 8620 FR: 60 FR 19683	-Established actions which applied only to EEZ off Atlantic coast of FL: Bag limits – 5 hogfish/person/day (recreational only), 2 cubera snapper/person/day > 30" TL; 12" TL – gray triggerfish.
Notice of Control Date	04/23/97	62 FR 22995	-Anyone entering federal black sea bass pot fishery off South Atlantic states after 04/23/97 was not assured of future access if limited entry program developed.
Interim Rule Request	1/16/98		-The South Atlantic Fishery Management Council (Council) requested all Amendment 9 measures except black sea bass pot construction changes be implemented as an interim request under the

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			Magnuson-Stevens Act.
Action Suspended	5/14/98		-NMFS informed the Council that action on the interim rule request was suspended.
Emergency Rule Request	9/24/98		-Council requested Amendment 9 be implemented via emergency rule.
Amendment #8 (1997)	12/14/98	PR: 63 FR 1813 FR: 63 FR 38298	-Established program to limit initial eligibility for snapper grouper fishery: -Must have demonstrated landings of any species in the snapper grouper FMU in 1993, 1994, 1995 or 1996; and have held valid snapper grouper permit between 02/11/96 and 02/11/97; -Granted transferable permit with unlimited landings if vessel landed ≥ 1,000 pounds (lb) of snapper grouper species in any of the years; -Granted non-transferable permit with 225 lb trip limit to all other vessels; -Modified problems, objectives, OY, and overfishing definitions; -Expanded the Council's habitat responsibility; -Allowed retention of snapper grouper species in excess of bag limit on permitted vessel with a single bait net or cast nets on board; -Allowed permitted vessels to possess filleted fish harvested in the Bahamas under certain conditions.
Request not Implemented	1/22/99		-NMFS informed the Council that the final rule for Amendment 9 would be effective 2/24/99; therefore they did not implement the emergency rule.
Regulatory Amendment #7 (1998a)	01/29/99	PR: 63 FR 43656 FR: 63 FR 71793	-Established 10 SMZs at artificial reefs off South Carolina.

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Amendment #9 (1998b)	2/24/99	PR: 63 FR 63276 FR: 64 FR 3624	-Red porgy: 14" TL (recreational and commercial); 5 fish rec. bag limit; no harvest or possession > bag limit, and no purchase or sale, in March and April; -Black sea bass: 10" TL (recreational and commercial); 20 fish rec. bag limit; required escape vents and escape panels with degradable fasteners in bsb pots; -Greater amberjack: 1 fish rec. bag limit; no harvest or possession > bag limit, and no purchase or sale, during April; quota = 1,169,931 lb; began fishing year May 1; prohibited coring; -Specified size limits for several snapper grouper species (indicated in parentheses in inches TL): including yellowtail snapper (12), mutton snapper (16), red snapper (20); red grouper, yellowfin grouper, yellowmouth grouper, and scamp (20) ; -Vermilion snapper: 11" TL (recreational), 12" TL commercial; -Gag: 24" TL (recreational); no commercial harvest or possession > bag limit, and no purchase or sale, during March and April; -Black grouper: 24" TL (recreational and commercial); no harvest or possession > bag limit, and no purchase or sale, during March and April; -Gag and Black grouper: within 5 fish aggregate grouper bag limit, no more than 2 fish may be gag or black grouper (individually or in combination); -All snapper grouper without a bag limit: aggregate recreational bag limit 20 fish/person/day, excluding tomtate and blue runner; -Vessels with longline gear aboard may only possess snowy, warsaw, yellowedge, and misty grouper, and golden, blueline and sand tilefish.
Emergency Action	9/3/99	64 FR 48326	-Reopened the Amendment 8 permit application process.
Emergency Interim Rule	09/08/99, expired 08/28/00	64 FR 48324 and 65 FR 10040	-Prohibited harvest or possession of red porgy.
Amendment #10 Comprehensive Essential Fish Habitat Amendment (1998c)	07/14/00	PR: 64 FR 37082 and 64 FR 59152 FR: 65 FR 37292	-Identified essential fish habitat (EFH) and established habitat areas of particular concern (HAPC) for species in the snapper grouper FMU.

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Amendment #11 Comprehensive Sustainable Fisheries Act Amendment (1998d)	12/02/99	PR: 64 FR 27952 FR: 64 FR 59126	-Maximum sustainable yield (MSY) proxy: goliath and Nassau grouper = 40% static spawning potential ratio (SPR); all other species = 30% static SPR; -OY: hermaphroditic groupers = 45% static SPR; goliath and Nassau grouper = 50% static SPR; all other species = 40% static SPR -Overfished/overfishing evaluations: BSB: overfished (minimum stock size threshold (MSST)=3.72 mp, 1995 biomass=1.33 mp); undergoing overfishing (maximum fishing mortality threshold (MFMT)=0.72, F1991-1995=0.95) Vermilion snapper: overfished (static SPR = 21-27%) Red porgy: overfished (static SPR = 14-19%). Red snapper: overfished (static SPR = 24-32%) Gag: overfished (static SPR = 27%) Scamp: no longer overfished (static SPR = 35%) Speckled hind: overfished (static SPR = 8-13%) Warsaw grouper: overfished (static SPR = 6-14%) Snowy grouper: overfished (static SPR = 5-15%) White grunt: no longer overfished (static SPR = 29-39%) Golden tilefish: overfished (couldn't estimate static SPR) Nassau grouper: overfished (couldn't estimate static SPR) Goliath grouper: overfished (couldn't estimate static SPR) -overfishing level: goliath and Nassau grouper = F>F40% static SPR; all other species: = F>F30% static SPR Approved definitions for overfished and overfishing. MSST = [(1-M) or 0.5 whichever is greater]*B_{MSY}. MFMT = $F_{MSY.}$
Amendment #12 (2000a)	09/22/00	PR: 65 FR 35877 FR: 65 FR 51248	For Red porgy: -MSY=4.38 mp; OY=45% static SPR; MFMT=0.43; MSST=7.34 mp; rebuilding timeframe=18 years (1999=year 1); -no sale of red porgy during Jan-April; -1 fish bag limit; -50 lb. bycatch commercial trip limit May-December; -Modified management options and list of possible framework actions.
Regulatory Amendment #8 (2000b)	11/15/00	PR: 65 FR 41041 FR: 65 FR 61114	-Established 12 SMZs at artificial reefs off Georgia; revised boundaries of 7 existing SMZs off Georgia to meet CG permit specs; restricted fishing in new and revised SMZs.

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Amendment #9 (1998b) resubmitted	10/13/00	PR: 63 FR 63276 FR: 65 FR 55203	-Commercial trip limit for greater amberjack.
Amendment #13A (2003)	04/26/04	PR: 68 FR 66069 FR: 69 FR 15731	-Extended for an indefinite period the regulation prohibiting fishing for and possessing snapper grouper species within the *Oculina* Experimental Closed Area.
Notice of Control Date	10/14/05	70 FR 60058	-Considered management measures to further limit participation or effort in the commercial fishery for snapper grouper species (excluding wreckfish).
Amendment #13C (2006)	10/23/06	PR: 71 FR 28841 FR: 71 FR 55096	-End overfishing of snowy grouper, vermilion snapper, black sea bass, and golden tilefish. Increase allowable catch of red porgy. Year 1 = 2006; 1. <u>Snowy Grouper</u> Commercial: -Quota = 151,000 lb gutted weight (gw) in year 1, 118,000 lb gw in year 2, and 84,000 lb gw in year 3 onwards. -Trip limit = 275 lb gw in year 1, 175 lb gw in year 2, and 100 lb gw in year 3 onwards; Recreational: -Limit possession to one snowy grouper in 5 grouper per person/day aggregate bag limit; 2. <u>Golden Tilefish</u> Commercial: Quota of 295,000 lb gw, 4,000 lb gw trip limit until 75% of the quota is taken when the trip limit is reduced to 300 lb gw. Do not adjust the trip limit downwards unless 75% is captured on or before September 1; Recreational: Limited possession to 1 golden tilefish in 5 grouper per person/day aggregate bag limit; 3. <u>Vermilion Snapper</u> Commercial: Quota of 1,100,000 lb gw; Recreational: 12” TL size limit. 4. <u>Black Sea Bass</u> Commercial: Quota of 477,000 lb gw in year 1, 423,000 lb gw in year 2, and 309,000 lb gw in year 3 onwards; -Required use of at least 2” mesh for the entire back panel of black sea bass pots effective 6 months after publication of the final rule; -Required black sea bass pots be removed from the water when the quota is met; -Changed fishing year from calendar year to June 1 – May 31; Recreational: Recreational allocation of 633,000 lb

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			gw in year 1, 560,000 lb gw in year 2, and 409,000 lb gw in year 3 onwards. Increase minimum size limit from 10" to 11" in year 1 and to 12" in year 2; -Reduced recreational bag limit from 20 to 15 per person per day; -Changed fishing year from the calendar year to June 1 through May 31. 5. Red Porgy Commercial and recreational: -Retained 14" TL size limit and seasonal closure (retention limited to the bag limit); -Specified a commercial quota of 127,000 lb gw and prohibit sale/purchase and prohibit harvest and/or possession beyond the bag limit when quota is taken and/or during January through April; -Increased commercial trip limit from 50 lb ww to 120 red porgy (210 lb gw) during May through December;--Increased recreational bag limit from one to three red porgy per person per day.
Notice of Control Date	3/8/07	72 FR 60794	-Considered measures to limit participation in the snapper grouper for-hire sector.
Amendment #14 (2007)	2/12/09	PR: 73 FR 32281 FR: 74 FR 1621	-Established eight deepwater Type II marine protected areas (MPAs) to protect a portion of the population and habitat of long-lived deepwater snapper grouper species.
Amendment #15A (2008a)	3/14/08	73 FR 14942	- Established rebuilding plans and status determination criteria for snowy grouper, black sea bass, and red porgy.
Notice of Control Date	12/4/08	74 FR 7849	-Established a control date for the golden tilefish portion of the snapper grouper fishery in the South Atlantic.
Notice of Control Date	12/4/08	74 FR 7849	-Established control date for black sea bass pot sector in the South Atlantic.
Amendment #15B (2008b)	2/15/10	PR: 74 FR 30569 FR: 74 FR 58902	-Prohibited the sale of snapper grouper harvested or possessed in the EEZ under the bag limits and prohibited the sale of snapper grouper harvested or possessed under the bag limits by vessels with a Federal charter vessel/headboat permit for South Atlantic snapper grouper were harvested; -Reduced the effects of incidental hooking on sea turtles and smalltooth sawfish; -Adjusted commercial permit renewal periods and transferability requirements; -Revised the management reference points for golden tilefish; -Implemented plan to monitor and assess bycatch; -Required a vessel that fished in the EEZ, if selected by NMFS, to carry an observer and install electronic logbook and/or video monitoring equipment provided by NMFS;

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			-Established reference points for golden tilefish; -Established allocations for snowy grouper (95% commercial & 5% recreational); -Established allocations for red porgy (50% commercial & 50% recreational).
Amendment #16 (2009a)	7/29/09	PR: 74 FR 6297 FR: 74 FR 30964	-Specified status determination criteria for gag and vermilion snapper; For gag: -Specified interim allocations 51% commercial & 49% recreational; -Recreational and commercial shallow water grouper spawning closure January through April; -Directed commercial quota= 352,940 lb gw; -Reduced 5-fish aggregate grouper bag limit, including tilefish species, to a 3-fish aggregate; -Captain and crew on for-hire trips cannot retain the bag limit of vermilion snapper and species within the 3-fish grouper aggregate; For vermilion snapper: -Specified interim allocations 68% commercial & 32% recreational; -Directed commercial quota split Jan-June=315,523 lb gw and 302,523 lb gw July-Dec; -Reduced bag limit from 10 to 4 and a recreational closed season November through March; -Required venting and dehooking tools when catching snapper grouper species to reduce recreational and commercial bycatch mortality.
Amendment #19 Comprehensive Ecosystem-Based Amendment 1 (CE-BA1) (2009b)	7/22/10	PR: 75 FR 14548 FR: 75 FR 35330	-Amended coral, coral reefs, and live/hardbottom habitat FMP to establish deepwater coral HAPCs; -Created a “shrimp fishery access area” (SFAA) within the Stetson-Miami Terrace CHAPC boundaries; -Created allowable “golden crab fishing areas” with the Stetson-Miami Terrace CHAPC and Pourtales Terrace CHAPC boundaries; -Amended the golden crab FMP to require vessel monitoring.
Amendment #17A (2010a)	12/3/10 red snapper closure; circle	PR: 75 FR 49447 FR: 75 FR 76874	-Required use of non-stainless steel circle hooks when fishing for snapper grouper species with hook-and-line gear north of 28 deg. N latitude in the South

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	hooks 3/3/2011		Atlantic EEZ; -Specified an annual catch limit (ACL) and an accountability measure (AM) for red snapper with management measures to reduce the probability that catches will exceed the stocks' ACL; -Specified a rebuilding plan for red snapper; -Specified status determination criteria for red snapper; -Specified a fishery-independent monitoring program for red snapper. -Implemented an area closure for snapper grouper species.
Emergency Rule	12/3/10	75 FR 76890	-Delayed the effective date of the area closure for snapper grouper species implemented through Amendment 17A.
Amendment #17B (2010b)	1/30/11	PR: 75 FR 62488 FR: 75 FR 82280	-Specify ACL of 0 and prohibit fishing for speckled hind and warsaw grouper; -Prohibited harvest of 6 deepwater species seaward of 240 feet to curb bycatch of speckled hind and warsaw grouper (snowy grouper, blueline tilefish, yellowedge grouper, misty grouper, queen snapper, silk snapper). -Specify allocations, ACLs and AMs for golden tilefish; -Modified management measures as needed to limit harvest to the ACL or ACT; -Updated the framework procedure for specification of total allowable catch; -Specified ACLs, ACTs, and AMs, where necessary, for 9 species undergoing overfishing (snowy grouper, black grouper, black sea bass, red grouper, vermilion snapper, gag, speckled hind, warsaw grouper, golden tilefish);
Regulatory Amendment #9 (2010a)	Bag limit: 6/22/11 Trip limits: 7/15/11	PR: 76 FR 23930 FR: 76 FR 34892	-Established trip limits for vermilion snapper and gag; -Increased trip limit for greater amberjack; -Harvest management measures for black sea bass (trip limit, split season quotas, carry-over of unused ACL, gear restrictions, bag limit modification, and a spawning season closure).
Regulatory Amendment #10 (2010b)	5/31/11	PR: 76 FR 9530 FR: 76 FR 23728	-Eliminated closed area for snapper grouper species approved in Amendment 17A.
Regulatory Amendment #11 (2011c)	5/10/12	PR: 76 FR 78879 FR: 77 FR 27374	-Eliminated 240 ft harvest prohibition for six deepwater species (snowy grouper, blueline tilefish, yellowedge grouper, queen snapper, silk snapper, misty grouper);

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Amendment # 25 Comprehensive Annual Catch Limit Amendment (2011d)	4/16/12	PR: 76 FR 74757 Amended PR: 76 FR 82264 FR: 77 FR 15916	-Reorganize FMUs to 6 complexes (deepwater, jacks, snappers, grunts, shallow-water groupers, porgies) (see final rule for species list); -Established acceptable biological catch (ABC) control rules and established ABCs, ACLs, and AMs for species not undergoing overfishing; -Removed some species from South Atlantic FMU (Tiger grouper, black margate, blue-striped grunt, French grunt, porkfish, smallmouth grunt, queen triggerfish, crevalle, yellow jack, grass porgy, sheepshead, puddingwife); -Designated species as ecosystem component species (schoolmaster, ocean triggerfish, bank triggerfish, rock triggerfish, longspine porgy); -Specified allocations between the commercial and, recreational sectors for species not undergoing overfishing; -Limited the total mortality for federally managed species in the South Atlantic to the ACLs.
Amendment #24 (2011e)	7/11/12	PR: 77 FR 19169 FR: 77 FR 34254	-Rebuilding plan (including MSY, ACLs, AMs, and OY, and allocations) for red grouper.
Amendment #23 Comprehensive Ecosystem-based Amendment 2 (CE-BA2) (2011f)	1/30/12	PR: 76 FR 69230 FR: 76 FR 82183	-Designated the Deepwater MPAs as EFH-HAPCs; -Modify management measures for Octocoral; -Limit harvest of snapper grouper species in SC SMZs to the bag limit; -Modify sea turtle release gear; -Designated new EFP for pelagic Sargassum habitat.
Amendment #18A (2012a)	7/1/12	PR: 77 FR 16991 FR: 77FR3 2408	-Limited participation and effort in the black sea bass sector; -Modifications to management of the black sea bass pot sector; -Improved data reporting (accuracy, timing, and quantity of fisheries statistics).
Amendment #20A (2012b)	10/26/12	PR: 77 FR 19165 FR: 77 FR 59129	- Individual transfer quota (ITQ) program for wreckfish: -Defined and reverted inactive shares; -Redistributed reverted shares; -Established a share cap; -Established an appeals process.
Regulatory Amendment #12 (2012c)	10/9/12	PR: 77 FR 42688 FR: 77 FR 61295	-Revised the ACL and OY for golden tilefish; -Revised recreational AMs for golden tilefish;

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Amendment #18B (2013a)	5/23/13	PR: 77 FR 75093 FR: 77 FR 23858	For Golden Tilefish: -Limited participation and effort in the commercial sector through establishment of a longline endorsement; -Established eligibility requirements and allowed transferability of longline endorsement; -Established an appeals process; -Modified trip limits; -Specified allocations ACLs for gear groups (longline and hook and line); -Adjusted the fishing year.
Amendment #28 (2013b)	8/23/13	PR: 78 FR 25047 FR: 78 FR 44461	-Established regulations to allow harvest of red snapper in the South Atlantic (formula used to compute ACLs, AMs, fishing seasons).
Regulatory Amendment #13 (2013c)	7/17/13	PR: 78 FR 17336 FR: 78 FR 36113	-Revised the ABCs, ACLs (including sector ACLs), and ACTs for 37 species implemented by the Comprehensive ACL Amendment (see final rule for list of species). The revisions may prevent a disjunction between the established ACLs and the landings used to determine if AMs are triggered.
Regulatory Amendment #15 (2013d)	9/12/13	PR: 78 FR 31511 FR: 78 FR 49183	-Modified ACLs and OY for yellowtail snapper; -Modified the commercial and recreational yellowtail snapper fishing years and commercial spawning season closure; -Modified the gag commercial ACL and AM to remove the requirement that all other shallow water groupers (black grouper, red grouper, scamp, red hind, rock hind, graysby, coney, yellowmouth grouper, and yellowfin grouper) are prohibited from harvest in the South Atlantic when the gag commercial ACL is met or projected to be met.
Regulatory Amendment #18 (2013e)	9/5/13	PR: 78 FR 26740 FR: 78 FR 47574	-Revised ACLs and OY for vermilion snapper; -Modified commercial trip limit for vermilion snapper; -Modified commercial fishing season and recreational closed season for vermilion snapper; -Revised ACLs and OY for red porgy.
Regulatory Amendment #19 (2013f)	ACL: 9/23/13 Pot closure: 10/23/13	PR: 78 FR 39700 FR: 78 FR 58249	-Specified ABC, and adjusted the ACL, recreational ACT and OY for black sea bass; -Implemented an annual closure on the use of black sea bass pots from November 1 to April 30.
Amendment #27 (2013g)	1/27/2014	PR:78 FR 78770 FR: 78 FR 57337	-Established the Council as the responsible entity for managing Nassau grouper throughout its range including federal waters of the Gulf of Mexico; -Modified the crew member limit on dual-permitted snapper grouper vessels; -Modified the restriction on retention of bag limit

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			quantities of some snapper grouper species by captain and crew of for-hire vessels; -Minimized regulatory delay when adjustments to snapper grouper species' ABC, ACLs, and ACTs are needed as a result of new stock assessments; -Removed blue runner from snapper grouper FMP; -Addressed harvest of blue runner by commercial fishermen who do not possess a South Atlantic Snapper Grouper Permit.
Amendment #31 Joint South Atlantic and Gulf of Mexico Generic Headboat Reporting Amendment (2013h)	1/27/2014	PR: 78 FR 59641 FR: 78 FR 78779	-Included under the Generic charter/headboat reporting amendment, that modified required logbook reporting for headboat vessels to require electronic reporting, regarding snapper grouper landings.
Amendment #?? (Revisions to Dealer Permitting and Reporting Requirements) (2013i)	8/7/2014	PR: 79 FR 81 FR: 79 FR 19490	- Modified permitting and reporting requirements for seafood dealers who first receive fish managed by the SA and Gulf through eight FMPs.
Regulatory Amendment #14 (2014a)	12/8/2014	PR: 79 FR 22936 FR: 79 FR 66316	-Modified the commercial and recreational fishing year for greater amberjack; -Modified the commercial and recreational sector fishing years for black sea bass; -Modified the recreational AM for black sea bass; -Modified the recreational AM for vermilion snapper; -Modify the commercial trip limit for gag.
Regulatory Amendment # 21 (2014b)	11/6/2014	PR: 79 FR 44735 FR: 79 FR 60379	-Modified the definition of the overfished threshold (MSST) for red snapper, blueline tilefish, gag, black grouper, yellowtail snapper, vermilion snapper, red porgy, and greater amberjack.
Amendment #29 (2014c)	7/1/2015	NOA: 79 FR 69819 PR: 79 FR 72567 FR: 80 FR 30947	-Updated the ABC control rule to incorporate methodology for determining the ABC of unassessed species; -Adjusted the ABCs for fourteen unassessed snapper grouper species (see final rule); -Adjusted the ACLs and ACTs for three species complexes and four snapper grouper species based on revised ABCs; -Established ACLs for unassessed species; -Modified gray triggerfish minimum size limits; -Established a commercial split season and commercial trip limits for gray triggerfish.

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Blueline Tilefish Emergency Rule	4/17/2014 through 10/10/2014 or 4/18/2015	PR: 79 FR 21636 FR:79 FR 61262	-Removed the blueline tilefish portion from the deep-water complex ACL; -Established separate commercial and recreational ACLs and AMs for blueline tilefish.
Regulatory Amendment #20 (2014d)	8/20/2015	PR: 80 FR 18797 FR: 80 FR 43033	-Adjusted the recreational and commercial ACLs for snowy grouper; -Adjusted the rebuilding strategy; -Modified the commercial trip limit; -Modified recreational bag limit; -Modified the recreational fishing season.
Amendment #32 (2014e)	3/30/2015	PR: 80 FR 3207 FR: 80 FR 16583	-End overfishing of blueline tilefish; -Removed blueline tilefish from the deepwater complex; -Specified AMs, ACLs, recreational ACLs, commercial trip limit, adjust recreational bag limit for blueline tilefish; -Specified ACLs and revised the AMs for the recreational section of the deepwater complex (yellowedge grouper, silk snapper, misty grouper, queen snapper, sand tilefish, black snapper, and blackfin snapper);
Regulatory Amendment #22 (2015a)	9/11/2015, except for the amendments to §§ 622.190(b) and 622.193(r)(1) which were effective 8/12/2015	PR: 80 FR 31880 FR: 80 FR 48277	-Adjusted ACLs and OY for gag and wreckfish;
Amendment # 33 Dolphin Wahoo Amendment 7 and Snapper Grouper Amendment 33 (2015b)	12/28/2015	NOA:80 FR 55819 PR:80 FR 60601 FR:80 FR 80686	-Allowed dolphin and wahoo fillets to enter the U.S. EEZ after lawful harvest in The Bahamas; -Specified the condition of any dolphin, wahoo, and snapper grouper fillets; -Described how the recreational bag limit is determined for any fillets; -Prohibited the sale or purchase of any dolphin, wahoo, or snapper grouper recreationally harvested in The Bahamas; -Specified the required documentation to be onboard any vessels that have these fillets; -Specified transit and stowage provisions for any vessels with fillets.
Amendment #34 Generic Accountability Measures and Dolphin	2/22/2016	NOA:80 FR 41472 PR:80 FR 58448 FR:81 FR 3731	-Modified AMs for snapper grouper species (golden tilefish, snowy grouper, gag, red grouper, black grouper, scamp, the shallow-water grouper complex (SASWG: red hind, rock hind, yellowmouth grouper, yellowfin grouper, coney, and graysby), greater amberjack, the jacks complex (lesser amberjack, almaco jack, and banded rudderfish), bar jack,

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Allocation Amendment (2015c)			yellowtail snapper, mutton snapper, the snappers complex (cubera snapper, gray snapper, lane snapper, dog snapper, and mahogany snapper), gray triggerfish, wreckfish (recreational sector), Atlantic spadefish, hogfish, red porgy, the porgies complex (jolthead porgy, knobbed porgy, whitebone porgy, scup, and saucereye porgy); -Modified the AM for commercial golden crab fishery; -Adjusted sector allocations for dolphin.
Amendment #35 (2015d)	6/22/2016	NOA:81 FR 6222 PR:81 FR 11502 FR:81 FR 32249	-Removed black snapper, dog snapper, mahogany snapper, and schoolmaster from the Snapper Grouper FMP; -Clarified regulations governing the use of Golden Tilefish Longline Endorsements.
Regulatory Amendment #16 (2016a)	12/29/2016 (closure) 1/30/2017 (gear markings)	NOI: 78 FR 72868 PR: 81 FR 53109 FR: 81 FR 95893	-Revise the area where fishing with black sea bass pots is prohibited from Nov.1-April 30. -Add additional gear marking requirements for black sea bass pot gear.
Regulatory Amendment #25 (2016b)	8/12/2016 except changes to blueline tilefish, effective 7/13/2016.	PR: 81 FR 34944 FR: 81 FR 45245	-Revised commercial and recreational ACL for blueline tilefish; -Revised the recreational bag limit for black sea bass; -Revised the commercial and recreational fishing year for yellowtail snapper.
Amendment #37 (2016c)	TBD	NOI: 80 FR 45641 NOA: 81 FR 69774 PR: 81 FR 91104	-Modify the hogfish fishery management unit; -Specify fishing levels for the two South Atlantic hogfish stocks; -Establish a rebuilding plan for the Florida Keys/East Florida stock; -Establish/revised management measures for both hogfish stocks in the South Atlantic Region, such as size limits, recreational bag limits, and commercial trip limits.
Amendment #26 (Bycatch Reporting Amendment)	TBD	TBD	-Modifies bycatch and discard reporting for commercial and for-hire vessels.
Amendment #36 (2016d)	TBD	NOI: 82 FR 810 PR: 82 FR 5512	-Establish SMZs to enhance protection for snapper grouper species in spawning condition including speckled hind and warsaw grouper.
Amendment #39 (Generic For-Hire Reporting Amendment) (2017b)	TBD		-Weekly electronic reporting for charter vessel operators with a federal for-hire permit; reduce the time allowed for headboat operators to complete electronic reports; and requires location reporting by charter vessels with the same detail currently

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			required for headboat vessels.
Amendment #41 (2017a)	TBD	TBD	-Update the MSY, ABC, ACL, OY, minimum stock size threshold, designate spawning months for regulatory purposes, and revise management measures for mutton snapper.

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Appendix D. Bycatch Practicability Analysis

1.1 Population Effects for the Bycatch Species

Background

In 2008, a stock assessment for red snapper indicated the red snapper stock was overfished and undergoing overfishing (Southeast Data, Assessment, and Review (SEDAR 15 2008a). Consequently, an interim rule was published on December 4, 2009 (National Marine Fisheries Service (NMFS) 2010), which prohibited harvest and possession of red snapper beginning on January 4, 2010. That rule was extended for 186 days. A new benchmark assessment completed in 2010, further confirmed that red snapper was experiencing overfishing and was overfished (SEDAR 24 2010b). Amendment 17A to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP) (Amendment 17A; SAFMC 2010a), effective December 3, 2010, continued the harvest and possession prohibition of red snapper to end overfishing and also implemented a rebuilding plan. **Appendix R** of Amendment 17A contains the BPA conducted for that amendment, and is incorporated herein by reference. At their June 2012 meeting, the South Atlantic Fishery Management Council (Council) reviewed red snapper discard mortality estimates and compared them to the 2012 acceptable biological catch (ABC) from the rebuilding projection, which were recommended by the Council's Scientific and Statistical Committee (SSC) based on the results of SEDAR 24 (2010b). The estimated mortalities for 2012 were less than the ABC for 2012 suggesting some minimal level of harvest of red snapper could occur without negatively affecting the stock (**Appendix B** of Temporary Measures through Emergency Action)(NMFS 2012)). As a result, the Council recommended reopening red snapper to a small amount of harvest in 2012.

In 2012, the final rule for Amendment 28 to the Snapper Grouper FMP (Amendment 28) implemented a process to determine if a red snapper fishing season could occur each year and would specify annual catch limits (ACL) for landings (78 FR 44461, July 24, 2013; SAFMC 2013). NMFS Southeast Fisheries Science Center (SEFSC) provided a report on the level of landings and dead discards of red snapper to the Council each year since 2010. Based on the landings reports and calculation of ACLs from Amendment 28, season lengths for the commercial and recreational sectors would be projected. Limited red snapper fishing seasons were allowed in 2012, 2013, and 2014. Landings were not allowed in 2015, 2016, and 2017 because the ABC was exceeded. The latest benchmark stock assessment for red snapper (SEDAR 41 2016a), indicated the red snapper stock was overfished and undergoing overfishing. During the review of the assessment, the SSC outlined several sources of uncertainty in the level of recreational landings and discards and determined the population was rebuilding (SAFMC 2016). This action would revise ACLs to allow limited harvest of red snapper beginning in 2018.

Since 2010, estimates of dead discards have accounted for most of the total removals (92%), likely a result of incidental catch of red snapper while fishermen targeted co-occurring species.

There have been very limited landings of red snapper in Florida state waters since Florida has not adopted compatible regulations (as of August 2017).

Amendment 17A indicated the top co-occurring species with red snapper are black sea bass, red grouper, gag, scamp, greater amberjack, vermilion snapper, and gray triggerfish. The directed snapper grouper fishery is executed primarily with hook-and-line gear for most of the top co-occurring species (**Table D-1**). However, commercial black sea bass are predominantly taken with pots. Red snapper were taken primarily (84%) with hook-and-line gear during the limited commercial openings in 2012, 2013, and 2014. This percentage is similar to the Amendment 17A BPA, which described the red snapper primary gear as hook-and-line prior to the closure.

Table D-1. Mean percentage of commercial landings by gear (2012-2014).

Species	Diving	Hook and Line	Longline	Pot	Other
Black sea bass	0.56%	41.12%	0.00%	54.62%	3.69%
Red grouper	6.04%	85.98%	7.28%	0.34%	0.36%
Gag	12.61%	85.85%	0.39%	0.27%	0.88%
Scamp	9.40%	89.07%	0.44%	0.16%	0.94%
Greater amberjack	5.02%	93.97%	0.05%	0.38%	0.57%
Vermilion snapper	0.53%	98.22%	0.31%	0.15%	0.78%
Gray triggerfish	2.51%	95.24%	0.32%	1.27%	0.66%

Between 2012 and 2014, the recreational sector dominated the landings of red grouper (>60% of landings) while black sea bass, greater amberjack, and gray triggerfish landings were evenly divided between the commercial and recreational sectors (**Table D-2).** The commercial sector dominated landings of gag and vermilion snapper that commonly occur with red snapper. **Appendix R** from Amendment 17A indicates the recreational sector took approximately 83% of the red snapper landings during 2005-2008.

Table D-2. Mean commercial and recreational landings (pounds whole weight) during 2012-2014. Commercial landings include all of Monroe County, Florida; MRIP landings do not include Monroe County, Florida; Headboat landings include Monroe County, Florida, for Atlantic-based vessels.

Species	Headboat	MRIP	Total Recreational	Commercial	Percent Recreational	Percent Commercial
Black sea bass	385,656	117,050	502,706	446,078	53%	47%
Red grouper	231,018	12,937	243,954	137,478	64%	36%
Gag	176,023	15,646	191,669	415,611	32%	68%
Scamp	36,528	14,639	51,167	167,390	23%	77%
Greater amberjack	802,835	66,939	869,774	908,878	49%	51%
Vermilion snapper	135,838	150,565	286,403	965,649	23%	77%
Gray triggerfish	268,536	116,971	385,507	303,214	56%	44%

Source: SEFSC commercial ACL data (May 2017); Recreational ACL data (June 2017).

Commercial Sector

Based on the commercial logbook, the average number of trips per year between 2012 and 2014 was 13,130; and fishermen spent an average of 1.64 days at sea per trip (**Table D-3**). Only trips that landed species under the Snapper Grouper FMP were used to calculate effort.

Table D-3. Snapper grouper commercial sector effort for South Atlantic.

Year	Trips	Days	Days per Trip
2012	12,737	20,899	1.64
2013	12,088	20,674	1.71
2014	14,564	23,019	1.58
Mean	13,130	21,531	1.64

Source: NMFS SEFSC coastal logbook program that records landings.

Among red snapper and co-occurring species during 2012-2014, the average percentage of trips that reported discards was greatest for red snapper and black sea bass (26.46% and 25.22%, respectively), followed by vermilion snapper (21.48%), gray triggerfish (14.13%), and gag (12.04%) **(Table D-4**). Species with the greatest number of individuals discarded during 2012-2014 were black sea bass (41,821), vermilion snapper (21,944), and red snapper (18,734) (**Table D-4**).

Release mortality estimates for the commercial sector compiled from the most recent stock assessments (as available) using the SEDAR process are included in **Table D-4**. Dead discards were estimated by applying the release mortality rates to the total discards. Discard mortality was highest for vermilion snapper (8,997), followed by red snapper (7,119) (**Table D-4**). **Table D-5** shows the discarded co-occurring species made during 2015 and 2016 when no red snapper harvest was allowed. The average percentage of trips that reported discards was greatest for red snapper and vermilion snapper (33.82% and 20.85%, respectively), followed by black sea bass 14.97%) and gray triggerfish (12.97%) **(Table D-5**). Discard mortality was highest for vermilion snapper (10,056), followed by red snapper (9,170) (**Table D-5**). See the "Finfish Bycatch Mortality" and "Practicability of Management Measures in Directed Fisheries Relative to their Impact on Bycatch and Bycatch Mortality" sections of this BPA for more details.

Table D-4. Percentage of commercial trips that discarded species and expanded commercial discards of red snapper and co-occurring species from 2012-2014.

Species	Percentage of trips that discarded species	Total discards	Release mortality	Dead Discards	Source
Black sea bass	25.22%	41,821	7%	2,927	SEDAR 2011
Red grouper	5.56%	2,105	20%	421	SEDAR 2010a
Gag	12.04%	9,697	40%	3,879	SEDAR 2006b
Scamp	10.55%	1,268	Unknown	Unknown	
Greater Amberjack	6.64%	2,029	20%	406	SEDAR 2008b
Red snapper	26.46%	18,734	38%	7,119	SEDAR 2016a
Vermilion snapper	21.48%	21,944	41%	8,997	SEDAR 2008c
Gray triggerfish	14.13%	12,918	12.50%	1,615	SEDAR 2016b

Note: Computed using mean discard rates (2012-2014) of vertical line and longline from commercial discard logbook (20% of fishery) applied to overall commercial effort reported to commercial logbook. Discard logbook and commercial logbook data provided by SEFSC April 2017.

Table D-5. Percentage of commercial trips that discarded species and expanded commercial discards of red snapper and co-occurring species from 2015-2016.

Species	Percentage of trips that discarded species	Total discards	Release mortality	Dead Discards
Black sea bass	14.97%	48,380	7%	3,387
Red grouper	1.70%	818	20%	164
Gag	8.54%	5,918	40%	2,367
Scamp	8.10%	1,132	Unknown	Unknown
Greater Amberjack	8.13%	4,300	20%	860
Red snapper	33.82%	24,131	38%	9,170
Vermilion snapper	20.85%	24,527	41%	10,056
Gray triggerfish	12.97%	15,236	12.50%	1,905

Note: Computed using mean discard rates (2015-2016) of vertical line and longline from commercial discard logbook applied to overall commercial effort reported to commercial logbook. Discard logbook and commercial logbook data provided by SEFSC April 2017.

Recreational Sector

For the recreational sector, estimates of the number of recreational discards are available from Marine Recreational Information Program (MRIP) and the NMFS headboat survey. The MRIP system classifies recreational catch into three categories:

- Type A - Fishes that were caught, landed whole, and available for identification and enumeration by the interviewers.

- Type B - Fishes that were caught but were either not kept or not available for identification:

    - Type B1 - Fishes that were caught and filleted, released dead, given away, kept but not observed by interviewer, or disposed of in some way other than Types A or B2.

    - Type B2 - Fishes that were caught and released alive.

During 2012-2014, recreational harvest of red snapper and co-occurring species was greatest for black sea bass followed by red snapper, gray triggerfish, vermilion snapper, red grouper, and gag (**Table D-6**). There were differences in the amount and variety of species harvested by the private recreational sector and the for-hire sectors (charter vessels/headboats) (**Table D-6**). During 2012-2014, the percentage of discards were highest for black sea bass, followed by gag, red snapper, and red grouper in the private recreational sector (**Table D-6**). For charter vessels, the percentage of discards were highest for gag, red snapper, black sea bass, and red grouper; while for the headboat sector, the percentage of discards were high for red snapper, black sea bass, and red grouper, followed by gag and scamp.

Release mortality estimates for the recreational sector compiled from the most recent stock assessments using data from SEDAR stock assessments (as available) are: 25% for gag (SEDAR 2006b); 7% for black sea bass (SEDAR 2011); 38% for vermilion snapper (SEDAR 2008c); 20% for red grouper (SEDAR 2010a); 20% for greater amberjack (SEDAR 2008b); and 12.5% for gray triggerfish (SEDAR 2016b) (**Table D-6**). Dead discards were estimated by applying the release mortality rates to the total discards. During 2012-2014, discard mortality was highest for black sea bass, red snapper, vermilion snapper, gag, and red grouper for the private recreational sector (**Table D-6**). For the for-hire sector (charter vessels/headboats), discard mortality was highest for black sea bass, followed by red snapper, vermilion snapper, gag, and red grouper (**Table D-6**). Discard mortality was zero for scamp for all the components of the recreational sector during 2012-2014 (**Table D-6**). For 2015 and 2016, discard mortality was highest for black sea bass, vermilion snapper, red snapper, and gray triggerfish for the recreational sector (**Table D-7**).

Table D-6. Mean number (expanded) of fish based on harvest (A + B1) and discards (B2) from MRIP for private and charter boat trips and SHBS for headboat trips for the South Atlantic from 2012-2014.

	Private						Charter boat						Headboat					
Species	Total Catch	A+B1	B2	% B2	Release Mortality	Dead Discards	Total	A+B1	B2	% B2	Release Mortality	Dead Discards	Total	A+B1	B2	% B2	Release Mortality	Dead Discards
Black sea bass	3,868,459	234,732	3,633,727	94%	7%	254,361	412,777	53,573	359,204	87%	7%	25,144	822,707	91,929	730,778	89%	7%	51,154
Red grouper	123,088	30,611	92,477	75%	20%	18,495	18,059	3,479	14,580	81%	20%	2,916	9,780	1,484	8,297	85%	20%	1,659
Gag	93,529	9,745	83,784	90%	25%	20,946	21,914	2,700	19,214	88%	25%	4,803	3,855	1,508	2,347	61%	25%	587
Scamp	4,493	4,493	0	0%		-	1,479	1,154	325	22%			4,129	1,889	2,240	54%		
Greater amberjack	41,194	18,870	22,324	54%	20%	4,465	25,845	17,804	8,042	31%	20%	1,608	7,057	3,551	3,506	50%	20%	701
Vermilion snapper	140,761	70,674	70,087	50%	38%	26,633	49,030	38,945	10,085	21%	38%	3,832	189,572	122,253	67,319	36%	38%	25,581
Red Snapper	172,590	35,054	137,536	80%	28%	38,510	23,952	3,065	20,887	87%	28%	5,848	50,106	2,200	47,906	96%	28%	13,414
Gray triggerfish	177,398	83,390	94,008	53%	12.5%	11,751	48,684	38,824	9,860	20%	12.5%	1,233	64,320	52,898	11,422	18%	12.5%	1,428

Source: SEFSC Recreational ACL Dataset (June 2017), Headboat CRNF files (expanded; Mar 2017).

Table D-7. Percentage of recreational trips that discarded red snapper and co-occurring species from 2015-2016.

Species	Percentage of trips that discarded species	Total discards	Release mortality	Dead Discards
Black sea bass	6.74%	6,744,495	7%	472,115
Red grouper	0.28%	163,728	20%	32,746
Gag	0.34%	78,655	25%	19,664
Scamp	0.01%	4,552	Unknown	Unknown
Greater Amberjack	0.44%	151,320	20%	30,264
Red snapper	1.45%	798,657	28%	223,624
Vermilion snapper	0.87%	721,671	38%	274,235
Gray triggerfish	1.11%	791,070	12.50%	98,884

Note: Computed using Recreational Fishery Statistical Queries (http://www.st.nmfs.noaa.gov/st1//recreational/queries/index.html), SEFSC Recreational ACL Dataset (June 2017), and Headboat CRNF files (expanded; Mar 2017). Shore trips were removed from total trips to estimate percentage of trips that discarded species.

Finfish Bycatch Mortality

Red snapper release mortality rates utilized in the three most recent stock assessments are reported in **Table D-8**. The most recent release mortality estimate was based on Sauls et al. (2015), which was a working paper submitted to SEDAR 41 (2016a). In this paper, the researchers calculated the release mortality rate through a mark recapture study and relative risk of injury due to several factors. The estimate was revised due to suggestions at the workshop and recommended for use for the recreational sector in the assessment. The commercial sector used information from Burns et al. (2002), but the discard mortality was decreased due to use of circle hooks. Diamond and Campbell (2009) reported a delayed mortality rate of 64% off Texas. A study by Burns et al. (2004) conducted on headboats off Florida in the Atlantic and Gulf of Mexico found a release mortality of 64% for red snapper. The majority of acute mortalities in this study (capture depth of 9-42 m) were attributed to hooking (49%), whereas barotrauma accounted for 13.5%. An earlier study by Burns et al. (2002), also conducted in the Atlantic and Gulf of Mexico, had similar results, as J-hook mortality accounted for 56% of the acute mortalities of red snapper on headboats. Using tagging data and cage studies, Burns et al. (2002) determined the depth at which 50% of the released red snapper would die is 43.7 m (143 feet). SEDAR 15 (2008a) indicated red snapper were most often caught at depths of 141-190 feet by the recreational sector and 141-234 feet by the commercial sector. Rummer and Bennett (2005) reported over 70 different overexpansion injuries related to barotrauma in red snapper, and Wilde (2009) observed reduced survival of this species when vented.

Table D-8. Discard mortality rates for red snapper utilized in last three stock assessments.

Source	Commercial	For-hire	Private Recreational
SEDAR 15 (2008a)	90%	40%	40%
SEDAR 24 (2010b)	48%	41%	39%
SEDAR 41 (2016a)	38%	28.5%	28.5%

SEDAR 17 (2008c) recommended a release mortality rate for vermilion snapper of 41% for the commercial sector and 38% for the recreational sector. The commercial sector has a slightly higher discard mortality rate because that sector typically fishes in deeper water than the recreational sector. Ruderhshausen et al. (2007) estimated release mortality rate to be 15% for undersized vermilion snapper. Immediate mortality of vermilion snapper was estimated to be 10% at depths of 25-50 m and delayed mortality was estimated to be 45% at the same depths. Rudershausen et al. (2007) indicated minimum size limits are moderately effective in shallower water for vermilion snapper. Previously, SEDAR 2 (2003) estimated a release mortality rate of 40% and 25% for vermilion snapper taken by commercial and recreational fishermen, respectively. Release mortality rates for vermilion snapper from SEDAR 2 (2003) were based on cage studies conducted by Collins (1996) and Collins et al. (1999). Burns et al. (2002) suggested that release mortality rates of vermilion snapper could be higher than those estimated from cage studies because cages protect the fish from predators. A higher release mortality rate is supported by low recapture rates of vermilion snapper in tagging studies. Burns et al. (2002) estimated a 0.7% recapture rate for 825 tagged vermilion snapper; whereas, recapture rates for red grouper, gag, and red snapper ranged from 3.8% to 6.0% (Burns et al. 2002). McGovern and Meister (1999) estimated a 1.6% recapture rate for 3,827 tagged vermilion snapper. Alternatively, recapture rates could be low if population size was very high or tagged fish were

unavailable to fishing gear. Harris and Stephen (2005) indicated approximately 50% of released vermilion snapper caught by one commercial fisherman were unable to return to the bottom. Lower recapture rates were estimated for black sea bass (10.2%), gray triggerfish (4.9%), gag (11%), and greater amberjack (15.1%)(McGovern and Meister 1999; McGovern et al. 2005). Burns et al. (2002) suggested released vermilion snapper did not survive as well as other species due to predation. Vermilion snapper that do not have air removed from swim bladders are subjected to predation at the surface of the water. Individuals with a ruptured swim bladder or those that have air removed from the swim bladder are subject to bottom predators, since fish would not be able to join schools of other vermilion snapper hovering above the bottom (Burns et al. 2002). However, Wilde (2009) reports that venting appears to be increasingly harmful for fish captured from deep water.

SEDAR 10 (2006b) estimated release mortality rates of 40% and 25% for gag taken by commercial and recreational fishermen, respectively. A tagging study conducted by McGovern et al. (2005) indicated recapture rates of gag decreased with increasing depth. The decline in recapture rate was attributed to depth-related mortality. Assuming there was no depth-related mortality at 0 m, McGovern et al. (2005) estimated depth related mortality ranged from 14% at 11-20 m (36-65 feet) to 85% at 71-80 m (233-262 feet). Similar trends in depth related mortality were provided by a gag tagging study conducted by Burns et al. (2002). Overton et al. (2008) reported post-release mortality for gag as 13.3%. Release mortality rates are not known for other shallow water grouper species, but could be similar to gag since they have a similar depth distribution. Rudershausen et al. (2007) estimated release mortality rates of 33% for undersized gag taken with J-hooks in depths of 25-50 m off North Carolina. For other gag caught at depths of 25-50 m, no immediate mortality was observed but delayed mortality was estimated to be 49%. McGovern et al. (2005) estimated a release mortality rate of 50% at 50 m, which is similar to the findings of Rudershausen et al. (2007). Rudershausen et al. (2007) concluded minimum size limits are effective for gag in the shallower portions of their depth range.

Release mortality rates were estimated as 20% for red grouper taken by recreational and commercial fishermen in SEDAR 19 (2010a). There was limited information to estimate discard mortality for red grouper. Wilson and Burns (1996) reported potential mortality rates for released red grouper to be low (0 - 14%) as long as the fish were caught from waters shallower than 44 m. It was recommended to use a discard mortality of 20% based on gag discard mortality since some studies did not account for post release mortality. SEDAR 15 (2008a) estimated a 20% release mortality rate for greater amberjack. Although SEDAR 41 (2016b) assessment was not approved as best science for assessing the gray triggerfish stock, a literature review was conducted on the release mortality. The report recommended using a release mortality of 12.5% for gray triggerfish.

Release mortality of black sea bass is considered to be low (7% for the recreational sector and 7% for hook-and-line fishery and 1% for pot fishery in the commercial sector) (SEDAR 2011) indicating minimum size limits are probably an effective management tool for black sea bass. McGovern and Meister (1999) report a recapture rate of 10.2% for 10,462 that were tagged during 1993-1998 suggesting that survival of released black sea bass is high. Rudershausen et al. (2007) reported a sub-legal discard rate of 12% for black sea bass. Collins et al. (1999) reported venting of the swim bladder yielded reductions in release mortality of black sea bass, and the

benefits of venting increased with capture depth. The same study was analyzed by Wilde (2009) to suggest that venting increased the survival of black sea bass, although this was an exception to the general findings of Wilde's (2009) study.

Practicability of Management Measures in Directed Fisheries Relative to their Impact on Bycatch and Bycatch Mortality

Expected Impacts on Bycatch of Red Snapper and Co-occurring Species from the Proposed Action

The snapper grouper fishery represents many species occupying the same location at the same time. For example, the top co-occurring species with red snapper are black sea bass, red grouper, gag, scamp, greater amberjack, vermilion snapper, and gray triggerfish. Fishermen could harvest one of these species and return a co-occurring species to the water as "regulatory discards" (e.g., if the fish is under the size limit) or if undesirable. A portion of the population would not survive. Species with the greatest average annual number of individuals discarded by the commercial and recreational sectors during 2012 to 2014 are listed in **Tables D-4 and D-5**. Based on recent years where red snapper was open (2012-2014), the species that the commercial sector caught with red snapper were black sea bass, red grouper, gag, scamp, greater amberjack, vermilion snapper, and gray triggerfish (**Table D-4**). The species that closed after October 1 for the commercial sector in 2016 included greater amberjack (10/4/2016), vermilion snapper (10/11/2016), and gray triggerfish (12/16/2016). Therefore, if the red snapper commercial season remains open for October through December as predicted, and the same species close after October, bycatch could increase for greater amberjack, vermilion snapper, and gray triggerfish.

Alternative 1 (No Action) would retain the current process to determine the ACL for red snapper. Under the current process, the ACL has been zero due to exceeding the ABC based on landings and discards in the previous year. Under **Alternative 1 (No Action),** no directed fishery for red snapper would be allowed in 2018. If trends in landings and dead discards continue on the current increasing trajectory seen since 2014, the red snapper portion of the snapper grouper fishery can expect a high level of regulatory discards.

Alternatives 2 through **5** would specify the red snapper ACL to allow limited harvest beginning in 2018. Fishermen may produce "regulatory discards" under all the alternatives, which could have adverse effects on the red snapper since release mortality rates for red snapper range from 28.5 to 38% depending on the fishing sector (SEDAR 2016a). However, it is expected that some of the dead discards that would be expected under **Alternative 1 (No Action)** would be landed under **Alternatives 2** through **5**.

Projected season lengths and landings and dead discards under **Alternatives 2** through **5** would vary based on the selected alternative. However, all of the alternatives would allow a commercial ACL that is not projected to be met. Under the "Predicted Landings" scenario, the recreational sector would be open for as short as 7 days (**Alternative 2**) and as long as 23 days (**Alternative 5**); and would be open for 12 days under **Preferred Alternative 4** (**Table 4.4**). Under the "High Landings" scenario, the recreational sector would be open for as short as 3 days

(**Alternative 2**) and as long as 12 days (**Alternative 5**); and would be open for 6 days under **Preferred Alternative 4** (**Table 4.4**).

Preferred Alternative 4 would establish a red snapper total ACL of 42,510 fish. The commercial ACL would be 124,815 pounds (whole weight) and the recreational ACL would be 29,656 fish. This alternative could reduce discards because a portion of caught red snapper would be retained as landings.

Allowing a limited harvest beginning in 2018 (**Alternatives 2-5)**, may increase bycatch through an increase in effort and "high-grading" behavior. Fishermen have testified that the current red snapper prohibition forces avoidance tactics such as leaving an area with a large number of red snapper. During an open season, fishermen may not avoid red snapper to the degree as during a closed season. In addition, trips targeting red snapper may increase during the open season.

High-grading is a practice of selectively landing fish so that only the best quality (usually largest) fish are brought ashore. For example, recreational fishermen may discard smaller size fish to retain a larger, more desirable red snapper. High-grading can result in many dead discards. High-grading is more likely to occur in fisheries with low recreational bag limits, which applies to this action as the recreational bag limit would be restricted to one red snapper per person.

In conclusion, under **Alternative 1 (No Action)**, the current increasing trend in bycatch would be expected to continue as the stock rebuilds. In numbers of fish, estimates of discards and dead discards of red snapper in 2016 were 1,018,929 and 406,195 (SEFSC 2016). In comparison, allowing harvest in 2018 of red snapper (**Alternatives 2-5**) could both increase and decrease occurrences of bycatch of red snapper as discussed above. Bycatch would decrease when fishermen retain red snapper during the open season; if the season was closed (**Alternative 1 (No Action)**), these fish would be returned to the water and a portion would not survive. Bycatch could increase due to increased targeting and high-grading behavior as discussed above.

As changes to bycatch from allowing harvest beginning in 2018 (**Alternatives 2-5**) would largely depend on fishermen's behavior it is not possible to determine the net change to the bycatch between a closed season (**Alternative 1 (No Action)**) and an open one (**Alternatives 2-5**). However, although fishery management actions can adversely impact non-target species, the proposed alternatives are not anticipated to substantially increase bycatch of red snapper and co-occurring species. The red snapper open seasons in 2012, 2013, and 2014 were short in duration (total days open since 2010: 17 recreational and 122 commercial) and future seasons based on landings during this time period would also be short.

Past, Current, and Future Actions to Prevent Bycatch and Improve Monitoring of Harvest, Discards, and Discard Mortality.

Amendment 14 to the Snapper Grouper FMP (Amendment 14; SAFMC 2007) established eight marine protected areas (MPAs) from North Carolina to Florida where harvest of snapper grouper species is prohibited. One of the objectives of Amendment 14 was to protect some areas

where spawning of snapper grouper species was known to occur. As all harvest of snapper grouper species is prohibited in the MPAs, no bycatch of snapper grouper species is assumed to be occurring in these areas.

Seasonal closures of shallow-water grouper species (commercial and recreational sectors) and vermilion snapper (recreational sector) implemented through Amendment 16 to the Snapper Grouper FMP (Amendment 16; SAFMC 2009) has likely reduced bycatch mortality of red snapper. Expected harvest reductions for red snapper from Amendment 16 in total mortality was estimated to be 16.5% (commercial sector), 1.1 to 7.7% (headboat sector), and 2.3% (private/charter sector) (SERO 2009a, b, c, d). A longer spawning seasonal closure could enhance the reproductive potential of grouper stocks. For example, Amendment 16 established a January-April spawning season closure for gag, red grouper, black grouper, and shallow-water grouper species. Gag are in spawning condition from December through April each year. There is some evidence spawning aggregations may be in place before and after a spawning season (Gilmore and Jones 1992). When aggregated, gag are extremely susceptible to fishing pressure since the locations are often well known by fishermen. Gilmore and Jones (1992) showed that the largest and oldest gag in aggregations are the most aggressive and first to be removed by fishing gear. Since gag change sex, larger and older males can be selectively removed. As a result, a situation could occur where there are not enough males in an aggregation to spawn with the remaining females. Furthermore, the largest, most fecund females could also be selectively removed by fishing gear. Therefore, a spawning season closure for all shallow-water grouper species is expected to protect grouper species when they are most vulnerable to capture, reduce bycatch of co-occurring grouper species, increase the percentage of males in grouper populations, enhance reproductive success, and increase the magnitude of recruitment. Other actions in Amendment 16 that could reduce bycatch of snapper grouper species include a reduction in the recreational bag limit to one gag or black grouper (combined) per day within a grouper aggregate bag limit of three fish and the establishment of a commercial quota for gag.

Unobserved mortality due to predation or trauma associated with capture could be substantial (Burns et al. 2002; Rummer and Bennett 2005; St. John and Syers 2005; Parker et al. 2006; Rudershausen et al. 2007; Hannah et al. 2008; Diamond and Campbell 2009). Amendment 16 also included actions that required the use of dehooking devices, which could help reduce bycatch mortality of vermilion snapper, black sea bass, gag, red grouper, black grouper, and red snapper. Dehooking devices can allow fishermen to remove hooks with greater ease and more quickly from snapper grouper species without removing the fish from the water. If a fish does need to be removed from the water, dehookers could still reduce handling time in removing hooks, thus increasing survival (Cooke et al. 2001).

In addition to prohibiting the harvest of red snapper, Amendment 17A implemented regulations requiring the use of non-stainless circle hooks north of 28 degrees N. latitude, effective March 2, 2011**.** Circle hooks are generally thought to reduce the discard mortality rate for red snapper (SEDAR 2005; Rummer 2007); however, Burns et al. (2004) did not observe decreased discard mortality rate when comparing recapture rates of red snapper caught on circle and J-hooks. Rummer (2007), and Diamond and Campbell (2009) found that a greater differential between the surface and bottom temperature caused a higher discard mortality rate for red snapper. Amendment 17B to the Snapper Grouper FMP (Amendment 17B; SAFMC

2010b) established ACLs and accountability measures (AMs) and addressed overfishing for eight species in the snapper grouper management complex listed at that time as undergoing overfishing: snowy grouper; speckled hind; warsaw grouper; black sea bass; gag; and red grouper; in addition to black grouper, golden tilefish, and vermilion snapper.

The Comprehensive ACL Amendment (SAFMC 2011a) implemented ACLs and accountability measures (AMs) for species not undergoing overfishing in four FMPs, in addition to other actions such as allocations and establishing annual catch targets for the recreational sector. The Comprehensive ACL Amendment also established additional measures to reduce bycatch in the snapper grouper fishery with the establishment of species complexes based on biological, geographic, economic, taxonomic, technical, social, and ecological factors. ACLs were assigned to these species complexes, and when the ACL for the complex is met or projected to be met, fishing for species included in the entire species complex is prohibited for the fishing year. ACLs and AMs have likely reduced bycatch of target species and species complexes as well as incidentally caught species such as red snapper.

Amendment 18A to the Snapper Grouper FMP (Amendment 18A; SAFMC 2011b) contains measures to limit participation and effort for black sea bass, and does not directly affect red snapper. Amendment 18A established an endorsement program than enables snapper grouper fishermen with a certain catch history to harvest black sea bass with pots. In addition, Amendment 18A included measures to reduce bycatch in the black sea bass pot sector, modify the rebuilding strategy, and other necessary changes to management of black sea bass as a result of a 2011 stock assessment (SEDAR 2011). Amendment 24 to the Snapper Grouper FMP (Amendment 24; SAFMC 2011c) established a rebuilding plan for red grouper which is overfished and undergoing overfishing. Amendment 24 also established ACLs and AMs for red grouper that could help to reduce bycatch of red grouper and co-occurring species such as red snapper.

1.2 Ecological Effects Due to Changes in the Bycatch

The ecological effects of bycatch mortality are the same as fishing mortality from directed fishing efforts. If not properly managed and accounted for, either form of mortality could potentially reduce stock biomass to an unsustainable level.

Overall fishing effort could increase in the commercial and recreational sectors in response to the limited opening(s) of red snapper, and therefore, increase the potential for bycatch. However, as stated in **Chapter 2** and analyzed in detail in **Chapter 4**, the opening(s) would be of short duration in the recreational sector and limited to an incidental catch limit (75 pounds gutted weight) in the commercial sector, and therefore, the ecological effects due to changes in the bycatch would likely be small.

1.3 Changes in the Bycatch of Other Fish Species and Resulting Population and Ecosystem Effects

The action in the amendment could allow a limited harvest of red snapper beginning in 2018. Thus, ecological changes could occur in the community structure of reef ecosystems through the proposed action, due to increased fishing pressure on co-occurring species that could be caught as bycatch. These ecological changes could affect the nature and magnitude of bycatch over time. However, as stated in **Chapters 2** and **4**, the allowed harvest of red snapper beginning in 2018 would likely be relatively limited in scope, and changes in the bycatch of other fish species and resulting population and ecosystem effects could be minimal in nature.

The commercial red snapper season would close when the commercial sector ACL is met or projected to be met. The end of the recreational red snapper season would be projected and announced before the start of the recreational season

1.4 Effects on Marine Mammals and Birds

Under Section 118 of the Marine Mammal Protection Act (MMPA), NMFS must publish, at least annually, a List of Fisheries (LOF) that places all U.S. commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishery. Of the gear utilized within the snapper grouper fishery, only the black sea bass pot is considered to pose an entanglement risk to marine mammals. The southeast U.S. Atlantic black sea bass pot sector is included in the grouping of the Atlantic mixed species trap/pot fisheries, which the final 2017 LOF classifies as a Category II (82 FR 3655, January 12, 2017). Gear types used in these fisheries are determined to have occasional incidental mortality and serious injury of marine mammals. For the South Atlantic snapper grouper fishery, the best available data on protected species interactions are from the SEFSC Supplementary Discard Data Program (SDDP) initiated in July of 2001. The SDDP sub-samples 20% of the vessels with an active permit. Since August 2001, only three interactions with marine mammals have been documented; each was taken by handline gear and each released alive (McCarthy SEFSC database). The longline and hook-and-line gear components of the snapper grouper fishery in the South Atlantic are classified in the final 2017 LOF (82 FR 3655, January 12, 2017) as Category III fisheries.

Although black sea bass pots can pose an entanglement risk to large whales due to their distribution and occurrence, sperm, fin, sei, and blue whales are unlikely to overlap with the black sea bass pot fishery operated within the snapper grouper fishery since it is executed primarily off North Carolina and South Carolina (with some effort off Florida) in waters ranging from 70-120 feet deep (21.3-36.6 meters). North Atlantic right overlap both spatially and temporally with the black sea bass pot fishery. In 2007, revisions to the Atlantic Large Whale Take Reduction Plan folded the Atlantic mixed species trap/pot fisheries into the plan (72 FR 57104; October 5, 2007). In the 2016 biological opinion, NMFS estimated that the number of annual lethal takes for NARWs from black sea bass trap/pot gear ranged from an estimated minimum of 0.005 to a maximum of 0.08. This equates to 1 estimated lethal entanglement approximately every 25 to 42 years.

Bermuda petrels are occasionally seen in the waters of the Gulf Stream off the coasts of North and South Carolina during the summer. Sightings are considered rare and only occurring in low numbers (Alsop 2001). Roseate terns occur widely along the Atlantic coast during the summer but in the southeast region, they are found mainly off the Florida Keys (unpublished U.S. Fish and Wildlife Service data). Interaction with fisheries has not been reported as a concern for either of these species.

These species are not commonly found and neither has been described as associating with vessels or having had interactions with fisheries, including the snapper grouper fishery. Thus, it is believed that the snapper grouper fishery has no effect affect the Bermuda petrel and the roseate tern.

1.5 Changes in Fishing, Processing, Disposal, and Marketing Costs

With the exception of a limited opening in 2012, 2013, and 2014, landing red snapper from federal waters has been prohibited since January 4, 2010, for both the commercial and recreational sectors. The action in the amendment would allow a limited harvest of red snapper beginning in 2018. Since red snapper is a desirable species, it is highly likely that all opportunities to harvest this species would be entertained. Therefore, there could be changes to costs associated with the fishing, processing, disposal, and marketing of red snapper. It is likely that all four states (North Carolina, South Carolina, Georgia, and Florida) would be affected by the regulations associated with this action, since fishermen from all the states would be interested in participating in any reopening that allows landings of red snapper. Additionally, factors such as waterfront property values, availability of less expensive imports, etc. may affect economic decisions made by recreational and commercial fishermen.

The Council has discussed options to enhance current data collection programs in future amendments. This might provide more insight in calculating the changes in fishing, processing, disposal, and marketing costs. The states and the SEFSC would work together to collect as much biological information as possible during the limited commercial and recreational openings for red snapper. The life history information obtained through data collection efforts may help in assessing the status of the stock in the future.

1.6 Changes in Fishing Practices and Behavior of Fishermen

Allowing harvest of red snapper could result in a modification of fishing practices by commercial and recreational fishermen, thereby affecting the magnitude of discards. However, the red snapper ACLs proposed by this action would result in limited fishing seasons, and are not expected to substantially increase overall fishing effort or alter the spatial and/or temporal distribution of current fishing effort. With the exception of limited openings in 2012, 2013, and 2014, harvest of red snapper has been prohibited since January 4, 2010, for both the commercial and recreational sectors. Since red snapper is a desirable species, it is highly likely that all opportunities to harvest this species would be entertained. Predicting changes in angler behavior

in response to a reopening is difficult. Many factors can influence fishing activity (see **Chapter 3** for more details) including: fuel costs and trip expenses; weather; changes in regulations; changes in fishing behavior; and conflicting activities (e.g., family activities, sporting events on weekends).

Landings of red snapper have only been allowed for 17 days for the recreational sector and 122 days for the commercial sector since 2010. Additionally, landings of red snapper from federal waters were not allowed since 2014 until November 2017 when an emergency action allowed for a mini-season. The limited information available for red snapper makes it difficult to determine how fishermen will respond to a similar opening in 2018.

NMFS would announce the pre-determined commercial and recreational fishing year start dates. The commercial red snapper season would close when the commercial sector ACL is met or projected to be met. The end of the recreational red snapper season would be projected and announced before the start of the recreational season. The NMFS Southeast Regional Administrator has the authority to delay the opening of red snapper fishing seasons in the event of a tropical storm or hurricane affecting the Council's area of authority.

1.7 Changes in Research, Administration, and Enforcement Costs and Management Effectiveness

Research and monitoring is ongoing to understand the effectiveness of proposed management measures and their effect on bycatch. Efforts are underway by the states and the SEFSC to enhance data collection activities if a limited opening for red snapper were to occur. In 1990, the SEFSC initiated a logbook program for vessels with federal permits in the snapper grouper fishery from the Gulf of Mexico and South Atlantic. Approximately 20% of commercial fishermen are selected to fill out discard information in logbooks; however, a greater percentage of fishermen could be selected with emphasis on individuals that dominate landings. Recreational discards are obtained from the MRIP and logbooks from the NMFS headboat program.

Additional data collection activities for the recreational sector are being considered by the Council that could allow for a better monitoring of snapper grouper bycatch in the future. The SEFSC is developing electronic logbooks, which could be used to enable fishery managers to obtain information on species composition, size distribution, geographic range, disposition, and depth of fishes that are released. Some observer information has been provided by Marine Fisheries Initiative and Cooperative Research Programs (CRP), but more is desired for the snapper grouper fishery. Electronic logbook reporting is in place for headboats in the southeast, which is expected to improve the quality of data in that sector. Further, the Council is developing an amendment that could require electronic reporting for snapper grouper vessels, which would be expected to improve data quality.

Cooperative research projects between scientists and industry are being used to a limited extent to collect bycatch information on the snapper grouper fishery in the South Atlantic. For example, Harris and Stephen (2005) characterized the entire (retained and discarded) catch of

reef fishes from a selected commercial fisherman in the South Atlantic including total catch composition and disposition of fishes that were released. The Gulf and South Atlantic Fisheries Foundation, Inc., conducted a fishery observer program within the snapper grouper vertical hook-and-line (bandit rig) fishery of the South Atlantic United States. Through contractors they randomly placed observers on cooperating vessels to collect a variety of data quantifying the participation, gear, effort, catch, and discards within the fishery.

In the spring 2010, Archipelago Marine Research Ltd. worked with North Carolina Sea Grant and several South Atlantic Unlimited Snapper Grouper Permit holders to test the effectiveness of electronic video monitoring to measure catch and bycatch. A total of 93 trips were monitored with video monitoring, 34 by self-reported fishing logbooks, and 5 by observers. Comparisons between electronic video monitoring data and observer data showed that video monitoring was a reliable source of catch and bycatch data.

Research funds for observer programs, as well as gear testing and testing of electronic devices are also available each year in the form of grants from the Marine Fisheries Initiative, Saltonstall-Kennedy program, and the CRP. Efforts are made to emphasize the need for observer and logbook data in requests for proposals issued by granting agencies. A condition of funding for these projects is that data are made available to the Councils and NMFS upon completion of a study.

Stranding networks have been established in the Southeast Region. The NMFS SEFSC is the base for the Southeast United States Marine Mammal Stranding Program (http://sero.nmfs.noaa.gov/protected_resources/marine_mammal_health_and_stranding_response_program/index.html). NMFS authorizes organizations and volunteers under the MMPA to respond to marine mammal strandings throughout the United States. These organizations form the stranding network whose participants are trained to respond to, and collect samples from live and dead marine mammals that strand along southeastern United State beaches. The SEFSC is responsible for: coordinating stranding events; monitoring stranding rates; monitoring human caused mortalities; maintaining a stranding database for the southeast region; and conducting investigations to determine the cause of unusual stranding events including mass strandings and mass mortalities (http://www.sefsc.noaa.gov/species/mammals/strandings.htm). The NMFS Southeast Regional Office and the SEFSC participate in a wide range of training and outreach activities to communicate bycatch related issues. The NMFS Southeast Regional Office issues public announcements, Southeast Fishery Bulletins, or News Releases on different topics, including use of turtle exclusion devices, bycatch reduction devices, use of methods and devices to minimize harm to turtles and sawfish, information intended to reduce harm and interactions with marine mammals, and other methods to reduce bycatch for the convenience of constituents in the southern United States. These are mailed out to various organizations, government entities, commercial interests and recreational groups. This information is also included in newsletters and publications that are produced by NMFS and the various regional fishery management councils. Announcements and news released are also available on the internet and broadcasted over NOAA weather radio.

NMFS established the SouthEast Fishery-Independent Survey in 2010 to strengthen fishery independent sampling efforts in southeast U.S. waters, addressing both immediate and long-term

fishery-independent data needs, with an overarching goal of improving fishery-independent data utility for stock assessments. Meeting these data needs is critical to improving scientific advice to the management process, ensuring overfishing does not occur, and successfully rebuilding overfished stocks on schedule.

1.8 Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

Any changes in economic, social, or cultural values from the proposed action are discussed in **Chapter 4** of the environmental assessment.

1.9 Changes in the Distribution of Benefits and Costs

The ACL for the commercial and recreational sectors was established in Amendment 28 to the Snapper Grouper FMP for the South Atlantic Region (SAFMC 2013) and the sector allocations in the Comprehensive ACL Amendment (SAFMC 2011a). Management measures proposed in Amendment 43 have the potential to reduce bycatch of red snapper during a limited opening of the recreational and commercial sectors. See earlier section titled, "Practicability of Management Measures in Directed Fisheries Relative to their Impact on Bycatch and Bycatch Mortality", in this BPA for a list of amendments and a summary of actions within them that could help reduce bycatch and discard mortality in the snapper grouper fishery. The extent to which these management measures would increase or decrease the magnitudes of discards is unknown. However, this depends on the degree to which fishermen shift effort to other species, seasons, or fisheries and whether effort decreases in response to more restrictive management measures as well as changes in community structure and age/size structures of red snapper that could result from ending overfishing. The distribution of benefits and costs expected from proposed actions in the environmental assessment are discussed in **Chapter 3**. Economic and social effects of the proposed actions are addressed in **Chapter 4** of this document.

1.10 Social Effects

The social effects of all the measures are described in **Chapter 4** of the environmental assessment.

1.11 Conclusion

This section evaluates the practicability of taking additional action to minimize bycatch and bycatch mortality using the ten factors provided at 50 CFR section 600.350(d)(3)(i). In summary, revising the process to determine ACLs for red snapper proposed has the potential to affect bycatch of red snapper during a limited opening of the recreational and commercial sectors as some bycatch is turned into retained catch. As summarized in **Section 1.3** of this BPA, the action is not expected to result in significant changes in bycatch of red snapper. In addition, the

Council, NMFS, and the SEFSC have implemented, and plan to implement numerous management measures and reporting requirements that have improved, or are likely to improve monitoring efforts of discards and discard mortality.

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Appendix E. Regulatory Impact Review

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 regulatory action; 2) it provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives which 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 any proposed regulations are a "significant regulatory action" under certain criteria provided in Executive Order (E.O.) 12866.

Problems and Objectives

The purpose and need, issues, problems, and objectives of this action are presented in **Chapter 1** of this amendment and are incorporated herein by reference.

Description of Fisheries

A description of the red snapper portion of the snapper grouper fishery of the Atlantic region is provided in **Chapter 3** of this amendment and is incorporated herein by reference.

Effects of Management Measures

A detailed analysis and discussion of the expected economic effects of each alternative for all proposed actions is included in **Chapter 4**. The following discussion summarizes the expected economic effects of the preferred alternatives for each action.

Action 1. Revise the process to determine the annual catch limits (ACLs) for red snapper

Preferred Alternative 4 for **Action 1** would allow limited harvest of red snapper and establish an ACL of 42,510 fish, with a commercial sector ACL of 124,815 pounds whole weight (ww) and a recreational sector ACL of 29,656 fish. The allowable harvest levels under **Preferred Alternative 4** create the opportunity for increased consumer surplus on recreational fishing trips and more revenue to be generated on commercial fishing trips. It is anticipated that there will be an approximate increase in recreational consumer surplus of $2.4 million (2016 dollars) and a short-term increase in commercial ex-vessel revenue of approximately $546,000 to $573,000 (2016 dollars), depending on the projected red snapper landings estimate examined.

By allowing recreational red snapper harvest in 2017 under **Preferred Alternative 4**, there is the potential that angler demand for for-hire (charter and headboat) trips will increase as well,

resulting in increased booking rates and for-hire business net operating revenue (NOR). Due to the complex nature of angler behavior and the for-hire industry, it is not possible to quantify these potential economic effects with available data. Commercial and recreational fishing for red snapper also spurs business activity (economic impacts) in the region in which it occurs. **Preferred Alternative 4** may be reasonably expected to increase such business activity relative to the status quo, by increasing recreational and commercial fishing expenditures on goods and services necessary for fishing and by increasing the supply of red snapper into the seafood value chain. Although retail prices for red snapper would likely be tempered by substitute finfish species and snapper imports, fresh locally-caught red snapper may fetch a price premium in seafood markets and restaurants, resulting in an increase in producer surplus. In addition, because seafood consumers may have strong preferences for locally-caught red snapper over other seafood options, it could result in an increase in consumer surplus as well. These potential economic benefits cannot be quantified with available data.

In addition to the short-term economic effects described above, medium to long-term indirect negative economic effects could ensue from **Preferred Alternative 4** as a result of its effects on the red snapper stock, future management decisions, and future catch rates. If increased fishing pressure associated with **Preferred Alternative 4** leads to a declining red snapper stock, and future catch limits and/or catch rates are reduced as a result, it could negatively affect profits for commercial and for-hire business, as well as CS for recreational anglers. These potential indirect negative economic effects cannot be estimated with available data but are expected to be minimal, as the ACL is set at a recently observed level of harvest that has still allowed for robust rebuilding of the stock to continue in subsequent years.

Cumulative Economic Effects Summary

Preferred Alternative 4 for **Action 1** is anticipated to have direct positive economic effects on fishery participants, associated industries, and communities. The overall estimated direct short-term positive economic effects are expected to range from $2.95 million to $2.98 million (2016 dollars) in 2017.

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 amendment include:

Council costs of document preparation, meetings, public hearings, and information dissemination……..$15,000

NMFS administrative costs of document preparation, meetings and review…….$15,000

TOTAL ……..$30,000

Law enforcement currently monitors regulatory compliance in effected fisheries under routine operations and does not allocate specific budgetary outlays to these fisheries, nor are increased

enforcement budgets expected to be requested to address components of this action. In practice, some enhanced enforcement activity might initially occur while the fishery becomes familiar with the new regulations. However, the costs of such enhancements cannot be forecast. Thus, no specific law enforcement costs can be identified.

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, these actions have been determined to not be economically significant for the purposes of E.O. 12866.

Appendix F. Regulatory Flexibility Analysis

1. Introduction

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

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

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

The need for and objective of this proposed action are provided in **Chapter 1**. In summary, there is a need to reduce adverse economic and social effects associated with persistent closures in the South Atlantic red snapper fishery. The objective of this proposed action is to revise annual catch limits (ACLs) of red snapper to allow commercial and recreational fishing access. The Magnuson-Stevens Fishery Conservation and Management Act provides the statutory basis for this proposed action.

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

This proposed action would apply to all federally-permitted commercial vessels and recreational anglers that fish for or harvest red snapper in federal waters of the South Atlantic. It would not directly apply to or regulate charter vessels and headboats (for-hire vessels). For-hire vessels sell fishing services to recreational anglers. The proposed changes to the red snapper management measures would not directly alter the services sold by these vessels. Any change in demand for these fishing services, and associated economic effects, as a result of the proposed action would be a consequence of behavioral change by anglers, secondary to any direct effect on anglers and, therefore, an indirect effect of the proposed rule. Because the effects on for-hire vessels would be indirect, they fall outside the scope of the RFA. For-hire captains and crew are permitted to retain red snapper under the recreational bag limit; however, they are not permitted to sell these fish. As such, for-hire captains and crew are only affected as recreational anglers. The RFA does not consider recreational anglers to be small entities, so they are outside the scope of this analysis and only the impacts on commercial vessels will be discussed.

As of July 10, 2017, there were 544 valid or renewable federal South Atlantic snapper-grouper unlimited permits and 114 valid or renewable 225-lb trip-limited permits. Each of these commercial permits is associated with an individual vessel. Data from the years of 2012 through 2016 were used in Amendment 43 and these data provided the basis for the Council's decisions. On average from 2012 through 2016, there were only 85 federally-permitted vessels with reported landings of red snapper. Their average annual vessel-level revenue from all species for 2012 through 2016 was approximately $88,000 (2016 dollars). Because the federal commercial red snapper seasons were very short or non-existent during 2012 through 2016, it is likely that this proposed action would affect more vessels than just those that reported red snapper landings during that time. On average, 582 vessels reported landings of any snapper grouper species from 2012 through 2016 and their average annual vessel-level revenue from all species was approximately $44,000 (2016 dollars). The maximum annual revenue from all species reported by a single one of these vessels from 2012 through 2016, was approximately $1.38 million (2016 dollars).

For RFA purposes only, NMFS has established a small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing (see 50 CFR § 200.2). A business primarily engaged in commercial fishing (NAICS code 11411) is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual receipts not in excess of $11 million for all its affiliated operations worldwide. All of the commercial vessels directly regulated by this proposed rule are believed to be small entities based on the NMFS size standard.

No other small entities that would be directly affected by this action have been identified.

4. Description of the projected reporting, record-keeping and other compliance requirements of the proposed action, including an estimate of the classes of small entities which will be subject to the

requirement and the type of professional skills necessary for the preparation of the report or records

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

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

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

6. Significance of economic impacts on a substantial number of small entities

Substantial number criterion

There are 658 commercial vessels eligible to fish for the species managed under the Snapper Grouper FMP and all of them may be affected by this proposed action.

Significant economic impacts

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

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

All entities likely to be affected by this action are believed to be small entities and thus the issue of disproportionality does not arise.

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

A detailed analysis of the economic effects associated with this proposed action can be found in **Chapter 4**. The following information summarizes the expected effects of this proposed action.

This proposed action would specify a constant total ACL for red snapper equal to 42,510 fish. The commercial red snapper ACL would be set at 124,815 pounds (whole weight) and the recreational ACL would be set at 29,656 fish. Compared to the status quo (no commercial red snapper harvest), the proposed action would be expected to increase total ex-vessel revenue by a range of $545,981 (2016 dollars) to $572,901 per year. Divided by the total number of federal snapper-grouper permit holders, this would constitute an average annual increase in ex-vessel revenue of $830 to $871 per vessel. Divided by the average number of commercial vessels that

reported landings of any snapper grouper species from 2012 through 2016, it would constitute an increase in ex-vessel revenue of $938 to $984 per vessel. This would be a 2% increase in average annual vessel-level revenue. The commercial red snapper season would be expected to increase from 0 days to a range of 105 to 176 days, which would allow commercial vessels to supplement their harvests with red snapper for a substantial part of the year. The economic benefits to each vessel would be expected to vary based on individual fishing practices; however, such distributional effects cannot be quantified with available data.

In summary, this proposed action would not be expected to have a significant adverse economic effect on any small entities.

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

This proposed action, if implemented, would not be expected to have a significant adverse economic effect on a substantial number of small entities. As a result, the issue of significant alternatives is not relevant.

Appendix G. Other Applicable Laws

1.1 Administrative Procedure Act (APA)

All federal rulemaking is governed under the provisions of the APA (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Among other things under the APA, the National Marine Fisheries Service (NMFS) is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day wait period from the time a final rule is published until it takes effect, with some exceptions. Amendment 43 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Amendment 43) complies with the provisions of the APA through the South Atlantic Fishery Management Council's (Council) extensive use of public meetings, requests for comments and consideration of comments. The proposed rule associated with this amendment will have a request for public comments, which complies with the APA, and upon publication of the final rule, unless the rule falls within an APA exception, there will be a 30-day wait period before the regulations are effective.

1.2 Information Quality Act (IQA)

The IQA (Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-443)) which took effect October 1, 2002, directed the Office of Management and Budget (OMB) to issue government-wide guidelines that "provide policy and procedural guidelines to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies." OMB directed each federal agency to issue its own guidelines, establish administrative mechanisms allowing affected persons to seek and obtain correction of information that does not comply with OMB guidelines, and report periodically to OMB on the number and nature of complaints. The NOAA Section 515 Information Quality Guidelines require a series of actions for each new information product subject to the IQA. Amendment 43 has used the best available information and made a broad presentation thereof. The information contained in this document was developed using best available scientific information. Therefore, this document is in compliance with the IQA.

1.3 Coastal Zone Management Act (CZMA)

Section 307(c)(1) of the federal CZMA of 1972 requires that all federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. While it is the goal of the Council to have management measures that complement those of the states, federal and state administrative procedures vary and regulatory changes are unlikely to be fully instituted at the same time. The Council believes the actions in this amendment are consistent to the maximum extent practicable with the Coastal Zone Management Plans of Florida, Georgia, South Carolina, and North Carolina. Pursuant to Section 307 of the CZMA, this determination will be submitted to the responsible state agencies

who administer the approved Coastal Zone Management Programs in the States of Florida, South Carolina, Georgia, and North Carolina.

1.4 Endangered Species Act (ESA)

The ESA of 1973 (16 U.S.C. Section 1531 et seq.) requires that federal agencies must ensure actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or the habitat designated as critical to their survival and recovery. The ESA requires NMFS to consult with the appropriate administrative agency (itself for most marine species, and the U.S. Fish and Wildlife Service for all remaining species) when proposing an action that may affect threatened or endangered species or adversely modify critical habitat. Consultations are necessary to determine the potential impacts of the proposed action. They are concluded informally when proposed actions may affect but are "not likely to adversely affect" threatened or endangered species or designated critical habitat. Formal consultations, resulting in a biological opinion, are required when proposed actions may affect and are "likely to adversely affect" threatened or endangered species or adversely modify designated critical habitat.

On December 1, 2016, NMFS completed its most recent formal consultation on the snapper grouper fishery of the South Atlantic Region. In the resulting biological opinion, NMFS concluded that the snapper grouper fishery's continued authorization is not likely to jeopardize the continued existence of the NARW, loggerhead sea turtle Northwest Atlantic DPSs, leatherback sea turtle, Kemp's ridley sea turtle, green sea turtle North Atlantic DPS, green sea turtle South Atlantic DPS, hawksbill sea turtle, smalltooth sawfish U.S. DPS, or Nassau grouper. NMFS concluded that the proposed action is not likely to adversely affect designated critical habitat or other ESA-listed species in the South Atlantic Region. Refer to **Section 3.2.6 (Protected Species**) for summary information on species, or DPSs of species, protected by federal law that may occur in the EEZ of the South Atlantic Region, or the analyses ("Section 7 consultations") conducted by NMFS to evaluate the potential adverse effects from the South Atlantic snapper grouper fishery on species and critical habitat protected under the ESA.

1.5 Executive Order 12612: Federalism

E.O. 12612 requires agencies to be guided by the fundamental federalism principles when formulating and implementing policies that have federalism implications. The purpose of the Order is to guarantee the division of governmental responsibilities between the federal government and the states, as intended by the framers of the Constitution. No federalism issues have been identified relative to the actions proposed in this document and associated regulations. Therefore, preparation of a Federalism assessment under E.O. 12612 is not necessary.

1.6 Executive Order 12866: Regulatory Planning and Review

E.O. 12866, signed in 1993, requires federal agencies to assess the costs and benefits of their proposed regulations, including distributional impacts, and to select alternatives that maximize net benefits to society. To comply with E.O. 12866, NMFS prepares a Regulatory Impact Review (RIR) for all fishery regulatory actions that implement a new fishery management plan

(FMP) or that significantly amend an existing plan. RIRs provide a comprehensive analysis of the costs and benefits to society associated with 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 Act. A regulation is significant if it is likely to result in an annual effect on the economy of at least $100,000,000 or if it has other major economic effects.

In accordance with E.O. 12866, the following is set forth by the Council: (1) this rule is not likely to have an annual effect on the economy of more than $100 million or to adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; (2) this rule is not likely to create any serious inconsistencies or otherwise interfere with any action taken or planned by another agency; (3) this rule is not likely to materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; (4) this rule is not likely to raise novel or policy issues arising out of legal mandates, or the principles set forth in the Executive Order; and (5) this rule is not controversial.

This amendment includes the RIR as **Appendix E**.

1.7 Executive Order 12898: Environmental Justice

E.O. 12898 requires that "to the greatest extent practicable and permitted by law…each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations in the United States and its territories and possessions."

The alternatives being considered in this document are not expected to result in any disproportionate adverse human health or environmental effects to minority populations or low-income populations of Florida, North Carolina, South Carolina, or Georgia, rather the impacts would be spread across all participants in the snapper grouper fishery regardless of race or income. A detailed description of the communities impacted by the actions contained in this document and potential socioeconomic impacts of those actions are contained in **Chapters 3** and **4** of this document.

1.8 Executive Order 12962: Recreational Fisheries

E.O. 12962 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. Additionally, the Order establishes a seven-member National Recreational Fisheries Coordination Council responsible for, among other things, ensuring that social and economic values of healthy aquatic systems that support recreational fisheries are considered by federal agencies in the course of

their actions, sharing the latest resource information and management technologies, and reducing duplicative and cost-inefficient programs among federal agencies involved in conserving or managing recreational fisheries. The National Recreational Fisheries Coordination Council also is responsible for developing, in cooperation with federal agencies, states and tribes, a Recreational Fishery Resource Conservation Plan - to include a five-year agenda. Finally, the Order requires NMFS and the U.S. Fish and Wildlife Service to develop a joint agency policy for administering the ESA.

The alternatives considered in this document are consistent with the directives of E.O. 12962.

1.9 Executive Order 13089: Coral Reef Protection

E.O. 13089, signed by President William Clinton on June 11, 1998, recognizes the ecological, social, and economic values provided by the Nation's coral reefs and ensures that federal agencies are protecting these ecosystems. More specifically, the Order requires federal agencies to identify actions that may harm U.S. coral reef ecosystems, to utilize their program and authorities to protect and enhance the conditions of such ecosystems, and to ensure that their actions do not degrade the condition of the coral reef ecosystem.

The alternatives considered in this document are consistent with the directives of E.O. 13089.

1.10 Executive Order 13158: Marine Protected Areas (MPAs)

E.O. 13158 was signed on May 26, 2000, to strengthen the protection of U.S. ocean and coastal resources through the use of Marine Protected Areas. The E.O. defined MPAs as "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 and cultural resources therein." It directs federal agencies to work closely with state, local and non-governmental partners to create a comprehensive network of MPAs "representing diverse U.S. marine ecosystems, and the Nation's natural and cultural resources."

The alternatives considered in this document are consistent with the directives of E.O. 13158.

1.11 Marine Mammal Protection Act (MMPA)

The 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. It also prohibits 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 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." A conservation plan is then developed to guide research and management actions to restore the population to healthy levels.

In 1994, Congress amended the MMPA, to govern the taking of marine mammals incidental to commercial fishing operations. This amendment required the preparation of stock assessments for all marine mammal stocks in waters under U.S. jurisdiction; development and implementation of take-reduction plans for stocks that may be reduced or are being maintained below their optimum sustainable population levels due to interactions with commercial fisheries; and studies of pinniped-fishery interactions. The MMPA requires a commercial fishery to be placed in one of three categories, based on the relative frequency of incidental serious injuries and mortalities of marine mammals. Category I designates fisheries with frequent serious injuries and mortalities incidental to commercial fishing; Category II designates fisheries with occasional serious injuries and mortalities; and Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities.

Under the MMPA, to legally fish in a Category I and/or II fishery, a fisherman must take certain steps. For example, owners of vessels or gear engaging in a Category I or II fishery, are required to obtain a marine mammal authorization by registering with the Marine Mammal Authorization Program (50 CFR 229.4). They are also required to accommodate an observer if requested (50 CFR 229.7(c)) and they must comply with any applicable take reduction plans. The commercial hook-and-line components of the South Atlantic snapper grouper fishery (i.e., bottom longline, bandit gear, and handline), which targets snapper grouper species are listed as part of a Category III fishery in the final List of Fisheries (LOF) for 2017 (82 FR 3655, January 12, 2017) because there have been no documented interactions between these gear and marine mammals. The black sea bass pot component of the South Atlantic snapper grouper fishery is part of the Atlantic mixed species trap/pot fishery, a Category II fishery, in the final List of Fisheries (LOF) for 2017 (82 FR 3655, January 12, 2017). The Atlantic mixed species trap/pot fishery designation was created in 2003 (68 FR 41725, July 15, 2003), by combining several separately listed trap/pot fisheries into a single group. This group was designated Category II as a precaution because of known interactions between marine mammals and gear similar to those included in this group. Prior to this consolidation, the black sea bass pot fishery in the South Atlantic was a part of the "U.S. Mid-Atlantic and Southeast U.S. Atlantic Black Sea Bass Trap/Pot" fishery (Category III). There has never been a documented interaction between marine mammals and black sea bass trap/pot gear in the South Atlantic. The actions in this EA are not expected to negatively impact the provisions of the MMPA.

1.12 National Environmental Policy Act (NEPA)

This document has been written and organized in a manner that meets NEPA requirements, and thus is a consolidated NEPA document, including an EA, as described in NOAA Administrative Order (NAO) 216- 6A.

Purpose and Need for Action

The purpose and need for this action are described in **Chapter 1**.

Alternatives

The alternatives for this action are described in **Chapter 2**.

Affected Environment

The affected environment is described in **Chapter 3**.

Impacts of the Alternatives

The impacts of the alternatives on the environment are described in **Chapter 4**.

1.13 National Marine Sanctuaries Act (NMSA)

Under the NMSA (also known as Title III of the Marine Protection, Research and Sanctuaries Act of 1972), as amended, the U.S. Secretary of Commerce is authorized to designate National Marine Sanctuaries to protect distinctive natural and cultural resources whose protection and beneficial use requires comprehensive planning and management. The National Marine Sanctuary Program is administered by the Sanctuaries and Reserves Division of NOAA. The NMSA provides authority for comprehensive and coordinated conservation and management of these marine areas. The National Marine Sanctuary Program currently comprises 13 sanctuaries around the country, including sites in American Samoa and Hawaii. These sites include significant coral reef and kelp forest habitats, and breeding and feeding grounds of whales, sea lions, sharks, and sea turtles. The three sanctuaries in the South Atlantic exclusive economic zone are the USS Monitor, Gray's Reef, and Florida Keys National Marine Sanctuaries.

The alternatives considered in this document are not expected to have any adverse impacts on the resources managed by the National Marine Sanctuaries.

1.14 Paperwork Reduction Act (PRA)

The purpose of the PRA is to minimize the burden on the public. The PRA is intended to ensure that the information collected under the proposed action is needed and is collected in an efficient manner (44 U.S.C. 3501 (1)). The authority to manage information collection and record keeping requirements is vested with the Director of the Office of Management and Budget (OMB). This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications. The PRA requires NMFS to obtain approval from the OMB before requesting most types of fishery information from the public. Actions in this document are not expected to affect PRA.

1.15 Regulatory Flexibility Act (RFA)

The RFA of 1980 (5 U.S.C. 601 et seq.) requires federal agencies to assess the impacts of regulatory actions implemented through notice and comment rulemaking procedures on small businesses, small organizations, and small governmental entities, with the goal of minimizing adverse impacts of burdensome regulations and record-keeping requirements on those entities. Under the RFA, NMFS must determine whether a proposed fishery regulation would have a significant economic impact on a substantial number of small entities. If not, a certification to

this effect must be prepared and submitted to the Chief Counsel for Advocacy of the Small Business Administration. Alternatively, if a regulation is determined to significantly impact a substantial number of small entities, the RFA requires the agency to prepare an initial and final Regulatory Flexibility Analysis to accompany the proposed and final rule, respectively. These analyses, which describe the type and number of small businesses, affected, the nature and size of the impacts, and alternatives that minimize these impacts while accomplishing stated objectives, must be published in the *Federal Register* in full or in summary for public comment and submitted to the chief counsel for advocacy of the Small Business Administration. Changes to the RFA in June 1996 enable small entities to seek court review of an agency's compliance with the RFA's provisions.

As NMFS has determined whether a proposed fishery regulation would have a significant economic impact on a substantial number of small entities, a certification to this effect will be prepared and submitted to the Chief Counsel for Advocacy of the Small Business Administration.

This amendment includes the RFA as **Appendix F**.

1.16 Small Business Act (SBA)

Enacted in 1953, the SBA requires that agencies assist and protect small-business interests to the extent possible to preserve free competitive enterprise. The objectives of the SBA are to foster business ownership by individuals who are both socially and economically disadvantaged; and to promote the competitive viability of such firms by providing business development assistance including, but not limited to, management and technical assistance, access to capital and other forms of financial assistance, business training, and counseling, and access to sole source and limited competition federal contract opportunities, to help firms achieve competitive viability. Because most businesses associated with fishing are considered small businesses, NMFS, in implementing regulations, must make an assessment of how those regulations will affect small businesses.

1.17 Public Law 99-659: Vessel Safety

Public Law 99-659 amended the Magnuson-Stevens Fishery Conservation and Management Act to require that a FMP or FMP amendment must consider, and may provide for, temporary adjustments (after consultation with the U.S. Coast Guard and persons utilizing the fishery) regarding access to a fishery for vessels that would be otherwise prevented from participating in the fishery because of safety concerns related to weather or to other ocean conditions. No vessel would be forced to participate in South Atlantic fisheries under adverse weather or ocean conditions as a result of the imposition of management regulations proposed in this amendment. No concerns have been raised by South Atlantic fishermen or by the U.S. Coast Guard that the proposed management measures directly or indirectly pose a hazard to crew or vessel safety under adverse weather or ocean conditions.

Appendix H. Essential Fish Habitat and Ecosystem-based Management

South Atlantic Fishery Management Council Habitat Conservation, Ecosystem Coordination and Collaboration

The South Atlantic Fishery Management Council (Council), using the Essential Fish Habitat Plan as the cornerstone, adopted a strategy to facilitate the move to an ecosystem-based approach to fisheries management in the region. This approach required a greater understanding of the South Atlantic ecosystem and the complex relationships among humans, marine life, and the environment including essential fish habitat. To accomplish this, a process was undertaken to facilitate the evolution of the Habitat Plan into a Fishery Ecosystem Plan (FEP), thereby providing a more comprehensive understanding of the biological, social, and economic impacts of management necessary to initiate the transition from single species management to ecosystem-based management in the region.

Moving to Ecosystem-Based Management

The Council adopted broad goals for Ecosystem-Based Management to include maintaining or improving ecosystem structure and function; maintaining or improving economic, social, and cultural benefits from resources; and maintaining or improving biological, economic, and cultural diversity. Development of a regional FEP (SAFMC 2009a) provided an opportunity to expand the scope of the original Council Habitat Plan and compile and review available habitat, biological, social, and economic fishery and resource information for fisheries in the South Atlantic ecosystem. The Council views habitat conservation as the core of the move to EBM in the region. Therefore, development of the FEP was a natural next step in the evolution and expands and significantly updates the SAFMC Habitat Plan (SAFMC 1998a) incorporating comprehensive details of all managed species (SAFMC, South Atlantic States, ASMFC, and NOAA Fisheries Highly Migratory Species and Protected Species) including their biology, food web dynamics, and economic and social characteristics of the fisheries and habitats essential to their survival. The FEP therefore serves as a source document and presents more complete and detailed information describing the South Atlantic ecosystem and the impact of fisheries on the environment. This FEP updated information on designated Essential Fish Habitat (EFH) and EFH-Habitat Areas of Particular Concern; expanded descriptions of biology and status of managed species; presented information that will support ecosystem considerations for managed species; and described the social and economic characteristics of the fisheries in the region. In addition, it expanded the discussion and description of existing research programs and needs to identify biological, social, and economic research needed to fully address ecosystem-based management in the region. It is anticipated that the FEP will provide a greater degree of guidance by fishery, habitat, or major ecosystem consideration of bycatch reduction, prey-predator interactions, maintaining biodiversity, and spatial management needs. This FEP serves as a living source document of biological, economic, and social information for all Fishery Management Plans (FMP). Future Environmental Assessments and Environmental Impact Statements

associated with subsequent amendments to Council FMPs will draw from or cite by reference the FEP.

The Fishery Ecosystem Plan for the South Atlantic Region encompasses the following volume structure:
FEP Volume I - Introduction and Overview of FEP for the South Atlantic Region
FEP Volume II - South Atlantic Habitats and Species
FEP Volume III - South Atlantic Human and Institutional Environment
FEP Volume IV - Threats to South Atlantic Ecosystem and Recommendations
FEP Volume V - South Atlantic Research Programs and Data Needs
FEP Volume VI - References and Appendices

Comprehensive Ecosystem-Based Amendment (CE-BA) 1 (SAFMC 2009b) is supported by this FEP and updated EFH and EFH-HAPC information and addressed the Final EFH Rule (e.g., GIS presented for all EFH and EFH-HAPCs). Management actions implemented in CE-BA 1 established deepwater Coral HAPCs to protect what is thought to be the largest continuous distribution (>23,000 square miles) of pristine, deepwater coral ecosystems in the world.

The Fishery Ecosystem Plan, slated to be revised every 5 years, will again be the vehicle to update and refine information supporting designation and future review of EFH and EFH-HAPCs for managed species. Planning for the update is being conducted in cooperation with the Habitat Advisory Panel during the fall and winter of 2013 with initiation during 2014.

Ecosystem Approach to Deepwater Ecosystem Management

The Council manages coral, coral reefs and live/hard bottom habitat, including deepwater corals, through the Fishery Management Plan for Coral, Coral Reefs and Live/Hard Bottom Habitat of the South Atlantic Region (Coral FMP). Mechanisms exist in the FMP, as amended, to further protect deepwater coral and live/hard bottom habitats. The SAFMC's Habitat and Environmental Protection Advisory Panel and Coral Advisory Panel have supported proactive efforts to identify and protect deepwater coral ecosystems in the South Atlantic region. Management actions in Comprehensive Ecosystem-Based Amendment (CE-BA 1) (SAFMC 2009b) established deepwater coral HAPCs (C- HAPCs) to protect what is thought to be the largest continuous distribution (>23,000 square miles) of pristine deepwater coral ecosystems in the world. In addition, CE-BA 1 established areas within the CHAPC, which provide for traditional fishing in limited areas, which do not impact deepwater coral habitat. CE-BA 1, supported by the FEP, also addressed non-regulatory updates for existing EFH and EFH- HAPC information and addressed the spatial requirements of the Final EFH Rule (i.e., GIS presented for all EFH and EFH-HAPCs). Actions in this amendment included modifications in the management of the following: octocorals; special management zones (SMZs) off the coast of South Carolina; and sea turtle release gear requirements for snapper grouper fishermen. The amendment also designated essential fish habitat (EFH) and EFH-Habitat Areas of Particular Concern (EFH-HAPCs).

CE-BA 2 established annual catch limits (ACL) for octocorals in the South Atlantic as well as modifying the Fishery Management Unit (FMU) for octocorals to remove octocorals off the coast of Florida from the FMU (SAFMC 2011). The amendment also limited the possession of

managed species in the SMZs off South Carolina to the recreational bag limit for snapper grouper and coastal migratory pelagic species; modified sea turtle release gear requirements for the snapper grouper fishery based upon freeboard height of vessels; amends Council fishery management plans (FMPs) to designate or modify EFH and EFH-HAPCs, including the FMP for Pelagic Sargassum Habitat; amended the Coral FMP to designate EFH for deepwater Coral HAPCs designated under CE-BA 1; and amended the Snapper Grouper FMP to designate EFH-HAPCs for golden and blueline tilefish and the deepwater Marine Protected Areas. The final rule was published in the federal register on December 30, 2011, and regulations became effective on January 30, 2012.

Building from a Habitat to an Ecosystem Network to Support the Evolution

Starting with our Habitat and Environmental Protection Advisory Panel, the Council expanded and fostered a comprehensive Habitat network in our region to develop the Habitat Plan of the South Atlantic Region completed in 1998 to support the EFH rule. Building on the core regional collaborations, the Council facilitated an expansion to a Habitat and Ecosystem network to support development of the FEP and CE-BA as well as coordinate with partners on other regional efforts.

Integrated Ocean Observing System (IOOS) and Southeast Coastal and Ocean Observing Regional Association (SECOORA)

The Integrated Ocean Observing System (IOOS®) is a partnership among federal, regional, academic, and private sector parties that works to provide new tools and forecasts to improve safety, enhance the economy, and protect our environment. IOOS supplies critical information about our Nation's oceans, coasts, and Great Lakes. Scientists working to understand climate change, governments adapting to changes in the Arctic, municipalities monitoring local water quality, and industries affected by coastal and marine spatial planning all have the same need: reliable, timely, and sustained access to data and information that inform decision making. Improving access to key marine data and information supports several purposes. IOOS data sustain national defense, marine commerce, and navigation safety. Scientists use these data to issue weather, climate, and marine forecasts. IOOS data are also used to make decisions for energy siting and production, economic development, and ecosystem-based resource management. Emergency managers and health officials need IOOS information to make decisions about public safety. Teachers and government officials rely on IOOS data for public outreach, training, and education.

SECOORA is one of 11 Regional Associations established nationwide through the US IOOS whose primary source of funding is through a 5-year cooperative agreement titled "Coordinated Monitoring, Prediction, and Assessment to Support Decision-Makers Needs for Coastal and Ocean Data and Tools". However, SECOORA was recently awarded funding via a NOAA Regional Ocean Partnership grant through the Governors' South Atlantic Alliance. SECOORA is the regional solution to integrating coastal and ocean observing data in the Southeast United States to inform decision makers and the general public. The SECOORA region encompasses 4 states, over 42 million people, and spans the coastal ocean from North Carolina to the west Coast of Florida and is creating customized products to address these thematic areas: Marine Operations; Coastal Hazards; Ecosystems, Water Quality, Living Marine Resources; and Climate Change. The Council is a voting member and Council staff was recently re-elected to serve on the

Board of Directors for the Southeast Coastal Regional Ocean Observing Association (SECOORA) to guide and direct priority needs for observation and modeling to support fisheries oceanography and integration into stock assessments through SEDAR. Cooperation through SECOORA is envisioned to facilitate the following:

- Refining current or water column designations of EFH and EFH-HAPCs (e.g., Gulf Stream and Florida Current).
- Providing oceanographic models linking benthic, pelagic habitats, and food webs.
- Providing oceanographic input parameters for ecosystem models.
- Integration of OOS information into Fish Stock Assessment process in the SA region.
- Facilitating OOS system collection of fish and fishery data and other research necessary to support the Council's use of area-based management tools in the SA Region including but not limited to EFH, EFH-HAPCs, Marine Protected Areas, Deepwater Coral Habitat Areas of Particular Concern, Special Management Zones, and Allowable Gear Areas.
- Integration of OOS program capabilities and research Needs into the South Atlantic Fishery Ecosystem Plan.
- Collaboration with SECOORA to integrate OOS products with information included in the Council's Habitat and Ecosystem Web Services and Atlas to facilitate model and tool development.
- Expanding Map Services and the Regional Habitat and Ecosystem Atlas in cooperation with SECOORAs Web Services that will provide researchers access to data or products including those collected/developed by SA OOS partners.

SECOORA researchers are developing a comprehensive data portal to provide discovery of, access to, and metadata about coastal ocean observations in the southeast US. Below are various ways to access the currently available data.

One project recently funded by SECOORA initiated development of species specific habitat models that integrate remotely sensed and in situ data to enhance stock assessments for species managed by the Council. The project during 2013/2014 was initiated to address red porgy, gray triggerfish, black seabass, and vermilion snapper. Gray triggerfish and red porgy are slated for assessment through SEDAR in 2014/15 and 2015/16 respectively.

National Fish Habitat Plan and Southeast Aquatic Resource Partnership (SARP)

In addition, the Council serves on the National Habitat Board and, as a member of the Southeast Aquatic Resource Partnership (SARP), has highlighted this collaboration by including the Southeast Aquatic Habitat Plan (SAHP) and associated watershed conservation restoration targets into the FEP. Many of the habitat, water quality, and water quantity conservation needs identified in the threats and recommendations Volume of the FEP are directly addressed by on-the-ground projects supported by SARP. This cooperation results in funding fish habitat restoration and conservation intended to increase the viability of fish populations and fishing opportunity, which also meets the needs to conserve and manage Essential Fish Habitat for Council managed species or habitat important to their prey. To date, SARP has funded 53 projects in the region through this program. This work supports conservation objectives identified in the SAHP to improve, establish, or maintain riparian zones, water quality, watershed connectivity, sediment flows, bottoms and shorelines, and fish passage, and addresses other key factors associated with the loss and degradation of fish habitats. SARP also developed

the Southern Instream Flow Network (SIFN) to address the impacts of flow alterations in the Southeastern US aquatic ecosystems which leverages policy, technical experience, and scientific resources among partners based in 15 states. Maintaining appropriate flow into South Atlantic estuarine systems to support healthy inshore habitats essential to Council managed species is a major regional concern and efforts of SARP through SIFN are envisioned to enhance state and local partners ability to maintain appropriate flow rates.

Governor's South Atlantic Alliance (GSAA)

Initially discussed as a South Atlantic Eco-regional Compact, the Council has also cooperated with South Atlantic States in the formation of a Governor's South Atlantic Alliance (GSAA). This will also provide regional guidance and resources that will address State and Council broader habitat and ecosystem conservation goals. The GSAA was initiated in 2006. An Executive Planning Team (EPT), by the end of 2007, had created a framework for the Governors South Atlantic Alliance. The formal agreement between the four states (NC, SC, GA, and FL) was executed in May 2009. The Agreement specifies that the Alliance will prepare a "Governors South Atlantic Alliance Action Plan" which will be reviewed annually for progress and updated every five years for relevance of content. The Alliance's mission and purpose is to promote collaboration among the four states, and with the support and interaction of federal agencies, academe, regional organizations, non-governmental organizations, and the private sector, to sustain and enhance the region's coastal and marine resources. The Alliance proposes to regionally implement science-based actions and policies that balance coastal and marine ecosystems capacities to support both human and natural systems. The GSAA Action Plan was released in December 2010 and describes the four Priority Issue Areas that were identified by the Governors to be of mutual importance to the sustainability of the region's resources: Healthy Ecosystems; Working Waterfronts; Clean Coastal and Ocean Waters; and Disaster-Resilient Communities. The goals, objectives, actions, and implementation steps for each of these priorities were further described in the GSAA Implementation Plan released in July 2011. The final Action Plan was released on December 1, 2010 and marked the beginning of intensive work by the Alliance Issue Area Technical Teams (IATTs) to develop implementation steps for the actions and objectives. The GSAA Implementation Plan was published July 6, 2011, and the Alliance has been working to implement the Plan through the IATTs and two NOAA-funded Projects. The Alliance also partners with other federal agencies, academia, non-profits, private industry, regional organizations, and others. The Alliance supports both national and state-level ocean and coastal policy by coordinating federal, state, and local entities to ensure the sustainability of the region's economic, cultural, and natural resources. The Alliance has organized itself around the founding principles outlined in the GSAA Terms of Reference and detailed in the GSAA Business Plan. A team of natural resource managers, scientists, and information management system experts have partnered to develop a Regional Information Management System (RIMS) and recommend decision support tools that will support regional collaboration and decision-making. In addition to regional-level stakeholders, state and local coastal managers and decision makers will also be served by this project, which will enable ready access to new and existing data and information. The collection and synthesis of spatial data into a suite of visualization tools is a critical step for long-term collaborative planning in the South Atlantic region for a wide range of coastal uses. The Council's Atlas presents the spatial representations of Essential Fish Habitat, managed areas, regional fish and fish habitat

distribution, and fishery operation information and it can be linked to or drawn on as a critical part of the collaboration with the RIMS.

South Atlantic Landscape Conservation Cooperative

One of the more recent collaborations is the Council's participation as Steering Committee member for the newly establish South Atlantic Landscape Conservation Cooperative (SALCC). Landscape Conservation Cooperatives (LCCs) are applied conservation science partnerships focused on a defined geographic area that informs on-the-ground strategic conservation efforts at landscape scales. LCC partners include DOI agencies, other federal agencies, states, tribes, non-governmental organizations, universities, and others. The newly formed Department of Interior Southeast Climate Services Center (CSC) has the LCCs in the region as their primary clients. One of the initial charges of the CSCs is to downscale climate models for use at finer scales.

The SALCC developed a Strategic Plan through an iterative process that began in December 2011. The plan provides a simple strategy for moving forward over the next few years. An operations plan was developed under direction from the SALCC Steering Committee to redouble efforts to develop version 1.0 of a shared conservation blueprint by spring-summer of 2014. The SALCC is developing the regional blueprint to address the rapid changes in the South Atlantic including but not limited to climate change, urban growth, and increasing human demands on resources which are reshaping the landscape. While these forces cut across political and jurisdictional boundaries, the conservation community does not have a consistent cross-boundary, cross-organization plan for how to respond. The South Atlantic Conservation Blueprint will be that plan. The blueprint is envisioned to be a spatially-explicit map depicting the places and actions need to sustain South Atlantic LCC objectives in the face of future change. The steps to creating the blueprint include development of: indicators and targets (shared metrics of success); the State of the South Atlantic (past, present, and future condition of indicators); and a Conservation Blueprint. Potential ways the blueprint could be used include: finding the best places for people and organizations to work together; raising new money to implement conservation actions; guiding infrastructure development (highways, wind, urban growth, etc.); creating incentives as an alternative to regulation; bringing a landscape perspective to local adaptation efforts; and locating places and actions to build resilience after major disasters (hurricanes, oil spills, etc.). Integration of connectivity, function, and threats to river, estuarine and marine systems supporting Council managed species is supported by the SALCC and enhanced by the Council being a voting member of its Steering Committee. In addition, the Council's Regional Atlas presents spatial representations of Essential Fish Habitat, managed areas, regional fish and fish habitat distribution, and fishery operation information and it be linked to or drawn on as a critical part of the collaboration with the recently developed SALCC Conservation Planning Atlas.

Building Tools to support EBM in the South Atlantic Region

The Council has developed a Habitat and Ecosystem Section of the website http://www.safmc.net/ecosystem/Home/EcosystemHome/tabid/435/Default.aspx and, in cooperation with the Florida Wildlife Research Institute (FWRI), developed a Habitat and Ecosystem Internet Map Server (IMS). The IMS was developed to support Council and regional partners' efforts in the transition to EBM. Other regional partners include NMFS Habitat Conservation, South Atlantic States, local management authorities, other Federal partners,

universities, conservation organizations, and recreational and commercial fishermen. As technology and spatial information needs evolved, the distribution and use of GIS demands greater capabilities. The Council has continued its collaboration with FWRI in the now evolution to Web Services provided through the regional SAFMC Habitat and Ecosystem Atlas (http://ocean.floridamarine.org/safmc_atlas/) and the SAFMC Digital Dashboard (http://ocean.floridamarine.org/safmc_dashboard/). The Atlas integrates services for the following:

Species distribution and spatial presentation of regional fishery independent data from the SEAMAP-SA, MARMAP, and NOAA SEFIS systems; SAFMC Fisheries: (http://ocean.floridamarine.org/SA_Fisheries/)

Essential Fish Habitat and Essential Fish Habitat Areas of Particular Concern; SAFMC EFH: (http://ocean.floridamarine.org/sa_efh/)

Spatial presentation of managed areas in the region; SAFMC Managed Areas: (http://ocean.floridamarine.org/safmc_managedareas/)

An online life history and habitat information system supporting Council managed, State managed, and other regional species was developed in cooperation with FWRI. The Ecospecies system is considered dynamic and presents, as developed, detailed individual species life history reports and provides an interactive online query capability for all species included in the system: http://atoll.floridamarine.org/EcoSpecies

Web Services System Updates:
Essential Fish Habitat (EFH) – displays EFH and EFH-HAPCS for SAFMC managed species and NOAA Fisheries Highly Migratory Species.
Fisheries - displays Marine Resources Monitoring, Assessment, and Prediction (MARMAP) and Southeast Area Monitoring and Assessment Program South Atlantic (SEAMAP-SA) data.
Managed Areas - displays a variety of regulatory boundaries (SAFMC and Federal) or management boundaries within the SAFMC's jurisdiction.
Habitat – displays habitat data collected by SEADESC, Harbor Branch Oceanographic Institute (HBOI), and Ocean Exploration dives, as well as the SEAMAP shallow and ESDIM deepwater bottom mapping projects, multibeam imagery, and scientific cruise data.
Multibeam Bathymetry - displays a variety of multibeam data sources and scanned bathymetry charts.
Nautical Charts – displays coastal, general, and overview nautical charts for the SAFMC's jurisdictional area.

Ecosystem Based Action, Future Challenges and Needs

The Council has implemented ecosystem-based principles through several existing fishery management actions including establishment of deepwater Marine Protected Areas for the Snapper Grouper fishery, proactive harvest control rules on species (e.g., dolphin and wahoo) which are not overfished, implementing extensive gear area closures which in most cases eliminate the impact of fishing gear on Essential Fish Habitat, and use of other spatial management tools including Special Management Zones. Pursuant to development of the

Comprehensive Ecosystem-Based Amendment, the Council has taken an ecosystem approach to protect deepwater ecosystems while providing for traditional fisheries for the Golden Crab and Royal Red shrimp in areas where they do not impact deepwater coral habitat. The stakeholder based process taps in on an extensive regional Habitat and Ecosystem network. Support tools facilitate Council deliberations and with the help of regional partners, are being refined to address long-term ecosystem management needs.

One of the greatest challenges to the long-term move to EBM in the region is funding high priority research, including but not limited to, comprehensive benthic mapping and ecosystem model and management tool development. In addition, collecting detailed information on fishing fleet dynamics including defining fishing operation areas by species, species complex, and season, as well as catch relative to habitat is critical for assessment of fishery, community, and habitat impacts and for Council use in place based management measures. Additional resources need to be dedicated to expand regional coordination of modeling, mapping, characterization of species use of habitats, and full funding of regional fishery independent surveys (e.g., MARMAP, SEAMAP, and SEFIS) which are linking directly to addressing high priority management needs. Development of ecosystem information systems to support Council management should build on existing tools (e.g., Regional Habitat and Ecosystem GIS and Arc Services) and provide resources to regional cooperating partners for expansion to address long-term Council needs.

The FEP and CE-BA 1 complement, but do not replace, existing FMPs. In addition, the FEP serves as a source document to the CE-BAs. NOAA should support and build on the regional coordination efforts of the Council as it transitions to a broader management approach. Resources need to be provided to collect information necessary to update and refine our FEP and support future fishery actions including but not limited to completing one of the highest priority needs to support EBM, the completion of mapping of near-shore, mid-shelf, shelf edge, and deepwater habitats in the South Atlantic region. In developing future FEPs, the Council will draw on SAFEs (Stock Assessment and Fishery Evaluation reports) which NMFS is required to provide the Council for all FMPs implemented under the Magnuson-Stevens Act. The FEP, which has served as the source document for CE-BAs, could also meet some of the NMFS SAFE requirements if information is provided to the Council to update necessary sections.

EFH and EFH-HAPC Designations Translated to Cooperative Habitat Policy Development and Protection

The Council actively comments on non-fishing projects or policies that may impact fish habitat. Appendix A of the Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans of the South Atlantic Region (SAFMC 1998b) outlines the Council's comment and policy development process and the establishment of a four-state Habitat Advisory Panel. Members of the Habitat Advisory Panel serve as the Council's habitat contacts and professionals in the field. AP members bring projects to the Council's attention, draft comment letters, and attend public meetings. With guidance from the Advisory Panel, the Council has developed and approved policies on:

1. Energy exploration, development, transportation, and hydropower re-licensing;
2. Beach dredging and filling and large-scale coastal engineering;
3. Protection and enhancement of submerged aquatic vegetation;

4. Alterations to riverine, estuarine, and nearshore flows;
5. Marine aquaculture;
6. Marine Ecosystems and Non-Native and Invasive Species: and
7. Estuarine Ecosystems and Non-Native and Invasive Species.

NOAA Fisheries, State and other Federal agencies apply EFH and EFH-HAPC designations and protection policies in the day-to-day permit review process. The revision and updating of existing habitat policies and the development of new policies is being coordinated with core agency representatives on the Habitat and Coral Advisory Panels. Existing policies are included at the end of this Appendix.

The Habitat and Environmental Protection Advisory Panel, as part of their role in providing continued policy guidance to the Council, is during 2013/14, reviewing and proposing revisions and updates to the existing policy statements and developing new ones for Council consideration. The effort is intended to enhance the value of the statements and support cooperation and collaboration with NOAA Fisheries Habitat Conservation Division and State and Federal partners in better addressing the Congressional mandates to the Council associated with designation and conservation of EFH in the region.

South Atlantic Bight Ecopath Model

The Council worked cooperatively with the University of British Columbia and the Sea Around Us project to develop a straw-man and preliminary food web models (Ecopath with Ecosim) to characterize the ecological relationships of South Atlantic species, including those managed by the Council. This effort was envisioned to help the Council and cooperators in identifying available information and data gaps while providing insight into ecosystem function. More importantly, the model development process provides a vehicle to identify research necessary to better define populations, fisheries, and their interrelationships. While individual efforts are still underway in the South Atlantic, only with significant investment of new resources through other programs will a comprehensive regional model be further developed.

The latest collaboration builds on the previous Ecopath model developed through the Sea Around Us project for the South Atlantic Bight with a focus on beginning a dialogue on the implications of potential changes in forage fish populations in the region that could be associated with environmental or climate change or changes in direct exploitation of those populations.

Essential Fish Habitat and Essential Fish Habitat Areas of Particular Concern

Following is a summary of the current Council's EFH and EFH-HAPCs. Information supporting their designation was updated (pursuant to the EFH Final Rule) in the Council's Fishery Ecosystem Plan and Comprehensive Ecosystem Amendment:

Snapper Grouper FMP

Essential fish habitat for snapper grouper species includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs, and medium to high profile outcroppings on and around the shelf break zone from shore to at least 600 feet (but to at least 2,000 feet for wreckfish) where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical complex. EFH includes the spawning area in the

water column above the adult habitat and the additional pelagic environment, including *Sargassum*, required for larval survival and growth up to and including settlement. In addition the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse snapper grouper larvae.

For specific life stages of estuarine dependent and nearshore snapper grouper species, essential fish habitat includes areas inshore of the 100-foot contour, such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (saltmarshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom.

Areas which meet the criteria for EFH-HAPCs for species in the snapper grouper management unit include medium to high profile offshore hard bottoms where spawning normally occurs; localities of known or likely periodic spawning aggregations; nearshore hard bottom areas; The Point, The Ten Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump (South Carolina); mangrove habitat; seagrass habitat; oyster/shell habitat; all coastal inlets; all state-designated nursery habitats of particular importance to snapper grouper (e.g., Primary and Secondary Nursery Areas designated in North Carolina); pelagic and benthic *Sargassum*; Hoyt Hills for wreckfish; the *Oculina* Bank Habitat Area of Particular Concern; all hermatypic coral habitats and reefs; manganese outcroppings on the Blake Plateau; and Council-designated Artificial Reef Special Management Zones (SMZs). In addition, the Council through CEBA 2 (SAFMC 2011) designated the deepwater snapper grouper MPAs and golden tilefish and blueline tilefish habitat as EFH-HAPCs under the Snapper Grouper FMP as follows:

EFH-HAPCs for golden tilefish to include irregular bottom comprised of troughs and terraces inter-mingled with sand, mud, or shell hash bottom. Mud-clay bottoms in depths of 150-300 meters are HAPC. Golden tilefish are generally found in 80-540 meters, but most commonly found in 200-meter depths.

EFH-HAPC for blueline tilefish to include irregular bottom habitats along the shelf edge in 45-65 meters depth; shelf break or upper slope along the 100-fathom contour (150-225 meters); hardbottom habitats characterized as rock overhangs, rock outcrops, manganese-phosphorite rock slab formations, or rocky reefs in the South Atlantic Bight; and the Georgetown Hole (Charleston Lumps) off Georgetown, SC.

EFH-HAPCs for the snapper grouper complex to include the following deepwater Marine Protected Areas (MPAs) as designated in Snapper Grouper Amendment 14: Snowy Grouper Wreck MPA, Northern South Carolina MPA, Edisto MPA, Charleston Deep Artificial Reef MPA, Georgia MPA, North Florida MPA, St. Lucie Hump MPA, and East Hump MPA.

Deepwater Coral HAPCs designated in Comprehensive Ecosystem-Based Amendment 1 are designated as Snapper Grouper EFH-HAPCs: Cape Lookout Coral HAPC, Cape Fear Coral HAPC, Blake Ridge Diapir Coral HAPC, Stetson-Miami Terrace Coral HAPC, and Pourtalés Terrace Coral HAPC.

Shrimp FMP

For penaeid shrimp, Essential Fish Habitat includes inshore estuarine nursery areas, offshore marine habitats used for spawning and growth to maturity, and all interconnecting water bodies as described in the Habitat Plan. Inshore nursery areas include tidal freshwater (palustrine), estuarine, and marine emergent wetlands (e.g., intertidal marshes); tidal palustrine forested areas; mangroves; tidal freshwater, estuarine, and marine submerged aquatic vegetation (e.g., seagrass); and subtidal and intertidal non- vegetated flats. This applies from North Carolina through the Florida Keys.

For rock shrimp, essential fish habitat consists of offshore terrigenous and biogenic sand bottom habitats from 18 to 182 meters in depth with highest concentrations occurring between 34 and 55 meters. This applies for all areas from North Carolina through the Florida Keys. Essential fish habitat includes the shelf current systems near Cape Canaveral, Florida, which provide major transport mechanisms affecting planktonic larval rock shrimp. These currents keep larvae on the Florida Shelf and may transport them inshore in spring. In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse rock shrimp larvae.

Essential fish habitat for royal red shrimp include the upper regions of the continental slope from 180 meters (590 feet) to about 730 meters (2,395 feet), with concentrations found at depths of between 250 meters (820 feet) and 475 meters (1,558 feet) over blue/black mud, sand, muddy sand, or white calcareous mud. In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse royal red shrimp larvae.

Areas which meet the criteria for EFH-HAPCs for penaeid shrimp include all coastal inlets, all state-designated nursery habitats of particular importance to shrimp (for example, in North Carolina this would include all Primary Nursery Areas and all Secondary Nursery Areas), and state-identified overwintering areas.

Coastal Migratory Pelagics FMP

Essential fish habitat for coastal migratory pelagic species includes sandy shoals of capes and offshore bars, high profile rocky bottom, and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf Stream shoreward, including *Sargassum*. In addition, all coastal inlets and all state-designated nursery habitats of particular importance to coastal migratory pelagics (for example, in North Carolina this would include all Primary Nursery Areas and all Secondary Nursery Areas).

For Cobia essential fish habitat also includes high salinity bays, estuaries, and seagrass habitat. In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse coastal migratory pelagic larvae.

For king and Spanish mackerel and cobia essential fish habitat occurs in the South Atlantic and Mid-Atlantic Bights.

Areas which meet the criteria for EFH-HAPCs include sandy shoals of Capes Lookout, Cape Fear, and Cape Hatteras from shore to the ends of the respective shoals, but shoreward of the Gulf stream; The Point, The Ten-Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump and Hurl Rocks (South Carolina); The Point off Jupiter Inlet (Florida); *Phragmatopoma* (worm reefs) reefs off the central east coast of Florida; nearshore hard bottom south of Cape Canaveral; The Hump off Islamorada, Florida; The Marathon Hump off Marathon, Florida; The "Wall" off of the Florida Keys; Pelagic *Sargassum*; and Atlantic coast estuaries with high numbers of Spanish mackerel and cobia based on abundance data from the ELMR Program. Estuaries meeting these criteria for Spanish mackerel include Bogue Sound and New River, North Carolina; Bogue Sound, North Carolina (Adults May-September salinity >30 ppt); and New River, North Carolina (Adults May-October salinity >30 ppt). For Cobia they include Broad River, South Carolina; and Broad River, South Carolina (Adults & juveniles May-July salinity >25ppt).

Golden Crab FMP

Essential fish habitat for golden crab includes the U.S. Continental Shelf from Chesapeake Bay south through the Florida Straits (and into the Gulf of Mexico). In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse golden crab larvae. The detailed description of seven essential fish habitat types (a flat foraminferan ooze habitat; distinct mounds, primarily of dead coral; ripple habitat; dunes; black pebble habitat; low outcrop; and soft-bioturbated habitat) for golden crab is provided in Wenner et al. (1987). There is insufficient knowledge of the biology of golden crabs to identify spawning and nursery areas and to identify HAPCs at this time. As information becomes available, the Council will evaluate such data and identify HAPCs as appropriate through the framework.

Spiny Lobster FMP

Essential fish habitat for spiny lobster includes nearshore shelf/oceanic waters; shallow subtidal bottom; seagrass habitat; unconsolidated bottom (soft sediments); coral and live/hard bottom habitat; sponges; algal communities (*Laurencia*); and mangrove habitat (prop roots). In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse spiny lobster larvae.

Areas which meet the criteria for EFH-HAPCs for spiny lobster include Florida Bay, Biscayne Bay, Card Sound, and coral/hard bottom habitat from Jupiter Inlet, Florida through the Dry Tortugas, Florida.

Coral, Coral Reefs, and Live/Hard Bottom Habitats FMP

Essential fish habitat for corals (stony corals, octocorals, and black corals) incorporate habitat for over 200 species. EFH for corals include the following:

A. Essential fish habitat for hermatypic stony corals includes rough, hard, exposed, stable substrate from Palm Beach County south through the Florida reef tract in subtidal waters to 30 m depth; subtropical (15°-35° C), oligotrophic waters with high (30-35$^{o}/_{oo}$) salinity and turbidity levels sufficiently low enough to provide algal symbionts adequate sunlight penetration for photosynthesis. Ahermatypic stony corals are not light restricted and their essential fish habitat includes defined hard substrate in subtidal to outer shelf depths throughout the management area.

B. Essential fish habitat for *Antipatharia* (black corals) includes rough, hard, exposed, stable substrate, offshore in high (30-35$^{o}/_{oo}$) salinity waters in depths exceeding 18 meters (54 feet), not restricted by light penetration on the outer shelf throughout the management area.

C. Essential fish habitat for octocorals excepting the order Pennatulacea (sea pens and sea pansies) includes rough, hard, exposed, stable substrate in subtidal to outer shelf depths within a wide range of salinity and light penetration throughout the management area.

D. Essential fish habitat for Pennatulacea (sea pens and sea pansies) includes muddy, silty bottoms in subtidal to outer shelf depths within a wide range of salinity and light penetration.

Areas which meet the criteria for EFH-HAPCs for coral, coral reefs, and live/hard bottom include: The 10-Fathom Ledge, Big Rock, and The Point (North Carolina); Hurl Rocks and The Charleston Bump (South Carolina); Gray's Reef National Marine Sanctuary (Georgia); The *Phragmatopoma* (worm reefs) reefs off the central east coast of Florida; Oculina Banks off the east coast of Florida from Ft. Pierce to Cape Canaveral; nearshore (0-4 meters; 0-12 feet) hard bottom off the east coast of Florida from Cape Canaveral to Broward County); offshore (5-30 meter; 15-90 feet) hard bottom off the east coast of Florida from Palm Beach County to Fowey Rocks; Biscayne Bay, Florida; Biscayne National Park, Florida; and the Florida Keys National Marine Sanctuary. In addition, the Council through CEBA 2 (SAFMC 2011) designated the Deepwater Coral HAPCs as EFH-HAPCs under the Coral FMP as follows:

Deepwater Coral HAPCs designated in Comprehensive Ecosystem-Based Amendment 1 as Snapper Grouper EFH-HAPCs: Cape Lookout Coral HAPC, Cape Fear Coral HAPC, Blake Ridge Diapir Coral HAPC, Stetson-Miami Terrace Coral HAPC, and Pourtalés Terrace Coral HAPC.

Dolphin and Wahoo FMP

EFH for dolphin and wahoo is the Gulf Stream, Charleston Gyre, Florida Current, and pelagic *Sargassum*. This EFH definition for dolphin was approved by the Secretary of Commerce on June 3, 1999 as a part of the Council's Comprehensive Habitat Amendment (SAFMC 1998b) (dolphin was included within the Coastal Migratory Pelagics FMP at that time).

Areas which meet the criteria for EFH-HAPCs for dolphin and wahoo in the Atlantic include The Point, The Ten-Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump and The Georgetown Hole (South Carolina); The Point off Jupiter Inlet (Florida); The Hump off Islamorada, Florida; The Marathon Hump off Marathon, Florida; The "Wall" off of the Florida Keys; and Pelagic *Sargassum*. This EFH-HAPC definition for dolphin was approved by the Secretary of Commerce on June 3, 1999 as a part of the Council's Comprehensive Habitat Amendment (dolphin was included within the Coastal Migratory Pelagics FMP at that time).

Pelagic *Sargassum* Habitat FMP

The Council through CEBA 2 (SAFMC 2011) designated the top 10 meters of the water column in the South Atlantic EEZ bounded by the Gulfstream, as EFH for pelagic Sargassum.

Actions Implemented That Protect EFH and EFH-HAPCs

Snapper Grouper FMP

- Prohibited the use of the following gear to protect habitat: bottom longlines in the EEZ inside of 50 fathoms or anywhere south of St. Lucie Inlet, Florida; bottom longlines in the wreckfish fishery; fish traps; bottom tending (roller- rig) trawls on live bottom habitat; and entanglement gear.
- Established the *Oculina* Experimental Closed Area where the harvest or possession of all species in the snapper grouper complex is prohibited.

Established deepwater Marine Protected Areas (MPAs) as designated in Snapper Grouper Amendment 14: Snowy Grouper Wreck MPA, Northern South Carolina MPA, Edisto MPA, Charleston Deep Artificial Reef MPA, Georgia MPA, North Florida MPA, St. Lucie Hump MPA, and East Hump MPA.

Shrimp FMP

- Prohibition of rock shrimp trawling in a designated area around the *Oculina* Bank,
- Mandatory use of bycatch reduction devices in the penaeid shrimp fishery,
- Mandatory Vessel Monitoring System (VMS) in the Rock Shrimp Fishery.
- A mechanism that provides for the concurrent closure of the EEZ to penaeid shrimping if environmental conditions in state waters are such that the overwintering spawning stock is severely depleted.

***Pelagic Sargassum* Habitat FMP**

- Prohibited all harvest and possession of *Sargassum* from the South Atlantic EEZ south of the latitude line representing the North Carolina/South Carolina border (34° North Latitude).
- Prohibited all harvest of *Sargassum* from the South Atlantic EEZ within 100 miles of shore between the 34° North Latitude line and the Latitude line representing the North Carolina/Virginia border.
- Harvest of *Sargassum* from the South Atlantic EEZ is limited to the months of November through June.
- Established an annual Total Allowable Catch (TAC) of 5,000 pounds landed wet weight.
- Required that an official observer be present on each *Sargassum* harvesting trip. Require that nets used to harvest *Sargassum* be constructed of four-inch stretch mesh or larger fitted to a frame no larger than 4 feet by 6 feet.

Coastal Migratory Pelagics FMP

- Prohibited of the use of drift gillnets in the coastal migratory pelagic fishery.

Golden Crab FMP

- In the northern zone, golden crab traps can only be deployed in waters deeper than 900 feet; in the middle and southern zones traps can only be deployed in waters deeper than 700 feet.

Northern zone - north of the 28°N. latitude to the North Carolina/Virginia border;
Middle zone - 28°N. latitude to 25° N. latitude; and
Southern zone - south of 25°N. latitude to the border between the South Atlantic and Gulf of Mexico Fishery Management Councils.

Coral, Coral Reefs and Live/Hard Bottom FMP

- Established an optimum yield of zero and prohibiting all harvest or possession of these resources which serve as essential fish habitat to many managed species.
- Designated the *Oculina* Bank Habitat Area of Particular Concern.
- Expanded the *Oculina* Bank Habitat Area of Particular Concern (HAPC) to an area bounded to the west by 80°W. longitude, to the north by 28°30' N. latitude, to the south by 27°30' N. latitude, and to the east by the 100 fathom (600 feet) depth contour.
- Established the following two Satellite *Oculina* HAPCs: (1) Satellite *Oculina* HAPC #1 is bounded on the north by 28°30'N. latitude, on the south by 28°29'N. latitude, on the east by 80°W. longitude, and on the west by 80°3'W. longitude; and (2) Satellite *Oculina* HAPC #2 is bounded on the north by 28°17'N. latitude, on the south by 28°16'N. latitude, on the east by 80°W. longitude, and on the west by 80°3'W. longitude.
- Prohibited the use of all bottom tending fishing gear and fishing vessels from anchoring or using grapples in the *Oculina* Bank HAPC.
- Established a framework procedure to modify or establish Coral HAPCs.
- Established the following five deepwater CHAPCs:

Cape Lookout Lophelia Banks CHAPC;
Cape Fear Lophelia Banks CHAPC;
Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace (Stetson- Miami Terrace) CHAPC;
Pourtales Terrace CHAPC; and
Blake Ridge Diapir Methane Seep CHAPC.

- Within the deepwater CHAPCs, the possession of coral species and the use of all bottom damaging gear are prohibited including bottom longline, trawl (bottom and mid-water), dredge, pot or trap, or the use of an anchor, anchor and chain, or grapple and chain by all fishing vessels.

Council Policies for Protection and Restoration of Essential Fish Habitat
SAFMC Habitat and Environmental Protection Policy

In recognizing that species are dependent on the quantity and quality of their essential habitats, it is the policy of the SAFMC to protect, restore, and develop habitats upon which fisheries species depend; to increase the extent of their distribution and abundance; and to improve their productive capacity for the benefit of present and future generations. For purposes of this policy, "habitat" is defined as the physical, chemical, and biological parameters that are necessary for continued productivity of the species that is being managed. The objectives of the SAFMC policy will be accomplished through the recommendation of no net loss or significant environmental degradation of existing habitat. A long-term objective is to support and promote a net-gain of fisheries habitat through the restoration and rehabilitation of the productive capacity of habitats that have been degraded, and the creation and development of productive habitats where increased fishery production is probable. The SAFMC will pursue these goals at state, Federal, and local levels. The Council shall assume an aggressive role in the protection and enhancement of habitats important to fishery species, and shall actively enter Federal, decision making processes where proposed actions may otherwise compromise the productivity of fishery resources of concern to the Council.

SAFMC EFH Policy Statements

In addition to implementing regulations to protect habitat from fishing related degradation, the Council in cooperation with NOAA Fisheries, actively comments on non-fishing projects or policies that may impact fish habitat. The Council adopted a habitat policy and procedure document that established a four-state Habitat Advisory Panel and adopted a comment and policy development process. Members of the Habitat Advisory Panel serve as the Council's habitat contacts and professionals in the field. With guidance from the Advisory Panel, the Council has developed and approved a number of habitat policy statements which are available on the Habitat and Ecosystem section of the Council website (http://www.safmc.net/ecosystem/Home/EcosystemHome/tabid/435/Default.aspx).

References:

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SAFMC (South Atlantic Fishery Management Council). 2009a. Fishery Ecosystem Plan for the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

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Wenner, E. L., G. F. Ulrich, and J. B. Wise. 1987. Exploration for golden crab, *Geryon fenneri*, in the south Atlantic Bight: distribution, population structure, and gear assessment. Fishery Bulletin 85:547-560.

Appendix I. Fishery Impact Statement (FIS)

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires a FIS be prepared for all amendments to Fishery Management Plans (FMPs). The FIS contains an assessment of the likely biological, social, and economic effects of the conservation and management measures on: 1) fishery participants and their communities; 2) participants in the fisheries conducted in adjacent areas under the authority of another Council; and 3) the safety of human life at sea.

Action Contained in Amendment 43 to the Snapper Grouper FMP (Amendment 43)

Amendment 43 has one action, which would revise the process established in Amendment 28 to the Snapper Grouper FMP (Amendment 28), to specify annual catch limits (ACL) for red snapper and allow limited commercial and recreational harvest starting in 2018. The existing management measures such as season start dates, commercial trip limit, and recreational bag limit would remain unchanged from those implemented by the final rule for Amendment 28 (78 FR 44461, July 24, 2013).

Harvest of red snapper from federal waters has not been allowed since 2010. Limited harvest of red snapper (mini fishing seasons) was allowed in 2012, 2013, and 2014 through the process established by Amendment 28. However, the estimated total removals of red snapper exceeded the acceptable biological catch (ABC) in 2014, 2015, and 2016, resulting in no allowable harvest 2015 and 2016. Harvest was allowed in 2017 through an emergency action. The most recent benchmark stock assessment investigating the health of the stock was completed in 2016 and revised in 2017, including data through 2014 (Southeast Data, Assessment, and Review (SEDAR) 41 2017). SEDAR 41 indicated that the stock was overfished and overfishing was occurring over the last 20 years of the assessment (1994-2014). In April 2016, the South Atlantic Fishery Management Council's (Council) Scientific and Statistical Committee (SSC) deemed SEDAR 41 as best scientific information available. However, the SSC also noted there was considerable uncertainty in the exploitation status from the assessment and thus estimates of the degree of overfishing were highly uncertain. At the June 2016 Council meeting, the SSC chair stated that when taking all of the available information into account, particularly the fishery-independent data, the progress in rebuilding of red snapper was unquestionable. The National Marine Fisheries Service (NMFS) informed the Council in a letter (dated March 3, 2017) that sufficient steps have been taken to address overfishing of red snapper and to continue to rebuild the stock through harvest prohibitions in 2015 and 2016. The action is needed to prevent overfishing, continue to rebuild the red snapper stock, and, to the extent practicable, reduce adverse social and economic effects as per the Magnuson-Stevens Act.

Assessment of Biological Effects

The specification of targets and limits, in the form of ACLs and annual catch targets (ACT), are crucial components of any management program involving natural resources. Without the designation of these components, regulations may not be sufficient to prevent overfishing. The Council typically manages to a biological benchmark based on scientific advice from the SSC, in the form of an ABC level. However the SSC was unable to provide an ABC for red snapper that could be effectively monitored. Therefore the Council is recommending a conservative ACL for red snapper that would convert some current bycatch of red snapper into landed catch. By setting the ACL at observed past catch levels after which the stock continued to increase, the risk of overfishing should be minimized and allow the stock to continue to rebuild.

Commercial trips targeting red snapper alone are unlikely due to the low commercial trip limit (75 lbs gutted weight). Red snapper likely would be caught on trips targeting other species and the incidental catch of red snapper would be retained turning bycatch into landed catch. The commercial sector would have little incentive to high-grade since the trip limit is established on a weight limit.

In the recreational sector, assuming that only a moderate level of high-grading occurs and that overall effort increases minimally due to the short projected season length, the proposed alternatives would not be anticipated to substantially increase bycatch of red snapper and co-occurring species. The management alternatives would change some current bycatch of red snapper into landed catch. If, however, large unexpected increases in effort occur during the red snapper season or high-grading greatly increases discard rates, then negative impacts could be expected for red snapper.

Since recent red snapper data from the long-term fishery independent index of abundance collected by the Southeast Reefish Survey (SERFS) program suggests the South Atlantic red snapper population has increased substantially since 2014; the Council's SSC indicated that the trends in SERFS relative abundance supported a population increase in their April 2017 report; and red snapper relative abundance from SERFS is currently the highest observed in the entire time series (1990-2016), allowing a small amount of red snapper harvest at the highest landings observed during the limited openings in 2012-2014 is neither expected to result in overfishing, nor prevent continued stock rebuilding.

Assessment of Economic Effects

The action in Amendment 43 will affect future fishing behavior and thus create economic effects. It will authorize limited harvest of red snapper in the South Atlantic region and establish an ACL of 42,510 fish, with a commercial sector ACL of 124,815 pounds whole weight (ww) and a recreational sector ACL of 29,656 fish. These allowable harvest levels will create the opportunity for increased consumer surplus on recreational fishing trips and more revenue to be generated on commercial fishing trips. It is anticipated that there will be an approximate short-term increase in recreational

consumer surplus of $2.4 million (2016 dollars) and a short-term increase in commercial ex-vessel revenue of approximately $177,000 to $236,000 (2016 dollars), depending on the projected red snapper landings estimate examined.

By allowing recreational red snapper harvest, there is the potential that angler demand for for-hire (charter and headboat) trips will rise as well, resulting in increased booking rates and for-hire business net operating revenue (NOR). Commercial and recreational fishing for red snapper also spurs business activity (economic impacts) in the region in which it occurs. The action may be reasonably expected to increase such business activity relative to the status quo, by increasing recreational and commercial expenditures on goods and services necessary for fishing and by increasing the supply of red snapper into the seafood value chain. Although retail prices for red snapper would likely be tempered by substitute finfish species and snapper imports, fresh locally-caught red snapper may fetch a price premium in seafood markets and restaurants, resulting in an increase in producer surplus. In addition, because seafood consumers may have strong preferences for locally-caught red snapper over other seafood options, it could also result in an increase in consumer surplus.

In addition to the short-term economic effects described, medium to long-term indirect negative economic effects could ensue from allowing harvest of red snapper as a result of its effects on the stock, future management decisions, and future catch rates. It is not known if the amendment will jeopardize the sustainability of the stock but negative economic effects are not likely, as the ACL is set at a recently observed level of harvest that has still allowed for robust rebuilding of the stock to continue in subsequent years.

The amendment is anticipated to have direct positive economic effects on snapper grouper fishery participants, associated industries, and communities. The overall estimated direct short-term positive economic effects are expected to range from $2.58 million to $2.64 million (2016 dollars) for both sectors combined.

Assessment of Social Effects

The action in the amendment stems from the fishery essentially being closed since 2010 due to the bycatch of red snapper in the recreational fishery. The action will make changes to management measures to help reduce the potential negative social effects that the current process to establish an ACL has on communities and fishermen throughout the South Atlantic region. The proposed change would enable fishermen access to the red snapper, which is an extremely popular species, especially for participants in the recreational sector. The absence of a fishing season for red snapper in recent years has been highly controversial with negative effects on recreational anglers, for-hire businesses, retail businesses, and commercial vessels, especially when compared to the benefits to fishermen during the allowed seasons in 2012, 2013, and 2014. The social effects of the proposed alternatives are expected to be associated with restricted access to the red snapper resource for several years, combined with distrust in science and management due to inconsistency in what fishermen see on the water versus the scientific models. Additionally, there would be positive social effects associated with transforming

discards into landings if there is a fishing season, along with social effects of improved data collection during a fishing season.

By allowing harvest under an ACL for red snapper, there should be positive social effects as the alternatives would allow fishermen to harvest this popular species, in addition to revenue generated for charter/headboat, retail business, and commercial businesses when compared to not revising the process to establish an ACL. It is assumed that with available ACL, there would be increased fishing opportunities for private, for-hire and commercial fishermen, and that there would be fewer discards as these fish are landed. Overall, the action in this amendment would have positive social effects on recreational and commercial fishing opportunities.

Appendix J. NMFS Guidance on MRIP Usage in Red Snapper Management

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149 U.S.A.
(305) 361-4204 Fax: (305) 361-4499

21 April, 2017

TO: Gregg Waugh, Executive Director, SAFMC
Michelle Duval, Ph.D., Chair, SAFMC

FROM: Bonnie J. Ponwith, Ph.D.,
Science and Research Director

SUBJECT: Red Snapper Guidance Request

The SEFSC concurs with the SEDAR Review Panel and SAFMC SSC's approval of SEDAR 41, the red snapper stock assessment. The SSC developed ABC recommendations based on the projection analysis that allowed the stock to reach a rebuilt status in the time allowed by the rebuilding plan (by 2044). The use of an ABC based primarily on fishery discards for monitoring the effectiveness of management action is likely ineffective due to the high level of uncertainty in measures of discards and the change in the effort estimation methodology that will be implemented in the MRIP survey.

Monitoring progress toward rebuilding will require a departure from the traditional techniques. SEFSC analysts are exploring an Index Projection Methodology as an alternative approach for monitoring stock response to management measures. They plan to discuss this with the SSC at their upcoming meeting to get input on the method. They will also discuss how these results may be used by the SSC to generate future catch level advice, given updated projections have not been provided. Information for the SSC regarding this is attached.

At the last SAFMC meeting we discussed holding a workshop to discuss ways to characterize the uncertainty of MRIP estimates (landings, discards) to provide guidance on: 1) at what point the uncertainty is sufficiently high to warrant alternative methods for accounting for catch; 2) what those alternative methods might be; 3) means to improve the precision of MRIP catch estimates; and 3) means to augment MRIP sampling to improve data quality. The SAFMC recognized this is a region-wide issue so a presentation was made to the GMFMC to request involvement of their SSC, and the GMFMC has agreed to participate. It has also been suggested that representation from the Mid-Atlantic Fishery Management Council may be advisable. We'll begin to stand up a steering committee to refine the workshop objectives, define the deliverables and begin work on the agenda. One deliverable from the workshop could evaluate the precision of red snapper discard estimates to help advise on their use for monitoring stock status when discards are the predominant contributor to fishing mortality. The target timeline for the workshop is this fall, however, we'll have more clarity on the timeline for delivery of advice to the SSC once the steering committee is stood up and begins their work on workshop planning.

Attachment

cc: Roy Crabtree, Jack McGovern, and Rick DeVictor
Monica Smit-Brunello
John Carmichael, Kari MacLauchlin, and Chip Collier
Theo Brainerd and Trika Gerard

SSC Input for April 2017 Meeting

The SAFMC SSC reviewed and approved the SEDAR 41 Red Snapper stock assessment in May 2016. The SSC developed ABC recommendations based on the projection analysis that allowed the stock to reach a rebuilt status in the time allowed by the rebuilding plan (by 2044). In our memo of February 15, 2017, the SEFSC indicated reasons why any further proposed projections would not be appropriate for management. These reasons revolve around the uncertainty and methodology changes for future estimates of discards from the MRIP survey. Non-traditional methods and data sources may need to be used to monitor management action effectiveness and progress toward rebuilding.

The SEFSC proposes creating and an Index Projection Methodology that uses trends in the fishery-independent survey to monitor rebuilding progress and serve as the basis for the SSC's future ABC advice to the Council.

The SEFSC would like to get feedback from the SSC on this proposed approach. Specifically:

1. The SEFSC is actively working on research into using SERFS video data to monitor future effectiveness of management actions, i.e. progress toward rebuilding. We ask the SSC to provide input on this proposed approach and its potential utility for determining management action effectiveness.
2. Discuss options for the appropriate baseline against which to compare the Index Projection.
3. Discuss how the index may be used by the SSC to develop ABC advice.

Dr. Erik Williams will be preparing a brief summary of the proposed approach and will be on hand to answer any questions the SSC may have at their next meeting.

We appreciate the SSC taking time to provide input on new methodology that has the potential to benefit management.

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
4055 Faber Place Drive, Suite 201, North Charleston SC 29405
Call: (843) 571-4366 | Toll-Free: (866) SAFMC-10 | Fax: (843) 769-4520 | Connect: www.safmc.net

Dr. Michelle Duval, Chair | Charlie Phillips, Vice Chair
Gregg T. Waugh, Executive Director

April 3, 2017

TO: Bonnie Ponwith

FROM: Gregg Waugh & Michelle Duval

SUBJECT: Red Snapper Guidance Request

At its March 2017 meeting, the South Atlantic Council requested that its SSC and the SEFSC work together to obtain an ABC for Red Snapper. This request was in response to two letters from NMFS addressing the status of Red Snapper. The first letter, from the SEFSC dated February 15, 2017 (**attached**), indicated that projections the Council requested in January 2017 could not be completed due to uncertainty in the assessment and the MRIP discard estimates. This letter also indicated that a complete evaluation of MRIP changes on the Red Snapper assessment (SEDAR 41) is necessary before it can be useful to management. The second letter, from SERO dated March 3, 2017 (**attached**), noted the SSC's concerns with uncertainty in the SEDAR 41 assessment and the resulting inability to reliably determine the degree of overfishing. In addition, NMFS noted that the assessment indicated overfishing was occurring during its terminal year of 2014 but the Council's actions to limit harvest since 2010, including harvest prohibitions in effect since 2015, have addressed overfishing and allowed the stock to continue rebuilding.

The SSC reviewed the SEDAR 41 Red Snapper assessment in May 2016 and considered it Best Scientific Information Available. However, because the Council has been informed in the past that SSC conclusions on BSIA are in fact recommendations, and that NMFS is actually responsible for the BSIA determinations, the Council requests the following:

1. The SEFSC concur with our determination that alternative methods are necessary to specify ABC and MSY for red snapper and that SEDAR 41 (original and revised) cannot be used to specify ABC or MSY for 2017 and beyond for the reasons outlined in your memo to Michelle Duval dated February 15, 2017. This is necessary to inform the SSC on the status of its existing ABC recommendation and to determine which sources of information used in the SEDAR 41 assessment can be considered for future ABC recommendations.
2. The SEFSC provide an evaluation of data limited techniques that can be considered by the SSC to develop an index-based ABC.
3. The SEFSC provide additional details on the proposed evaluation of the effect of MRIP changes on the Red Snapper assessment, particularly the types of evaluations to be considered and when they will be available for SSC review.

Given that the SEFSC will be providing the SSC a revised SEDAR 41 Red Snapper assessment to correct errors with some of the headboat input data, it is critical that a response to these issues

also be provided to the SSC. This will help inform the SSC on how to view the revised assessment.

Please provide this information needs to Council staff by noon on April 10, 2017 to be distributed to the SSC for review at their April 25-27, 2017 meeting. This is a complex matter and the SSC needs adequate time to review the revised assessment and responses prior to their meeting.

Please contact John Carmichael to address any questions concerning this request.

cc: Roy Crabtree, Jack McGovern, and Rick DeVictor
Monica Smit-Brunello
John Carmichael, Kari MacLauchlin, and Chip Collier
Theo Brainerd and Trika Gerard

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Drive
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15 February, 2017

MEMORANDUM FOR: Gregg Waugh, Executive Director
South Atlantic Fishery Management Council

FROM: Bonnie J. Ponwith, Ph.D.
Science and Research Director

SUJBECT: **Red Snapper Projections**

On January 18, 2017, you sent a memo requesting, "Provide projections to 2044 (the end of the rebuilding period) based on fixed fishing mortality rates at Fmax, F20%SPR, F27%SPR, F30%SPR, and F40%SPR under the assumptions that all fish caught at each F level are subsequently discarded and the scenario mortality level is the total mortality (i.e., there are no additional discard mortalities). For each scenario, provide the full suite of projection outputs as provided for SEDAR 41 projections."

In working on those projections, Southeast Fisheries Science Center staff have advised, and I concur, that the proposed projections are not appropriate for management use for the following reasons:

- The uncertainty in the assessment is already large, and will increase due to the MRIP discard data, especially for the interim period (2015-16), the upcoming changes to MRIP from the new effort survey. For some background: the uncertainty in projections is generally high after 3-5 years, and these projections would have 2-3 years of an interim period (depending on whether 2017 or 2018 was the effective year of regulations).
- The SAFMC SSC has indicated that overfishing for this stock is occurring, but cannot quantify by how much. Fishing mortality rates in the last few years of the assessment are very sensitive to 2014 data and retrospective analyses indicate fishing mortality rates are considerably lower if these data are excluded. This uncertainty in the stock assessment inhibits the ability to set an ABC that can be effectively monitored.
- Fishing mortality in the interim period is calculated using actual landings and discards in 2015, though the status was determined using fishing mortality when there was a fishery occurring during mini-seasons (2012-2014). There were no fishing seasons for red snapper in 2015 or 2016 and final 2016 MRIP data are not yet available.
- The MRIP telephone survey will end this year and be replaced by a new mail-based effort survey. The new effort survey will be calibrated with the old telephone survey and undergo peer-review this summer. Preliminary results from the calibration study will be available in late-2017 and final results incorporating all three years of side-by-

side surveys will be available in 2018. Projections timed to benefit from the completed calibration study would be stronger than if based on the preliminary results.

- We feel that a more complete evaluation of the effect of the upcoming changes to MRIP on the Red Snapper assessment is needed before it can be useful to management.
    - We further recommend a thorough investigation, possibly through a workshop, into the reliability and utility of mail survey based MRIP estimates of catch and discards for many of our offshore species, which are known to have low intercept rates relative to other species covered by MRIP.

cc: Roy Crabtree
Andy Strelcheck
Jack McGovern
Theo Brainerd
Trika Gerard
Erik Williams

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

F/SER25:FH

Dr. Michelle Duval, Chair
South Atlantic Fishery Management Council
4055 Faber Place Drive, Suite 201
North Charleston, South Carolina 29405

MAR 0 3 2017

Dear Dr. Duval:

The most recent South Atlantic red snapper stock assessment (SEDAR 41) was completed in April 2016 and indicated that the stock is undergoing overfishing and is overfished, but is rebuilding. The South Atlantic Fishery Management Council's (Council) Scientific and Statistical Committee (SSC) reviewed the assessment and determined the assessment is based on the best scientific information available. However, the SSC noted there is considerable uncertainty in the exploitation status, and thus, the degree of overfishing is highly uncertain. The uncertainty in exploitation status inhibits the Council's ability to set an acceptable biological catch that can be effectively monitored. Additionally, in the February 15, 2017, response to a Council request for red snapper projections, Dr. Bonnie Ponwith, Director of the National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center noted that the overfishing determination was based on fishing mortality levels during 2012-2014 when a limited amount of harvest was allowed. Landings during 2012-2014 represented a high fraction of the overall fishing mortality, but since that time, harvest has been prohibited. Dr. Ponwith also noted that the uncertainty in the assessment is large and is predicted to increase as catch and effort estimates are updated through the new Marine Recreational Information Program (MRIP) effort survey.

NMFS has determined that the latest assessment identified the South Atlantic red snapper stock as undergoing overfishing, and adequate management action has been taken to address overfishing and continue to rebuild the stock through a harvest prohibition in 2015 and 2016. Due to uncertainty in the level of overfishing associated with the assessment and the new MRIP effort survey, data poor assessment methods for the red snapper stock, such as use of fishery independent indices, may be appropriate in the future. I look forward to continuing work with the Council on Amendment 43 to the Fishery Management Plan for the Snapper-Grouper Fishery of the South Atlantic Region to reduce discards of red snapper in the South Atlantic and continue to rebuild the stock.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

cc:
F/SEC - Bonnie Ponwith
F/SER2 - Jack McGovern
F/SER25 - Rick DeVictor

Appendix K. Calculation of Red Snapper ACLs

Total Annual Catch Limit

The total annual catch limit (ACL) in **Alternatives 2** through **5** were calculated using two different base values. One value was based on the average landings during the mini-seasons from 2012 to 2014, and the other was based on the highest landings reported during the mini-seasons (2014). **Alternative 3** and **Alternative 5** ACLs were calculated by multiplying an adjustment factor by the average landings (**Alternative 2** ACL) or highest landings (**Alternative 4** ACL), respectively. The adjustment factor was developed by comparing the average abundance index value from a scientific survey in 2012 to 2014 to the average abundance index from 2015 to 2016 (See **Appendix L** for information on the calculation of the abundance index). Over this time period, the average abundance index for red snapper increased by 1.88 times. Therefore the adjustment factor was 1.88.

Table K-1. Development of the ACL value for **Alternative 3** and **Alternative 5**. The landings were based on landings from 2012 to 2014 when mini-seasons for red snapper were open. The adjustment factor is based on the increase in the red snapper abundance index.

Landings Type	Landings (number)	Adjustment Factor	ACL (number)	Alternative
Average	23,623	1.88	44,411	**Alternative 3**
Maximum	42,510	1.88	79,919	**Alternative 5**

Sector ACL

The total ACL is developed in numbers of fish; however, the method to determine the allocations for each sector is based on pounds of fish. Therefore numbers of fish were converted to pounds of fish. The estimate of fish weight came from averaging four different values of projected red snapper weight in 2018 (SEDAR 2017).

The allocations were developed by using the allocations in the Comprehensive ACL Amendment to the Snapper Grouper Fishery Management Plan for the South Atlantic Region (Comprehensive ACL Amendment)(SAFMC 2011). The allocation was developed using data from 1986 to 2008. The allocation was calculated by using the following formula:

Allocation by sector = (0.5 * catch history) + (0.5 * current trend) whereby, catch history = average landings 1986-2008, current trend = average landings 2006-2008 for the Comprehensive ACL Amendment (SAFMC 2011).

This resulted in the sector allocations in the Comprehensive ACL Amendment as 28.07% commercial and 71.93% recreational. These same allocations were used in Amendment 43 to specify sector ACLs in 2018.

The commercial ACL in whole weight was calculated by multiplying the total weight of the ACL by the commercial allocation (28.07%) (**Table K-2**). The commercial ACL in gutted weight was calculated by using the whole weight to gutted weight ratio developed in SEDAR 41 (2016), which was 1.1.

Table K-2. Development of the red snapper commercial ACL for **Alternative 2** through **5** in Amendment 43. ww=whole weight, gw=gutted weight

Alt	ACL Num	Average Weight from SEDAR 41 Projections	Total ACL Weight (ww)	Commercial Allocation	Commercial ACL (ww)	Commercial ACL (gw)
Alt 2	23,623	10.46	247,097	28.07%	69,360	63,055
Alt 3	44,411	10.46	464,539	28.07%	130,396	118,542
Alt 4	42,510	10.46	444,655	28.07%	124,815	113,468
Alt 5	79,919	10.46	835,953	28.07%	234,652	213,320

The recreational ACL in numbers of fish was calculated by subtracting the commercial sector ACL converted to numbers of fish from the total ACL in numbers of fish. Since the commercial ACL is calculated in pounds of fish, pounds of fish were converted to numbers of fish based on average weight of red snapper caught in the commercial sector from 2012 to 2014 (9.71 lbs ww) (SEDAR 41 2017). The commercial numbers of fish is then subtracted from the total ACL to get the recreational ACL.

Table K-3. Development of the red snapper recreational ACL for **Alternative 2** through **5** in Amendment 43.

Alt	ACL Num	Commercial ACL (lbs ww)	Commercial Avg Weight (lbs ww)	Commercial ACL Num	Recreational ACL Number
Alt 2	23,623	69,360	9.71	7,143	16,480
Alt 3	44,411	130,396	9.71	13,429	30,982
Alt 4	42,510	124,815	9.71	12,854	29,656
Alt 5	79,919	234,652	9.71	24,166	55,753

Appendix L. SERFS Chevron Trap Red Snapper Abundance Index Update

Red Snapper Fishery-Independent Index of Abundance in US South Atlantic Waters Based on a Chevron Trap Survey (1990-2016 & 2010-2016)

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SAFMC Amendment Development Team Reference Document
Amendment 43
MARMAP Technical Report # 2017-008

*Report documents development of Red Snapper relative abundance index based on the SERFS chevron trap survey. The document details two versions of the abundance index, one using the full time series of the chevron trap index (1990-2016) and the other only using data derived during the years 2010-2016.

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Objective

This report presents two standardized relative abundance indices of Red Snapper derived from the SERFS chevron trap survey: one spanning the years 1990-2016 and the other the years 2010-2016. The standardized index accounts for annual sampling distribution shifts with respect to covariates that affect catch of Red Snapper in chevron traps. This report uses the same methodology for index development as documented in Ballenger and Smart (2015) for the chevron trap index during SEDAR41:

http://sedarweb.org/docs/wpapers/SEDAR41_DW54_Ballenger%26Smart_RSChevron2010.2014_8.17.2015.pdf.

Methods

Survey Design and Gear

(see Smart et al. 2015 for full description)

Sampling area

- Cape Hatteras, NC, to St. Lucie Inlet, FL
  - General expansion of geographic coverage through time

Sampling season

- May through September
  - Limited earlier and later sampling in some years

Survey Design

- 1990-2014
  - Simple random sample survey design from a chevron trap universe of confirmed live-bottom and/or hard-bottom habitat stations
- 2015-2016
  - Stratified random sample survey design from a chevron trap universe of confirmed live-bottom and/or hard-bottom habitat stations
    - Depth and latitude strata
      - Depth strata: inner shelf (<30 m deep); mid-shelf (30-42 m deep); outer-shelf (43-63 m deep); slope (≥64 m deep)
      - Latitude strata: southern-latitudes (<29.71°N); mid-latitudes (29.71-32.60°N); northern-latitudes (≥32.61°N)
- In a given year, no two stations are selected for sampling that are closer than 200 m from each other
- Traps deployed on suspected live-bottom and/or hard-bottom in a given year (reconnaissance) are evaluated based on catch and/or video or photographic evidence of bottom type for inclusion in the universe in subsequent years
  - If added to the known habitat universe, data from the reconnaissance deployment is included in CPUE analysis

Sampling Gear – Chevron Traps

(see Collins 1990 and MARMAP 2009 for descriptions that are more complete)

Oceanographic and Environmental Data

- Latitude (°N) data collected via GPS
- Depth (m) data collected via fathometer
- Bottom temperature (°C) data collected via CTD

Data Filtering/Inclusion

(see Ballenger and Smart 2015 for more complete description)

Chevron trap data were limited to:

- Projects conducting monitoring efforts
- Reef fish monitoring samples
- Traps that fished properly
- Traps on live-bottom and/or hard-bottom habitat
- Traps with soak times between 45-150 minutes
  - SERFS targets a soak time of 90 minutes for all chevron trap deployments
- Traps deployed at depths between 15 and 75 m
  - Range of depth for which we have ever observed Red Snapper in our monitoring program
- Excluded any chevron trap samples missing covariate information (Table 1)

Standardized Index Model Formulation

Model Basics

- Response variable – Catch/Trap (Figures 1 and 2)
- Offset term – $\ln(\text{soak time})$
- Dependent variables
  - Year
  - Covariates
    - Depth (m), latitude (°N), bottom temperature (°C), and day of year
      - Annual summary of covariates available in Table 2
      - Distribution of covariates available in Figures 3 and 4
- Model structure – zero-inflated negative binomial GLM (ZINB)
- Annual year effect coefficients of variation (CVs) computed using bootstrapping

Zero-Inflated Model Background

(see Cameron & Trivedi 1998, Hardin and Hilbe 2007, Hilbe 2007, Zeileis et al. 2008, and Chapter 11 in Zuur et al. 2009)

Covariate Treatment

(see Ballenger and Smart 2015 for more complete description)

- Covariates modeled as continuous covariates using polynomials

- Pairs plots, variance inflation factors (Table 3), box plots and violin plots were used to investigate the possibility of collinearity between any of the considered variables
  - No indication of strong collinearity among any considered covariates
- Model selection based on Bayesian information criterion (BIC; Schwarz 1978)

Results

Sampling Summary

- 1990-2016
  - 14,306 chevron trap samples retained and used in the development of the relative abundance index (Table 1)
  - Proportion of traps positive for Red Snapper averaged 0.08 (range: 0.00 – 0.16)
  - Caught on average 148 (range: 5-1088) Red Snapper annually
- 2010-2016
  - 8,073 chevron trap samples retained and used in the development of the relative abundance index (Table 1)
  - Proportion of traps positive for Red Snapper averaged 0.12 (range: 0.09 – 0.16)
  - Caught on average 519 (range: 116-1088) Red Snapper annually

ZINB Index

Model Selection
(see Table 4 for model selection results)

- Both indices, covariate day of year is removed from the count sub-model
- Both indices, the covariates year and bottom temperature are removed from the zero-inflation sub-model
- Both indices, best fit model suggest little to no overdispersion remaining in the data

Covariate Effects
(see Figures 7 and 8)

- Relative effects of latitude and bottom temperature is larger than the effect of sampling depth or day of year
- Predicted covariate effects
  - Depth – catch is above average at depths of ~25-45 m
  - Latitude – catch is higher than average at latitudes 28-30°N
  - Bottom temperature – catch of Red Snapper increases exponentially as bottom temperature increases, over the range of bottom temperatures observed in the survey
  - Day of Year – linear decrease in catch of Red Snapper throughout the survey season

Final Index
(see Table 5 and Figure 8)

- 1990-2016 Index
  - General slight decreasing trend from index start through the mid-2000's
  - Increasing relative abundance from approximately 2006 through the terminal year
  - CV estimates generally decrease through time
    - 1990-2009 – avg. 0.54 (range: 0.35 – 0.98; SD: 0.14)
    - 2010-2016 – avg. 0.17 (range: 0.16 – 0.20; SD: 0.02)
- 2010-2016 Index
  - Increasing relative abundance throughout the time series
    - Rate of increase increases after 2013
  - CV estimates – avg. 0.14 (range: 0.10 – 0.19; SD: 0.03)
- Correlation between the indices was 0.99 for the period 2010-2016 (Table 6 and Figure 9)

Conclusions

Here I present two updated relative abundance indices derived from the SERFS chevron trap survey. Both of these indices were developed using the same methodology used for the development of the chevron trap index during SEDAR 41 (see Ballenger and Smart 2015). They differ only in the length of the time series, one using data from the full chevron trap index time series (1990-2016) and the other only using chevron trap data collected from 2010-2016. During SEDAR41 it was decided to use a reduced time series for the chevron trap index (2010-2014). The three primary reasons for this decision was the low proportion of traps positive for Red Snapper prior to 2010, the low absolute number of Red Snapper captured annually in the survey prior to 2010, and the lower level of sampling effort off the coasts of Georgia and Florida prior to 2010. The consequences of these three factors can be seen in the higher degree of uncertainty of the chevron trap index from 1990-2009 (Table 5), with the annual coefficient of variation being approximately three times higher during this period of time than it is from 2010-2016. However, during the overlapping period both indices depicted the same increase in relative abundance (Table 6 and Figure 9). Both suggest that Red Snapper relative abundance is more than three times higher in 2016 than it was in 2010 and is more than 1.5 times higher in 2016 than it was in 2014.

I also provide a quick comparison to the Red Snapper index of relative abundance presented in the 2016 SCDNR Reef Fish Survey annual trends report. SCDNR Reef Fish Survey staff presented the index as developed for the trends report to the SAFMC SSC in April 2017 and the SAFMC in June 2017. The trends report Red Snapper relative abundance index differs primarily in statistical framework (delta-lognormal versus the ZINB model used here), response variable (catch/(trap*hr) versus catch/trap), and treatment of covariates (discrete versus continuous). Despite these differences, the correlation of the trends report index with either index presented herein exceeds 0.91 (Table 6) and depicts a very similar pattern of increase since 2010. It suggests that Red Snapper relative abundance in 2016 is 3.3 times higher than it was in 2010 and is more than two times what it was in 2014.

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Tables

Table 1: Annual and total exclusion of chevron trap monitoring station collections from analysis due to missing covariate data (1 collection missing both latitude and water temperature information; 599 collections missing water temperature information). Pre-exclusion and post-exclusion refers to the sample size prior to or after exclusion of samples due to missing covariate data.

Year	Pre-exclusion	Post-exclusion	% Change
1990	343	308	10.20
1991	290	269	7.24
1992	315	288	8.57
1993	388	388	0.00
1994	404	379	6.19
1995	379	361	4.75
1996	357	347	2.80
1997	417	385	7.67
1998	425	414	2.59
1999	237	215	9.28
2000	299	293	2.01
2001	246	236	4.07
2002	238	238	0.00
2003	218	218	0.00
2004	275	275	0.00
2005	324	303	6.48
2006	302	291	3.64
2007	331	331	0.00
2008	297	297	0.00
2009	397	397	0.00
2010	726	697	3.99
2011	861	684	20.56
2012	1170	1114	4.79
2013	1353	1335	1.33
2014	1428	1428	0.00
2015	1440	1400	2.78
2016	1446	1415	2.14
1990-2016 Total	**14906**	**14306**	**4.03**
2010-2016 Total	**8424**	**8073**	**4.17**

Table 2: Number of chevron trap deployments on live/hard-bottom areas, proportion of traps positive for Red Snapper, total number of Red Snapper caught, and information regarding covariate distribution annually.

				Depth (m)				Latitude (°N)				Temperature (°C)				Day of Year			
					Range				Range				Range				Range		
Year	n	Prop. Pos.	# of Fish	Avg.	Min	Max	SE	Avg.	Min	Max	SE	Avg.	Min	Max	SE	Avg.	Min	Max	SE
1990	308	0.0227	23	33	17	62	0.60	32.52	30.42	33.82	0.037	22.1	18.4	27.8	0.14	149	114	222	1.6
1991	269	0.0223	17	33	17	57	0.64	32.64	30.75	34.61	0.049	25.0	20.6	27.5	0.10	216	163	268	2.1
1992	288	0.0278	20	34	17	62	0.59	32.77	30.42	34.32	0.041	21.3	15.3	24.5	0.16	155	92	227	2.5
1993	388	0.0309	31	34	16	60	0.62	32.41	30.44	34.32	0.040	22.8	17.7	28.5	0.14	176	131	226	1.5
1994	379	0.0501	45	38	16	64	0.61	32.37	30.74	33.82	0.031	22.8	18.1	26.9	0.10	173	130	300	1.8
1995	361	0.0194	13	34	16	60	0.71	32.14	29.78	33.75	0.042	24.6	20.1	28.3	0.13	198	124	299	2.6
1996	347	0.0173	6	36	15	62	0.63	32.38	27.92	34.33	0.052	22.2	14.2	27.0	0.16	190	121	261	2.4
1997	385	0.0156	24	38	15	74	0.69	32.00	27.87	34.59	0.080	22.9	17.8	28.0	0.12	194	126	273	1.5
1998	414	0.0193	25	39	15	75	0.71	32.03	27.44	34.59	0.071	21.4	9.5	28.6	0.22	178	126	231	1.9
1999	215	0.0186	22	37	15	75	0.88	31.88	27.27	34.41	0.123	22.9	17.9	28.8	0.14	202	154	272	1.8
2000	293	0.0273	17	35	15	75	0.75	32.29	28.95	34.28	0.064	24.0	18.0	28.5	0.13	202	138	294	2.7
2001	236	0.0297	9	37	15	67	0.82	32.36	27.87	34.28	0.074	23.6	16.0	29.2	0.17	203	144	298	2.2
2002	238	0.0546	33	37	15	70	0.84	31.87	27.86	33.95	0.087	24.3	15.2	28.3	0.20	207	169	268	1.9
2003	218	0.0046	7	38	16	62	0.79	32.07	27.43	34.33	0.112	18.9	13.4	25.1	0.15	203	155	266	2.2
2004	275	0.0145	5	40	15	75	0.92	32.26	29.00	33.97	0.064	20.9	16.7	25.8	0.17	176	127	303	2.2
2005	303	0.0231	12	38	15	69	0.74	32.08	27.33	34.32	0.084	23.0	18.0	28.5	0.17	191	124	273	2.8
2006	291	0.0172	6	37	15	69	0.76	32.29	27.27	34.39	0.088	22.6	15.0	26.7	0.17	203	158	272	2.0
2007	331	0.0242	29	37	15	73	0.75	32.17	27.33	34.33	0.079	23.4	15.3	28.9	0.16	200	142	268	2.1
2008	297	0.0236	19	37	15	70	0.70	32.16	27.27	34.59	0.086	21.8	15.2	27.2	0.14	193	127	274	2.6
2009	397	0.0202	10	36	15	73	0.69	32.23	27.27	34.6	0.082	22.6	15.4	27.2	0.13	202	127	282	2.4
2010	697	0.0875	148	38	15	72	0.51	31.41	27.34	34.59	0.063	22.1	12.3	29.4	0.16	219	125	301	2.0
2011	684	0.0950	116	40	15	75	0.53	30.86	27.23	34.54	0.070	21.7	14.8	28.8	0.15	210	140	300	1.8
2012	1114	0.1248	398	39	15	75	0.42	31.80	27.23	35.02	0.065	22.2	12.9	27.8	0.10	194	116	285	1.3
2013	1335	0.1049	367	37	15	75	0.36	31.24	27.23	35.01	0.054	22.1	12.4	28.1	0.08	197	115	278	1.3
2014	1428	0.1050	614	38	15	75	0.33	31.88	27.23	35.01	0.055	23.5	16.1	29.3	0.07	192	114	295	1.2
2015	1400	0.1129	903	37	16	75	0.35	31.84	27.26	35.02	0.055	22.7	13.6	28.5	0.07	186	112	296	1.2
2016	1415	0.1548	1088	38	17	75	0.35	32.06	27.23	35.01	0.055	24.1	15.5	29.3	0.06	217	126	302	1.2

Table 3: Variance inflation factor (VIF) estimates and degrees of freedom (df) for all considered covariates based on individual index time series.

	1990-2016		2010-2016	
Variable	**VIF**	**df**	**VIF**	**df**
Year	1.39	26	1.20	6
Depth (m)	1.28	1	1.29	1
Latitude (oN)	1.15	1	1.13	1
Bottom Temperature (oC)	1.80	1	1.69	1
Day of Year	1.41	1	1.33	1

Table 4: Results of BIC selection for the top 10 ranked ZINB models.

	Count Model					Zero-Inflation Model					
Rank	Latitude	Depth	Temperature	Day of Year	Year	Latitude	Depth	Temperature	Day of Year	BIC	Θ
					1990-2016 Index						
1	7	8	1	0	0	4	3	0	1	10565	1.100
2	7	8	1	0	0	4	4	0	1	10567	1.097
3	7	8	1	0	0	4	3	0	2	10567	1.107
4	7	8	1	0	0	5	3	0	1	10568	1.098
5	7	8	1	0	0	4	3	0	0	10568	1.124
6	7	8	1	0	0	4	4	0	2	10569	1.099
7	7	8	1	0	0	5	3	0	2	10569	1.105
8	7	8	1	0	0	5	4	0	1	10570	1.099
9	7	8	1	0	0	4	4	0	0	10570	1.122
10	7	8	1	0	0	5	4	0	2	10571	1.104
					2010-2016 Index						
1	8	3	1	0	0	4	3	0	1	8486	1.112
2	8	3	1	0	0	4	4	0	0	8486	1.121
3	8	3	1	0	0	8	4	0	0	8486	1.177
4	8	3	1	0	0	8	3	0	0	8487	1.117
5	8	3	1	0	0	4	4	0	1	8489	1.124
6	8	3	1	0	0	6	3	0	0	8489	1.064
7	8	3	1	0	0	4	3	1	0	8491	1.109
8	8	3	1	0	0	6	4	0	0	8491	1.058
9	8	3	1	0	0	8	4	0	1	8491	1.161
10	8	3	1	0	0	5	3	0	0	8491	1.106

Table 5: Red Snapper relative abundance index based on the SERFS chevron trap survey as standardized using a ZINB GLM. Index = relative abundance of Red Snapper, Bias = observed bias in bootstrap analysis, CV = coefficient of variation

	1990-2016 Index						2010-2016 Index					
					Confidence Interval						Confidence Interval	
Year	Index	Bias	SE	CV	Lower	Upper	Index	Bias	SE	CV	Lower	Upper
1990	1.1752	0.0030	0.8319	0.7079	0.1142	3.1460	–	–	–	–	–	–
1991	0.7657	0.0415	0.5712	0.7460	0.0797	2.1871	–	–	–	–	–	–
1992	1.8059	-0.0119	0.7724	0.4277	0.5011	3.4989	–	–	–	–	–	–
1993	1.1136	0.0027	0.4941	0.4437	0.3564	2.2705	–	–	–	–	–	–
1994	1.4820	0.0096	0.8147	0.5498	0.4279	3.4165	–	–	–	–	–	–
1995	0.3033	0.0013	0.1493	0.4923	0.0743	0.6456	–	–	–	–	–	–
1996	0.2011	0.0010	0.1010	0.5024	0.0482	0.4399	–	–	–	–	–	–
1997	0.4765	-0.0027	0.3072	0.6447	0.0422	1.1898	–	–	–	–	–	–
1998	0.7081	-0.0269	0.3771	0.5326	0.1238	1.5375	–	–	–	–	–	–
1999	1.0781	0.0464	0.6372	0.5910	0.0550	2.6007	–	–	–	–	–	–
2000	0.5232	-0.0004	0.2650	0.5066	0.1277	1.1317	–	–	–	–	–	–
2001	0.6394	0.0023	0.3179	0.4971	0.1553	1.3682	–	–	–	–	–	–
2002	1.2692	0.0263	0.5714	0.4502	0.3759	2.5989	–	–	–	–	–	–
2003	0.8969	-0.0207	0.8791	0.9801	0.0000	2.9783	–	–	–	–	–	–
2004	0.4063	-0.0030	0.2246	0.5527	0.0643	0.9236	–	–	–	–	–	–
2005	0.2797	-0.0034	0.1185	0.4237	0.0745	0.5352	–	–	–	–	–	–
2006	0.1955	-0.0017	0.0873	0.4464	0.0388	0.3852	–	–	–	–	–	–
2007	0.7004	-0.0367	0.3991	0.5698	0.1136	1.5524	–	–	–	–	–	–
2008	0.8762	-0.0167	0.3609	0.4119	0.2177	1.6263	–	–	–	–	–	–
2009	0.2318	-0.0034	0.0820	0.3538	0.0847	0.4057	–	–	–	–	–	–
2010	0.9839	-0.0126	0.1997	0.2029	0.6216	1.4206	0.5333	-0.0021	0.1023	0.1918	0.3498	0.7508
2011	0.9646	-0.0093	0.1740	0.1804	0.6449	1.3247	0.5490	0.0072	0.0948	0.1727	0.3893	0.7558
2012	1.3984	0.0011	0.2185	0.1563	1.0111	1.8683	0.8099	0.0017	0.0995	0.1229	0.6270	1.0136
2013	1.0847	0.0032	0.1754	0.1617	0.7832	1.4708	0.6657	-0.0054	0.0852	0.1280	0.5014	0.8362
2014	1.7807	0.0221	0.3052	0.1714	1.2763	2.4604	1.1501	-0.0132	0.1371	0.1192	0.8791	1.4210
2015	2.6890	-0.0291	0.4188	0.1558	1.8963	3.5523	1.5510	0.0027	0.1747	0.1127	1.2206	1.9063
2016	2.9708	0.0180	0.4737	0.1595	2.1387	3.9867	1.7409	0.0091	0.1794	0.1031	1.4045	2.1165

Table 6: Correlation table between the two indices provided in the current report and between those indices and the index provided in the 2016 SCDNR Reef Fish Survey trends report and presented to the SAFMC (June 2017) and SAFMC SSC (April 2017).

	1990-2016 ZINB	2010-2016 ZINB
2010-2016 ZINB	0.9949	
Trends Report	0.9155	0.9254

Figures

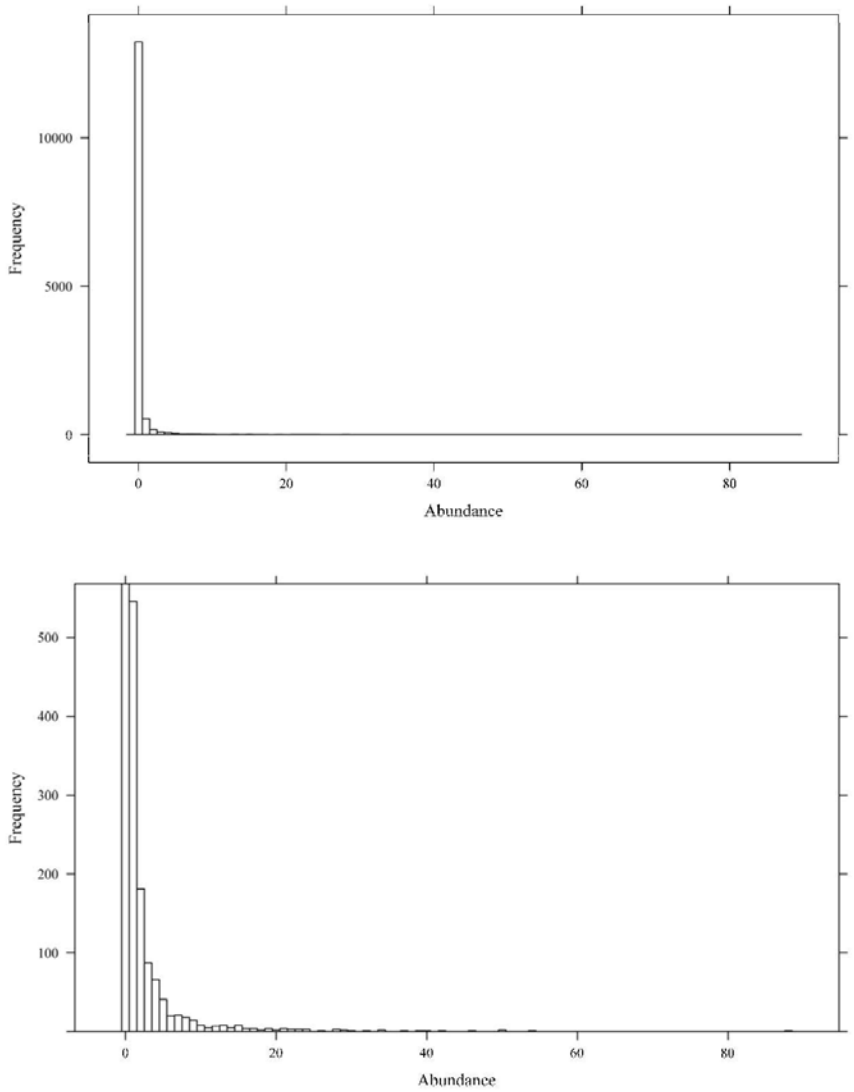

Figure 1: Frequency of occurrence of chevron traps (from 1990-2016) with a given catch of Red Snapper. Top panel – full distribution showing excess zeros; Bottom panel – restricted distribution better depicting frequency of traps with a given catch of Red Snapper.

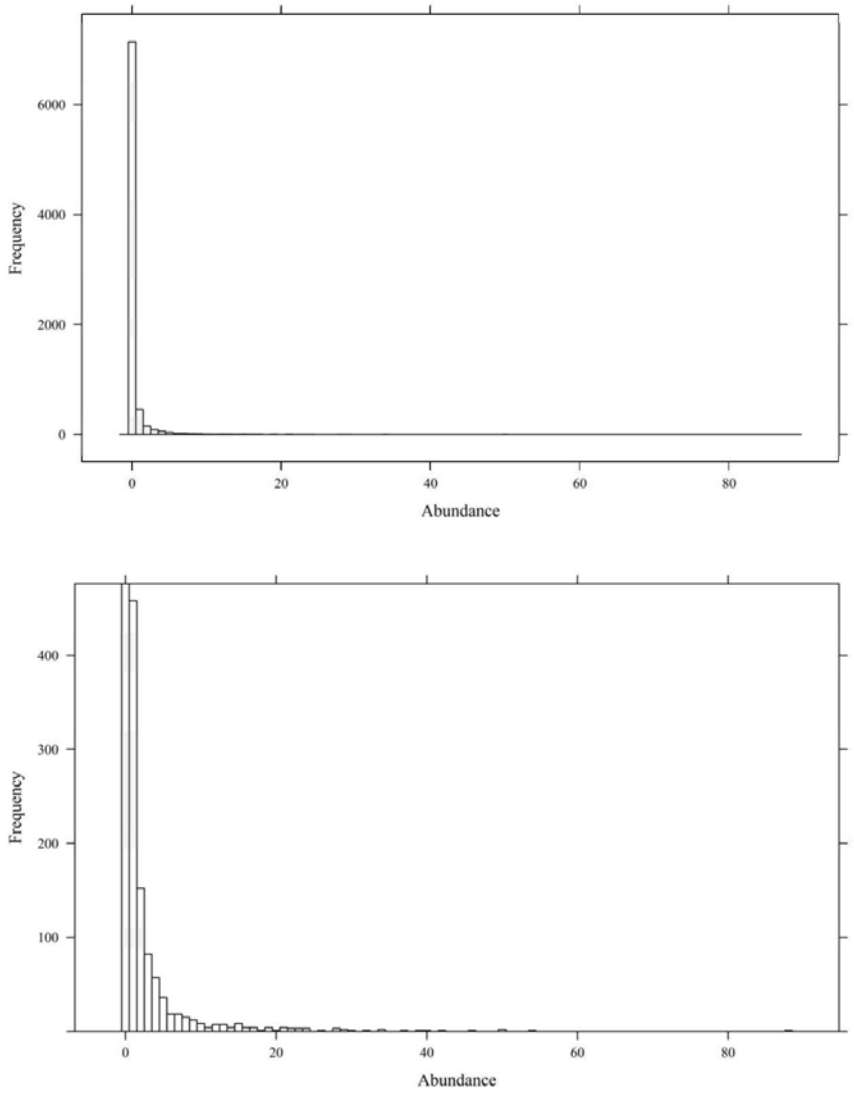

Figure 2: Frequency of occurrence of chevron traps (from 2010-2016) with a given catch of Red Snapper. Top panel – full distribution showing excess zeros; Bottom panel – restricted distribution better depicting frequency of traps with a given catch of Red Snapper.

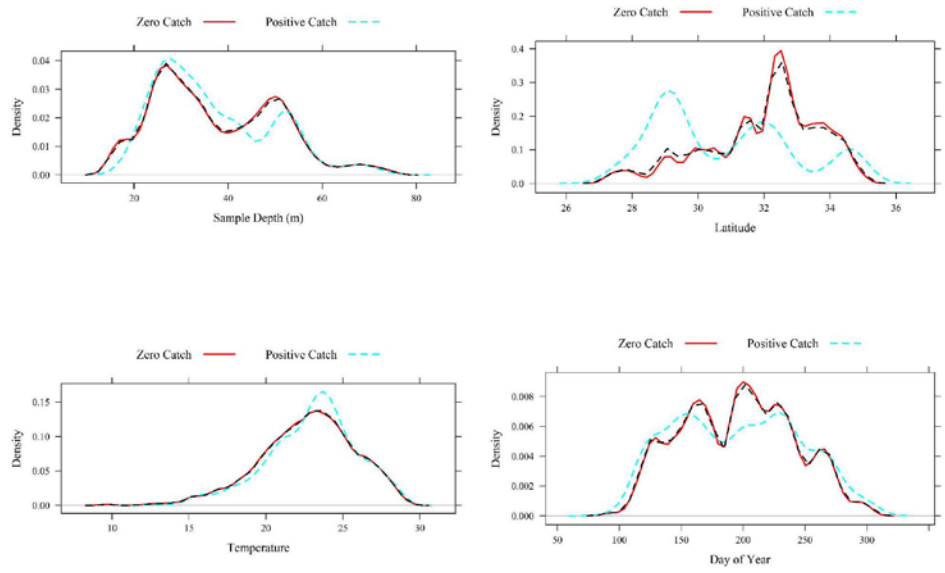

Figure 3: Density plots of all traps (1990-2016; dashed black line), negative (red line) and positive (dashed blue line) for Red Snapper with respect to each covariate considered in the model.

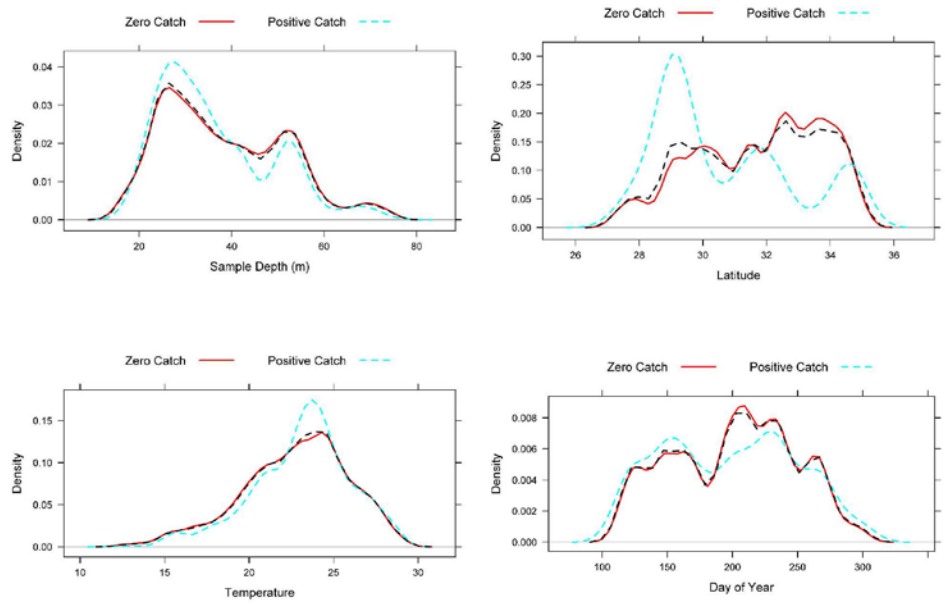

Figure 4: Density plots of all traps (2010-2016; dashed black line), negative (red line) and positive (dashed blue line) for Red Snapper with respect to each covariate considered in the model.

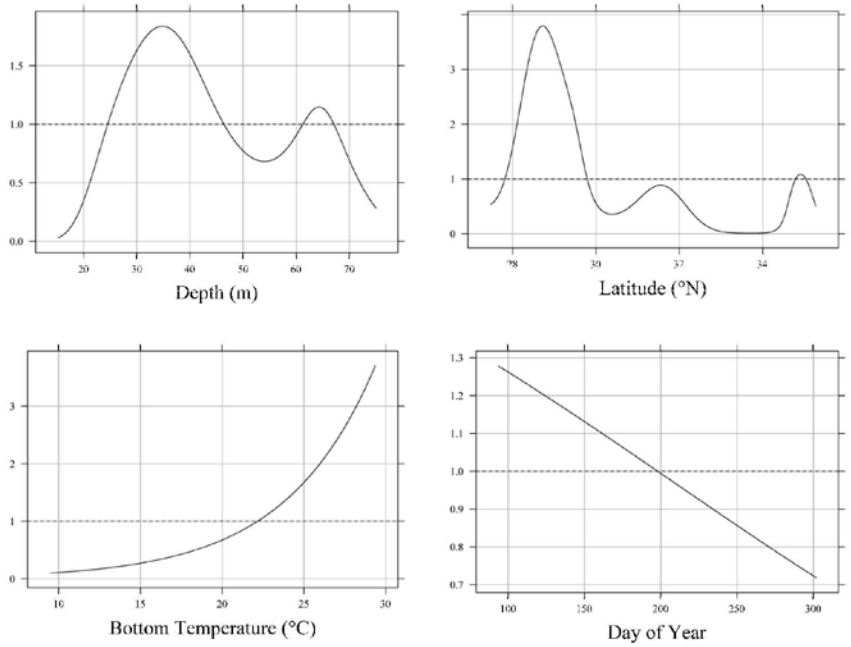

Figure 5: Predicted relative effect of each covariate on the catch of Red Snapper in chevron traps using the 1990-2016 data set. Note that the scale of the y-axis changes among panels, and hence y-axis scale can provide an indication of the magnitude of the effect of individual covariates.

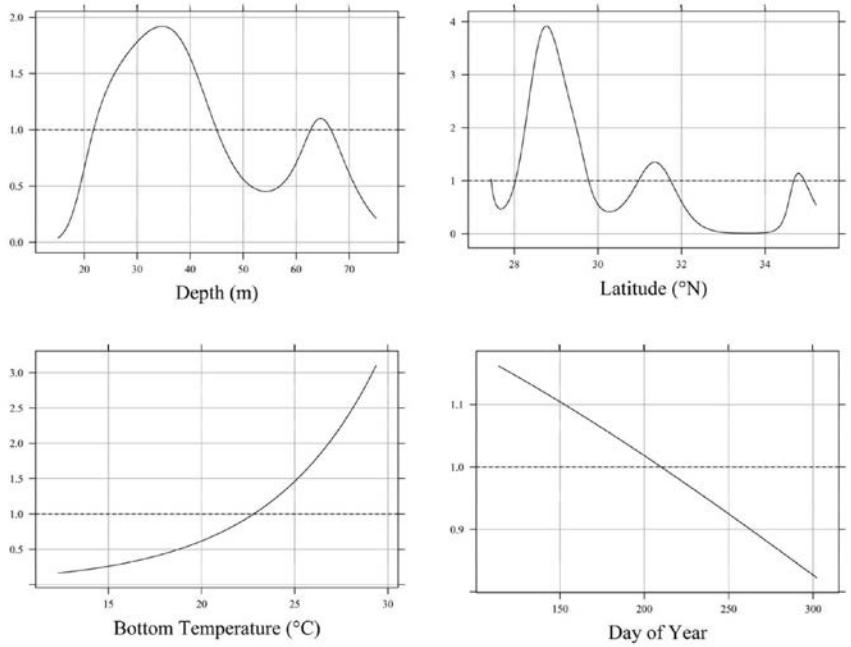

Figure 6: Predicted relative effect of each covariate on the catch of Red Snapper in chevron traps using the 2010-2016 data set. Note that the scale of the y-axis changes among panels, and hence y-axis scale can provide an indication of the magnitude of the effect of individual covariates.

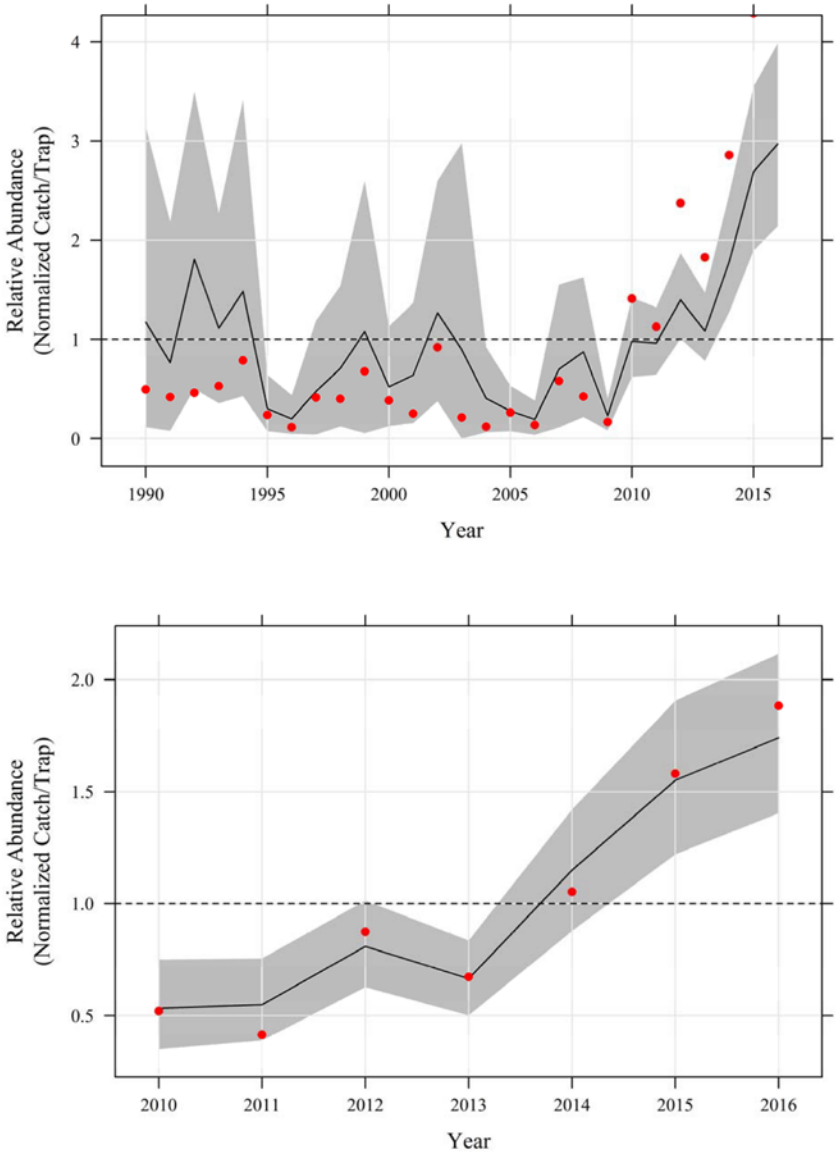

Figure 7: Red Snapper index of relative abundance based on the SERFS chevron trap survey. Top panel is the index based on the years 1990-2016. Bottom panel is the index based on the years 2010-2016. The ZINB standardized catch (solid black line) is normalized to the average relative abundance, as estimated by the model, during each surveys respective time series. Red dots represent normalized nominal annual relative abundance. Gray shaded region represents the 95% confidence interval of annual relative abundance based on 10,000 bootstraps.

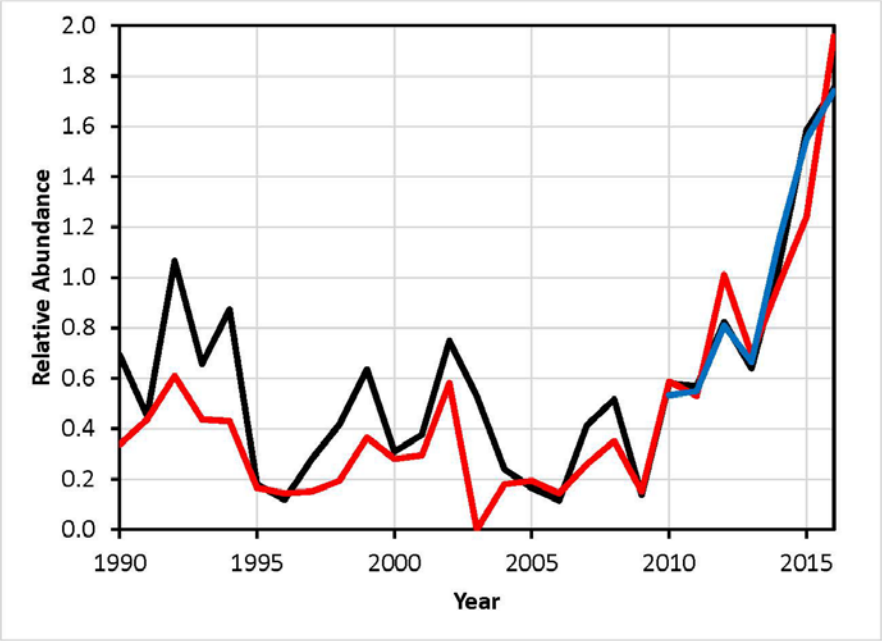

Figure 8: Red Snapper index of relative abundance based on the SERFS chevron trap survey, with annual relative abundance being normalized to the average relative abundance from 2010-2016. The different lines represent the relative abundance index developed using the full chevron trap time series and the methodology reported in Ballenger and Smart (2015; black line), the relative abundance index developed using the full chevron trap time series and the methodology reported in the SCDNR Reef Fish Survey 2016 trends report (red line), and the relative abundance index developed using only chevron trap data collected from 2010-2016 and the methodology reported in Ballenger and Smart (2015; blue line). The surveys are normalized to the average relative abundance from 2010-2016 here so that predicted changes in relative abundance in the overlapping period can be more easily compared.

Appendix M. Scientific and Statistical Committee October 2016 Final Report

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

SCIENTIFIC AND STATISTICAL COMMITTEE

SSC Meeting Report

Oct 18-20, 2016

Charleston Marriott Hotel
Charleston, SC

VERSION
Final Report
November 29, 2016

CONTENTS

revised NS1 Guidelines. Mr. Shepherd Grimes (NOAA General Council) clarified that the phase in needs to be part of the fisheries management plan and the ABC control rule. The requirement that Councils cannot exceed the ABC recommendations of the SSC is not overruled by the flexibility allowance. The FMP and control rule would specify the conditions under which the phase-in would occur and how the ABC is developed when a phase-in is considered.

- *A phase-in that reduces the buffer between the overfishing level and the allowable catch increases the risk of ending up in an overfished situation and a rebuilding plan, especially as overages have occurred in recent (3-4) years.*
- *If council chooses to phase-in the ACL, SSC recommends considering management uncertainty and recent overages. The SSC recommends that the ACL should not exceed 90% of the OFL in year one because the ACL was exceeded in recent years.*
- *In addition to revising the ABC control rule, new projection estimates will need to be provided if a phased-in approach is chosen.*

- Also consider providing a constant ABC for later years, specified in 3-year blocks.

  Consistency in the ACL will make it easier for holders of the tilefish endorsements to adjust their business models. However, the economic analysis in Amendment 18B that led to the restriction of tilefish access rights to a limited number of endorsement holders noted that both the ACL and average trip costs would have to remain static in order for the remaining operations to maintain profitability. The IFQ system in the Wreckfish fishery was able to adjust to a much sharper reduction in its ACL through the sale of shares to the members of the fleet that utilized them most profitably.

7. SNAPPER GROUPER AMENDMENT 43 - RED SNAPPER

7.1. Documents

Attachment 19. SEDAR 41 SAR, Red Snapper
Attachment 20. SEDAR 41 Supplemental Projections Apr2016
Attachment 21. SEDAR 41 Proj Runs at F_{MAX} and $F_{20\%SPR}$ Aug 2016
Attachment 22. SEDAR 41 Projection Overview Presentation
Attachment 23. Amendment 43 Options Paper
Attachment 24a. MRIP Int Reliability RS

7.2. Presentation

Projections Overview: Dr. Kate Siegfried, SEFSC
Amendment 43 ACT alternative: Chip Collier, SAFMC

7.3. Overview

The Committee reviewed the Red Snapper Benchmark assessment prepared through SEDAR 41 and provided fishing level recommendations at their May 2016 meeting. The base assessment run suggested that in the terminal year of 2014 the stock remained overfished. The SSC did not have confidence in the terminal fishing mortality estimates; however they recommended that the assessment results suggested overfishing was likely occurring in the terminal years of the assessment (2012-2014). , although the degree to which overfishing was occurring at that time could not be reliably quantified from the assessment results. Status determination and catch level recommendations provided by the SSC in May 2016 were based on the current F_{MSY} proxy of $F_{30\%SPR}$.

SEDAR 41 estimated the long-term sustainable yield at MSY to be about 25% of what it was estimated to be in SEDAR 24, and projected catch levels from SEDAR 41 at $F_{Rebuild}$ were approximately 21% of the catch levels projected for 2017 based on SEDAR 24. Given the lack of an estimated stock recruitment relationship and the need to fix steepness in SEDAR 41 at a level different than that used for SEDAR 24, and considering the importance of the stock-recruit parameters to the reference point recommendations, the Council directed the SSC to recommend an appropriate F_{MSY} proxy for red snapper that reflects the most recent assessment results. The Council requested additional projection runs and reference point criteria at F_{MAX} and $F_{20\%SPR}$, for the SSC to consider.

There was also concern over the amount of uncertainty in the recreational landings and discard estimates used in SEDAR 41. Recent landings estimates have a high degree of error associated with them, which is partially due to the difficulties of generating estimates during the recent moratoriums and short mini-seasons. Discard estimates also exhibit high sampling error. Due to these recreational data uncertainties the Council requested that the SSC evaluate the current MRIP estimates (landings and discards) for Red Snapper to determine if they are reliable and adequate for management.

The Council has also begun work on Amendment 43 to address alternative management strategies for Red Snapper. Although the Amendment is still in the early stages, there are items the Council would like the SSC's feedback on, such as the MSY (Action 1 in Amendment 43), specifying ABC and Annual Catch Limit (ACL) in landings versus landings and discards (Action 3), and calculating the annual catch target (ACT; Action 4). Attachment 23 has the three actions highlighted here for SSC review copied to the front of the document after the purpose and need for the amendment for ease of SSC review. The full options paper is provided after the Actions 1, 3 and 4 to provide background information and all other proposed action and alternatives.

The Council requested the SSC discuss the risk associated with using different values of MSY (Action 1). The MSY alternatives in the options paper include F_{MAX}, $F_{20\%}$, $F_{26\%}$, $F_{30\%}$, and $F_{40\%}$. Projections are provided for F_{MAX}, $F_{20\%}$, $F_{27\%}$, and $F_{30\%}$ in Attachment 21.

There are slight differences between the alternatives and the projections because the alternatives in the amendment were developed after the request for projections was sent the SEFSC.

The Council requested the SSC comment on the risk of specifying the ABC and ACL in landings or landings + discards (Action 3). The current ABC is based on landings and dead discards and the ACL is based on landings only. The discards are not tracked for any other fish in the South Atlantic and compared to the ABC, which includes landings and dead discards. However, the largest component of fishing mortality for Red Snapper in the last five years came from the dead discards in the recreational fishery.

The calculation of the ACT (Action 5) includes a new method for review by the SSC (Alternative 4). The new method reduces the ACT from the ACL based on the average percentage the annual landings exceeded the ACL based on a selected timeframe. The timeframe for the ACT calculation was based on 2012 to 2014 when short seasons were opened for Red Snapper.

Table 3. Red Snapper Recommendations from the May 2016 SSC Meeting

Criteria			**Deterministic**	**Probabilistic**
Overfished evaluation ($SSB_{2014}/SSB_{30\%}$)			0.16	0.17
Overfishing evaluation			$F_{12-14}/F_{30\%} > 1$	$F_{12-14}/ F_{30\%}>1$
MFMT ($F_{30\%}$)			0.15	0.15
$SSB_{30\%}$ (Eggs 1E8)			328,552	294,166
MSST (Eggs 1E8)			246,414	220,624
MSY (1000 lb)			430	419
Y at 75% $F_{30\%}$ (1000 lb)			398	397
ABC Control Rule Adjustment			Under Rebuilding	
P-Star			Under Rebuilding	
M			0.134	
Management starting in 2017 (probabilistic projection results)				
OFL RECOMMENDATIONS				
Year	Landed LBS	Discard LBS	Landed Number	Discard Number
2017	174,000	189,000	18,000	35,000
2018	204,000	210,000	19,000	37,000
2019	230,000	227,000	21,000	39,000
ABC RECOMMENDATIONS				
Year	Landed LBS	Discard LBS	Landed Number	Discard Number
2017	165,000	179,000	17,000	33,000
2018	195,000	200,000	18,000	35,000
2019	220,000	218,000	20,000	37,000

7.4. Action

- Evaluate the MRIP estimates for Red Snapper

- Determine if they are reliable and adequate for management, including quota monitoring and discard information.

- Consider alternative reference points
  - Comment on the risk of using alternative SPR metrics in lieu of $F_{30\%SPR}$ in determining stock status and running projections.
  - Review the projections at F_{MAX} and $F_{20\%SPR}$.
  - Update or revise fishing level recommendations as appropriate.

- Amendment 43 ACT alternative (Action 4)
  - Discuss the pros and cons of the proposed alternative method for calculating the ACT.
  - What are the benefits to using the proposed methodology over the Council's current ACT rule of (1-PSE)*ACL?

SSC RECOMMENDATIONS:

- Evaluate the MRIP estimates for Red Snapper
  - Determine if they are reliable and adequate for management, including quota monitoring and discard information.
    - *The number of intercepts is relatively low and the expansion factors relatively high, with the highest number of intercepts in Florida.*
    - *The SSC realizes that these estimates are influential in assessments and management. By design, 90% of the effort is focused on "inshore" areas, while the remainder is focused "off-shore". Better data would be ideal, such as surveys focused on off-shore trips. The SSC realizes that while these estimates are influential in assessments and management, they are currently all there is. Uncertainties and use of data was discussed extensively at the SEDAR 41 Data Workshop and during the review.*
    - *The SSC agrees that all sources of mortality should be considered; therefore the ABC should be specified in total yield (landings + discards). Not accounting for dead discards in management increases the risk of overfishing ("a dead fish is a dead fish").*
    - *Discard mortality will remain one of the key issues. Assessment estimates and projections can be significantly improved if reliable estimates of discards and discard mortality are improved. As a result, efforts to better estimate and validate discards and discard mortality should be given a very high research and survey priority.*
    - *Similarly, the proportion of stock yield available for harvest can increase if discard mortality is reduced, e.g. by the use of descending devices or other descending techniques, or avoiding areas with high concentrations of red snapper. Release mortality*

studies could improve discard mortality estimates, and should be given a high research priority. Such studies could include evaluation of existing devices and release methods, and development of alternative methods. It will be important to evaluate acceptance of these techniques by fishers.

- *In addition, other data collection approaches should be studied, such as those in the GOM (stamp), as recommended in the new approach the Council put forth.*
- *The PSE could be informative in determining the adequacy of estimates. An ACCSP Workshop report (available on the ACCSP website) suggested PSEs higher than 40% to 60% may not be usable. However, higher levels were acceptable for short-lived species or those with low levels of recreational catch.*
- *Simulation evaluation could be used to determine the effect of differing PSE values on the resulting reference points.*
- *The incorporation of uncertainty in the catch data is dependent on the chosen method of assessment. We currently use catch-based assessments, which assume the catch is known with very little error. Moving to an effort-based assessment or a Bayesian framework would allow fitting to the catch and better incorporate the estimates of uncertainty (PSE) into the assessment.*

- Consider alternative reference points
  - Comment on the risk of using alternative SPR metrics in lieu of $F_{30\%SPR}$ in determining stock status and running projections.

    By definition F_{MAX} and $F_{20\%}$ have a higher risk of overfishing than $F_{30\%SPR}$ or $F_{40\%SPR}$. Furthermore, the analyses presented to the SSC indicated that the various alternatives ($F_{20\%}$, $F_{27\%}$, $F_{30\%}$, and F_{max}) showed very similar results and the changes in yield were minimal. It is the opinion of the SSC that there is no compelling reason to change the proxy based on the data presented, and even if a different metric is chosen (other than $F_{30\%}$), the status determination and yield will not change substantially. Scientific literature supports that longer lived species should have a higher percentage of SPR, which supports maintaining $F_{30\%}$ at a minimum.
  - Review the projections at F_{MAX}, $F_{20\%SPR}$, and $F_{27\%SPR}$.

    See above.
  - Update or revise fishing level recommendations as appropriate.
    - *Previous SSC discussions and the RW reports discussed the MSY proxy issues. No new data have become available to justify a revision of the fishing level recommendations.*

- *A retrospective analysis would be useful to investigate the "overfishing uncertainty" between the proposed F_{MSY} proxies.*

- Amendment 43 ACT alternative (Action 4)
  - Discuss the pros and cons of the proposed alternative method for calculating the ACT.
  - What are the benefits to using the proposed methodology over the Council's current ACT rule of (1-PSE)*ACL?
    - *The use of an ACT and chosen buffer is a management decision, but having an ACT is preferable over not having one because:*
      - *Provides buffer from the ACL. Using a percentage of the ACL recognizes that catches may not be known precisely.*
      - *Could be used for in-season monitoring, and can be adjusted as time progresses, management changes, and data collection improves.*
      - *It is consistent with Gulf methodology. ACT based on performance – evaluation of proportional overages over time, similar to alternative 6.*
    - *Does not consider uncertainty in the point estimates of the landings as Alt 2 does. Alt 2 accounts for the observed uncertainty in the catch estimates.*

8. ABC CONTROL RULE MODIFICATIONS

8.1. Documents

Attachment 25. ABC Control Rule Modifications DD
Attachment 26. ABC Control Rules from Other Jurisdictions
Attachment 27. ABC Control Rule Presentation
Attachment 28. ABC Control Rule Background Information

8.2. Presentation

Changes to the ABC Control Rule: John Carmichael, SAFMC

8.3. Overview

During the October 2014 ABC Workshop, several issues with the ABC Control Rule were identified, including the use of stock status, MRAG Productivity and Susceptibility Analysis scores and catch adequacy in determining the P* value for Tier 1 stocks . Other concerns include the overly prescriptive nature of Levels 2 and 3 that could be viewed as precluding consideration of newly developed data poor assessment methods and the lack of clarity on application of the ABC Control Rule in developing annual catch level recommendations for stocks in a rebuilding plan. The SSC created a sub-committee to develop recommendations for control rule revisions. At the May 2016 meeting, the SSC discussed the results of analyses that had been put together by the ABC Control Rule sub-

Appendix N. Commercial Sector Projected Seasons

Predicting Closure Dates for Amendment 43 Proposed Catch Limits for the South Atlantic Red Snapper Commercial Sector

LAPP/DM Branch
NOAA Fisheries Service
Southeast Regional Office

In 2016, a stock assessment was conducted for the South Atlantic red snapper (SEDAR 41). Results from the assessment showed the red snapper stock is overfished and experiencing overfishing. Amendment 43 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Amendment 43) is currently being drafted and its purpose is to establish new Annual Catch Limits (ACL) that will rebuild the stock.

Amendment 43 is currently being drafted and will likely be imposed on the 2018 fishing year. An estimate of future landings is required to determine potential closure dates for the alternative ACLs being considered. Frequently future landings are predicted from taking an average of the most recent years of complete data following the assumption that recent landings will likely reflect future landings. However, the South Atlantic red snapper fishery was closed in 2010, 2011, 2015 and 2016, and was only open for short periods of time (57 days or less) in 2012, 2013, and 2014. The short opening in 2012, 2013, and 2014 occurred over different months; therefore, landings from different months and years were combined to predict future landings. Commercial landings for South Atlantic red snapper came from the Southeast Fisheries Science Center's (SEFSC) updated commercial ACL dataset, which was provided on May 2, 2017. The commercial fishery will open on the second Monday of July and, if the ACL is not exceeded, close on December 31. Future landings were only predicted for July through December. Future landings were determined by calculating the daily catch rate for a month and then applying the catch rate to the total number of days in that month. Predicted landings for each month assumed a uniform distribution within a month, and were partitioned into a daily catch rate by dividing the landings for a month by the number of days in that month. The daily catch rates were projected forward and a closure date was determined when the landings exceeded the various ACLs proposed in Amendment 43. The projections start on July 9 because this is the second Monday of July in 2018, therefore landings were assumed to be zero before July 9.

- July 2014 was the most recent year when the commercial sector was open in July, and the commercial sector was open from July 14 through July 31. The July daily catch rate was applied for 22 days in July to match a potential opening in 2018.

- Future August landings were assumed to match the August 2014 landings because this was the most recent time period when the commercial sector was open for the entire month of August.
- Future September landings were assumed to match the September 2013 landings because this was the most recent year where the commercial sector was open for the entire month of September.
- October of 2013 was the most recent year when the commercial sector was open in October and the sector was open from October 1 through October 8 of 2013. Future October landings were determined from calculating the daily catch rate from October 2013 and then applying the catch rate to the total number of days in October (31 days).
- The most recent years where the commercial sector was open in November and December was in 2012 (8 days in November and 7 days for December). However, a reduced trip limit of 50 pounds gutted weight (lbs gw) was implemented in 2012 which is different than the trip limit of 75 lbs gw which was implemented in 2013 and continues today. A trip limit analysis was done for the red snapper temporary rule in 2012 (Red Snapper Rule 2012) and found that a change in the trip limit from 50 to 75 lbs gw resulted in a 51% increase in landings. Following the trip limit analysis done for the red snapper temporary rule, the landings in 2012 were increased by 51% to adjust for the increased trip limit from 50 to 75 lb gw. These modified landings were used to determine future November and December landings from calculating the daily catch rate within each month when they were open in 2012. The catch rate was applied to the total number of days in each month. Details of the landings used to create the predicted landings are shown in Table 1, and Figure 2 displays landings by month.

Table 1. Details of the commercial landings used to determine the predicted future commercial landings for red snapper.

Month	Most Recent Year	Days open	Method
July	2014	17 days	Determined July 2014 average daily catch rate; applied catch rate to open days in July
August	2014	31 days	Used August 2014 landings
September	2013	30 days	Used September 2013 landings
October	2013	8 days	Determined October 2013 average daily catch rate; applied to open days in October
November	2012	8 days	Landings adjusted for trip limit, then determined November 2012 average daily catch rate; applied to open days in November
December	2012	7 days	Landings adjusted for trip limit, then determined December 2012

			average daily catch rate; applied to open days in December

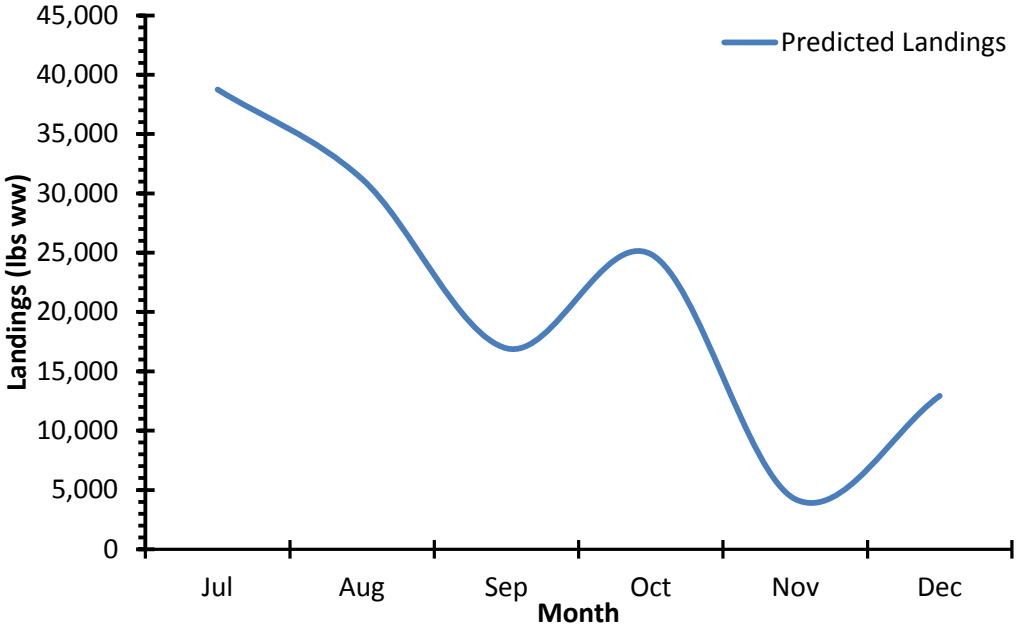

Figure 1. Predicted South Atlantic red snapper commercial landings by month. The commercial sector is expected to open on the second Monday in July and close at the end of December, therefore, landings were only predicted for July through December.

Amendment 43 includes different alternatives to develop ACLs. Some of the alternatives are increased by an adjustment factor due to an increase in red snapper abundance based on a fish trap index of abundance. The adjustment factor is 1.88 and is based on the change in the average index of abundance from 2012 to 2014 compared to the average abundance from 2015 to 2016. Opening the fishery to an increased stock size will likely cause changes in harvest. The question is how will the harvest change in the commercial sector? There likely won't be any new commercial fishermen harvesting red snapper because the number of commercial fishermen is capped because the permit is limited access. Also, the harvest per trip is capped by a 75 pound trip limit. The fishermen could do more trips for red snapper but it is not likely they will go fishing solely for red snapper because of the low trip limit (75 lbs gw). It's more likely that the increased stock size will cause more trips to meet the trip limit. This potential change in pounds per trip was analyzed by first examining the distribution of pounds per trip with the commercial logbook data (accessed April 17, 2017 from SEFSC). Figure 2 displays the pounds per trip distribution for the two most recent years that had the 75 lbs gw trip limit (2013 and 2014). Following the assumption that trips that did not meet the trip limit will now meet the trip limit the logbook landings were modified. For example, trips that harvested red snapper and had less than 60 pounds per trip were modified to meet the 75 lbs gw trip limit. Trips of 60 lbs gw or more were assumed to have been close to meeting the current trip limit and were not modified. This modification leads to an increase in landings of 34%. This percentage was applied to the predicted landings describer earlier to provide a "high landings" estimate. Table 2 provides the predicted closure dates for the proposed

ACL alternatives for Amendment 43 for both landings predictions. If the ACL is not met and there is no closure then the predicted commercial landings expected from July 9 to December 31 are 118,950 pounds whole weight (lbs ww) and the predicted high landings for the same time period are expected to be 159,393 lbs ww.

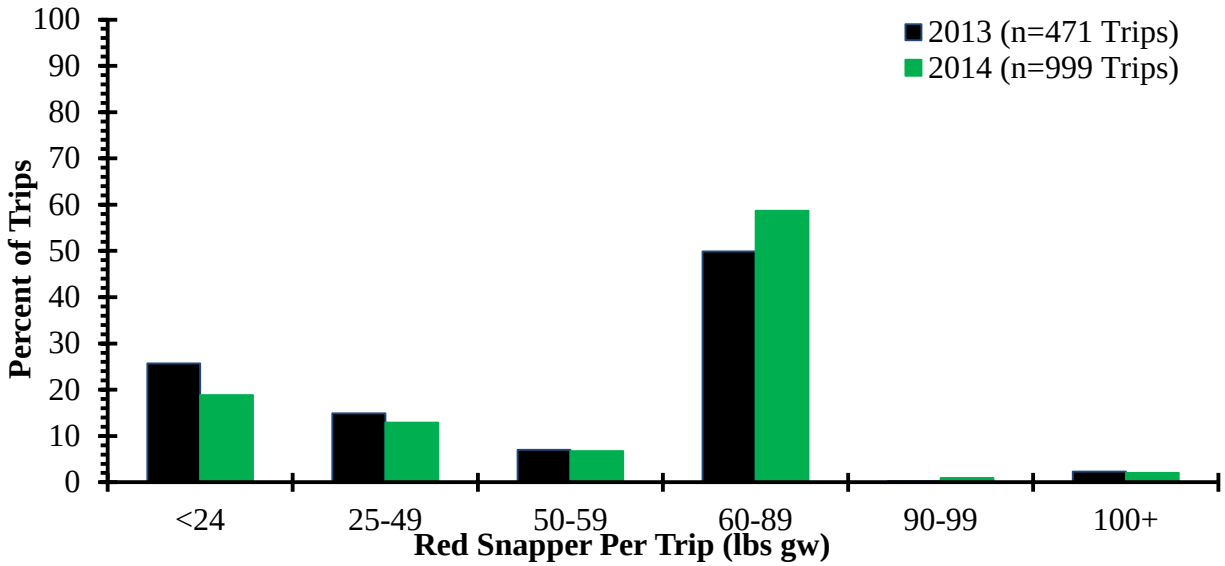

Figure 2. Distribution of the South Atlantic red snapper harvested per trip (lbs gw) in 2013 and 2014. Data comes from the commercial logbook dataset.

Table 2. South Atlantic predicted closure dates for the commercial sector for the different proposed ACL alternatives in Amendment 43. These closure dates assume the commercial sector start on the second Monday in July of 2018 (July 9, 2018). The "Predicted Landings" are a prediction of future landings, and the "High Landings" are the prediction of future landings with a 34% increase in landings following the assumption that more fishermen will meet the trip limit of 75 lbs gw due to an increased stock size. Alternative 1 states to be determined (TBT) because it's dependent on the total removals of 2017 which are not available at this time.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
ACL	TBT	69,360 lbs ww	130,396 lbs ww	124,815 lbs ww	234,652 lbs ww
Predicted Landings	TBT	17-Sep	No Closure	No Closure	No Closure
High Landings	TBT	23-Aug	26-Nov	21-Oct	No Closure

As with most projections, the reliability of the results is dependent upon the accuracy of the underlying data and input assumptions. This analysis attempted to create a baseline as a foundation for comparisons, under the assumption that projected past landings will accurately reflect actual future landings. Uncertainty exists in this projection, as economic conditions, weather events, changes in catch-per-unit effort, fisher response to management regulations, and a variety of other factors may cause departures from this assumption.

References

Red Snapper Rule. 2012. Measures to allow limited harvest of red snapper (*Lutjanus campechanus*) in the South Atlantic in 2012. Temporary measures through emergency action. 92 pages.

SEDAR 41. 2017. Stock assessment of red snapper off the Southeastern United States. Southeast Data, Assessment and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.

Appendix O. Recreational Sector Projected Seasons

Predicting Closure Dates for Amendment 43 Proposed Annual Catch Limits for the South Atlantic Red Snapper Recreational Sector

LAPP/DM Branch
NOAA Fisheries Service
Southeast Regional Office

In 2016, a stock assessment was conducted for the South Atlantic red snapper (SEDAR 41). Results from the assessment showed the red snapper stock is overfished and experiencing overfishing. Amendment 43 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region is currently being drafted and its purpose is to establish new Annual Catch Limits (ACL) that will rebuild the stock. The recreational season for South Atlantic red snapper was closed in 2010 and 2011, then had a very short season in 2012, 2013, and 2014. The season varied each year and included two weekends (6 days) during September 2012, one weekend (3 days) in August 2013, and three weekends (8 days, with the third weekend only open on Friday and Saturday) during July 2014. Due to a short season and limitations of Marine Recreational Fisheries Statistics Survey (MRFSS) the South Atlantic states (North Carolina, South Carolina, Georgia, east Florida) conducted their own state specific red snapper surveys during the short red snapper recreational seasons in 2012, 2013, and 2014. A red snapper mini-season ad-hoc group call and webinar was held to review the MRFSS and individual state red snapper surveys to determine the best estimates to use to characterize the recreational catch. The ad-hoc group compared MRFSS against the specific state surveys for each state looking closely at estimates by wave and year. Then the ad-hoc group determined which survey best characterized the recreational catch. For example, in some years MRFSS was chosen as providing the best estimate of landings in Georgia but other years the Georgia state survey was chosen. Following the recommendations determined from the ad-hoc group the recreational red snapper landings were compiled. However, since the recent assessment (SEDAR 41) used Marine Recreational Information Program (MRIP) instead of MRFSS in any cases where the MRFSS landings were chosen as the best estimate of landings these MRFSS landings were replaced by MRIP landings. The recreational sector was closed in 2015 and 2016 and there were no state specific surveys during these years. Therefore, MRIP landings were used for 2015 and 2016 landings. Also, the Southeast Region headboat survey (SRHS) was conducted from 1972 to 2016 and was used to provide the red snapper landings from the headboat mode. Table 1 reveals which recreational survey was chosen by the ad-hoc group to estimate the recreational landings for each state by mode and year. Table 2 summarizes the South Atlantic red snapper recreational landings in numbers of fish by wave.

Table 1. The recreational survey that was chosen by the ad-hoc group to estimate the recreational landings for each state by mode and year.

Year	State	Charter	Private	Headboat
2012	NC	MRIP	No Landings	SRHS
	SC	SC Survey	No Landings	SRHS

	GA	MRIP	MRIP	SRHS
	FL	FL Survey	FL Survey	SRHS
2013	NC	No Landings	No Landings	SRHS
	SC	SC Survey	No Landings	SRHS
	GA	GA Survey	GA Survey	SRHS
	FL	FL Survey	FL Survey	SRHS
2014	NC	MRIP	NC Survey	SRHS
	SC	SC Survey	SC Survey	SRHS
	GA	GA Survey	MRIP	SRHS
	FL	FL Survey	FL Survey	SRHS
2015	NC	MRIP	MRIP	SRHS
	SC	MRIP	MRIP	SRHS
	GA	MRIP	MRIP	SRHS
	FL	MRIP	MRIP	SRHS
2016	NC	MRIP	MRIP	SRHS
	SC	MRIP	MRIP	SRHS
	GA	MRIP	MRIP	SRHS
	FL	MRIP	MRIP	SRHS

Table 2. South Atlantic red snapper recreational landings in numbers of fish by wave from 2012 to 2016.

	Jan/Feb	Mar/Apr	May/June	Jul/Aug	Sep/Oct	Nov/Dec	Total
2012	1	478	353	79	14,080	0	14,991
2013	0	2	403	2,050	4,160	14	6,629
2014	1,151	45	722	28,798	19	334	31,069
2015	0	847	467	486	56	14	1,870
2016	0	1	188	205	3	6	403

Amendment 43 is currently being drafted and will likely be implemented in the 2018 fishing year. An estimate of future landings is required to determine if the alternative ACLs being considered will lead to a closure. Frequently future landings are predicted from taking an average of the most recent years of complete data following the assumption that recent landings will likely reflect future landings. However, the South Atlantic red snapper recreational fishery was closed in 2010, 2011, 2015 and 2016, and was only open for short periods of time 2012 (6 days), 2013 (3 days), and 2014 (8 days). The short opening in 2012, 2013, and 2014 occurred over different months; therefore, landings from different months and years were combined to predict future landings. Recreational landings for South Atlantic red snapper came from the annual total removals reports provided by the Southeast Fisheries Science Center's (SEFSC) and then when MRFSS landings were used they were replaced with MRIP landings. MRIP landings were provided by the SEFSC on June 7, 2017. The recreational fishery will open on the second Friday of July and, if the ACL is not exceeded, close on December 31. Future landings were only predicted for July through September because the recreational ACLs

proposed in Amendment 43 are relatively low and all of the proposed ACLs will likely be exceeded before the end of September. Future landings were determined by calculating the daily catch rate for a month and then applying the catch rate to the number of weekend days in that month (Friday, Saturday, and Sunday). Predicted landings for each month assumed a uniform distribution within a month, and were partitioned into a daily catch rate by dividing the landings for a month by the number of days in that month. The daily catch rates were projected forward and a closure date was determined when the landings exceeded the various ACLs proposed in Amendment 43. The projections start on July 13 because this is the second Friday of July in 2018, therefore landings were assumed to be zero before July 13. Additionally, the recreational season will only be open on Friday, Saturday, and Sunday. Therefore, landings were only predicted for each Friday, Saturday, and Sunday after July 13, 2018 and landings from Monday to Thursday were assumed to be zero.

- July 2014 was the most recent year when the recreational sector was open in July, and the recreational sector was open for 8 days. The July daily catch rate was applied to the open weekend days in July to match a potential opening in 2018.
- August 2013 was the most recent year when the recreational sector was open in August, and the recreational sector was open for 3 days. The August daily catch rate was applied to the open weekend days in August to match a potential opening in 2018.
- September 2012 was the most recent year when the recreational sector was open in September, and the recreational sector was open for 6 days. The September daily catch rate was applied to the open weekend days in September to match a potential opening in 2018.

Table 1. Details of the recreational landings used to determine the predicted future recreational landings for red snapper.

Month	Most Recent Year	Days open	Method
July	2014	8 days	Determined July 2014 average daily catch rate; applied catch rate to open days in July
August	2013	3 days	Determined August 2013 average daily catch rate; applied catch rate to open days in August
September	2012	6 days	Determined September 2012 average daily catch rate; applied catch rate to open days in September

Amendment 43 includes different alternatives to develop ACLs. Some of the alternatives are increased by an adjustment factor due to an increase in red snapper abundance based on a fish trap index of abundance. The adjustment factor is 1.88 and is based on the change in the average index of abundance from 2012 to 2014 compared to the average abundance from 2015 to 2016. Opening the fishery to an increased stock size will likely

cause changes in harvest. The adjustment factor of 1.88 was applied to the landings to provide a "high landings" estimate to replicate what the future harvest will be with an increased stock size. The bag limit is restricted to one fish per person and the recreational ACL is in numbers of fish so the size of fish is irrelevant for monitoring the ACL. Therefore, the "high landings" assumes more recreational trips will harvest red snapper because of the increase in red snapper abundance. Table 2 provides the predicted closure dates and predicted number of open days for the proposed ACL alternatives for Amendment 43 for both landings predictions.

Table 2. South Atlantic predicted closure dates and predicted number of open days for the recreational sector for the different proposed ACL alternatives in Amendment 43. The predicted number of open days is provided in parenthesize after the closure dates. These closure dates assume the recreational sector start on the second Friday in July of 2018 (July 13, 2018). The "Predicted Landings" are a prediction of future landings, and the "High Landings" are the prediction of future landings with a 1.88 adjustment factor following the assumption of a larger stock size. Alternative 1 is stated as to be determined (TBT) because it's dependent on the total removals of 2017 which are not available at this time.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
ACL	TBD	16,480 Fish	30,982 Fish	29,656 Fish	55,753 Fish
Predicted Landings	TBD	21-Jul (4)	28-Jul (7)	28-Jul (7)	15-Sep (28)
High Landings	TBD	15-Jul (2)	21-Jul (4)	21-Jul (4)	29-Jul (8)

As with most projections, the reliability of the results is dependent upon the accuracy of the underlying data and input assumptions. This analysis attempted to create a baseline as a foundation for comparisons, under the assumption that projected past landings will accurately reflect actual future landings. Uncertainty exists in this projection, as economic conditions, weather events, changes in catch-per-unit effort, fisher response to management regulations, and a variety of other factors may cause departures from this assumption.

References

SEDAR 41. 2017. Stock assessment of red snapper off the Southeastern United States. Southeast Data, Assessment and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.