Photo: Brendan Runde, Department of Applied Ecology, NCSU

Regulatory Amendment 29

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

Gear Requirement Modifications

Regulatory Impact Review | Regulatory Flexibility Analysis

April 2019 DRAFT

A publication of the South Atlantic Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award Number FNA10NMF4410012

Definitions, Abbreviations and Acronyms Used in the FMP

ABC	acceptable biological catch
ACL	annual catch limit
AM	accountability measure
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}
FEIS	final environmental impact statement
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
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

Regulatory Amendment 29 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region

Proposed actions:	Modify gear requirements for South Atlantic snapper grouper species. Actions include requirements for descending and venting devices, and modifications to requirements for circle hooks and powerheads.
Lead agency:	Regulatory Amendment – South Atlantic Fishery Management Council Environmental Assessment – National Marine Fisheries Service (NMFS), Southeast Regional Office
For Further Information Contact:	Christina Wiegand South Atlantic Fishery Management Council 4055 Faber Place, Suite 201 North Charleston, SC 29405 843-571-4366 866-SAFMC-10 Christina.Wiegand@safmc.net Frank Helies NMFS, Southeast Region 263 13th Avenue South St. Petersburg, FL 33701 727-824-5305 Frank.Helies@noaa.gov

Table of Contents

List of Appendices

List of Figures

List of Tables

Chapter 1. Introduction

1.1 What Actions are Being Proposed?

Regulatory Amendment 29 amends the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP). Regulatory Amendment 29 proposes modifications to gear requirements for South Atlantic snapper grouper species. Actions include establishing requirements for descending and venting devices and modifying requirements for circle hooks and powerheads.

Management Agencies

- ***South Atlantic Fishery Management Council***– Engages in a process to determine a range of actions and alternatives and recommends action to the National Marine Fisheries Service.
- ***National Marine Fisheries Service*** and ***Council staffs*** – Develops alternatives based on guidance from the Council and analyzes the environmental impacts of those alternatives. If approved by the Secretary of Commerce, NMFS implements the action through rulemaking.

1.2 Who is Proposing these Actions?

The South Atlantic Fishery Management Council (Council) is responsible for managing fish stocks in the South Atlantic region. The Council develops the framework amendment and sends it to the National Marine Fisheries Service (NMFS) who publishes a rule to implement the framework amendment on behalf of the Secretary of Commerce. NMFS is an agency of the National Oceanic and Atmospheric Administration within the Department of Commerce. Guided by the Magnuson-Stevens Fishery Conservation and Management Act, the Council works with NMFS and other partners and stakeholders to assess and predict the status of fish stocks, establish annual catch limits, reduce bycatch, and ensure compliance with fisheries regulations.

The Council and NMFS are also responsible for making this document available for public comment. The draft environmental assessment (EA) will be made available to the public during the scoping process, public hearings, and in Council meeting briefing books. The final EA/framework amendment will be made available during the proposed rule stage of the rulemaking process.

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 Snapper Grouper FMP (SAFMC 1983) (**Figure 1.3.1**). There are 55 species managed by the Council under the Snapper Grouper FMP.

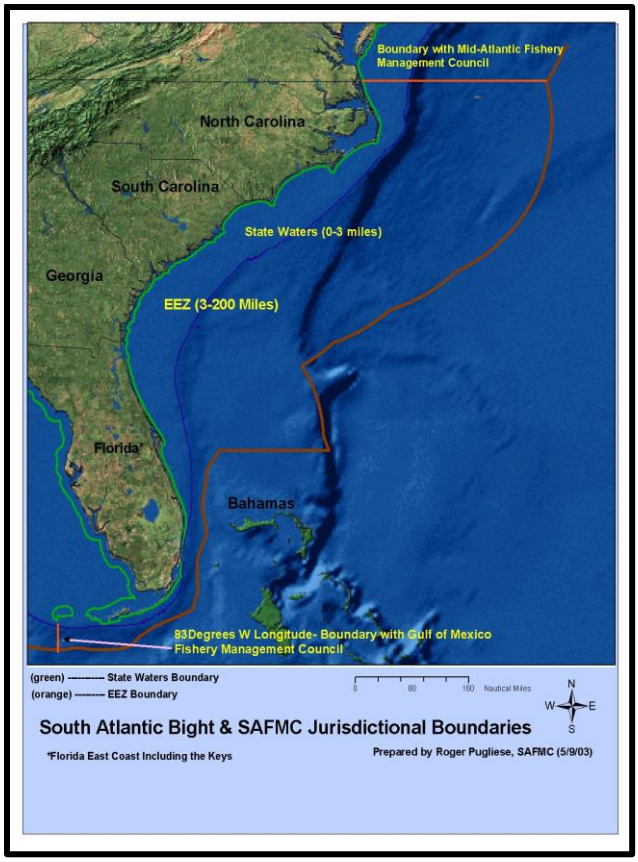

Figure 1.3.1. Jurisdictional boundaries of the South Atlantic Council.

1.4 Why are the Council and NMFS Considering Action?

Commercial and recreational fishermen have expressed concern about regulations that result in released fish that do not survive. This has been particularly true for red snapper since 2010. Observations from recent fishery-independent studies show the population of red snapper has increased (SEDAR 41 2017). As a result, fishermen are reporting an increase in the number of released red snapper. A portion of released fish will die due to foul hooking (hooking the fish in the stomach or throat), injuries caused by barotrauma (injury due to expansion of gas when reeled up from depth), and predation.

To reduce the number of released fish and improve the survivorship of released fish, the Council is considering measures that would encourage the use of best fishing practices that aim to avoid non-target species or sizes through fishing techniques and/or gear that minimizes the impact of capture. Common examples of best fishing practices include recompressing fish, reducing the number of hooks fished, using hooks that reduce or minimize gut hooking or foul-hooking, and using knotless landing nets.

Additionally, fishermen have expressed concern regarding inequitable access for the dive component of the snapper grouper fishery. Powerheads, also known as bang-sticks (any device with an explosive charge, usually attached to a spear gun, spear, pole, or stick, that fires a projectile upon contact), may not be used to harvest snapper grouper in federal waters off South Carolina but are allowed in federal waters off North Carolina, Georgia, and Florida. To allow

for more consistent regulations for the dive component of the snapper grouper fishery, the Council is considering removing the powerhead prohibition in federal waters off South Carolina or prohibiting the use of powerheads to harvest snapper grouper species throughout the South Atlantic EEZ

1.4.1 Purpose and Need

Purpose for Action

The *purpose* is to modify gear requirements for the snapper grouper fishery to promote best fishing practices and to ensure consistent regulations for the dive component of the snapper grouper fishery.

Need for Action

The *need* is to reduce discards and discard mortality of snapper grouper species and to decrease the burden of compliance with differing regulations for the dive component of the snapper grouper fishery while minimizing, to the extent practicable, adverse social and economic effects.

1.5 What is the history of management for snapper grouper species?

Snapper grouper regulations in the South Atlantic were first implemented in 1983. The reader is referred to **Appendix D** for the full management history of the species in the Snapper Grouper FMP. Actions relevant to best fishing practices are listed below.

Amendment 4 to the Snapper Grouper FMP, effective January 1, 1992, prohibited powerhead use in designated special management zones off South Carolina.

Amendment 7 to the Snapper Grouper FMP, effective January 23, 1995, prohibited the use of explosive charges, including powerheads, to harvest snapper grouper species in the EEZ off South Carolina.

Amendment 16 to the Snapper Grouper FMP (Amendment 16), effective July 29, 2009, included an action requiring the use of venting and dehooking tools for a person on board a vessel to fish for snapper grouper species in the South Atlantic EEZ. The venting tool requirement was not approved by NMFS based on information obtained during public comment that indicated the benefits of venting remained unclear and, in some cases, might increase mortality of some species, depending on capture depth. Additionally, Amendment 16 considered the mandatory use of circle hooks but was removed after the amendment was reviewed by the Council's Scientific and Statistical Committee (SSC). The SSC was concerned that there was not enough published information to quantify the effects of reducing discard mortality for various snapper grouper species, including red snapper. The SSC also expressed concern, as did some public comments, that mandatory use of circle hooks could reduce availability of some snapper grouper species such as yellowtail snapper and gray triggerfish.

Amendment 17A to the Snapper Grouper FMP, effective March 3, 2011, ultimately required the use of non-stainless-steel circle hooks when fishing for snapper grouper species with hook-and-line gear and natural bait north of 28 degrees North latitude in the South Atlantic EEZ.

Chapter 2. Proposed Actions and Alternatives

2.1 Action 1. Specify requirements for the use of descending devices* and/or venting devices** when fishing for or possessing species in the snapper grouper fishery management unit.

Alternative 1 (No Action). Descending devices and/or venting devices are not required to be onboard a vessel fishing for or possessing species in the snapper grouper fishery management unit.

Preferred Alternative 2. Within six months of implementation of Snapper Grouper Regulatory Amendment 29, require a *descending device** be on board a vessel fishing for or possessing species in the snapper grouper fishery management unit.

Preferred Sub-alternative 2a. private recreational vessels.
Preferred Sub-alternative 2b. for-hire vessels.
Preferred Sub-alternative 2c. commercially permitted South Atlantic snapper grouper vessels.

Alternative 3. Within six months of implementation of Snapper Grouper Regulatory Amendment 29, require a *venting device*** be on board a vessel fishing for or possessing species in the snapper grouper fishery management unit.

Sub-alternative 3a. private recreational vessels.
Sub-alternative 3b. for-hire vessels.
Sub-alternative 3c. commercially permitted South Atlantic snapper grouper vessels.

* For the purpose of this requirement, "descending device" means an instrument that will release fish at a depth sufficient for the fish to be able to recover from the effects of barotrauma, generally 33 feet (twice the atmospheric pressure at the surface) or greater. The device can be, but is not limited to, a weighted hook, lip clamp, or box that will hold the fish while it is lowered to depth. The device should be capable of releasing the fish automatically, releasing the fish by actions of the operator of the device, or by allowing the fish to escape on its own. Since minimizing surface time is critical to increasing survival, descending devices shall be rigged and ready for use while fishing is occurring.

** For the purpose of this requirement, "venting device" means a device capable of penetrating the abdomen of a fish in order to release the excess gas accumulated in the body cavity when a fish is retrieved from depth. A venting device must be a sharpened, hollow instrument, such as a hypodermic syringe with the plunger removed, or a 16–gauge needle fixed to a handle. A larger gauge needle is preferred in order to allow more air to escape rapidly. A device that is not hollow, such as a knife or ice pick, is not a venting device and will cause additional damage.

2.1.1 Comparison of Alternatives

A portion of released fish will die due to injuries caused by expansion of gas when reeled up from depth (barotrauma). It is the intent of the Council that descending devices and venting

devices only be used when a fish may be experiencing barotrauma (eg. caught in deep water, protruding stomach etc.) Additionally, **Preferred Alternative 2** does not preclude the use of venting devices nor does **Alternative 3** preclude the use of descending devices. Regulations pertaining to this action will be applied six months from the implantation date of this amendment. The additional six months will allow time for fishermen to purchase new devices and become comfortable with their proper use.

Studies have shown that use of descending and venting devices does relieve symptoms of barotrauma and can decrease potential discard mortality, especially when compared to treatments with no barotrauma relief. If the devices are properly used and maintained, **Preferred Alternative 2** and **Alternative 3** could provide increased survivorship and reduced mortality of discarded snapper grouper species. A recent literature review (76 publications) completed by Eberts and Somers (2017) found both descending and venting devices had positive effects on survival, but overall found no significant difference in survival rates when using a descending device versus a venting device. Alternatively, some recent studies have recommended the use of descending devices over venting devices for treating fish experiencing symptoms of barotrauma. Though faster to use, venting devices have the potential to damage vital organs and cause additional stress if not used correctly. It is possible that, under **Alternative 3**, fishermen who are not comfortable or competent venting a fish would be required to attempt the procedure, potentially injuring the fish further.

Under **Preferred Alternative 2** and **Alternative 3** some vessel owners and operators would need to purchase or construct qualifying devices and would incur direct costs in doing so. The number of private recreational vessels is unknown, since there is no permit requirement, therefore cumulative costs cannot be quantified with available data. While there is a range of costs to purchase or fabricate a descending or venting device, it is assumed that affected for-hire and commercial vessels will go with the lowest cost option to meet regulatory compliance since they represent profit-seeking businesses. As such, the assumed marginal cost per vessel is approximately $6.30 for both **Preferred Alternative 2** and **Alternative 3**.

However, if **Preferred Alternative 2** and **Alternative 3** increase survivorship of released fish, as anticipated, this may lead to improvements in affected fish stocks which may in turn yield indirect economic benefits through the availability of increased exploitable numbers of fish in the future or less stringent harvest limits such as higher trip limits and bag limits as well as longer open harvest seasons. Similarly, less stringent regulations and increased access would result in long-term social benefits for fishing communities.

Finally, **Preferred Alternative 2** and **Alternative 3** incorporate recommendations made by fishermen during development of the 2016-2020 Vision Blueprint for the Snapper Grouper Fishery. Responding to fishermen' concerns about regulations that result in released fish that do not survive could have the social benefit of improving perceptions of the management process.

2.2. Action 2. Modify the requirement for the use of non-stainless-steel circle hooks when fishing for and/or possessing snapper grouper species with hook-and-line gear.

Alternative 1 (No Action). Use of non-stainless-steel circle hooks is required when fishing for and/or possessing species in the snapper grouper fishery management unit with hook-and-line gear and natural baits north of 28 degrees north latitude.

Preferred Alternative 2. Require the use of *non-offset*, non-stainless-steel circle hooks when fishing for and/or possessing species in the snapper grouper fishery management unit with hook-and-line gear and natural baits in the exclusive economic zone:

Preferred Sub-alternative 2a. north of 28 degrees north latitude (approximately 25 miles south of Cape Canaveral, Florida).

Sub-alternative 2b. throughout the extent of the South Atlantic Council's jurisdiction (North Carolina/Virginia border through Key West, Florida).

Alternative 3. Require *non-offset*, non-stainless-steel circle hooks be *on board* a vessel possessing species in the snapper grouper fishery management unit when fishing in the exclusive economic zone:

Sub-alternative 3a. north of 28 degrees north latitude (approximately 25 miles south of Cape Canaveral, Florida).

Sub-alternative 3b. throughout the extent of the South Atlantic Council's jurisdiction (North Carolina/Virginia border through Key West, Florida).

Preferred Alternative 4. Require the use of non-stainless-steel hooks when fishing for and/or possessing species in the snapper grouper fishery management unit in the exclusive economic zone.

2.2.1 Comparison of Alternatives

A portion of released fish will die due to injuries caused by foul hooking. Action 2 would modify the requirement for the use of non-stainless-steel circle hooks when fishing for and/or possessing snapper grouper species with hook and line gear.

Studies show that use of circle hooks can reduce traumatic hooking rates (incidence of foul hooking and bleeding) of certain species of snapper grouper (e.g. red snapper, red grouper), when compared to J hooks. However, the impact of hook type appears to be species specific and can vary between studies. The top co-occurring species for the snapper grouper hook-and-line component are red snapper, black sea bass, red grouper, gag, scamp, greater amberjack, vermilion snapper, and gray triggerfish. These species, excluding gray triggerfish, have similar mouth morphology. Hooking mortality on these species could be reduced under **Alternative 1 (No Action)**, **Preferred Alternative 2**, and **Alternative 3**. Not all species in the snapper grouper complex have the same mouth morphology and it is possible that circle hooks could negatively impact survival.

Studies suggest that, relative to non-offset circle hooks, offset circle hooks may reduce fishing efficiency and can counteract the conservation benefits commonly associated with circle hooks (e.g. lower mortality). **Preferred Alternative 2** could reduce discard mortality for snapper grouper species and result in benefits to the biological environment. **Preferred Alternative 2** would result in direct costs for participants involved in the snapper grouper fishery that do not already own non-offset circle hooks. If the Council chooses to set standards for the type of circle hook that must be used under **Preferred Alternatives 2**, some fishermen will agree that it is in the interest of saving the species while others may object to the loss of personal choice in the selection of hook types, especially if they feel they will experience a reduction in catch rates.

If fishermen decide to utilize non-offset, non-stainless-steel, circle hooks, **Alternative 3** could provide biological benefits to species in the snapper grouper complex. However, use would be voluntary and would ultimately depend on fisherman preference, thus it is difficult to gauge the potential effects to the biological environment. **Alternative 3** would result in direct costs for participants involved in the snapper grouper fishery that do not already own non-offset, non-stainless-steel, circle hooks. Additionally, non-offset, non-stainless-steel, circle hooks also may reduce the catchability of some species in comparison to J hooks, treble hooks, or offset circle hooks, which would negatively affect catch efficiency. Alternatively, **Alternative 3** may result in direct cost reductions, as multiple circle hook types and sizes would not be necessary to satisfy the circle hook requirement. Additionally, J hooks or treble hooks could be used to harvest snapper grouper species, which may increase the catchability of some species in comparison to circle hooks, which would positively affect catch efficiency. On the other hand, **Alternative 3** may decrease survivorship of fish that are discarded and may lead to some deterioration in affected fish stocks which may in turn yield indirect negative economic effects. Lastly, requiring possession of non-offset circle hooks on board without requiring usage may be perceived as ineffective or as unnecessary government regulation.

Hooks made of non-stainless-steel should degrade faster in the marine environment then stainless-steel. Under **Preferred Alternative 4**, fish that are gut hooked could theoretically have a greater chance of survival if the hook is made of non-stainless-steel. **Preferred Alternative 4** would result in direct costs for participants involved in the snapper grouper fishery that fish south of the 28 degrees north latitude and do not already own non-stainless-steel hooks. The potential long-term economic effects would be dependent upon the net biological effect that occurred due to requiring the use of non-stainless-steel hooks. Requiring non-stainless-steel hooks may contribute to the sustainable harvest of snapper grouper stocks and provide for long-term social benefits.

2.3 Action 3. Adjust powerhead prohibitions in the South Atlantic Region.

Alternative 1 (No Action). A powerhead may not be used in the exclusive economic zone off South Carolina to harvest South Atlantic snapper grouper. The possession of a mutilated South Atlantic snapper grouper species in or from the exclusive economic zone off South Carolina, and a powerhead is prima facie evidence that such fish was harvested by a powerhead.

Preferred Alternative 2. Allow the use of a powerhead for harvest of species in the South Atlantic snapper grouper fishery management unit in the exclusive economic zone off South Carolina.

Preferred Sub-alternative 2a. private recreational and for-hire vessels.

Preferred Sub-alternative 2b. commercially permitted South Atlantic snapper grouper vessels.

Alternative 3. Prohibit the use of a powerhead for harvest of species in the South Atlantic snapper grouper fishery management unit in the exclusive economic zone of the South Atlantic Region.

Sub-alternative 3a. private recreational and for-hire vessels.

Sub-alternative 3b. commercially permitted South Atlantic snapper grouper vessels.

2.3.1 Comparison of Alternatives

The use of powerheads to harvest species in the South Atlantic snapper grouper fishery management unit is currently prohibited in federal waters off South Carolina and allowed in federal waters off North Carolina, Georgia and Florida. Dive fishermen have expressed frustration with inconsistent regulations. **Preferred Alternative 2** and **Alternative 3** would create consistency in regulations throughout federal waters and would be expected to reduce confusion among commercial and recreational dive fishermen and aid in compliance and enforcement efforts resulting in positive economic and social effects. Allowing the use of powerheads off South Carolina (**Preferred Alternative 2**) would not remove prohibitions on powerhead use in special management zones found at 50 CFR §622.182(a)(2).

Preferred Alternative 2 would increase the potential for localized depletion of snapper grouper on reefs off South Carolina by the recreational sector (**Preferred Sub-alternative 2a**) and/or the commercial sector (**Preferred Sub-alternative 2b**). The greatest impact would be on larger species that aggregate around artificial and natural reefs at certain times of the year. **Preferred Alternative 2** may lead to increased harvest or additional harvest of larger specimens which would be a direct benefit for users of powerhead gear but could lead to long-term costs overall due to decreased reproductive capacity or increased costs for other user groups and/or sectors. However, **Preferred Alternative 2** would allow additional opportunities to harvest snapper grouper species in some circumstances, which may lead to increased revenue. Associated positive or negative effects related to fish abundance and availability would be experienced by private recreational, commercial, and for-hire fishermen participating in the snapper grouper fishery regardless of gear type utilized which would increase conflict between

fishermen participating in the dive component of the snapper grouper fishery and other snapper grouper user groups.

Alternative 3 would remove a highly effective gear type and a source of fishing mortality for the recreational sector (**Sub-alternative 3a**) and/or commercial sector (**Sub-alternative 3b**). Preventing a cause of localized depletion could provide long-term biological benefits to snapper grouper species targeted by powerheads in the form of higher biomass and increased reproductive potential. **Alternative 3** may lead to decreased harvest of larger specimens which would be a direct cost to users of powerhead gear but could lead to long-term benefits overall due to increased reproductive capacity or decreased costs for other user groups and/or sectors. **Alternative 3** would also remove some opportunities to harvest snapper grouper species in some circumstances, which may lead to decreased revenue. **Alternative 3** would result in negative short-term social effects to fishing communities that participate in the dive component of the snapper grouper fishery and utilize powerheads. Fishermen would need to adjust their businesses and/or fishing practices in order to compensate for the decrease in access. Alternatively, prohibiting powerheads may prevent localized depletion resulting in long-term social benefits to fishing communities.

Chapter 3. Affected Environment

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

- **Habitat environment** (Section 3.1)
- **Biological environment** (Section 3.2)
- **Economic environment** (Section 3.3)
- **Social environment** (Section 3.4)
- **Administrative environment** (Section 3.5)

3.1 Habitat Environment

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), however the exact extent and distribution of productive snapper grouper habitat in South Atlantic continental shelf habitats is unknown. Juvenile stages of some snapper grouper species also utilize inshore seagrass beds, mangrove estuaries, lagoons, oyster reefs, and embayment systems. For many species, various combinations of these habitats may be utilized during daytime feeding migrations or seasonal shifts in cross-shelf distributions.

The distribution of coral and live hard bottom habitat as presented in the Southeast Marine Assessment and Prediction Program bottom mapping project is a proxy for the distribution of the species within the snapper grouper complex. Maps are available on the South Atlantic Fishery Management Council's (Council) Habitat and Ecosystem Atlas.[1] Also, 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.

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

Additional information on the habitat utilized by species in the Snapper Grouper Fishery Management Unit (FMU) is included in Volume II of the Fishery Ecosystem Plan[2] (FEP; SAFMC 2009) and Vision Blueprint Regulatory Amendments 26 and 27 (SAFMC, under development) and incorporated here by reference.

3.1.1 Essential Fish Habitat / Habitat Areas of Particular Concern

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. 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.

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 ; and deep-water Marine Protected Areas. Areas that meet the criteria for EFH-HAPC include habitats required during each life stage (including egg, larval, post larval, juvenile, and adult stages).

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

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

3.2 Biological and Ecological Environment

The reef environment in the South Atlantic management area affected by actions in this environmental assessment is home to affected fish populations (snapper grouper) and protected species (e.g., sea turtles, marine mammals, corals, and fish). Each component will be described in detail in the following sections.

3.2.1 Fish Populations Affected by this Amendment

The waters off the South Atlantic coast are home to a diverse population of fish. The snapper grouper FMU 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. 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.

Life History

Life history information for snapper grouper species affected by this amendment may be found in the South Atlantic EcoSpecies Database[3] and Vision Blueprint Regulatory Amendments 26 and 27 (SAFMC, under development) and is hereby incorporated by reference. In addition, timing of spawning for snapper grouper species in the South Atlantic region that are likely to be affected by these actions is summarized in **Table 3.2.1.1**. Additional details on the life histories and ecology of snapper grouper species can also be found in Volume II of the Fishery Ecosystem Plan (SAFMC 2009).[4]

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

Table 3.2.1.1. Timing of spawning (gray shading) and peak spawning (black shading) for exploited Atlantic Ocean reef fish stocks off the southeastern United States. Months in bold denote core SERFS core fishery-independent sampling months.

Stock	Jan	Feb	Mar	Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	Oct	Nov	Dec	Citation
Gray triggerfish													[10]
Greater amberjack													[7]
White grunt													[14, 17]
Cubera Snapper													WDH, pers. comm.
Red snapper													[17, 18]
Vermilion snapper													[2, 17]
Blueline tilefish													[6]
Tilefish													[4, 17]
Black sea bass													[15, 17]
Gag													[13, 17]
Red grouper													[1]
Scamp (NC)													[12]
Scamp (FL)													[5]
Scamp (29.95–32.95 °N)													[8, 17]
Snowy grouper													[16, 19]
Speckled hind													[20]
Warsaw Grouper													[11, 17]
Red porgy													[3, 17]

doi:10.1371/journal.pone.0172968.t006

Source: Farmer et al. 2017 and references therein.

Landings

Landings information is presented in **Section 3.3**.

Stock Status

All 55 species in the snapper grouper FMU could be directly affected by the proposed actions. For assessed snapper grouper species, additional life history and stock status information may be found in their respective Southeast Data, Assessment, and Review (SEDAR) reports, which are available on the SEDAR Web site http://www.sefsc.noaa.gov/sedar/.

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. Snapper grouper species are caught as bycatch, depending on the target species. The top co-occurring species targeted by fishermen are red snapper, black sea bass, red grouper, gag, scamp, greater amberjack, vermilion snapper, and gray triggerfish. The actions in this amendment are not expected to result in significant changes in quantity of snapper grouper bycatch, however, the actions may reduce bycatch mortality of affected species. The Council, NMFS, and the NMFS Southeast Fisheries Science Center (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. Additional information on bycatch of species in the snapper grouper FMU is included in **Chapter 4** and the Bycatch Practicability Analyses in Vision Blueprint Regulatory Amendments 26 and 27 (SAFMC, under development) and incorporated here by reference.

3.2.2 Protected Species

NMFS manages marine protected species in the Southeast region under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). There are 29 ESA-listed species or Distinct Population Segments (DPSs) of marine mammals, sea turtles, fish, and corals managed by NMFS that may occur in the EEZ of the South Atlantic or Gulf of Mexico. There are 91 stocks of marine mammals managed within the Southeast region plus the addition of the stocks such as North Atlantic right whales (NARWs), and humpback, sei, fin, minke, and blue whales that regularly or sometimes occur in Southeast region managed waters for a portion of the year (Hayes et al. 2017). All marine mammals in U.S. waters are protected under the MMPA. The MMPA requires that each commercial fishery be classified by the number of marine mammals they seriously injure or kill. NMFS's List of Fisheries (LOF) classifies U.S. commercial fisheries into three categories based on the number of incidental mortality or serious injury they cause to marine mammals. More information about the LOF and the classification process can be found at: https://www.fisheries.noaa.gov/action/final-list-fisheries-2018

Five of the marine mammal species (sperm, sei, fin, blue, and NARW) protected by the MMPA, are also listed as endangered under the ESA. In addition to those five marine mammals, six species or DPSs of sea turtles (green (the North Atlantic DPS and the South Atlantic DPS), hawksbill, Kemp's ridley, leatherback, and the Northwest Atlantic DPS of loggerhead); nine species or DPSs of fish (the smalltooth sawfish; five DPSs of Atlantic sturgeon; Nassau grouper; oceanic whitetip shark, and giant manta ray); and seven species of coral (elkhorn coral, staghorn coral, rough cactus coral, pillar coral, lobed star coral, mountainous star coral, and boulder coral) 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 Northwest Atlantic DPS of loggerhead sea turtles, and *Acropora* corals occur within the Council's jurisdiction.

NMFS has conducted specific analyses (Section 7 consultations) to evaluate the potential effects from the South Atlantic snapper grouper fishery on species and critical habitat protected under the ESA. On December 1, 2016, NMFS completed its most recent biological opinion (2016 Opinion) on the snapper grouper fishery of the South Atlantic Region (NMFS 2016). In the 2016 Opinion, NMFS concluded that the snapper grouper 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.

Since publication of the 2016 Opinion, NMFS has published two additional final listing rules. On January 22, 2018, NMFS listed the giant manta ray (*Manta birostris*) as threatened under the ESA, effective February 21, 2018. On January 30, 2018, NMFS listed the oceanic whitetip shark (*Carcharinus longimanus*) as threatened under the ESA, effective March 1, 2018. Giant manta rays and oceanic whitetip sharks are found in the South Atlantic and may be affected by the subject fishery via incidental capture in snapper grouper fishing gear. In a June 11, 2018, memo NMFS documented ESA Section 7(a)(2) and Section 7(d) determinations for

allowing the continued authorization of fishing managed by the Snapper Grouper FMP, during reinitiation of ESA consultation on this fishery, for its effects on the giant manta ray and the oceanic whitetip shark. Based on the analysis, NMFS determined that allowing the proposed action to continue during the reinitiation period will not violate Section 7(a)(2) or 7(d). This Section 7(a)(2) determination is only applicable to the proposed action during the reinitiation period and does not address the agency's long-term obligation to ensure its actions are not likely to jeopardize the continued existence of any listed species or destroy or adversely modify critical habitat.

For summary information on the species that may be adversely affected by the snapper grouper fishery and how they are affected refer to Section 3.2.5 in Vision Blueprint Regulatory Amendment 27 (https://www.fisheries.noaa.gov/action/regulatory-amendment-27-vision-blueprint-commercial-measures). The 2016 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.

3.3 Economic Environment

3.3.1 Economic Description of the Commercial Sector

Economic information pertaining to the commercial snapper grouper fishery is provided in Buck (2018) and Overstreet et al. (2018) and is incorporated herein by reference. Select updates to this information are provided below. The major sources of data summarized in this section are the NMFS Southeast Regional Office (SERO) Permits Information Management System (PIMS) and the SEFSC's Socioeconomic Panel[5] data set. Inflation adjusted values are reported in 2017 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 December 20, 2018, there were 535 valid or renewable South Atlantic Snapper Grouper unlimited permits and 108 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.

Landings, Value, and Effort

The number of federally permitted commercial vessels that landed South Atlantic snapper grouper species increased from 2013 through 2015 and then decreased to a 5-year low in 2017 (**Table 3.3.1.1**). Landings of snapper grouper species fluctuated during this time. On average (2013 through 2017), vessels that landed snapper grouper species did so on approximately 71% of their South Atlantic trips and snapper grouper species accounted for 68% of their annual all species revenue, including revenue from Gulf of Mexico trips (**Table 3.3.1.1** and **Table 3.3.1.2**). Average all species vessel-level revenue for these vessels fluctuated from 2013 through 2017 (**Table 3.3.1.2**). During this time period, the average annual price per pound of snapper grouper

[5] This data set is compiled by the SEFSC Social Science Research Group from Federal Logbook System data, supplemented by average prices calculated from the Accumulated Landings System. Because these landings are self-reported, they may diverge slightly from dealer-reported landings presented elsewhere.

species ranged from $3.13 to $3.44 (2017 dollars). Although not shown in the tables, on average (2013 through 2017), 76 vessels reported landings of snapper grouper species on trips that primarily used dive gear, including powerheads. In addition, approximately 5% of total snapper grouper species landings and ex-vessel revenue, on average (2013 through 2017), were from trips that primarily used dive gear.

Table 3.3.1.1. Number of vessels, number of trips, and landings (lbs gw) by year for South Atlantic snapper grouper species.

Year	# of vessels that caught snapper grouper species (> 0 lbs gw)	# of trips that caught snapper grouper species	snapper grouper species landings (lbs gw)	Other species' landings jointly caught w/ snapper grouper species (lbs gw)	# of South Atlantic trips that only caught other species	Other species' landings on South Atlantic trips w/o snapper grouper species (lbs gw)	All species landings on Gulf trips (lbs gw)
2013	576	10,226	5,500,725	532,669	4,337	1,841,767	923,495
2014	577	12,024	5,624,271	645,576	5,190	2,670,471	1,245,200
2015	580	11,029	5,332,296	505,083	4,484	2,085,362	1,012,701
2016	563	11,507	5,175,852	602,715	4,747	2,230,645	793,431
2017	545	11,246	5,212,159	732,363	4,658	2,095,915	882,923
Average	568	11,206	5,369,061	603,681	4,683	2,184,832	971,550

Source: SEFSC Socioeconomic Panel (Version 7) accessed by the SEFSC Economic Query System (January 2019).
Note: South Atlantic trips refer to trips taken in South Atlantic Council jurisdictional waters and Gulf trips refer to trips taken in Gulf of Mexico Council jurisdictional waters.

Table 3.1.1.2. Number of vessels and ex-vessel revenue by year (2017 dollars) for South Atlantic snapper grouper species.

Year	# of vessels that caught snapper grouper species (> 0 lbs gw)	Dockside revenue from snapper grouper species	Dockside revenue from 'other species' jointly caught w/ snapper grouper species	Dockside revenue from 'other species' caught on South Atlantic trips w/o snapper grouper species	Dockside revenue from 'all species' caught on Gulf trips	Total dockside revenue	Average total dockside revenue per vessel
2013	576	$17,217,942	$1,809,944	$3,452,530	$2,960,777	$25,441,193	$44,169
2014	577	$18,307,792	$2,267,861	$4,131,554	$3,973,477	$28,680,684	$49,707
2015	580	$17,964,032	$1,516,331	$3,297,663	$3,032,317	$25,810,343	$44,501
2016	563	$17,791,494	$1,692,765	$3,561,278	$2,237,209	$25,282,746	$44,907
2017	545	$17,012,736	$1,788,804	$3,566,427	$2,400,678	$24,768,645	$45,447
Average	568	$17,658,799	$1,815,141	$3,601,890	$2,920,892	$25,996,722	$45,746

Source: SEFSC Socioeconomic Panel (Version 7) accessed by the SEFSC Economic Query System (January 2019).
Note: South Atlantic trips refer to trips taken in South Atlantic Council jurisdictional waters and Gulf trips refer to trips taken in Gulf of Mexico Council jurisdictional waters.

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 and grouper species, imports affect the returns to fishermen through the ex-vessel prices they receive for their landings. As substitutes to domestic production of snappers and groupers, 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 the domestic harvest of snapper and grouper species.

Imports[6] of fresh snapper increased steadily from 23.2 million lbs product weight (pw) in 2013 to 31.2 million lbs pw in 2017. During this time, total revenue from fresh snapper imports ranged from $72 million (2017 dollars[7]) to $92 million. Imports of fresh snappers primarily originated in Mexico or Central America and entered the U.S. through the port of Miami, Florida. Imports of fresh snapper were highest on average (2013 through 2017) during the

[6] 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.
[7] Converted to 2017 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

months of March through July. Imports of frozen snapper ranged from 9.3 million lbs pw to 14.4 million lbs pw during 2013 through 2017. The annual value of these imports ranged from $25 million (2017 dollars) to $39 million, 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, Florida, New York, New York, and San Juan, Puerto Rico. Imports of frozen snappers tended to be lowest during March through May when fresh snapper imports were high.

Imports of fresh grouper decreased from 10 million lbs pw in 2013 to 8.6 million lbs pw in 2014, then rose steadily to 12.3 million lbs pw in 2017. Total revenue from fresh grouper imports ranged from $37 million (2017 dollars) to $50.7 million during this time period. Imports of fresh grouper primarily originated in Mexico or Central America and entered the U.S. through the ports of Miami and Tampa, Florida. On average (2013 through 2017), monthly imports of fresh grouper were mostly stable with a peak in July. Imports of frozen grouper ranged from 0.8 million lbs pw to 1.8 million lbs pw during 2013 through 2017. The annual value of these imports ranged from $1.5 million (2017 dollars) to $3.8 million, with a peak in 2014. Imports of frozen grouper primarily originated in Mexico and India. The majority of frozen grouper imports entered the U.S. through the ports of Miami and Tampa, Florida. On average (2013 through 2017), monthly imports of frozen groupers were mostly stable with a peak in January.

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 seafood 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 spend their money on substitute goods, such as other finfish or seafood products, and services, such as visits to different food service establishments. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic effects may be distributed through regional markets and should not be interpreted to represent the impacts if these species are not available for harvest or purchase.

Estimates of the U.S. average annual business activity associated with the commercial harvest of snapper grouper species in the South Atlantic were derived using the model developed for and applied in NMFS (2017) and are provided in **Table 3.3.1.3**.[8] This business activity is characterized as jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), output impacts (gross business sales), and value-added impacts, which represent the contribution made to the U.S. Gross Domestic Product (GDP). These impacts should not be added together because this would result in double counting. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species. Separate models to address individual species are not available.

Table 3.1.1.3. Average annual business activity (2013 through 2017) associated with the commercial harvest of snapper grouper species in the South Atlantic. All monetary estimates are in 2017 dollars.*

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

Species	Average Ex-vessel Value ($ thousands)	Total Jobs	Harvester Jobs	Output (Sales) Impacts ($ thousands)	Income Impacts ($ thousands)	Value Added ($ thousands)
Snappers and Groupers	$17,999	2,361	560	$178,489	$65,548	$92,611

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

3.3.2 Economic Description of the Recreational Sector

The recreational fishing sector of the South Atlantic 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 party boats). 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 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.

Estimates of snapper grouper target and catch effort[9] are provided in **Table 3.3.2.1** and **Table 3.3.2.2**, respectively. It is important to note that in 2018, MRIP transitioned from the old Coastal Household Telephone Survey (CHTS) to a new mail-based fishing effort survey (FES). The estimates presented in **Table 3.3.2.1** and **Table 3.3.2.2** are based on the CHTS and have not been calibrated to the FES; however, it is expected that such calibration would result in greater estimates. The majority of snapper grouper target and catch trips in the South Atlantic, as estimated by MRIP, were recorded in Florida and the private/rental mode was the predominant mode of fishing on these trips (**Table 3.3.2.1** and **Table 3.3.2.2**). The number of target trips for snapper grouper species steadily increased in North Carolina from 2013 through 2017 but

[9] These estimates include all trips that targeted or caught one or more of the species managed under the South Atlantic Snapper Grouper FMP.

fluctuated elsewhere during this time period (**Table 3.3.2.1**). Although not shown in the tables, on average (2013-2017), approximately 9% of estimated snapper grouper target trips and 2% of estimated snapper grouper catch trips involved spearfishing. There were no estimated snapper grouper species target or catch trips that used spear gear in South Carolina from 2013 through 2017.

Table 3.3.2.1. South Atlantic recreational snapper grouper target trips, by mode and state, 2013-2017.*

	FL	GA	NC	SC	Total
	Shore Mode				
2013	48,170	0	964	0	49,134
2014	49,279	0	2,124	0	51,403
2015	55,306	580	718	271	56,875
2016	110,476	319	5,424	0	116,219
2017	57,847	726	3,126	78	61,777
Average	64,216	325	2,471	70	67,082
	Charter Mode				
2013	5,302	262	2,840	0	8,404
2014	7,011	989	2,167	4,833	15,000
2015	11,376	0	1,717	3,880	16,973
2016	6,647	756	1,480	1,602	10,485
2017	5,330	1,649	1,398	8,574	16,951
Average	7,133	731	1,920	3,778	13,563
	Private/Rental Mode				
2013	171,309	14,344	9,663	10,227	205,543
2014	209,779	12,781	14,561	24,715	261,836
2015	174,653	2,044	16,627	8,802	202,126
2016	181,394	705	15,057	10,285	207,441
2017	195,063	2,523	22,165	9,914	229,665
Average	186,440	6,479	15,615	12,789	221,322
	All Modes				
2013	224,781	14,605	13,466	10,227	263,079
2014	266,069	13,770	18,852	29,548	328,239
2015	241,335	2,624	19,062	12,953	275,974
2016	298,517	1,780	21,961	11,887	334,145
2017	258,241	4,898	26,689	18,566	308,394
Average	257,789	7,535	20,006	16,636	301,966

Source: MRIP database, SERO, NMFS.

* Headboat data are unavailable.

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

Table 3.3.2.2. South Atlantic recreational snapper grouper catch trips, by mode and state, 2013-2017.

	FL	GA	NC	SC	Total
	Shore Mode				
2013	271,608	13,349	51,762	13,468	350,187
2014	314,778	31,582	55,933	34,707	437,000
2015	287,342	22,188	47,240	39,450	396,220
2016	414,308	11,084	78,075	37,392	540,859
2017	501,377	12,134	80,672	18,072	612,255
Average	357,883	18,067	62,736	28,618	467,304
	Charter Mode				
2013	63,206	3,544	11,314	2,761	80,825
2014	74,007	5,195	17,056	34,173	130,431
2015	108,508	5,285	16,811	34,083	164,687
2016	92,900	3,548	18,074	17,057	131,579
2017	95,420	3,943	17,104	41,520	157,987
Average	86,808	4,303	16,072	25,919	133,102
	Private/Rental Mode				
2013	1,009,108	48,385	245,049	60,146	1,362,688
2014	1,263,643	28,633	196,663	128,598	1,617,537
2015	1,014,496	26,251	246,634	117,281	1,404,662
2016	1,113,273	18,640	261,591	95,026	1,488,530
2017	1,024,088	30,313	260,454	123,813	1,438,668
Average	1,084,922	30,444	242,078	104,973	1,462,417
	All Modes				
2013	1,343,922	65,278	308,126	76,375	1,793,702
2014	1,652,428	65,410	269,652	197,478	2,184,968
2015	1,410,346	53,724	310,685	190,814	1,965,568
2016	1,620,482	33,272	357,740	149,476	2,160,969
2017	1,620,885	46,390	358,231	183,405	2,208,911
Average	1,529,613	52,815	320,887	159,510	2,062,824

Source: MRIP database, SERO, NMFS.
* Headboat data are unavailable.
Note: These estimates are based on the MRIP CHTS. Directed effort estimates that are calibrated to the new MRIP mail-based FES may be greater than what are presented here.

Similar analysis of recreational angler trips 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.[10] Headboat effort in the South Atlantic, in terms of angler days, increased substantially in Florida

[10] 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.

through Georgia from 2013 through 2014, leveled off through 2016, and then dropped sharply in 2017. In North Carolina and South Carolina, there were modest fluctuations in headboat effort during this time period (**Table 3.3.2.3**). Headboat effort was the highest, on average, during the summer months of June through August (**Table 3.3.2.4**).

Table 3.3.2.3. South Atlantic headboat angler days and percent distribution by state (2013-2017).

	Angler Days			Percent Distribution		
	FL/GA*	**NC**	**SC**	**FL/GA**	**NC**	**SC**
2013	165,679	20547	40,963	72.93%	9.04%	18.03%
2014	195,890	22691	42,025	75.17%	8.71%	16.13%
2015	194,979	22716	39,702	75.75%	8.83%	15.42%
2016	196,660	21565	42,207	75.51%	8.28%	16.21%
2017	126,126	20170	36,914	68.84%	11.01%	20.15%
Average	175,867	21,538	40,362	74%	9%	17%

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

Table 3.3.2.4. South Atlantic headboat angler days and percent distribution by month (2013-2017).

	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
	Headboat Angler Days											
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
2017	7,693	10,066	13,382	17,448	19,377	27,050	33,356	21,037	6,684	8,928	8,929	9,260
Avg	9,820	11,572	18,689	20,698	23,731	34,721	41,037	29,550	14,186	12,255	9,432	12,075
	Percent Distribution											
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%
2017	4%	5%	7%	10%	11%	15%	18%	11%	4%	5%	5%	5%
Avg	4%	5%	8%	9%	10%	15%	17%	12%	6%	5%	4%	5%

Source: NMFS Southeast Region Headboat Survey (SRHS).

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 December 20, 2018, there were 1,747 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.

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 June 11, 2018, 64 South Atlantic headboats were registered in the SRHS (K. Fitzpatrick, NMFS SEFSC, pers. comm.). The majority of these headboats were located in Florida/Georgia (39), followed by North Carolina (14) 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.

Direct estimates of the CS for every species potentially affected by this action are not currently available. There are, however, estimates for snapper and grouper species in general. Haab et al. (2012) estimated the CS (willingness to pay (WTP) for one additional fish caught and kept) for snappers and groupers in the Southeastern U.S. using four separate econometric modeling techniques. The finite mixture model, which takes into account variation in the preferences of fishermen, had the best prediction rates of the four models and, as such, was selected for presentation here. The WTP for an additional snapper (excluding red snapper) estimated by this model was $12.47 (2017 dollars).[11] This value may seem low and may be strongly influenced by the pooling effect inherent to the model in which it was estimated. The WTP for an additional red snapper, in comparison, was estimated to be $141.28 (2017 dollars). The WTP for an additional grouper was estimated to be $135.74 (2017 dollars). Another study estimated the value of the consumer surplus for catching and keeping a second grouper on an angler trip at approximately $105 (2017 dollars) and lower thereafter (approximately $70 for a third grouper, $52 for a fourth grouper, and $41 for a fifth grouper) (Carter and Liese 2012). Additionally, this study estimated the value of harvesting a second red snapper at approximately $82 (2017 dollars) and lower thereafter. No estimates were provided for other snapper species.

[11] Converted to 2017 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis (BEA).

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. For the South Atlantic region, estimated NOR values are $168 (2017 dollars) per charter angler trip and $45 per headboat angler trip (C. Liese, NMFS SEFSC, pers. comm.). Holland et al. (2012) estimated average annual gross revenue for charter vessels and headboats operating in the South Atlantic at $120,297 and $212,680 (2017 dollars), respectively. Estimates of average annual producer surplus or profits 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 snapper grouper species 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 2017 dollars using 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 impacts (gross business sales), and value-added impacts (contribution to the GDP in a state or region). Estimates of the average annual economic impacts (2013-2017) resulting from South Atlantic recreational snapper grouper target trips are provided in **Table 3.3.2.5**. 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 snapper grouper catch trips. To calculate the multipliers from **Table 3.3.2.5**, simply divide the desired impact measure (sales impact, value-added impact, income impact or employment) associated with a given state and mode by the number of target trips for that state and mode.

The estimates provided in **Table 3.3.2.5** only apply at the state-level. Addition of the state-level estimates to produce a regional (or national) total may underestimate the actual amount of total business activity, because state-level impact multipliers do not account for interstate and

interregional trading. It is also important to note, that these economic impacts estimates are based on trip expenditures only and do not account for durable expenditures. Durable expenditures cannot be reasonably apportioned to individual species or species groups. As such, the estimates provided in **Table 3.3.2.5** may be considered a lower bound on the economic activity associated with those trips that targeted snapper grouper species.

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 3.3.2.5. Estimated annual average economic impacts (2013-2017) from South Atlantic recreational snapper grouper target trips, by state and mode, using state-level multipliers. All monetary estimates are in 2017 dollars (in thousands).

	NC	SC	GA	FL
	Charter Mode			
Target Trips	1,920	3,778	731	7,133
Value Added Impacts	$677	$1,560	$186	$2,946
Sales Impacts	$1,266	$2,882	$340	$5,326
Income Impacts	$460	$1,015	$127	$1,894
Employment (Jobs)	10	26	3	41
	Private/Rental Mode			
Target Trips	15,615	12,789	6,479	186,440
Value Added Impacts	$585	$264	$132	$3,926
Sales Impacts	$1,039	$479	$230	$6,680
Income Impacts	$365	$158	$79	$2,257
Employment (Jobs)	10	5	2	60
	Shore			
Target Trips	2,471	70	325	64,216
Value Added Impacts	$158	$4	$8	$1,148
Sales Impacts	$275	$7	$15	$1,893
Income Impacts	$97	$2	$5	$652
Employment (Jobs)	3	0	0	18
	All Modes			
Target Trips	20,006	16,636	7,536	257,788
Value Added Impacts	$1,420	$1,828	$327	$8,020
Sales Impacts	$2,580	$3,369	$585	$13,899
Income Impacts	$922	$1,176	$211	$4,803
Employment (Jobs)	24	32	5	118

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.

3.4 Social Environment

This regulatory amendment affects the commercial and recreational management of the snapper grouper fishery in the South Atlantic. This section provides the background for the proposed actions, which are evaluated in **Chapter 4**.

Commercial and recreational permits by state are included to provide information on the geographic distribution of fishing involvement. A description of the commercial dive gear and recreational spearfishing is included in order to provide information on the use of powerheads. Descriptions of the top-ranking communities by the number of commercial snapper grouper permits are included, along with descriptions of the top communities involved in commercial snapper grouper, descriptions of the top-ranking communities by the number of for-hire permits, and descriptions of 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.

3.4.1 Permits by State

Commercial

As described in Section 3.3.1, as of December 20, 2018, there were 535 South Atlantic commercial snapper grouper unlimited permits. In the period 2013 through 2017, the number of snapper grouper unlimited permits decreased over time (Table 3.4.1.1). The majority of snapper grouper unlimited permits are issued to individuals in Florida (average of 69.6%), followed by North Carolina (19.2%), South Carolina (8.9%), and Georgia (1.2%). Residents of other states (Louisiana, Massachusetts, New Jersey, New York, Texas, and Virginia) also hold snapper grouper unlimited permits, but these states represent a small percentage of the issued permits.

Table 3.4.1.1. Number of South Atlantic commercial snapper grouper unlimited permits, by state, 2013-2017.

State	2013	2014	2015	2016	2017	Average
Florida	416	409	399	391	379	399
Georgia	6	6	7	8	7	7
North Carolina	112	112	108	107	112	110
South Carolina	50	51	50	51	52	51
Other	8	6	7	8	4	7
Total	592	584	571	565	554	573

Source: NMFS, SERO Permits Dataset, 2019.

As described in Section 3.3.1, as of December 20, 2018, there were 108 South Atlantic commercial snapper grouper 225-lb trip-limited permits. In the period 2013 through 2017, the number of snapper grouper 225-lb trip-limited permits decreased over time (**Table 3.4.1.2**). The majority of snapper grouper 225-lb trip-limited permits are issued to individuals in Florida (average of 89.9%), followed by North Carolina (7.1%), and South Carolina (1.3%). Residents

of other states (New Jersey and Virginia) also hold snapper grouper 225-lb trip-limited permits, but these states represent a small percentage of the issued permits.

Table 3.4.1.2. Number of South Atlantic commercial snapper grouper 225-lb trip-limited permits, by state, 2013-2017.

State	2013	2014	2015	2016	2017	Average
Florida	117	113	109	105	100	109
Georgia	0	0	0	0	0	0
North Carolina	8	8	8	8	11	9
South Carolina	2	2	2	1	1	2
Other	2	2	2	2	2	2
Total	129	125	121	116	114	121

Source: NMFS, SERO Permits Dataset, 2019.

Recreational

As of January 28, 2019, there were 1654 South Atlantic for-hire snapper grouper permits. In the period 2013 through 2017, the number of for-hire snapper grouper permits increased over time (**Table 3.4.1.3**). The majority of for-hire snapper grouper permits are issued to individuals in Florida (average of 60.4%), followed by North Carolina (17.5%), South Carolina (10.1%), and Georgia (2.4%). Residents of other Gulf states (Alabama, Mississippi, Louisiana, and Texas) also hold a sizable amount of for-hire snapper grouper permits (4.1%). Residents of other states and territories (California, Delaware, Idaho, Indiana, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Puerto Rico, Rhode Island, Tennessee, and Virginia) also hold for-hire snapper grouper permits.

Table 3.4.1.3. Number of South Atlantic for-hire snapper grouper permits, by state, 2013-2017.

State	2013	2014	2015	2016	2017	Average
Florida	1120	1062	1071	1100	1179	1106
Georgia	30	34	45	53	62	45
North Carolina	308	294	308	331	362	321
South Carolina	150	160	188	212	215	185
Gulf (AL, MS, LA, TX)	91	81	73	69	63	75
Other	100	96	94	102	101	99
Total	1799	1727	1779	1867	1982	1831

Source: NMFS, SERO Permits Dataset, 2019.

3.4.2 Gear

Descriptions of commercial dive gear and recreational spearfishing are included in order to provide information, which can be used as a proxy for the use of powerheads. However, commercial dive gear and recreational spearfishing contain forms of gear other than powerheads and do not necessarily include powerheads.

Commercial

Figure 3.4.2.1 shows the proportion of total commercial landings by gear as reported on trips for the South Atlantic from 2013 to 2017. As described in Section 3.3.1, on average, 76 vessels reported landings of snapper grouper species on trips that used dive gear and approximately 5% of landings were from trips that primarily used dive gear. Within the category of dive gear, dive trips with explosive devices comprised an average of 1.6% of snapper grouper landings for the years 2013 to 2017 (**Figure 3.4.2.1**). Although not shown in the figure, on average for the years 2013 to 2017, 17 vessels reported landings of snapper grouper species on trips that used dive gear with explosive devices.

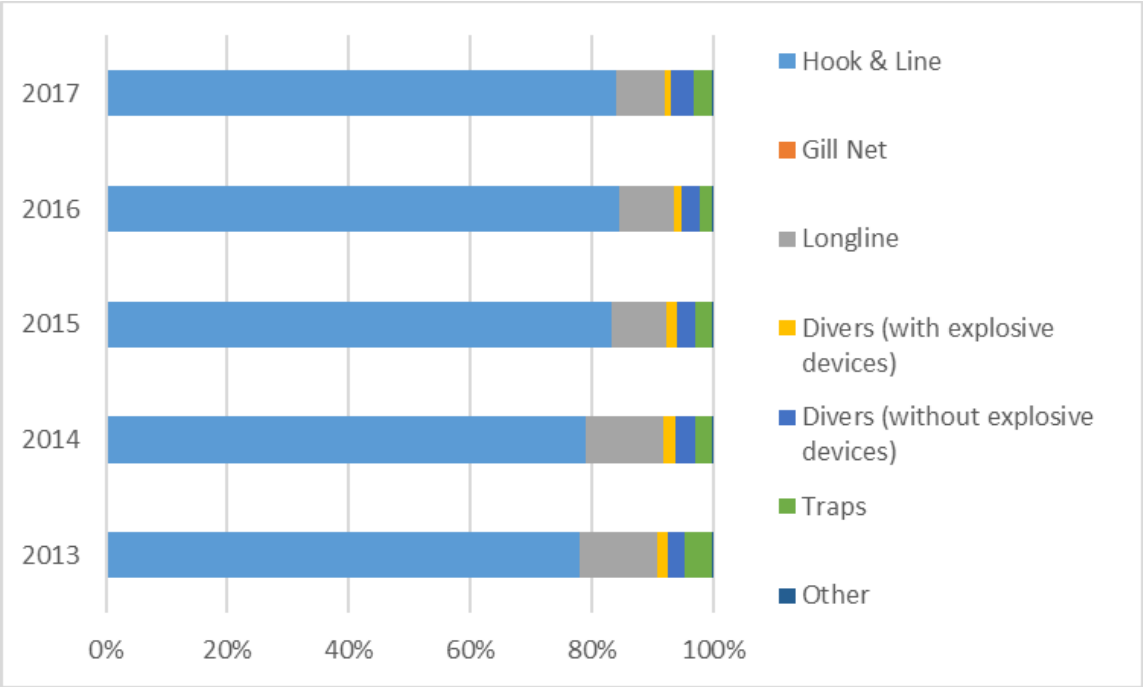

Figure 3.4.2.1. Snapper grouper commercial landings by gear reported on trips for the South Atlantic region, 2013-2017.

Source: SEFSC Socioeconomic Panel (Version 7) accessed by the SEFSC Economic Query system (Feb. 2019).

Note: Hook and line gear includes handlines, bandit (electric and bandit reels), trolling, and buoy gear. Divers with explosive devices includes powerheads and bang-sticks.

Recreational

As described in Section 3.3.2, on average for the years 2013 to 2017, approximately 9% of estimated snapper grouper target trips and 2% of estimated snapper grouper catch trips involved spearfishing.

3.4.3 Fishing Communities

Commercial

South Atlantic commercial snapper grouper unlimited permits are held by individuals with mailing addresses in 156 communities, located in 12 states (SERO Permit Office, January 28, 2019). Communities with the most commercial snapper grouper unlimited permits are located in Florida, South Carolina, and North Carolina (**Table 3.4.3.1**). The community with the most Gulf

commercial snapper grouper unlimited permits is Key West, Florida (10.1% of commercial snapper grouper unlimited permits).

South Atlantic commercial snapper grouper 225-lb trip-limited permits are held by individuals with mailing addresses in 53 communities, located in six states (SERO Permit Office, January 28, 2019). Communities with the most commercial snapper grouper 225-lb trip-limited permits are located in Florida and North Carolina (**Table 3.4.3.1**). The community with the most Gulf commercial snapper grouper 225-lb trip-limited permits is Key West, Florida (9.3% of commercial snapper grouper 225-lb trip-limited permits).

Table 3.4.3.1. Top ranking communities based on the number of South Atlantic commercial snapper grouper unlimited permits and 225-lb trip-limited permits, in descending order**.**

State	Community	Unlimited Permits	State	Community	225-lb Trip-Limited Permits
FL	Key West	54	FL	Key West	10
FL	Jacksonville	39	FL	Marathon	9
FL	Miami	19	FL	Summerland Key	9
FL	Marathon	15	FL	Jupiter	6
FL	Key Largo	13	FL	Miami	6
SC	Little River	13	FL	Big Pine Key	5
NC	Southport	11	FL	Key Largo	4
FL	Hialeah	10	FL	Fort Pierce	3
FL	Jupiter	10	FL	Melbourne Beach	3
FL	Tavernier	10	NC	Wilmington	3
SC	Murrells Inlet	10			
FL	Islamorada	8			
FL	Palmetto Bay	8			
FL	Port Orange	8			
FL	St. Augustine	8			
NC	Hampstead	8			
FL	Big Pine Key	7			
FL	Homestead	7			
FL	Summerland Key	7			
NC	Sneads Ferry	7			
NC	Wilmington	7			

Source: NMFS SERO permit office, January 28, 2019.

The descriptions of communities include information about the top communities based on a "regional quotient" (RQ) of commercial landings and value for snapper grouper. The RQ is the proportion of landings and value out of the total landings and value of that species management complex for that region and is a relative measure. These communities would be most likely to

experience the effects of the proposed actions that could change the fishery and impact participants, associated businesses, and communities within the region. If a community is identified as a snapper grouper community based on the RQ, this does not necessarily mean that the community would experience significant impacts due to changes in the fishery if a different species or number of species were also important to the local community and economy.

South Atlantic communities with commercial landings of snapper grouper are located in Florida, Georgia, North Carolina, and South Carolina (SERO Community ALS, 2016). About 13% of snapper grouper is landed in the top community of Murrells Inlet, South Carolina, representing about 14% of the South Atlantic-wide ex-vessels value (**Figure 3.4.3.1**). About 12% of snapper grouper is landed in the second ranked community of Key West, Florida, representing about 11% of the ex-vessel value. Additionally, several other Florida Keys communities (Marathon, Key Largo, and Islamorada) are included in the top communities and these communities collectively represent about 15% of landings and 14% of value.

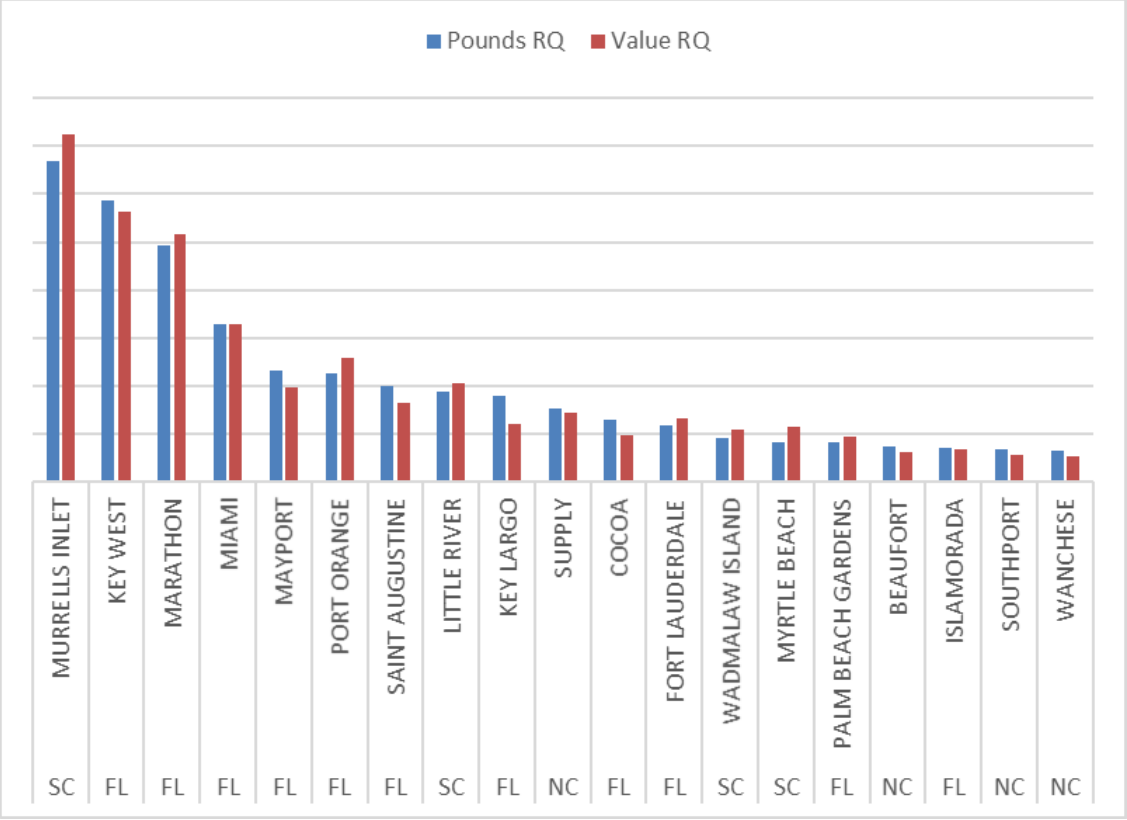

Figure 3.4.3.1. Top South Atlantic communities ranked by pounds and value regional of quotient (RQ) of snapper grouper. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality. Source: SERO, Community ALS 2016.

Recreational

South Atlantic for-hire snapper grouper permits are held by those with mailing addresses in 452 communities, located in 24 states (SERO permit office, January 28, 2019). Communities with the most for-hire snapper grouper permits are located in communities in Florida, followed by North Carolina, and South Carolina (**Table 3.4.3.2**). The community with most South

Atlantic for-hire snapper grouper permits is Key West, Florida (7.8% of for-hire snapper grouper permits, **Table 3.4.3.2**).

Table 3.4.3.2. Top ranking communities based on the number of South Atlantic for-hire snapper grouper permits, in descending order.

State	Community	Permits
FL	Key West	129
FL	Marathon	57
FL	Islamorada	46
FL	St. Augustine	27
FL	Jacksonville	26
FL	Port Orange	25
FL	Naples	24
FL	Tavernier	24
NC	Hatteras	23
SC	Charleston	23
FL	Merritt Island	22
NC	Wilmington	21
FL	Ft. Lauderdale	20
FL	Jupiter	19
FL	Key Largo	19
NC	Manteo	19
SC	Hilton Head	19
FL	Miami	17
FL	Summerland Key	17

Source: NMFS SERO permit office, January 28, 2019.

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

Figure 3.4.3.2 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. Five communities (Marathon,

Florida; Islamorada, Florida; Hatteras, North Carolina; Manteo, North Carolina; and Atlantic Beach, North Carolina) demonstrate high levels of recreational reliance.

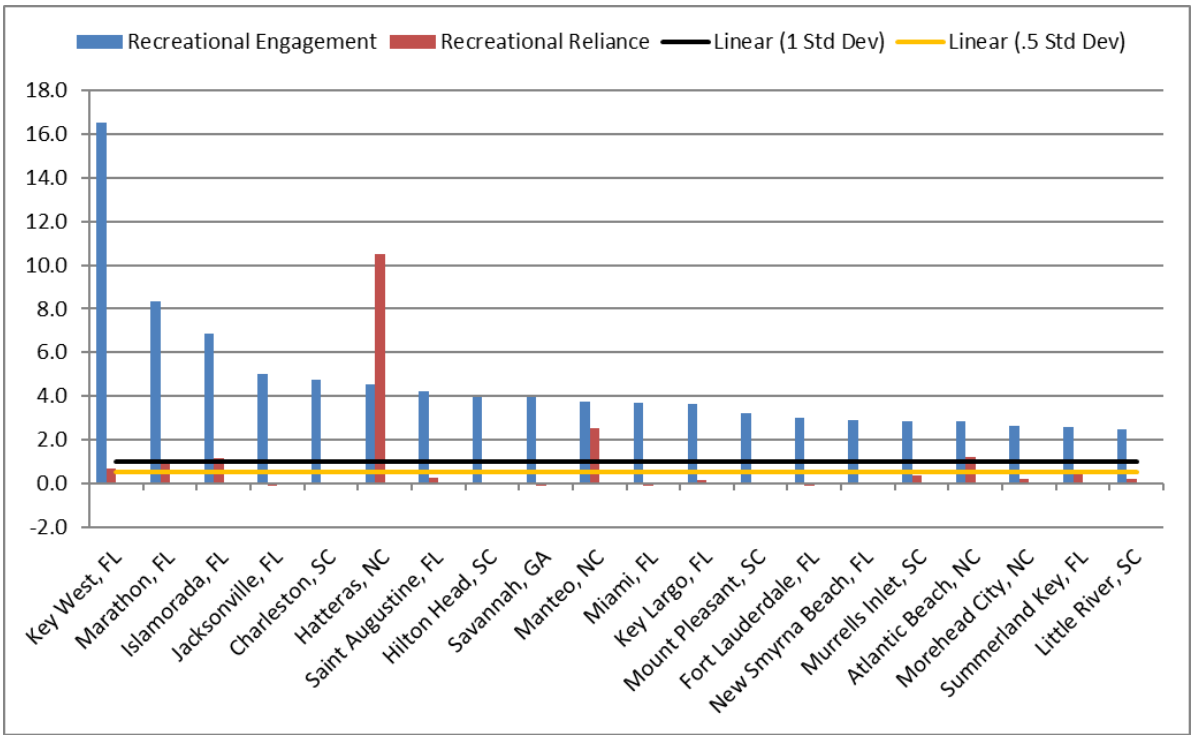

Figure 3.4.3.2. Top 20 recreational fishing communities' engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators Database 2018 (American Community Survey 2012-2016).

Additional detailed information about fishing communities contained in this description can be found on the SERO Community Snapshots website.[12]

3.4.4 Environmental Justice

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 anglers and associated industries could be impacted by the proposed actions. However, information on the race and income status for groups at the different participation levels is not available. Although information is available concerning communities'

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

overall status with regard to minorities and poverty (e.g., census data), such information is not available specific to fishermen, their households, 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. 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 3.4.4.1 and **Figure 3.4.4.2** provide the social vulnerability of the top commercial and recreational communities. Several South Atlantic communities exceed the threshold of 0.5 standard deviation for at least one of the social vulnerability indices: Cocoa, Fort Lauderdale, Fort Pierce, Hialeah, Homestead, Marathon, and Miami, Florida; Savannah, Georgia; Beaufort, Morehead City, and Sneads Ferry, North Carolina; and Myrtle Beach, South Carolina. The communities of Cocoa, Fort Pierce, Hialeah, Homestead, and 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.

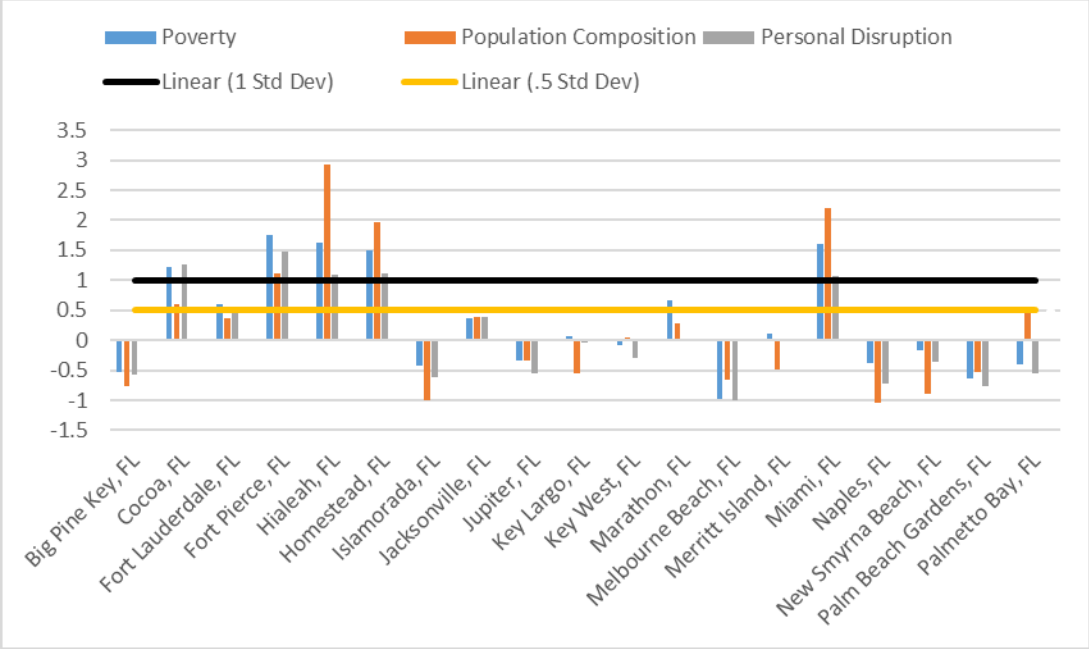

Figure 3.4.4.1. Social vulnerability indices for top commercial and recreational communities. Source: SERO, Community Social Vulnerability Indicators Database 2018 (American Community Survey 2012-2016).

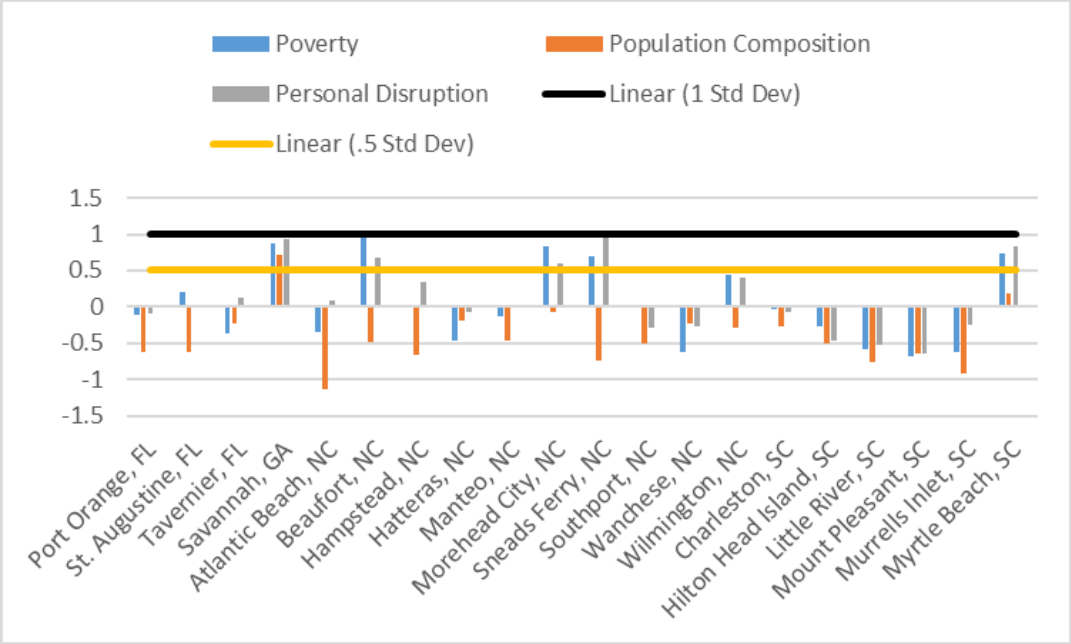

Figure 3.4.4.2. Social vulnerability indices for top commercial and recreational communities continued. Source: SERO, Community Social Vulnerability Indicators Database 2018 (American Community Survey 2012-2016).

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, data are not available on the race and income status for those involved in the local fishing industry (employment), or for their dependence on snapper grouper species (participation). However, the implementation of the proposed actions of this amendment would not discriminate against any group based on their race, ethnicity, or income status because the proposed actions would be applied to all participants in the fishery. Thus, the actions of this amendment are not expected to result in adverse or disproportionate environmental or public health impacts to EJ populations. Although no EJ issues have been identified, the absence of potential EJ concerns cannot be assumed.

3.5 Administrative Environment

Federal fishery management is conducted under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the EEZ, 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.

3.5.2 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.

3.5.3 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.[13]

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

Chapter 4. Environmental Effects

4.1 Action 1. Specify requirements for the use of descending devices* and/or venting devices** when fishing for or possessing species in the snapper grouper fishery management unit.

Alternatives*
1. Descending devices and/or venting devices are not required to be onboard a vessel fishing for or possessing species in the snapper grouper fishery management unit.
2. Within six months, require a *descending device* be on board a vessel fishing for or possessing species in the snapper grouper fishery management unit. **2a. private recreational vessels** **2b. for-hire vessels** **2c. commercially permitted South Atlantic snapper grouper vessels**
3. Within six months, require a *venting device* be on board a vessel fishing for or possessing species in the snapper grouper fishery management unit. **3a.** private recreational vessels **3b.** for-hire vessels **3c.** commercially permitted South Atlantic snapper grouper vessels.
***Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives.

4.1.1 Biological Effects

The standard practice to improve survivorship of released fish is to reduce handling and the amount of time a fish is out of the water. However, fish experiencing barotrauma may not survive without some assistance. There are two types of tools that can be used to treat barotrauma: descending devices and venting devices. Proper and widespread use can significantly increase the likelihood of survival of released fish and in turn contribute to overall stock productivity and sustainability. As such, decreased levels of fishing mortality through higher survivorship of released fish should lead to increased fish population abundance (GMFMC 2018).

Expected Effects to Snapper Grouper Species

Not requiring descending or venting devices be on board vessels while fishing for or possessing snapper grouper species under **Alternative 1 (No Action)** is not expected to provide increased survivorship or reduced mortality of discards.

The South Atlantic Fishery Management Council's (Council) intent is that descending and/or venting devices only be used as needed. For example, if the swim bladder is inflated or the fish was caught in deep water, then the devices should be used. However, venting is not necessary if the fish appears normal, not bloated, and is able to swim to depth on its own. Depending on depth of capture, use of a descending device may or may not be necessary or provide benefits to

discarded fish. If the devices are properly used and maintained, **Preferred Alternative 2** and **Alternative 3** could provide increased survivorship and reduced mortality of discarded snapper grouper species, this resulting in both short and long-term positive biological effects to snapper grouper species. **Preferred Alternative 2** would provide the greatest benefit to the biological environment, followed by **Alternative 3**, with **Alternative 1 (No Action)** having no positive impact.

Studies have shown that use of descending and venting devices does relieve symptoms of barotrauma and can decrease potential discard mortality, especially when compared to treatments with no barotrauma relief. Surface released red snapper (non-vented and not descended) were three times as likely to suffer mortality compared to descended fish and 1.9 times as likely to suffer mortality compared to vented fish (Curtis et al. 2015). Rapid recompression (descending device simulation) reduced discard mortality for red snapper with simulated capture from 30 and 60 meters (98 and 197 feet) (Drumhiller et al. 2014). The mortality for fish released at 30 meters decreased from 33% to 0% and for fish released at 60 meters decreased from 83% to 17% - 0%. Runde and Buckel (2018) found that even for deep-water grouper species, such as snowy grouper and speckled hind, rapidly returning fish to depth with a descender device can increase discard survival. Use of descender devices on rockfish by recreational fishermen in waters off California produced discard mortality rates as low as 7.5% in capture depths less than 100 m and up to 16.4% at capture depths from 100 to 135 m (Bellquist et al. 2019).

Some studies indicated that recompression and venting did not significantly improve discard mortality rates (Diamond et al. 2011). However, a recent literature review (76 publications) and comparative analysis completed by Eberts and Somers (2017) found both venting and descending had positive effects on survival, but overall found no significant difference in survival rates when using a descending device versus a venting device. However, some recent studies have recommended the use of descending devices over venting devices for treating fish experiencing symptoms of barotrauma. Though faster to use, venting devices have the potential to damage vital organs and cause additional stress if not used correctly (Harrison 2015; Pulver 2017; Wilde 2009).

The use of descending and venting devices may also reduce predation on snapper grouper species by allowing rapid return to depth making them less vulnerable to predators. Discarded fish stranded at the surface become prey for marine mammals, sea birds, and large predators such as amberjack, barracuda, and sharks (Burns et al. 2002). Collins et al. (1999) determined that venting of black sea bass provided significant reductions in mortality and benefits of deflation increased with depth. Swim bladder deflation of vermilion snapper also had positive effects but to a lesser extent (Collins et al. 1999). The benefits of releasing air from the swim bladder of released fishes was supported by McGovern et al. (2005) who conducted a tagging study of gag and greater amberjack. McGovern et al. (2005) stated if swim bladders of gag had not been deflated prior to the release of fish, it is likely mortality would have been higher and tag recapture rates would have been lower.

Expected Effects to Protected Species

In the 2016 Endangered Species Act (ESA) biological opinion on the snapper grouper fishery (2016 Biological Opinion), the National Marine Fisheries Service (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 (NMFS 2016). A conservation recommendation for Nassau grouper from the opinion stated, "NMFS should fund or collect future research to identify ways to reduce the 20% mortality rate of incidentally captured Nassau grouper in the fishery" (NMFS 2016). **Alternative 1** (**No Action**) is not expected to have an impact on protected species. **Preferred Alternative 2** and **Alternative 3** are likely to reduce the risk of adverse effects to Nassau grouper, which is an ESA listed species, from interactions with the fishery. Venting and descending devices are not applicable to certain protected species like sea turtles, but the devices could reduce negative effects to discarded Nassau grouper. Regardless, current monitoring programs will allow NMFS to track and evaluate any increased risk to protected species. If necessary, an ESA Section 7 consultation can be re-initiated to address any increased levels of risk to ESA-listed species.

4.1.2 Economic Effects

Under **Alternative 1 (No Action)** there would continue to be no regulatory requirement for descending or venting devices to be present on board a vessel fishing for or possessing snapper grouper species, thus there would be no direct costs incurred from requiring the purchase or construction of these devices. This alternative would lead to for-gone indirect economic benefits that could be achieved through a reduction in release mortality that may be accrued due to increased use of descending or venting devices which would may provide increased economic benefits through an improvement in fish stocks.

Preferred Alternative 2 or **Alternative 3** would require descending or venting devices on board a vessel fishing for or possessing snapper grouper species, however owners or operators that already own a qualifying descending or venting device would not incur direct costs under either alternative. While the ownership or use of such devices on board recreational and commercial vessels is unknown, under these alternatives some vessel owners and operators would need to purchase or construct qualifying devices and would incur direct costs in doing so. If purchased, such devices have a range of costs. While not an exhaustive list of all options available, **Table 4.1.2.1** shows prices for several venting and descending devices that range from approximately $6.30 to $78.00 for descending devices and $6.30 to $29.00 for venting devices (2017 dollars). Alternatively, vessel owners or operators may construct a device out of existing materials, which could be a lower cost option. How these costs will occur among sectors will be dependent upon the sub-alternatives of **Preferred Alternative 2** or **Alternative 3** that are chosen. Under **Preferred Sub-alternative 2a** and **Sub-alternative 3a**, the described costs would be incurred by the private recreational sector, while these costs would be incurred by the for-hire sector under **Preferred Sub-alternative 2b** and **Sub-alternative 3b**. For **Preferred Sub-alternative 2c** and **Sub-alternative 3c**, the described costs would be incurred by the commercial sector.

To estimate the cumulative direct cost of requiring a descending or venting device, an estimate of the number of affected vessels and average cost per vessel must be determined. The number of private recreational vessels is unknown, since there is no permit requirement, therefore cumulative costs cannot be quantified with available data. From 2013 through 2017 an

average of 573 vessels held a South Atlantic commercial snapper grouper unlimited permit (SG1), 121 vessels held a South Atlantic commercial snapper grouper 225-lb trip limited permit (SG2), and 1,831 vessels held a South Atlantic for-hire snapper grouper permit (**Section 3.4.1**). Based on information provided in Buck (2018) regarding permit portfolios of commercial snapper grouper permit holders, it is assumed that 21.8% of SG1 permitted vessels (125 vessels) and 23.6% of SG2 permitted vessels (29 vessels) also held a for-hire snapper grouper permit, bringing the total number of known vessels that may be affected by requiring descending or venting device to 2,371 vessels. While there is a range of costs to purchase or fabricate a descending or venting device, it is assumed that affected for-hire and commercial vessels will go with the lowest cost option to meet regulatory compliance since they represent profit-seeking businesses. As such, the assumed marginal cost per vessel is approximately $6.30 for both **Preferred Alternative 2** and **Alternative 3**, with estimated cumulative direct costs reported in **Table 4.1.2.2**. Based on these assumptions, the estimated cumulative direct cost is $11,956 for **Preferred Sub-alternative 2b**, $4,372 for **Preferred Sub-alternative 2c**, and $14,937 for **Preferred Sub-alternative 2b** and **2c** combined (2017 dollars).

In comparison to **Alternative 1 (No Action)**, **Preferred Alternative 2**, and **Alternative 3** may increase survivorship of fish that are discarded (**Section 4.1.1**). This may lead to improvements in affected fish stocks, which in turn, could yield greater numbers of exploitable fish in the future, higher catch rates, and less stringent harvest limits, such as higher trip limits and bag limits, as well as longer open harvest seasons. Such changes would improve anglers' experiences on recreational trips and reduce costs and/or increase revenue on commercial trips. Should these changes occur, economic benefits would be expected to accrue in the form of increased consumer surplus (CS) for private and for-hire anglers, improved net operating revenue (NOR) for commercial and for-hire businesses, and increased recreational and commercial fishing expenditures, which would be economically beneficial for other fishing-related businesses.

In terms of direct costs, **Alternative 1 (No Action)** would be the lowest cost option, followed by **Alternative 3** and **Preferred Alternative 2**. In terms of potential indirect economic benefits, **Preferred Alternative 2** and **Alternative 3** would be expected to have similar benefits; whereas, **Alternative 1 (No Action**) would forgo any such benefits.

Table 4.1.2.1. Summary prices for fish venting and descending devices (2017 dollars).

Device	Price
Berkley De-hooker/Ventilator Tool	$6.26[a]
Shelton SFD Fish Descender	$6.29[b]
Ohero Vent for Life Venting Tool	$9.37[a]
Angler's Choice Fish Venting Tool	$12.21[a]
Arc Dehooker Venting Tool	$17.25[b]
Fish Saver Descending Device	$19.56[a]
Ventafish Fish Venting Tool	$29.38[b]
Roklees Fish Descender	$34.22[b]
Blacktip Recompression Tool	$53.77[c]
Seaqualizer Fish Release Tool	$58.66[d]
West Marine Fish Recompression Basket	$78.22[c]

[a] as found on www.amazon.com, accessed January 16, 2019.
[b] as found on www.google.com/shopping, accessed January 16, 2019.
[c] as found on www.westmarine.com, accessed January 16, 2019.
[d] as found on www.seaqualizer.com, accessed January 16, 2019.

Table 4.1.2.2. Estimated cumulative direct cost of **Action 1** (2017 dollars).

Alternative	Estimated Number of Vessels Affected	Estimated Cumulative Cost
Alternative 1 (No Action)	0	$0
Pref. Sub-alt 2a	**Unknown**	**-**
Pref. Sub-alt 2b	**1,831**	**$11,956**
Pref. Sub-alt 2c	**694**	**$4,372**
Pref. Sub-alt 2b and 2c	**2,371**	**$14,937**
Sub-alt 3a	Unknown	-
Sub-alt 3b	1,831	$11,535
Sub-alt 3c	694	$4,372
Sub-alt 3b and 3c	2,371	$14,937

4.1.3 Social Effects

Alternative 1 (No Action) is not anticipated to result in positive or negative direct social effects to fishing communities engaged in the snapper grouper fishery. Alternatively, management measures that increase the survivorship of discarded fish typically result in long-term positive social effects throughout the fishery in the form of increased access in the future. If requiring descending devices (**Preferred Alternative 2**) and/or venting devices (**Alternative 3**) results in lower discard mortality, as anticipated, fishing communities would experience long-term indirect social benefits.

Preferred Alternative 2 and **Alternative 3** incorporate recommendations made by fishermen during development of the 2016-2020 Vision Blueprint for the Snapper Grouper Fishery. Responding to fishermen's concerns about regulations that result in released fish that

do not survive could have the social benefit of improving perceptions of the management process. Alternatively, requiring possession of a descending device and/or venting tool on board without requiring usage may be perceived by fishermen as unnecessary government regulation.

The Council's intent under **Preferred Alternative 2** and **Alternative 3** is that descending and venting only be done as needed (i.e., a fish is experiencing signs of barotrauma). This action should not alter how often or where recreational and commercial fishermen fish and would not have any effect on the businesses which are dependent on the fishery. There may be short-term negative impacts if fishermen must purchase new gear. Additionally, it is possible that, under **Alternative 3**, fishermen who are not comfortable or competent venting a fish would be required to attempt the procedure, potentially injuring the fish further.

Overall, **Preferred Alternative 2** and **Alternative 3** would result in improved survivorship of discarded snapper grouper species when compared to **Alternative 1 (No Action)**. If improvement in discard mortality results in healthier stocks, as envisioned, recreational and commercial fishing communities would experience positive social effects in the form of less stringent regulations and increased access as well as long-term sustainability of snapper grouper fish stocks.

4.1.4 Administrative Effects

Preferred Alternative 2 and **Alternative 3** would create moderate adverse administrative effects since it would require extensive coordination between the NMFS Office of Sustainable Fisheries and the Office of Law Enforcement, compared to **Alternative 1 (No Action)**. Several forms of educational and outreach materials would need to be made available to fishery participants. Educational materials would outline proper use and technique when using the required devices and would provide specifications for what constitutes an effective venting and/or descending devices. Other outreach materials such as Fishery Bulletins and the NMFS web site would be used to notify fishery participants of the requirement for each vessel in the commercial or recreational sector of the snapper grouper fishery to use venting and descending devices on snapper grouper species. The education and outreach component of this provision would create a relatively short-term impact on the administrative environment; however, enforcement of its implementing regulations would be ongoing.

4.2. Action 2. Modify the requirement for the use of non-stainless-steel circle hooks when fishing for and/or possessing snapper grouper species with hook-and-line gear.

The following effects analyses for alternatives in Action 2 address various conditions related to the use or possession of non-stainless-steel circle hooks while fishing for and/or possessing species in the snapper grouper fishery management unit with hook-and-line gear and natural baits.

Alternatives*
1. Use of non-stainless-steel circle hooks is required north of 28 degrees north latitude. **2. Require the use of *non-offset*, non-stainless-steel circle hooks:** **2a. north of 28 degrees north latitude.** **2b**. throughout the extent of the South Atlantic Council's jurisdiction. **3.** Require *non-offset*, non-stainless-steel circle hooks be *onboard*: **3a**. north of 28 degrees north latitude**.** **3b**. throughout the extent of the South Atlantic Council's jurisdiction. **4. Require the use of non-stainless-steel hooks.** *****Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

4.2.1 Biological Effects

Expected Effects to Snapper Grouper Species

Alternative 1 (No Action) would keep the current non-stainless-steel circle hook requirement in place and would not provide additional benefits to South Atlantic snapper grouper stocks south of 28° north latitude.

In general, studies on the effects of circle hooks on discard mortality rates of snapper grouper species remain sparse. However, several, studies show that use of circle hooks can reduce traumatic hooking rates (incidence of foul hooking and bleeding) of certain species of snapper grouper (e.g. red snapper, red grouper), when compared to J hooks (Bacheler and Buckel 2004; Burns 2009; Burns and Froeschke, 2012; Burns et al. 2004; Cooke and Suski 2004; Cooke et al. 2012; Garner 2018; Sauls and Ayala 2012). However, the impact of hook type appears to be species specific and can vary between studies. Burns (2009) reported red snapper were very susceptible to hooking injury; however, circle hooks were not more effective than J hooks in reducing hooking mortality. In contrast, Garner (2018) found red snapper caught with circle hooks showed less hook trauma then those caught with J hooks. Variations in fish physiology and fishery characteristics are likely to influence the effect of circle hooks.

Preferred Alternative 2 would add the use of *non-offset* circle hooks to the current requirement (**Preferred Sub-alt. 2a**) or expand the requirement for use of *non-offset*, non-stainless circle hooks to the entire Council's jurisdiction (**Sub-alt. 2b**). The alternative could reduce discard mortality for snapper grouper species and result in benefits to the biological environment. Ostrand et al. (2005) compared performance and ease of dehooking between offset

and non-offset circle hooks. They reported that offset circle hooks were harder to remove and caused slightly more bleeding than non-offset circle hooks, but overall, little difference was found between the two types relative to injury that could lead to mortality (Ostrand et al. 2005). A similar study conducted with seven commonly harvested reef fish in the Great Barrier Reef line fishery (a mixed species reef fish fishery) illustrated that "offset circle hooks and J hooks were more often associated with injuries than non-offset circle hooks" (Mapleston et al. 2007). Much of the recent research on circle hooks involves pelagic species. Rice et al. (2012) found that swordfish had (1) marginally higher catch rates, (2) significantly lower mortality, and (3) significantly less deep hooking on non-offset than offset circle hooks. These studies suggest that, relative to non-offset circle hooks, offset circle hooks may reduce fishing efficiency and can counteract the conservation benefits commonly associated with circle hooks (e.g., lower mortality)(Rice et al. 2012).

Requiring use of non-offset, non-stainless-steel circle hooks throughout the extent of the Council's jurisdiction (**Sub-Alt. 2b**) could reduce discard mortality for species in the snapper grouper complex. However, this requirement could negatively affect the yellowtail snapper stock. The yellowtail snapper fishery in southern Florida is prosecuted in such a way that results in small circle hooks being swallowed by fish or snagged in the fish's gut, thus increasing discard mortality.

If circle hooks increase catch rates as suggested by Henwood et al. (2006), a negative effect on the biological environment is possible. Because the recreational sector is managed with size limits, bag limits, and closed seasons, it is more susceptible to increased catch rates. If recreational anglers catch the bag limit more frequently and land larger fish, landings could increase beyond current levels. However, if catch rates increase the number of legal-size fish landed and reduce discard mortality, a net benefit would be expected. Therefore, exclusion of smaller individuals or an increase in survival of regulatory discards would be considered to be a positive biological effect.

Similarly, if circle hooks decrease catch per unit effort and/or reduce the incidence of fatal hooking events, then a net benefit to the stock could occur. In addition, circle hooks could reduce regulatory discards, thereby providing additional benefits. Modifying gear to reduce bycatch and bycatch mortality could also have beneficial effects on the biological and ecological environment of non-targeted species. The top co-occurring species for the snapper grouper hook-and-line component are red snapper, black sea bass, red grouper, gag, scamp, greater amberjack, vermilion snapper, and gray triggerfish. These species, excluding gray triggerfish, have similar mouth morphology, which is an important factor in the effectiveness of circle hook use (Cooke and Suski 2004). As a result, hooking mortality on these species could be reduced. Specifically, Burns (2009) indicated red grouper benefited from the use of circle hooks.

Nevertheless, studies on the effects of circle hooks and J hooks on retention and survival is limited to a handful of snapper grouper species. Due to limited data, it may not be possible to quantify the reduction in snapper grouper mortality that could be provided by using circle hooks. Not all species in the snapper grouper complex have the same mouth morphology and it is possible that circle hooks could negatively impact survival. Garner (2018) found use of circle hooks had no positive impact on the discard mortality of gray triggerfish. Alternatively, use of

circle hooks would substantially reduce harvest of some species (e.g. yellowtail snapper), thus would have positive biological benefits but have negative social and economic impacts on fishermen dependent upon the species.

Alternative 3 would remove the requirement to use non-stainless-steel circle hooks and require *non-offset* circle hooks be *on board* a vessel north of 28 degrees north latitude (**Sub-alt. 3a**) or throughout the entire Council's jurisdiction (**Sub-alt. 3b**). If fishermen decide to utilize circle hooks, this alternative could provide biological benefits to species in the snapper grouper complex. However, use would be voluntary and would ultimately depend on fisherman preference, thus it is difficult to gauge the potential effects to the biological environment.

Alternative 4 would require the use of non-stainless-steel hooks, but not restrict the type. Hooks made of non-stainless-steel should degrade faster in the marine environment then stainless-steel. Fish that are gut hooked could theoretically have a greater chance of survival if the hook is made of non-stainless-steel. Preventing gut hooking through the use of circle hooks would have a greater impact on discard mortality.

Sub-alternative 2b would provide the greatest benefits to the biological environment, followed by **Preferred Sub-alternative 2a**, **Alternative 1 (No Action)**, **Preferred Alternative 4**, **Sub-alternative 3b**, and **Sub-alternative 3a**.

Expected Effects to Protected Species

In the 2016 ESA 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). Circle hook requirements could reduce the risk of interactions with protected species. Circle hooks are known to reduce the severity of impacts to sea turtles from incidental capture by reducing the likelihood of hook ingestion. Depending on the size of the animal, circle hooks may also reduce the frequency of incidental capture of sea turtles and smalltooth sawfish. The terms and conditions in the 2016 Biological Opinion on the snapper grouper fishery of the South Atlantic include a measure to assess the effectiveness of non-stainless-steel circle hooks on reducing injury and mortality to Nassau grouper and, if effective, consider revisions of regulations to expand the use of circle hooks south of 28 degrees north latitude.

Alternative 1 (No Action) would perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. **Preferred Alternative 2** is likely to reduce the severity of injuries associated with the incidental hooking of ESA-listed species, particularly Nassau grouper and sea turtles. The use of large circle hooks has been shown to significantly reduce the rate of hook ingestion in loggerhead sea turtles, potentially reducing post-hooking mortality. Because hooking location is one of the primary factors influencing post release mortality in all species of sea turtles, circle hooks are generally believed to increase post-release survival. Circle hook design typically results in hooking of a sea turtle's lower jaw when bitten, and even smaller circle hooks that are swallowed are shaped such that they hook the esophageal or digestive tract with much lower frequency than J hooks (Watson et al. 2003). Watson et al.

(2005) and Swimmer et al. (2017) found that loggerhead and leatherback bycatch rates declined significantly with the use of circle hooks in the U.S. pelagic longline fishery when compared to J hooks. Stokes et al. (2012) found 20-30º offset J hooks were more likely to be swallowed by loggerhead sea turtles than non-offset or minimal offset (10º) large circle hooks. Swimmer et al (2010) found no significant difference in anatomical hooking location of the number of sea turtles caught between 14/0 circle hooks with and without a 10º offset, suggesting similar levels of injury for turtles caught on each circle hook type in this hook size range. **Alternative 3** would only reduce the severity of interactions between the fishery and ESA-listed species if fishermen choose to utilize circle hooks.

Preferred Alternative 4 could reduce incidental hooking mortality if the hook corrodes faster, however, studies have shown hook type has a larger positive impact on survival of incidentally hooked ESA-listed species, particularly sea turtles.

Sub-alternative 2b would provide the greatest benefits to protected species, followed by **Preferred Sub-alternative 2a**, **Alternative 1 (No Action)**, **Preferred Alternative 4**, **Sub-alternative 3b**, and **Sub-alternative 3a**.

4.2.2 Economic Effects

Alternative 1 (No Action) would retain the current requirement of the use of non-stainless-steel circle hooks north of 28 degrees north latitude, thus there would be no direct costs incurred from purchasing different hook types to comply with new hook specifications. This alternative would lead to for-gone indirect economic benefits that may be achieved through a reduction in release mortality from the use of non-offset, non-stainless-steel circle hooks but also would lead to ongoing indirect economic benefits that are achieved through lower release mortality from the use of non-stainless-steel circle hooks north of the 28 degrees north latitude in comparison to other hook types such as J hooks and treble hooks.

Preferred Alternative 2 would result in direct costs for some commercial and recreational participants involved in the snapper grouper fishery in comparison to **Alternative 1 (No Action).** These participants would need to purchase non-offset, non-stainless-steel circle hooks circle hooks of proper size for the species that they target if they do not already own such hooks. The cost of purchasing circle hooks is highly variable and will depend on how many hooks each commercial or recreational participant will need as well as the quantity in which the hooks are purchased. In general, the cost per hook may vary from approximately $0.30 per hook to a $1.00 per hook. Cost estimates for various non-offset, non-stainless-steel circle hooks are provided in **Table 4.2.2.1**. Additionally, non-offset circle hooks may reduce the catchability of some species, which could negatively affect catch efficiency on some fishing trips. This may result in reduced landings for some species, which in turn would result in negative economic effects through reduced CS on private and for-hire recreational trips due to decreases in angler satisfaction from lower landings and reduced NOR on commercial trips due to potential decreases in trip revenue. Reducing catch efficiency may also increase opportunity costs which may reduce CS on recreational trips due to lower angler satisfaction with the fishing trip. For the commercial sector, trips may achieve the same revenue but the cost of fishing (implicit or explicit) may increase which in turn would reduce economic profits. These negative direct effects may be mitigated as recreational and commercial participants become accustomed to

using non-offset circle hooks and increase their efficiency and effectiveness while fishing with circle hooks. The described effects cannot be cumulatively estimated with existing data. The distribution of these potential effects would depend on the sub-alternative that is chosen. Under **Preferred Sub-alternative 2a**, the described effects would be incurred by commercial and recreational participants fishing north of 28 degrees north latitude while those fishing in the entire South Atlantic region would be affected under **Sub-alternative 2b**.

In comparison to **Alternative 1 (No Action)**, **Preferred Alternative 2** may increase survivorship of fish that are discarded (**Section 4.2.1**). This may lead to improvements in affected fish stocks, which in turn, could yield greater numbers of exploitable fish in the future, higher catch rates, and less stringent harvest limits, such as higher trip limits and bag limits, as well as longer open harvest seasons. Such changes would improve anglers' experiences on recreational trips and reduce costs and/or increase revenue on commercial trips. Should these changes occur, economic benefits would be expected to accrue in the form of increased CS for private and for-hire anglers, improved NOR for commercial and for-hire businesses, and increased recreational and commercial fishing expenditures, which would be economically beneficial for other fishing-related businesses. Given the larger affected area under **Preferred Sub-alternative 2a**, this sub-alternative would likely lead to higher in-direct economic benefits in comparison to **Sub-alternative 2b**.

Alternative 3 would result in direct costs for commercial and recreational participants involved in the snapper grouper fishery that do not already own non-offset, non-stainless-steel circle hooks. Such participants would need to purchase hooks to comply with new hook specifications. Those that do own compliant hooks would not be affected by this alternative. Under **Sub-alternative 3a**, the described effects would be incurred by commercial and recreational participants fishing north of 28 degrees north latitude while those fishing in the entire South Atlantic region would be affected under **Sub-alternative 3b**.

For commercial and recreational participants involved in the snapper grouper fishery that fish north of the 28 degrees north latitude, **Alternative 3** may result in direct cost reductions, as circle hooks would only be needed to be on board the vessel and not put in use. Under such circumstances, multiple circle hook types and sizes would not be necessary to satisfy the circle hook requirement. Additionally, J hooks or treble hooks could be used to harvest snapper grouper species, which may increase the catchability of some species in comparison to circle hooks, which would positively affect catch efficiency on some fishing trips. This may result in increased landings for some species, which in turn would result in economic benefits through increased CS on private and for-hire recreational trips due to increases in angler satisfaction from higher landings and increased NOR on commercial trips due to potential increases in trip revenue. Increasing catch efficiency may also decrease opportunity costs which may increase CS on recreational trips due to higher angler satisfaction with the fishing trip. For the commercial sector, trips may achieve the same revenue but the cost of fishing (implicit or explicit) may decrease which in turn would increase economic profits. The described effects cannot be cumulatively estimated with existing data and would be the same under **Sub-alternative 3a** and **3b**, as J hooks and treble hooks may currently be used within the South Atlantic Council's jurisdiction south of 28 degrees north latitude.

Alternative 3 may decrease survivorship of fish that are discarded in comparison to **Alternative 1 (No Action)**, as the use of non-circle hooks has been shown to increase release mortality in some circumstances (**Section 4.2.1**). This may lead to some deterioration in affected fish stocks, which in turn, could yield smaller numbers of exploitable fish in the future, lower catch rates, and more stringent harvest limits, such as lower trip limits and bag limits, as well as shorter open harvest seasons. Such changes would worsen anglers' experiences on recreational trips and increase costs and/or decrease revenue on commercial trips. Should these changes occur, economic costs would be expected to accrue in the form of decreased CS for private and for-hire anglers, lower NOR for commercial and for-hire businesses, and decreased recreational and commercial fishing expenditures, which would be economically harmful for other fishing-related businesses. These economic effects would be the same under **Sub-alternative 3a** and **3b**, as J hooks and treble hooks may currently be used within the South Atlantic Council's jurisdiction south of 28 degrees north latitude.

Preferred Alternative 4 would result in direct costs for commercial and recreational participants involved in the snapper grouper fishery that fish south of the 28 degrees north latitude within the South Atlantic Council's jurisdiction and do not already own non-stainless-steel hooks. Participants fishing north of the 28 degrees north latitude would not be affected since there is already a non-stainless-steel hook requirement in place. The cost of purchasing non-stainless-steel hooks is highly variable and will depend on how many hooks each commercial or recreational participant will need as well as the quantity in which the hooks are purchased. In general, the cost per non-stainless-steel hook may vary from approximately $0.30 per hook to a $1.00 per hook (2017 dollars). Cost estimates for non-stainless steel hooks are similar to that of non-offset, non-stainless steel circle hook costs that are provided in **Table 4.2.2.1**. **Preferred Alternative 4** may increase survivorship of fish that are discarded (**Section 4.2.1**) and would be expected to have similar in-direct economic benefits as those described in **Preferred Alternative 2**.

In terms of potential direct costs, **Sub-alternative 3a** would have the lowest direct costs, followed by **Alternative 1 (No Action), Sub-alternative 3b**, **Preferred Alternative 4**, **Preferred Sub-alternative 2a** and **Sub-alternative 2b**. In terms of potential in-direct economic benefits, **Sub-alternative 2b** has the potential to yield the highest benefits, followed by **Preferred Sub-alternative 2a**, **Preferred Alternative 4, Alternative 1 (No Action)**, **Sub-alternative 3a**, and **Sub-alternative 3b**.

Table 4.2.2.1. Summary prices for non-offset, non-stainless steel circle hooks (2017 dollars).

Hook Description	Price Per Package[a]	Price Per Hook
Eagle Claw Lazer Sharp L7228 Octopus Circle Hook 2/0 (50 pack)	$15.64	$0.31
Eagle Claw Lazer Sharp L7228 Octopus Circle Hook 5/0 (50 pack)	$17.59	$0.35
Offshore Angler In-Line Heavy Wire Circle Hook 5/0 (25 pack)	$10.75	$0.43
Offshore Angler In-Line Heavy Wire Circle Hook 8/0 (25 pack)	$13.68	$0.55
Gamakatsu Inline Octopus Circle Hook 1/0 (6 pack)	$3.41	$0.57
Gamakatsu Inline Octopus Circle Hook 6/0 (5 pack)	$3.41	$0.68
Mustad UltraPoint In-Line Octopus Circle Hook 4/0 (6 pack)	$4.39	$0.73
Mustad UltraPoint In-Line Octopus Circle Hook 9/0 (5 pack)	$4.39	$0.88
Gamakatsu Inline Octopus Circle Hook 8/0 (4 pack)	$3.90	$0.98

[a]as found on www.cabelas.com, accessed April 16, 2019.

4.2.3 Social Effects

Alternative 1 (No Action), which would continue to require the use of circle hooks north of 28 degrees north latitude when fishing for or possessing snapper grouper species, is not anticipated to result in positive or negative social effects to communities engaged in the snapper grouper fishery.

Some fishermen prefer to be able to choose the type of hooks they use when they fish, regardless of what may be best for the fish. While other fishermen may prefer to use whichever hook is the most environmentally friendly. If the Council chooses to set standards for the type of circle hook that must be used under **Preferred Alternative 2**, some fishermen will agree that it is in the interest of saving the species while others may object to the loss of personal choice in the selection of hook types, especially if they feel they will experience a reduction in catch rates. However, if the required use of non-offset circle hooks improves the survivorship of discarded species, as envisioned, it is expected to contribute to the sustainability of harvest and the health of snapper grouper stocks and provide for increased long-term social benefits in the form of increased access.

Requiring non-offset circle hooks to be on board, but not requiring their use under **Alternative 3**, would allow fishermen the ability to choose the hook-type appropriate for the snapper grouper species they are targeting. Fishermen have suggested that some snapper grouper species, namely yellowtail snapper and gray triggerfish, experience reduced catch rates when using circle hooks. Social benefits would be reduced if catch success in general or for individual species is adversely affected. **Alternative 3** would be expected to result in the full increased social benefits associated with decreased hook-related mortality of fish not retained, while avoiding the lost benefits associated with the reduced harvests of species for which circle hooks may not be appropriate. Alternatively, requiring possession of non-offset circle hooks on board without requiring usage may be perceived by fishermen as ineffective or as unnecessary government regulation.

It is unknown, however, whether **Preferred Alternative 2** or **Alternative 3** would be expected to result in the better social outcome, though the implicit recognition in **Alternative 3**

that circle hooks may be inappropriate for some species may result in **Alternative 3** providing more social benefit to communities.

The extent of social effects related to **Preferred Alternative 2** and **Alternative 3** will depend on which sub-alternative is chosen as preferred. Because of the limited geographic application of **Preferred Sub-alternative 2a** and **Sub-Alternative 3a**, the potential harvest problems and associated loss of social benefits associated with yellowtail snapper could be substantially reduced if not eliminated, while some problems with gray triggerfish and other species that might experience reductions in catch rates, would continue. However, increased social benefits associated with reduced hook-related mortality of fish not retained would be expected. Alternatively, because it is assumed that the imposition of circle hook restrictions is expected to support a healthier snapper grouper resource as well as possible higher allowable harvest levels, **Sub-alternative 2b** and **Sub-alternative 3b** would be expected to result in greater social benefits.

Preferred Alternative 4 may result in minor negative social effects if commercial and recreational fishermen south of 28 degrees north latitude are not already using non-stainless-steel hooks and must replace their gear. However, requiring non-stainless-steel hooks may reduce hooking mortality due to hooks being able to corrode at a faster rate. Improving discard mortality is expected to contribute to the sustainability of harvest and the health of snapper grouper stocks and provide for increased long-term social benefits in the form of increased access. However, improvements to discard mortality are expected to be greater under non-stainless-steel circle hooks than non-stainless-steel hooks alone (see **Section 4.2.1**).

4.2.4 Administrative Effects

All alternatives in Action 2, excluding **Alternative 1 (No Action)**, would create moderate adverse administrative effects since it would require extensive coordination between the NMFS Office of Sustainable Fisheries and the Office of Law Enforcement. Several forms of educational and outreach materials would need to be made available to fishery participants. Fishery Bulletins and the NMFS web site would be used to notify fishery participants of the new requirements. The education and outreach component of this provision would create a relatively short-term impact on the administrative environment; however, enforcement of its implementing regulations would be ongoing.

4.3 Action 3. Adjust powerhead prohibitions in the South Atlantic Region.

4.3.1 Biological Effects

Alternatives*
1. A powerhead may not be used in the exclusive economic zone off South Carolina to harvest South Atlantic snapper grouper. **2. Allow the use of a powerhead in the exclusive economic zone off South Carolina.** **2a. private recreational and for-hire vessels.** **2b. commercially permitted South Atlantic snapper grouper vessels.** **3**. Prohibit the use of a powerhead in the exclusive economic zone of the South Atlantic Region. **3a.** private recreational and for-hire vessels. **3b.** commercially permitted South Atlantic snapper grouper vessels. *****Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

Expected Effects to Snapper Grouper Species

Alternative 1 (No Action) would continue the powerhead prohibition off South Carolina and would reduce the potential for localized depletion of snapper grouper species susceptible to powerhead harvest (e.g., amberjack, groupers). **Preferred Alternative 2** would increase the potential for localized depletion of snapper grouper on reefs off South Carolina by the recreational sector (**Preferred Sub-alt. 2a**) and/or the commercial sector (**Preferred Sub-alt. 2b**) (SAFMC 1994). Localized depletion can delay repopulation of reefs, as long as a year or more, particularly for species that are long-lived (SAFMC 1991). Powerhead gear is more effective than conventional spear fishing gear because of the immediate death of the targeted fish and rapid reloading of the gear. The greatest impact would be on larger species that aggregate around the artificial and natural reefs at certain times of the year. **Preferred Alternative 2** could reduce bycatch and discards of snapper grouper species off South Carolina during trips utilizing dive and spear gear. However, the commercial and recreational dive components of the fishery only make up approximately 5% and 2% of landings and targeted trips, respectively, so overall impacts on bycatch would be low (**Section 3.4.2**).

Alternative 3 would remove a highly effective gear type and a source of fishing mortality for the recreational sector (**Sub-alt. 3a**) and/or commercial sector (**Sub-alt. 3b**). Preventing a cause of localized depletion could provide long-term biological benefits to snapper grouper species targeted by powerheads in the form of higher biomass and increased reproductive potential.

Alternative 3 would provide the greatest benefits to the biological environment, followed by **Alternative 1 (No Action)**. **Alternative 2** would not provide benefits to the biological environment.

Expected Effects to Protected Species

The alternatives in Action 3 are not expected to have an impact on protected species.

4.3.2 Economic Effects

Alternative 1 (No Action) would retain the prohibition on the use of powerheads to harvest snapper grouper species in the EEZ off of South Carolina . This would result in forgone direct economic benefits to some commercial and recreational participants by preventing harvest of snapper grouper species in some circumstances. It would also maintain the situation where regulations for the EEZ off of South Carolina do not align with other areas of the South Atlantic EEZ and would forego potential gains in compliance and enforcement efficiency from having such alignment. This alternative may provide some indirect economic benefits as well by helping to prevent localized depletion of snapper grouper stocks. Such depletion could negatively affect catches on commercial and recreational fishing trips, thus reducing CS and NOR occurring from such trips.

Allowing the use of a powerhead in the EEZ off of South Carolina to harvest snapper grouper species under **Preferred Alternative 2** would align federal regulations for the use of this gear with other areas of the South Atlantic EEZ. Doing so may result in indirect economic benefits by enhancing compliance with and enforcement of such regulations in comparison to **Alternative 1 (No Action)**. **Preferred Alternative 2** may also provide additional opportunities to harvest snapper grouper species in the EEZ off of South Carolina. These opportunities may lead to increased NOR for some commercial and for-hire businesses and increased CS for some recreational and for-hire anglers. How these potential benefits would be incurred by sector would depend upon which sub-alternative is chosen. Under **Preferred Sub-alternative 2a**, the potential indirect benefits would be incurred by the recreational sector while the benefits would be incurred by the commercial sector under **Preferred Sub-alternative 2b**. These economic effects cannot be estimated with available data.

Preferred Alternative 2 may lead to increased harvest of snapper grouper species in general, or additional harvest of larger specimens of exceptional biological benefit to a fish stock. Such harvest changes would be a direct benefit to users of powerhead gear, as described in the previous paragraph, but could also diminish the size or reproductive capacity of some stocks. In turn, this could lead to fewer exploitable fish in the future, lower catch rates, and more stringent harvest limits, such as lower trip limits and bag limits, as well as shorter open harvest seasons. In addition, if larger specimens are removed by powerhead gear, they would no longer be available for harvest by other individuals using non-powerhead gear. Should any of the above occur, indirect economic costs may accrue in the form of decreased CS for private and for-hire anglers, decreased NOR for commercial and for-hire businesses, and decreased recreational and commercial fishing expenditures, which would be economically harmful for other fishing-related businesses. These indirect economic effects cannot be quantified with available data.

Prohibiting the use of powerheads in the EEZ of the South Atlantic region to harvest snapper grouper species under **Alternative 3** remove some opportunities to harvest snapper grouper species in the EEZ of the South Atlantic, which may lead to decreased NOR for some commercial and for-hire businesses and decreased CS for some recreational and for-hire anglers. How these potential direct negative economic effects would be incurred by sector would depend on whether **Sub-alternative 3a** and **Sub-alternative 3b** are chosen. Under **Sub-alternative 3a**, the direct negative economic effects would be incurred by the recreational sector while the negative effects would be incurred by the commercial sector under **Sub-alternative 3b**.

While recreational use of powerheads is not tracked by the Marine Recreational Information Program, and is therefore unknown, commercial use of powerheads is accounted for in the Southeast Coastal Fisheries Trip Report Form that is submitted by federally permitted commercial snapper grouper fishermen to the Southeast Fisheries Science Center (SEFSC). Based on landings reported through this form, from 2013 through 2017 an annual average of 82,583 pounds gutted weight of snapper grouper species were commercially landed in the South Atlantic with the use of powerheads[14]. These annual landings accounted for $255,313[14] in trip gross revenue, $107,232 in trip net cash flow, and $61,020 in trip net revenue[15] (2017 dollars). While commercial fishermen may be able to partially compensate for a prohibition on the use of powerhead gear for harvesting snapper grouper species in the EEZ by harvesting these species with the gear in state waters (where legal) or using other gears such as regular spear gear, the above-stated revenue and cash flow estimates represent an upper bound estimation of the potential direct negative economic effects of **Sub-alternative 3b.**

Alternative 3 would align federal regulations for the use of powerhead gear throughout the South Atlantic EEZ. Doing so may result in indirect economic benefits by enhancing compliance with and enforcement of such regulations in comparison to **Alternative 1 (No Action)**. **Alternative 3** may also lead to decreased harvest of snapper grouper species in general, or reduced harvest of larger specimens of exceptional biological benefit to a fish stock. Such harvest changes would be a direct cost to current users of powerhead gear, as described in the previous paragraph, but could also increase the size or reproductive capacity of some stocks. In turn, this could lead to more exploitable fish in the future, higher catch rates, and less stringent harvest limits, such as higher trip limits and bag limits, as well as longer open harvest seasons. Additionally, because larger specimens would no longer be removed via powerheads, as under **Alternative 1 (No Action)**, these fish would be available for harvest by individuals using non-powerhead gear. Should any of these changes occur, indirect economic benefits may accrue in the form of increased CS for private and for-hire anglers, increased NOR for commercial and for-hire businesses, and increased recreational and commercial fishing expenditures, which would be economically beneficial for other fishing-related businesses. These indirect economic effects cannot be quantified with available data.

In terms of potential direct costs, **Preferred Alternative 2** would have the lowest direct costs, followed by **Alternative 1 (No Action)**, and **Alternative 3**. In terms of potential indirect economic benefits, **Alternative 3** has the potential to yield the highest benefits, followed by **Alternative 1 (No Action)**, and **Preferred Alternative 2**.

[14] SEFSC Socioeconomic Panel (Version 7) accessed by the SEFSC Economic Query System (May 2019).

[15] According to Overstreet, Perruso, and Liese (2018), from 2014 through 2016, "trip net cash flow" from snapper grouper trips was 42% of the gross trip revenue, while "trip net revenue" was 23.9% of the gross trip revenue. "Trip net cash flow" represents the additional flow of money to the business from taking a trip, while "trip net revenue" represents economic profit at the trip level and thus is the best measure of net economic benefits. "Trip net cash flow" is gross revenue minus the costs for fuel, bait, ice, groceries, miscellaneous, and hired crew. "Trip net revenue" is gross revenue minus the costs for fuel, bait, ice, groceries, miscellaneous, hired crew, as well as the opportunity cost of the owner's time as captain.

4.3.3 Social Effects

Alternative 1 (No Action) is not anticipated to result in positive or negative social effects to communities engaged in the snapper grouper fishery. **Preferred Alternative 2** would align regulations for powerhead use in federal waters off South Carolina with regulations throughout the rest of the South Atlantic EEZ. Creating consistency in regulations throughout federal waters would be expected to reduce confusion among commercial and recreational dive fishermen and aid in compliance and enforcement efforts resulting in indirect positive social effects. Alternatively, allowing powerhead use off South Carolina may result in localized depletion of heavily fished reef areas, especially of larger species, delaying repopulation. Should this localized depletion result in deterioration of snapper grouper fish stocks, fishing communities may experience negative social effects associated with decreased access in the form of more stringent regulations. These negative social effects would be experienced by private recreational, commercial, and for-hire fishermen participating in the snapper grouper fishery regardless of gear type utilized. This could increase conflict between fishermen participating in the dive component of the snapper grouper fishery and other snapper grouper user groups.

Alternative 3 would align regulations for powerhead use in federal waters throughout the South Atlantic EEZ with regulations in the federal waters off South Carolina. Prohibiting the use of powerhead gear for harvesting snapper grouper species would create consistency in regulations throughout federal waters and would be expected to reduce confusion among commercial and recreational dive fishermen and aid in compliance and enforcement efforts resulting in indirect positive social effects. Prohibiting the use of powerheads would result in negative short-term social effects to fishing communities that participate in the dive component of the snapper grouper fishery and utilize powerheads. Those for-hire and commercial fishermen would need to adjust their businesses in order to compensate for the decrease in access. Alternatively, prohibiting powerheads may prevent localized depletion and allow larger fish to survive, improving the sustainability of the fishery and resulting in direct long-term social benefits to fishing communities in the form of increased access for all sectors and components of the snapper grouper fishery.

The full extent of positive and/or negative social effects will depend on whether **Preferred Sub-alternative 2a** and **Sub-Alternative 3a** or **Preferred Sub-alternative 2b** and **Sub-alternative 3b** are chosen as preferred. Creating inconsistent regulations for the commercial and recreational sectors may increase confusion among snapper grouper dive fishermen causing direct negative effects to compliance and enforcement efforts. Additionally, user group conflict may increase if one sector feels the dive component of the other sector is responsible for negative effects to snapper grouper stocks.

4.3.4 Administrative Effects

Alternative 1 (No Action) would not create additional administrative effects. **Preferred Alternative 2** would create short-term, moderate adverse administrative effects on the NMFS Office of Sustainable Fisheries. Fishery Bulletins and the NMFS web site also would be used to notify fishery participants of removal of the powerhead prohibition. **Alternative 3** would create moderate adverse administrative effects since it would require extensive coordination between the NMFS Office of Sustainable Fisheries and the Office of Law Enforcement. Fishery Bulletins and the NMFS web site would also be used to notify fishery participants upon implementation of

the powerhead prohibition. Because powerhead use is allowed off three of the four states within the Council's jurisdiction, substantial outreach would be necessary to educate stakeholders. A powerhead prohibition would require at-sea enforcement. The education and outreach component of this provision would create a relatively short-term impact on the administrative environment; however, enforcement of its implementing regulations would be ongoing.

Chapter 5. Council's Choice for the Preferred Alternative

5.1 Action 1. Specify requirements for the use of descending devices* and/or venting devices** when possessing species in the snapper grouper fishery management unit.

5.1.1 Snapper Grouper Advisory Panel Comments and Recommendations

5.1.2 Scientific and Statistical Committee Comments and Recommendations

5.1.3 Public Comments and Recommendations

5.1.4 South Atlantic Council's Choice for Preferred Alternative

5.2. Action 2. Modify the requirement for the use of non-stainless-steel circle hooks when fishing for and/or possessing snapper grouper species with hook-and-line gear.

5.2.1 Snapper Grouper Advisory Panel Comments and Recommendations

5.2.2 Scientific and Statistical Committee Comments and Recommendations

5.2.3 Public Comments and Recommendations

5.2.4 South Atlantic Council's Choice for Preferred Alternative

5.3 Action 3. Adjust powerhead prohibitions in the South Atlantic Region.

5.2.1 Snapper Grouper Advisory Panel Comments and Recommendations

5.2.2 Scientific and Statistical Committee Comments and Recommendations

5.2.3 Public Comments and Recommendations

5.2.4 South Atlantic Council's Choice for Preferred Alternative

Chapter 6. Cumulative Effects

6.1 Affected Area

The immediate impact area would be the federal exclusive economic zone (EEZ) 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 **Chapter 3**. For this action, the CEA includes an analysis of actions and events dating back to 1983 when the original Snapper Grouper FMP was implemented, and through what is expected to take place in the reasonably foreseeable future. For the actions found in Regulatory Amendment 29 (Regulatory Amendment 29) to the Fishery Management Plan (FMP) for the Snapper Grouper fishery of the South Atlantic Region (Snapper Grouper FMP), the cumulative effects analysis (CEA) includes an analysis of data from 2013 through 2018.

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

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 D (History of Management)**.

Past Actions

Amendment 4 to the Snapper Grouper FMP, effective January 1, 1992, prohibited powerhead use in designated special management zones off South Carolina.

Amendment 7 to the Snapper Grouper FMP, effective January 23, 1995, prohibited the use of explosive charges, including powerheads, to harvest snapper grouper species in the EEZ off South Carolina.

Amendment 16 to the Snapper Grouper FMP, effective July 29, 2009, included an action requiring the use of venting and dehooking tools for a person on board a vessel to fish for snapper grouper species in the South Atlantic EEZ. The venting tool requirement was not approved by the National Marine Fisheries Service (NMFS) based on information obtained during public comment on the amendment that indicated the benefits of venting remained unclear and, in some cases, might increase mortality of some species, depending on capture depth.

Amendment 17A to the Snapper Grouper FMP, effective March 3, 2011, required the use of non-stainless-steel circle hooks when fishing for snapper grouper species with hook-and-line gear and natural bait north of 28 degrees North latitude in the South Atlantic EEZ.

Present Actions

The Vision Blueprint Recreational Regulatory Amendment 26 to the Snapper Grouper FMP considers actions to establish a recreational deep-water aggregate, and specify the recreational season and bag limit for species in the deep-water aggregate. The regulatory amendment would also remove the recreational minimum size limit for deep-water species, modify the recreational minimum size limit for gray triggerfish off east Florida, and modify the bag limit for the 20-Fish aggregate. The Council approved the amendment for Secretarial review at their December 2018 Council meeting.

The Vision Blueprint Recreational Regulatory Amendment 27 to the Snapper Grouper FMP considers actions to modify commercial regulations for blueline tilefish, snowy grouper, greater amberjack, red porgy, vermilion snapper, almaco jack, Other Jacks Complex, queen snapper, silk snapper, blackfin snapper, and gray triggerfish. Actions include modifying fishing seasons, trip limits, and minimum size limits. The Council approved the amendment for Secretarial review at their September 2018 Council meeting.

Regulatory Amendment 30 to the Snapper Grouper FMP would revise the rebuilding schedule for red grouper based on the most recent stock assessment and modify the spawning season closure of red grouper for the commercial and recreational sectors in the EEZ off North and South Carolina. The amendment also includes an action to establish a commercial trip limit for red grouper harvested in the South Atlantic EEZ. The Council plans to go final on this amendment at their June 2019 meeting.

Amendment 42 to the Snapper Grouper FMP would add new allowable sea turtle release gear for the commercial and charter/headboat component of the snapper grouper fishery and modify the snapper grouper framework so the Council may more quickly modify sea turtle and other protected resources release gear and handling requirements in the future. The Council approved the amendment for Secretarial review at their March 2019 meeting.

Reasonably Foreseeable Future Actions

Comprehensive Acceptable Biological Catch (ABC) Control Rule Amendment (Amendment 45 to the Snapper Grouper FMP) would modify the ABC control rule, specify an approach for determining the acceptable risk of overfishing and the probability of rebuilding success for overfished stocks, allow phase-in of ABC changes, and allow carry-over of unharvested catch. This amendment will continue being developed in 2019.

Amendment 46 to the Snapper Grouper FMP proposes actions to focus on private recreational permit requirements and reporting. Development of this amendment is currently on hold.

Regulatory Amendment 31 to the Snapper Grouper FMP (included in the Comprehensive Recreational Accountability Measures Amendment) could include actions to revise recreational accountability measures to allow more flexibility in managing recreational fisheries.

Expected Impacts from Past, Present, and Future Actions

The proposed actions in Regulatory Amendment 29 are not expected to result in significant cumulative adverse biological or socio-economic effects (see **Chapter 4**). The proposed actions are intended to modify gear requirements for the snapper grouper fishery to promote best fishing practices and to ensure consistent regulations for the dive component of the snapper grouper fishery. The actions are expected to reduce discards and discard mortality of snapper grouper species and to decrease the burden of compliance with differing regulations for the dive component of the snapper grouper fishery while minimizing, to the extent practicable, adverse social and economic effects.

The proposed action to require a descending device be rigged and ready while fishing for or possessing snapper grouper species could provide increased survivorship and reduced mortality of discarded snapper grouper species, thus resulting in both short and long-term positive biological effects. Under this action some vessel owners and operators would need to purchase or construct qualifying devices and would incur direct costs in doing so. However, the action could increase survivorship of released fish which could lead to improvements in affected fish stocks. This may in turn yield indirect economic benefits through the availability of increased exploitable numbers of fish in the future or less stringent harvest limits such as higher trip limits and bag limits as well as longer open harvest seasons.

The proposed action to consider the use of non-offset non-stainless-steel circle hooks could result in reduced discard mortality for snapper grouper species and result in benefits to the biological environment. However, the action would result in direct costs for participants involved in the snapper grouper fishery that do not already own non-offset circle hooks.

The proposed action to allow the use of powerheads off South Carolina would increase the potential for localized depletion of snapper grouper on reefs off South. Localized depletion can delay repopulation of reefs, as long as a year or more, particularly for species that are long-lived. The greatest impact would be on larger species that aggregate around artificial and natural reefs at certain times of the year. However, the action would align federal regulations for the use of this gear with other areas of the South Atlantic EEZ and doing so may result in indirect economic benefits by enhancing compliance with and enforcement of such regulations and may also provide additional opportunities to harvest snapper grouper species in the EEZ off of South Carolina.

The likely cumulative biological effects of the actions would be reduced discards and associated dead discards of snapper grouper species. Potential socioeconomic effects would be improved commercial fishing opportunities, and benefits to associated businesses and communities.

When combined with the impacts of past, present, and future actions affecting the snapper grouper fishery, minor cumulative impacts are likely to accrue, such as biological and socio-economic benefits associated with reduced snapper grouper discards and discard mortality, but also costs associated with newly required gear for the commercial and recreational sectors. These cumulative effects however, are not expected to rise to a level of significance.

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 Regulatory Amendment 29 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 SEDAR 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 alternatives on the human environment appear in **Chapter 4** of this document. None of the impacts of the actions 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 species, 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 EEZ. These actions are 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 actions are 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 actions are 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 are being collected through the Southeast Fishery Information Survey and the Marine Resources Monitoring Assessment and Prediction Program. The effects of the proposed actions are, and would continue to be, monitored through collection of commercial landings data by the four states in the South Atlantic Region (Florida, Georgia, South Carolina, and North Carolina). The NMFS would continue to monitor and collect information on snapper grouper species for stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations. The proposed actions relate to the harvest of indigenous species in the Atlantic, and the activities/regulations being altered do not introduce non-indigenous species and are not reasonably expected to facilitate the spread of such species through depressing the populations of native species. Additionally, these alternatives do not propose any activity, such as increased ballast water discharge from foreign vessels, which is associated with the introduction or spread of non-indigenous species.

Chapter 7. List of Preparers

Name	Agency/Division	Title
Frank Helies	SERO/SF	IPT Lead/Fishery Biologist
Christina Wiegand	SAFMC	IPT Lead/Social Scientist
Brian Cheuvront	SAFMC	Deputy Executive Director for Management
Mike Errigo	SAFMC	Data Analyst
Myra Brouwer	SAFMC	Fishery Biologist
Chip Collier	SAFMC	Fishery Biologist
John Hadley	SAFMC	Economist
Dave Records	SERO/SF	Economist
Christina Package-Ward	SERO/SF	Social Scientist
Alisha DiLeone	SERO/SF	Data Analyst
Kurtis Gregg	SERO/HC	Fishery Biologist
Joelle Godwin	SERO/SF	Technical Writer and Editor
Patrick Opay	SERO/PR	Biologist
Monica Smit-Brunello	NOAA/GC	General Counsel
Kate Siegfried	SEFSC	Fishery Biologist
Scott Crosson	SEFSC	Economist

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, OLE= Office of Law Enforcement

Chapter 8. Agencies and Persons Consulted

Responsible Agencies
South Atlantic Fishery Management Council (Administrative Lead)
4055 Faber Place Drive, Suite 201
N. Charleston, South Carolina 29405
843-571-4366/ 866-SAFMC-10 (TEL)
843-769-4520 (FAX)
www.safmc.net

NMFS, Southeast Region
263 13th Avenue South
St. Petersburg, Florida 33701
727- 824-5301 (TEL)
727-824-5320 (FAX)

List of Agencies, Organizations, and Persons Consulted
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
National Marine Fisheries Service
- Washington Office
- Office of Ecology and Conservation
- Southeast Regional Office
- Southeast Fisheries Science Center

Chapter 9. References

Buck, Kari MacLauchlin. 2018. Socio-economic profile of the snapper grouper commercial fishery in the South Atlantic region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

Bacheler, N. M. and J. A. Buckel. 2004. Does hook type influence catch rate, size, and injury of grouper in a North Carolina commercial fishery? Fisheries Research 69:303-311.

Bellquist, L., S. Beyer, M. Arrington, J. Maeding, A. Siddall, P. Fischer, J. Hyde, and N. C. Wegner. 2019. Effectives of descending devices to mitigate the effects of barotrauma among rockfishes (*Sebastes spp*.) in California recreational fisheries. Fisheries Research. 215: 44-52.

Burns, K. M. 2009. Evaluation of the efficacy of the minimum size rule in the red grouper and red snapper fisheries with respect to J and circle hook mortality and barotrauma and the consequences for survival and movement. Ph.D. Dissertation. College of Marine Science, University of South Florida. 183 pp.

Burns, K. M, and J. T. Froeschke. 2012. Survival of red grouper (*Epinephalus morio*) and red snapper (*Lutjanus campechanus*) caught on J-hooks and circle hooks in the Florida recreational and recreational-for-hire fisheries. Bulletin of Marine Science. 88(3): 633–646.

Burns, K. M., N. F. Parnell, and R. R. Wilson. 2004. Partitioning release mortality in the undersized red snapper bycatch: comparison of depth versus hooking effects. Mote Marine Laboratory Technical Report No. 932.

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

Collins, M. R., J. C. McGovern, G. R. Sedberry, H. S. Meister and R. Pardieck. 1999. Swim bladder deflation in black sea bass and vermilion snapper: potential for increasing postrelease survival. North American Journal of Fisheries Management. 19(3): 828–832.

Cooke, S. J. and C. D. Suski. 2004. Are circle hooks an effective tool for conserving marine and freshwater recreational catch-and-release fisheries? Aquatic Conservation: Marine and Freshwater Ecosystems 14: 299-326.

Cooke, S. J., Nguyen, V. M., Murchie, K. J., Danylchuk, A. J. and C. D. Suski, 2012. Scientific and stakeholder perspectives on the use of circle hooks in recreational fisheries. Bulletin of Marine Science, 88(3), pp.395-410.

Curtis, J. M., M. W. Johnson, S. L. Diamond, and G. W. Stunz. 2015. Quantifying delayed mortality from barotrauma impairment in discarded red snapper using acoustic telemetry. Marine and Coastal Fisheries. 7: 434-449.

Diamond, S. L., T. Hedrick-Hopper, G. Stunz, M. Johnson, and J. Curtis. 2011. Reducing discard mortality of red snapper in the recreational fisheries using descender hooks and rapid recompression. Final report, grant no. NA07NMF4540078, 52 p.

Drumhiller, K. L., M. W. Johnson, S. L. Diamond, M. M. Reese Robillard, and G. W. Stunz. 2014. Venting or rapid recompression increase survival and improve recovery of red snapper with barotrauma. Marine and Coastal Fisheries. 6: 190-199.

Eberts, R. L. and C. M. Somers. 2017. Venting and descending provide equivocal benefits for catch-and-release survival: study design influences effectiveness more than barotrauma relief method. North American Journal of Fisheries Management. 37(3): 612-623.

Haab, T., Hicks, R. L., Schnier, K., Whitehead, J. C. 2012. Angler heterogeneity and the species-specific demand for marine recreational fishing. Working Paper No. 10-02. Appalachian State University, Department of Economics. Available: http://econ.appstate.edu/marfin/. (September 2014).

Harrison, S. 2015. Increasing Survival Rates of Discarded Red Snapper: Best Release Strategies, Fisheries, 40(1):3-4.

Henwood, T., W. Ingram, and M. Grace. 2006. Shark/snapper/grouper longline surveys. NOAA, NMFS, SEFSC, 3209 Frederick Street, Pascagoula, Mississippi 39567. 22 pp.

Holland, S. M., Oh, C., Larkin, S. L., Hodges, A. W. 2012. The operations and economics of the for-hire fishing fleets of the South Atlantic states and the Atlantic coast of Florida. University of Florida. Available: *https://fred.ifas.ufl.edu/pdf/Holland.pdf*. (December 2018).

Jacob, S., P. Weeks, B. Blount, and M. Jepson. 2013. Development and evaluation of social indicators of vulnerability and resiliency for fishing communities in the Gulf of Mexico. Marine Policy 37:86-95.

Jepson, M. and L. L. Colburn. 2013. Development of social indicators of fishing community vulnerability and resilience in the U.S. Southeast and Northeast Regions. U.S. Dept. of Commerce, NOAA Technical Memorandum NMFS-F/SPO-129, 64 p.

Mapleston, A., D. Welch, G. A. Begg, M. McLennan, D. Mayer, and I. Brown. 2007. Effects of changes in hook patter and size on catch rate, hooking location, injury and bleeding for a number of tropical reef fish species. Fisheries Research, 2008, Vol 91 p 203-211.

McGovern, J. C., G. R. Sedberry, H. S. Meister, T. M. Westendorff, D. M. Wyanski, and P. J. Harris. 2005. A tag and recapture study of gag, *Mycteroperca microlepis*, from the Southeastern United States. Bulletin of Marine Science. 76:47-59.

NMFS. 2011. A Users Guide to the National and Coastal State I/O Model. 2011. www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.pdf (accessed February 2016).

NMFS (National Marine Fisheries Service). 2016. Endangered Species Act Section 7 consultation on the continued authorization of snapper grouper fishing in the U.S. South Atlantic EEZ as managed under the Snapper Grouper Fishery Management Plan (SGFMP) of the South Atlantic Region, including Proposed Regulatory Amendment 16 to the SGFMP. Biological Opinion. December 1.

NMFS. 2017. Fisheries Economics of the United States, 2015. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-170, 247p.

Ostrand, K. G., M. J. Siepker, S. J. Cooke, D. P. Philipp, and D. H. Wahl, 2005. A review of the effects of catch-and-release angling on black bass, *Micropterus spp*.: implications for conservation and management of populations. Fisheries Research 2005, Vol 74 p 306-311.

Overstreet, E., L. Perruso, and C. Liese. 2018. Economics of the U.S. South Atlantic Snapper-Grouper Fishery - 2016. NOAA Technical Memorandum NMFS-SEFSC-730. 104 p.

Pulver, J. R. 2017. Sink or swim? Factors affecting immediate discard mortality for the Gulf of Mexico commercial reef fish fishery. Fisheries Research, 188:166-172.

Rice, P. H., J. E. Serafy, D. Snodgrass, and E. D. Prince. 2012. Performance of non-offset and 10 offset 18/0 circle hooks in the United States pelagic longline fishery. Bulletin of Marine Science, 88(3), pp.571-587.

Runde, B. J., and J. A. Buckel. 2018. Descender devices are promising tools for increasing survival in deepwater groupers. Marine and Coastal Fisheries; Dynamics, Management, and Ecosystem Science. 10: 100-117.

SAFMC (South Atlantic Fishery Management Council). 1991. Amendment 4, Regulatory Impact Review, Initial Regulatory Flexibility Analysis and Environmental Assessment for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 200 pp.

SAFMC (South Atlantic Fishery Management Council). 1994. Amendment 7, Regulatory Impact Review, Social Impact Assessment, Initial Regulatory Flexibility Analysis and Supplemental Environmental Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Ste 306, Charleston, S.C. 29407-4699. 110 pp.

Sauls, B. and O. Ayala. 2012. Circle hook requirements in the Gulf of Mexico: application in recreational fisheries and effectiveness for conservation of reef fishes. Bulletin of Marine Science, 88:667-679.

Stokes, L. W., S. P. Epperly, and K. J. McCarthy. 2012. Relationship between hook type and hooking location in sea turtles incidentally captured in the United States Atlantic pelagic longline fishery. Bulletin of Marine Science, 88(3), 703-718.

Swimmer, Y., R. Arauz, J. Wang, J. Suter, M. Musyl, A. Bolaños, and A. López. 2010. Comparing the effects of offset and non-offset circle hooks on catch rates of fish and sea turtles in a shallow longline fishery. Aquatic Conservation: Marine and Freshwater Ecosystems, 20(4), pp.445-451.

Swimmer, Y, A. Gutierrez, K. Bigelow, C. Barceló, B. Schroeder, K. Keene, K. Shattenkirk, and D. G. Foster. 2017. Sea Turtle Bycatch Mitigation in U.S. Longline Fisheries. Front. Mar. Sci. 4:260.

Watson, J. W., S. P. Epperly, A. K. Shah, and D. G. Foster. 2005. Fishing methods to reduce sea turtle mortality associated with pelagic longlines. Can J Fish Aquat Sci. 62:965–981. http://dx.doi. org/10.1139/f05-004.

Wilde, G. R. 2009. Does venting promote survival of released fish? American Fisheries Society, Fisheries 34(1):20-28.

Appendix A. Considered but Rejected Alternatives

Action 2. Modify the requirement for the use of non-stainless-steel circle hooks when fishing for and/or possessing snapper grouper species with hook-and-line gear.

Alternative 2. Require the use of non-stainless-steel circle hooks when fishing for and/or possessing species in the snapper grouper fishery management unit with hook-and-line gear and natural baits in the exclusive economic zone:

Sub-alternative 2a. throughout the extent of the South Atlantic Council's jurisdiction (North Carolina/Virginia border through Key West, Florida).

Discussion: The South Atlantic Fishery Management Council (Council) removed this alternative during their March 2019 meeting. There are additional alternatives under Action 2 that would allow the Council to require the use of circle hooks in federal waters throughout the South Atlantic.

Alternative 5. Remove the requirement for use of non-stainless-steel circle hooks when fishing for and/or possessing species in the snapper grouper fishery management unit with hook-and-line gear and natural baits north of 28 degrees north latitude:

Sub-alternative 5a. private recreational and for-hire vessels.

Sub-alternative 5b. commercially permitted South Atlantic snapper grouper vessels.

Discussion: The South Atlantic Fishery Management Council (Council) removed this alternative during their March 2019 meeting. The Council felt removing the requirement for non-stainless-steel circle hooks did not meet the purpose and need of the amendment to promote the use of best fishing practices in order to reduce discards and discard mortality of snapper grouper species. Removing requirements for circle hooks could have a negative impact on the survivorship of released fish and negatively affect the long-term sustainability of the snapper grouper fishery.

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.

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.

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

Directed Fishery: Fishing directed at a certain species or species group.

Discards: Fish captured but released at sea.

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).

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.

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.

Gulf of Mexico Fishery Management Council (GMFMC): 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 GMFMC develops fishery management plans for fisheries off the coast of Texas, Louisiana, Mississippi, Alabama, and the west coast of Florida.

Head Boat: A fishing boat that charges individual fees per recreational angler on board.

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.

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.

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.

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.

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.

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.

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

Appendix C. Other Applicable Law

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. Regulatory Amendment 29 (Regulatory Amendment 29) to the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP) 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. Regulatory Amendment 29 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 (2016 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.

Additionally, since publication of the 2016 Opinion, NMFS has published two additional final listing rules. On January 22, 2018, NMFS listed the giant manta ray (*Manta birostris*) as threatened under the ESA, effective February 21, 2018. On January 30, 2018, NMFS listed the oceanic whitetip shark (*Carcharinus longimanus*) as threatened under the ESA, effective March 1, 2018. In a June 11, 2018, memo NMFS documented ESA Section 7(a)(2) and Section 7(d) determinations for allowing the continued authorization of fishing managed by the Snapper Grouper FMP, during reinitiation of ESA consultation on this fishery, for its effects on the giant manta ray and the oceanic whitetip shark. Based on the analysis, NMFS determined that allowing the proposed action to continue during the reinitiation period will not violate Section 7(a)(2) or 7(d). This Section 7(a)(2) determination is only applicable to the proposed action during the reinitiation period and does not address the agency's long-term obligation to ensure its actions are not likely to jeopardize the continued existence of any listed species or destroy or adversely modify critical habitat.

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 3.2.2 (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 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.

1.7 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.

1.8 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.

1.9 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.

1.10 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 proposed 2019 MMPA List of Fisheries (83 FR 53422)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 proposed 2019 MMPA List of Fisheries (83 FR 53422). 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.

1.11 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.

1.13 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.

1.14 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 D. History of Management

South Atlantic Snapper Grouper History of Management
Last Updated: 5/6/19

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 (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR 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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Emergency Rule	8/3/90	55 FR 32257	• Added wreckfish to the fishery management unit (FMU); o Fishing year beginning 4/16/90; o Commercial quota of 2 million pounds; o 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 (1989)	11/02/90	PR: 55 FR 28066 FR: 55 FR 40394	• Established artificial reef at Key Biscayne, FL as SMZ; • 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; o Defined optimum yield (OY) and overfishing; o Required permit to fish for, land or sell wreckfish; o Required catch and effort reports from selected, permitted vessel; o Established control date of 03/28/90; o Established a fishing year for wreckfish starting April 16; o Established a process to set annual quota, with initial quota of 2 million pounds; provisions for closure; o Established 10,000-pound trip limit; o Established a spawning season closure for wreckfish from January 15 to April 15; o Provided for annual adjustments of wreckfish management measures.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
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; • 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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Amendment #5 (1992a)	04/06/92	PR: 56 FR 57302 FR: 57 FR 7886	• For wreckfish: o Established limited entry system with individual transferable quotas (ITQs); o Required dealer to have permit; o Rescinded 10,000 lb. trip limit; o Required off-loading between 8 am and 5 pm; o Reduced occasions when 24-hour advance notice of offloading required for off-loading; o 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): o Modified definition of BSB pot; o Allowed multi-gear trips for BSB; o Allowed retention of incidentally-caught fish on BSB trips.
Emergency Rule Extension	11/30/92	57 FR 56522	• For Black Sea Bass: o Modified definition of BSB pot; o Allowed multi-gear trips for BSB; o Allowed retention of incidentally-caught fish on BSB trips.
Regulatory Amendment #4 (1992b)	07/06/93	FR: 58 FR 36155	• For Black Sea Bass: o Modified definition of BSB pot; o Allowed multi-gear trips for BSB; o 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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Amendment #6 (1993)	06/27/94	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 Magnuson-Stevens Act.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
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: o 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; o Granted transferable permit with unlimited landings if vessel landed ≥ 1,000 pounds (lb) of snapper grouper species in any of the years; o 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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
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 (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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Amendment #11 (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: o 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) o Vermilion snapper: overfished (static SPR = 21-27%) o Red porgy: overfished (static SPR = 14-19%). o Red snapper: overfished (static SPR = 24-32%) o Gag: overfished (static SPR = 27%) o Scamp: no longer overfished (static SPR = 35%) o Speckled hind: overfished (static SPR = 8-13%) o Warsaw grouper: overfished (static SPR = 6-14%) o Snowy grouper: overfished (static SPR = 5-15%) o White grunt: no longer overfished (static SPR = 29-39%) o Golden tilefish: overfished (couldn't estimate static SPR) o Nassau grouper: overfished (couldn't estimate static SPR) o Goliath grouper: overfished (couldn't estimate 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: o MSY=4.38 mp; OY=45% static SPR; MFMT=0.43; MSST =7.34 mp; rebuilding timeframe=18 years (1999=year 1); o no sale of red porgy during Jan-April; o 1 fish bag limit; o 50 lb. bycatch commercial trip limit May-December; o Modified management options and list of possible framework actions.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
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.
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; • <u>Snowy Grouper</u> • Commercial: o 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. o Trip limit = 275 lb gw in year 1, 175 lb gw in year 2, and 100 lb gw in year 3 onwards; • Recreational: o Limit possession to one snowy grouper in 5 grouper per person/day aggregate bag limit; • <u>Golden Tilefish</u> • Commercial: o 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: o Limited possession to 1 golden tilefish in 5 grouper per person/day aggregate bag limit; • <u>Vermilion Snapper</u> • Commercial: o Quota of 1,100,000 lb gw; • Recreational: o 12” TL size limit. • <u>Black Sea Bass</u> • Commercial: o 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; o 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; o Required black sea bass pots be removed from the water when the quota is met; o Changed fishing year from calendar year to June 1 – May 31;

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
			• Recreational: o Recreational allocation of 633,000 lb gw in year 1, 560,000 lb gw in year 2, and 409,000 lb gw in year 3 onwards. Increased the minimum size limit from 10" to 11" in year 1 and to 12" in year 2; o Reduced recreational bag limit from 20 to 15 per person per day; o Changed fishing year from the calendar year to June 1 through May 31. • Red Porgy • Commercial and recreational: o Retained 14" TL size limit and seasonal closure (retention limited to the bag limit); o 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; o 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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Amendment #15B (2008b)	12/16/09, except for the amendments to § 622.18(c) was effective 11/16/2009; the amendment to § 622.10(c) was effective 2/16/2010; and §§ 622.5, 622.8, and 622.18(b)(1)(ii) required OMB approval.	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 regardless of where 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; • Established allocations for snowy grouper (95% commercial & 5% recreational); • Established allocations for red porgy (50% commercial & 50% recreational).

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Amendment #16 (2009a)	7/29/09	PR: 74 FR 6297 FR: 74 FR 30964	• Specified status determination criteria for gag and vermilion snapper; • Gag: o Specified interim allocations 51% commercial & 49% recreational; o Recreational and commercial shallow water grouper spawning closure January through April; o Directed commercial quota= 352,940 lb gw; o Reduced 5-fish aggregate grouper bag limit, including tilefish species, to a 3-fish aggregate; o Captain and crew on for-hire trips cannot retain the bag limit of vermilion snapper and species within the 3-fish grouper aggregate; • Vermilion snapper: o Specified interim allocations 68% commercial & 32% recreational; o Directed commercial quota split Jan-June=315,523 lb gw and 302,523 lb gw July-Dec; o Reduced bag limit from 10 to 4 and a recreational closed season November through March; • Required possession of dehooking tools when catching snapper grouper species to reduce recreational and commercial bycatch mortality.
Amendment #19 (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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Amendment #17A (2010a)	12/3/10 red snapper closure; circle hooks 3/3/2011	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 and natural bait north of 28 deg. N latitude in the South 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)	1/31/11	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 (97% commercial, 3% recreational), 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);
Notice of control date	1/31/11	76 FR 5325	• Anyone entering federal snapper grouper fishery off S. Atlantic states after 09/17/10 was not assured of future access if limited entry program developed.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
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; • Set black sea bass recreational bag limit at 5 fish per person per day
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);
Amendment # 25 (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; • Established jurisdictional ABC allocations between the SAFMC and GMFMC for yellowtail snapper, mutton snapper, and black grouper; • 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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Amendment #23 (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	• Modified the rebuilding strategy, ABC , ACL, ACT for black sea bass; • 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: o Defined and reverted inactive shares; o Redistributed reverted shares; o Established a share cap; o 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;
Emergency Rule	11/7/2012, through 5/6/2013	77 FR 66744	• Increased the commercial ACL for yellowtail snapper from 1,142,589 lb to 1,596,510 lb.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Amendment #18B (2013a)	5/23/13	PR: 77 FR 75093 FR: 77 FR 23858	• For Golden Tilefish: o Limited participation and effort in the commercial sector through establishment of a longline endorsement; o Established eligibility requirements and allowed transferability of longline endorsement; o Established an appeals process; o Modified trip limits; o Specified allocations and ACLs for gear groups (longline:85% and hook-and-line:15%);
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 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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
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 South Atlantic 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 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 (2013h)	1/27/2014	PR: 78 FR 59641 FR: 78 FR 78779	• Required electronic reporting for headboat vessels at weekly intervals.
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.
Generic Dealer Amendment (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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
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	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.
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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
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 (2015b)	12/28/2015	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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Amendment #34 (2015c)	2/22/2016	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, 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.
Notice of Control Date	6/15/16	76 FR 66244	• Fishermen entering the federal for-hire recreational sector for the Snapper Grouper fishery after June 15, 2016, will not be assured of future access should a management regime that limits participation in the sector be prepared and implemented.
Amendment #35 (2015d)	6/22/2016	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)	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.

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Amendment #36 (2016d)	7/31/17	PR: 82 FR 5512 FR:82 FR 29772	• Established SMZs to enhance protection for snapper-grouper species in spawning condition including speckled hind and warsaw grouper.
Amendment #37 (2016c)	8/24/17	PR: 81 FR 91104 FR:82 FR 34584	• Modified the hogfish fishery management unit; • Specified fishing levels for the two South Atlantic hogfish stocks; • Established a rebuilding plan for the Florida Keys/East Florida stock; • Established/revised management measures for both hogfish stocks in the South Atlantic Region, such as size limits, recreational bag limits, and commercial trip limits.
Emergency Rule (2017a)	Effective 11/2/2017, through 11/31/2017. The recreational red snapper season opened on 11/3/2017, and closed on 11/6/2017; then reopened on 11/10/2017, and closed on 11/13/2017. The commercial red snapper season opened on 11/2/2017.	FR: 82 FR 50839	• Allowed for the limited harvest and possession of red snapper in 2017 by changing the process used to set the ACL, as requested by the Council; • These rules also announced the opening and closing dates of the 2017 recreational fishing season and the opening date for the 2017 commercial fishing season for red snapper

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Interim Rule (2017b)	1/2/2018 through 7/1/2018 and 7/2/2018 through 1/3/2019	PR: 82 FR 50101 FR: 83 FR 65 FR EXT: 83 FR 28387	• Reduced the golden tilefish total ACL, the commercial and recreational sector ACLs, and the quotas for the hook-and-line and longline components of the commercial sector.
Amendment #41 (2017c)	2/10/2018	PR:82 FR 49167 FR:83 FR 1305	• Updated the MSY, ABC, ACL, OY, MSST; • Designated spawning months of April through June for regulatory purposes; • Revised management measures for mutton snapper including the minimum size limit (18 inches total length), recreational bag limit (five mutton snapper per person per day within the ten-snapper aggregate), and commercial trip limit (500 pounds whole weight during January through March and July through December; and during the April through June spawning season, of five mutton snapper per person per day, or five mutton snapper per person per trip, whichever is more restrictive).
Amendment #43 (2017d)	7/26/2018	PR:83 FR 22939 FR:83 FR35428	• Actions addressed overfishing of red snapper by specifying recreational and commercial ACLs beginning in 2018;
Amendment #39 (2017e)	TBD	PR:83 FR 14400	• Weekly electronic reporting for charter vessel operators with a federal for-hire permit; • Reduce the time allowed for headboat operators to complete electronic reports; • Requires location reporting by charter vessels with the same detail currently required for headboat vessels.
Abbreviated Framework #1 (2017f)	8/27/2018	PR:83 FR 14234 FR:83 FR35435	• Adjust the ACLs for South Atlantic red grouper in response to the results of the latest stock assessment.
Regulatory Amendment #28 (2018a)	1/4/2019	PR: 83 FR 48788 FR: 83 FR 62508	• End overfishing of golden tilefish by reducing the ACL based on the most recent stock assessment

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Abbreviated Framework #2 (2018b)	5/9/2019	PR: 84 FR 4758 FR: 84 FR 14021	• Adjusts the annual catch limits for South Atlantic vermilion snapper and black sea bass in response to the results of the latest stock assessments.
Amendment #26	TBD	TBD	• Modify bycatch and discard reporting for commercial and for-hire vessels.
Regulatory Amendment #26	TBD	TBD	• Establish deep-water species aggregate, establish recreational season for dee-water species, modify aggregate bag limit for deep-water species aggregate and 20-fish aggregate, reduce the minimum size limit for gray triggerfish off east FL (recreational) & remove the minimum size limit (recreational) for deep-water snappers (silk, queen, blackfin)
Regulatory Amendment #27	TBD	TBD	• Commercial split seasons (snowy grouper, greater amberjack, red porgy), trip limit modifications (blueline tilefish, vermilion snapper), trip limit for Other Jacks Complex, minimum size limit (commercial only) for almaco jack; reduce minimum size limit for gray triggerfish off east FL & remove the minimum size (commercial) limit for deep-water snappers (silk, queen, blackfin)
Regulatory Amendment #29	TBD	TBD	• Best fishing practices & powerheads
Regulatory Amendment #30	TBD	TBD	• Revise the rebuilding schedule for red grouper; • Establish a commercial trip limit for red grouper;

Document	All Actions Effective By:	Proposed Rule (PR) Final Rule (FR)	Major Actions. *Note: not all details are provided here. Refer to PR/FR for all impacts of listed documents.*
Regulatory Amendment #32	TBD	TBD	• Revise accountability measures for yellowtail snapper to reduce the possibility of in-season closures.
Regulatory Amendment #33	TBS	TBD	• Revise the red snapper season openings.
Amendment #38	TBD	TBD	• Measures for blueline tilefish.
Amendment #42	TBD	TBD	• Modification to sea turtle release gear and snapper grouper framework procedure.
Amendment #44	TBD	TBD	• Long-term management measures for yellowtail snapper.
Amendment #46	TBD	TBD	• Recreational permitting and reporting.

References:

SAFMC (South Atlantic Fishery Management Council). 1983. Fishery Management Plan, Regulatory Impact Review and Final Environmental Impact Statement for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Circle, Suite 306, Charleston, South Carolina, 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1987. Regulatory Amendment 1 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1988a. Amendment 1 and Environmental Assessment and Regulatory Impact Review to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 63 pp.

SAFMC (South Atlantic Fishery Management Council). 1988b. Regulatory Amendment 2 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1989. Regulatory Amendment 3 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1990a. Amendment 2,
to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1990b. Amendment 3, Regulatory Impact Review, Initial Regulatory Flexibility Analysis and Environmental Assessment for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1991. Amendment 4, Regulatory Impact Review, Initial Regulatory Flexibility Analysis and Environmental Assessment for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 200 pp.

SAFMC (South Atlantic Fishery Management Council). 1992a. Amendment 5 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1992b. Regulatory Amendment 4 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1992c. Regulatory Amendment 5 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1993. Amendment Number 6, Regulatory Impact Review, Initial Regulatory Flexibility Analysis and Environmental Assessment for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 155 pp.

SAFMC (South Atlantic Fishery Management Council). 1994a. Amendment 7, Regulatory Impact Review, Social Impact Assessment, Initial Regulatory Flexibility Analysis and Supplemental Environmental Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Ste 306, Charleston, S.C. 29407-4699. 110 pp.

SAFMC (South Atlantic Fishery Management Council). 1994b. Regulatory Amendment 6 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1997. Amendment 8, Regulatory Impact Review, Social Impact Assessment, Initial Regulatory Flexibility Analysis and Supplemental Environmental Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Ste 306, Charleston, S.C. 29407-4699. 124 pp.

SAFMC (South Atlantic Fishery Management Council). 1998a. Regulatory Amendment 7 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1998b. Amendment 9, Final Supplemental Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 246 pp.

SAFMC (South Atlantic Fishery Management Council). 1998c. Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans of the South Atlantic Region (Amendment 10 to the Snapper Grouper Fishery Management Plan). South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1998d. Comprehensive Amendment Addressing Sustainable Fishery Act Definitions and Other Required Provisions in Fishery Management Plans of the South Atlantic Region (Amendment 11 to the Snapper Grouper Fishery Management Plan). South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 151 pp.

SAFMC (South Atlantic Fishery Management Council). 2000a. Amendment Number 12, Regulatory Impact Review, Social Impact Assessment, Initial Regulatory Flexibility Analysis and Supplemental Environmental Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Ste 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 2000b. Regulatory Amendment 8 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 2003. Amendment 13A, Regulatory Impact Review, Initial Regulatory Flexibility Analysis and Environmental Assessment for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 2006. Amendment 13C, Final Environmental Assessment, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Ste 306, Charleston, S.C. 29407-4699. 631 pp.

SAFMC (South Atlantic Fishery Management Council). 2007. Amendment 14, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2008a. Amendment 15A, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2008b. Amendment 15B, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2009a. Amendment 16, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2009b. Comprehensive Ecosystem Based Amendment 1, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for South Atlantic Region (Amendment 19 to the Snapper Grouper FMP). South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405. 286 pp.

SAFMC (South Atlantic Fishery Management Council). 2010a. Amendment 17A, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2010b. Amendment 17B, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2011a. Regulatory Amendment 9, Final Environmental Assessment, Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2011b. Regulatory Amendment 10, Final Environmental Assessment, Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2011c. Regulatory Amendment 11, Final Environmental Assessment, Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2011d. Comprehensive Annual Catch Limit (ACL) Amendment (Amendment 25 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region). South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.
SAFMC (South Atlantic Fishery Management Council). 2011e. Amendment 24 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2011f. Comprehensive Ecosystem Based Amendment 2, Final Environmental Assessment, Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. (Amendment 23 to the Snapper Grouper FMP). South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2012a. Amendment 18A to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2012b. Amendment 20A to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2012c. Regulatory Amendment 12, Final Environmental Assessment, Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013a. Amendment 18B to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013b. Amendment 28 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region . South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013c. Regulatory Amendment 13 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region . South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013d. Regulatory Amendment 15 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region . South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013e. Regulatory Amendment 18 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region . South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013f. Regulatory Amendment 19 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013g. Amendment 27 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013h. Joint Headboat Reporting Amendment (Amendment 31). South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013i. Modifications to federally permitted seafood dealer reporting requirements. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2014a. Regulatory Amendment 14 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2014b. Regulatory Amendment 21 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2014c. Amendment 29 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2014d. Regulatory Amendment 20 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2014e. Amendment 32 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2015a. Regulatory Amendment 15 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2015b. Amendment 33 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2015c. Amendment 34 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2015d. Amendment 35 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2016a. Regulatory Amendment 16 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2016b. Regulatory Amendment 25 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2016c. Amendment 37 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2016d. Amendment 36 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2017a. Amendment 41 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2017b. Modifications to Charter Vessel and Headboat Reporting Requirements (Generic For-hire Reporting Amendment, Snapper Grouper Amendment 39). South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2017a. Red Snapper Emergency Rule to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2017b. Golden Tilefish Interim Rule to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2017c. Amendment 41 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2017d. Amendment 43 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2017e. Amendment 39 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2017f. Abbreviated Framework 1: Red Grouper to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405

SAFMC (South Atlantic Fishery Management Council). 2018a. Regulatory Amendment 28 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405

SAFMC (South Atlantic Fishery Management Council). 2018b. Abbreviated Framework 2 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405

Appendix E. Research and Monitoring Plan for Descending Devices

Action 1 of Regulatory Amendment 29 to the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic (Regulatory Amendment 29) proposes a requirement for descending devices to be onboard vessels fishing for or possessing species in the snapper grouper fishery management unit. The South Atlantic Fishery Management Council (Council) recommends that the National Marine Fishery Service begin monitoring descending device usage rates and continue research that can determine descending device effectiveness at reducing discard mortality. This information may be used to evaluate improvements in the survivorship of released snapper grouper species in order to incorporate new discard mortality estimates into future stock assessments. The following goals represent a comprehensive approach for addressing the use and effectiveness of descending devices.

Goal 1. Monitor the number of fish by species that are being released using descending devices.

- In order to incorporate reductions in release mortality as a result of descending device regulations, it is important to estimate the number of release events attributed to descending devices. This could require new survey methods as well as changes to current mandatory and voluntary survey efforts.

- *Considerations:* Questions addressing descending device use may be incorporated into existing required monitoring programs such as the Marine Recreational Information Program (MRIP), for-hire logbooks, commercial logbooks, and state surveys, and voluntary reporting applications such as MyFishCount. Surveys should gather information beyond simply asking if a descending device is being used. When possible, information on depth fished and the number of fish descended by species should be collected.

Goal 2. Expand barotrauma research to address more snapper grouper species, fishing conditions, and release devices.

- Existing research on the effectiveness of descending devices for reducing release mortality is limited to only a few snapper grouper species and devices. Studies are needed that address the effects of barotrauma and descending devices on additional snapper grouper species under a variety of fishing and oceanographic conditions. Additionally, studies are needed that explore social aspects of descending device use and implementation of Regulatory Amendment 29, including understanding fishermen's perceptions of descending devices, preferred types of descending devices, where fishermen are accessing information on descending devices, and differences in use between sectors.

- *Considerations:* NMFS should conduct research that specifically addresses release mortality for South Atlantic snapper grouper species and include research needs related to descending devices in RFPs for programs such as CRP and MARFIN. The SMART

(Simple Multi-Attribute Rating Technique) Tool should be considered for addressing research needs (https://www.st.nmfs.noaa.gov/recreational-fisheries/tools/smart-tool-home).

Goal 3. Organize a working group and host a workshop to provide recommendations on integrating descending device usage by commercial and recreational fishermen into the management system.

- The purpose of the workshop would be to provide release mortality rate estimates for key snapper grouper species (ex. vermilion snapper, snowy grouper golden tilefish, red grouper, black sea bass, gag grouper, white grunt, red porgy, red snapper) to provide recommendations for revised release mortality rates incorporating descending device usage, and to develop best practices for incorporating revised release mortality rates in stock assessment and management analyses. .

- *Considerations:* Workshop participants should include representatives from the Council's Scientific and Statistical Committee, Snapper Grouper Advisory Panel, NMFS Southeast Fisheries Science Center, NMFS National Observer Program, state agencies, and others with relevant expertise. Participants should review discard mortality rates from available barotrauma studies and consider the reduction in mortality relative to surface release as well as uncertainty in short-term and long-term survival estimates. Where species-specific estimates are unavailable, participants should consider indirect estimates from other species. Differential release mortality rates associated with depth of capture and release should be considered. Finally, participants should discuss an appropriate level of precaution given the uncertainty in descending device usage rates and discard mortality estimates.

Goal 4. Develop outreach material to ensure that snapper grouper fishermen have access to the latest information on descending devices and best fishing practices.

- To ensure effective use of descending devices it is important that fishermen have access to information on available device options, both commercial and self-constructed, as well as their proper usage.

- *Considerations:* Education and outreach information should summarize best fishing practices for a variety of snapper grouper species and conditions. Where possible, information developed by other entities (state-agencies, non-profits) should be incorporated to avoid duplication in effort or conflicting information. NMFS should develop a series of workshops and web-based material designed to educate recreational and commercial snapper grouper fishermen on barotrauma, descending devices and the proper technique for releasing snapper grouper species, as well as other best fishing practices.

Appendix F. Regulatory Impact Review

To be completed.

Appendix G. Regulatory Flexibility Analysis

To be completed.