Vision Blueprint Commercial Regulatory Amendment 27

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

Address specific action items in the 2016-2020 Vision Blueprint for the Commercial Sector of the Snapper Grouper Fishery of the South Atlantic Region.

Environmental Assessment **Regulatory Impact Review** **Regulatory Flexibility Act Analysis**

January 24, 2019

A publication of the South Atlantic Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award Number FNA15NMF4410010

Abbreviations and Acronyms Used in the FMP

ABC	acceptable biological catch
ACL	**annual catch limits**
AM	**accountability measures**
ACT	**annual catch target**
B	**a measure of stock biomass in either weight or other appropriate unit**
BMSY	**the stock biomass expected to exist under equilibrium conditions when fishing at FMSY**
BOY	**the stock biomass expected to exist under equilibrium conditions when fishing at FOY**
BCURR	**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**
F30%SPR	**fishing mortality that will produce a static SPR = 30%**
FCURR	**the current instantaneous rate of fishing mortality**
FMSY	**the rate of fishing mortality expected to achieve MSY under equilibrium conditions and a corresponding biomass of BMSY**
FOY	**the rate of fishing mortality expected to achieve OY under equilibrium conditions and a corresponding biomass of BOY**
FMP	**fishery management plan**
FMU	**fishery management unit**
M	**natural mortality rate**
MARMAP	**Marine Resources Monitoring Assessment and Prediction Program**
MFMT	**maximum fishing mortality threshold**
MMPA	**Marine Mammal Protection Act**
MRFSS	**Marine Recreational Fisheries Statistics Survey**
MRIP	**Marine Recreational Information Program**
MSFCMA	**Magnuson-Stevens Fishery Conservation and Management Act**
MSST	**minimum stock size threshold**
MSY	**maximum sustainable yield**
NEPA	**National Environmental Policy Act**
NMFS	**National Marine Fisheries Service**
NOAA	**National Oceanic and Atmospheric Administration**
OFL	**overfishing limit**
OY	**optimum yield**
RFA	**Regulatory Flexibility Act**
RIR	**Regulatory Impact Review**
SAFMC	**South Atlantic Fishery Management Council**
SEDAR	**Southeast Data Assessment and Review**
SEFSC	**Southeast Fisheries Science Center**
SERO	**Southeast Regional Office**

SIA	**social impact assessment**
SPR	**spawning potential ratio**
SSC	**Scientific and Statistical Committee**

Vision Blueprint Commercial Regulatory Amendment 27 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region

Proposed actions:	Modify commercial regulations such as fishing seasons, trip limits, and minimum size limits for certain species in the snapper grouper fishery.

Responsible Agencies and Contact Persons

South Atlantic Fishery Management Council 4055 Faber Place, Suite 201 North Charleston, South Carolina 29405 IPT lead: Myra Brouwer myra.brouwer@safmc.net	843-571-4366 843-769-4520 (fax) www.safmc.net
National Marine Fisheries Service Southeast Regional Office 263 13th Avenue South St. Petersburg, Florida 33701 IPT lead: Mary Vara mary.vara@noaa.gov	727-824-5305 727-824-5308 (fax) http://sero.nmfs.noaa.gov

Table of Contents

List of Appendices

List of Tables

List of Figures

Summary

Why is the South Atlantic Council considering action?

The Vision Blueprint Regulatory Amendment 27 (Regulatory Amendment 27) to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP) addresses specific action items for the commercial sector in the 2016-2020 Vision Blueprint for the Snapper Grouper Fishery of the South Atlantic Region (Vision Blueprint; SAFMC 2015b). The Vision Blueprint identifies the goals, objectives, strategies, and actions that support the vision for the snapper grouper fishery and centers around four goal areas: Science, Management, Communication, and Governance. During a series of stakeholder meetings in 2014, the South Atlantic Fishery Management Council (South Atlantic Council) gathered input from commercial fishermen throughout the region. In 2015, the South Atlantic Council prioritized action items that would be addressed through amendments to the Snapper Grouper FMP over the next five years. The South Atlantic Council chose to focus on actions that would address “seasonality” and “retention” in the fishery and began development of two amendments to address the commercial and recreational sectors, respectively. Regulatory Amendment 27 includes modifications to commercial sector management measures based on stakeholder input and intends to allow more equitable access, minimize discards, and achieve optimum yield.

The use of split seasons for the commercial sector is addressed under the Vision Blueprint’s Strategy 2.3 - *Support development of management approaches that account for the seasonality of the snapper grouper fishery*. One of the priority actions under that strategy states *Expand the use of split seasons for the commercial fishery*. The intent is to “line up” harvest for species that are often caught together, level out accessibility in different areas, and to reduce regulatory discards. Factors such as distance to fishing grounds and weather/temperature affect availability of some species to the commercial fleets in different parts of the South Atlantic Council’s jurisdiction. Actions 1 through 4 consider split seasons for blueline tilefish, snowy grouper, greater amberjack, and red porgy, respectively.

The use of trip limits for the commercial sector is addressed under the Vision Blueprint’s Strategy 2.1 - *Support development of management approaches that address retention of snapper grouper species*. The first priority action under this strategy is to consider trip limit adjustments for the commercial sector to lengthen seasons and better utilize annual catch limits. Modification to trip limits for blueline tilefish, greater amberjack, red porgy, and vermilion snapper are considered under Actions 1, 3, 4, and 5, respectively. Specifying a trip limit for the Other Jacks Complex is addressed in Action 7.

Removal of minimum size limits for deep-water species is addressed in the Vision Blueprint Strategy 4.2 (in Appendix B of the Vision Blueprint) - *Consider management approaches that address the impact of depth on bycatch of snapper grouper species.* Three deep-water snappers—silk snapper, queen snapper, and blackfin snapper—are managed under a 12-inch total length minimum size limit in federal waters. These minimum size limits were put in place early in the management of the snapper grouper fishery, before estimates of discard mortality were available, and long before the creation of the various species complexes in the Snapper Grouper FMP. Species in the Deep-water Complex (yellowedge grouper, silk snapper, misty grouper, queen snapper, sand tilefish, and blackfin snapper) are typically associated with high discard mortality. To curb potential discard losses, the South Atlantic Council is considering action to eliminate minimum size limit requirements for queen snapper, silk snapper, and blackfin snapper in Action 8. The remaining species in the Deep-water Complex do not have a minimum size limit requirement.

Actions 6 and 9 address minimum size limits for almaco jack and gray triggerfish, respectively. Action 6 was suggested due to concern from snapper grouper commercial permit holders about the small size and resulting poor commercial value of some of the fish being landed. In 2015, a gray triggerfish commercial minimum size limit of 12 inches fork length was implemented in federal waters off North Carolina, South Carolina, and Georgia, and a commercial minimum size limit of 14 inches fork length was put in place in federal waters off east Florida. This was a precautionary action in response to concerns about the status of the South Atlantic gray triggerfish stock, to align east Florida regulations with those in the Gulf of Mexico, and achieve consistency between state and federal regulations off the east coast of Florida. However, after the new minimum size limit went into effect (on July 1, 2015), stakeholders in Florida voiced concern to the Florida Fish and Wildlife Conservation Commission (FWC) regarding increasing discards of gray triggerfish in south Florida where the average size of gray triggerfish is smaller than that off northeast Florida. In response, the FWC reduced the recreational minimum size limit of gray triggerfish to 12 inches fork length in November 2015 and requested that the South Atlantic Council follow suit in issuing consistent regulations.

Purpose for Actions

The purpose of this amendment is to address commercial stakeholder input to enable equitable access for fishermen participating in the snapper grouper fishery, and to minimize discards to the extent practicable while improving marketability for some species.

Need for Actions

The need for this amendment is to improve management of the commercial sector of the snapper grouper fishery to achieve optimum yield, while minimizing, to the extent practicable, adverse socio-economic effects for commercial fishermen in the South Atlantic Region.

What actions are being proposed in this framework amendment?

Regulatory Amendment 27 proposes the following nine actions for snapper grouper species in the South Atlantic Region:

1. Establish a commercial split season and modify the commercial trip limit for blueline tilefish

Currently: The commercial fishing year for blueline tilefish in the South Atlantic exclusive economic zone is from January 1 to December 31 and commercial harvest is restricted to 300 pounds gutted weight per trip.

Preferred Alternative 3. Retain the January 1 through December 31 commercial fishing year for blueline tilefish in the South Atlantic exclusive economic zone. Modify the commercial trip limit for blueline tilefish:

Preferred Sub-alternative 3a. 100 pounds gutted weight from January 1 through April 30 and 300 pounds gutted weight from May 1 through December 31.

2. Establish a commercial split season for snowy grouper

Currently: The commercial fishing year for snowy grouper in the South Atlantic exclusive economic zone is from January 1 to December 31.

Preferred Alternative 3. Specify two commercial fishing seasons for snowy grouper. Allocate the snowy grouper commercial annual catch limit into two quotas: 70% to the period January 1 through June 30 (Season 1) and 30% to the period July 1 through December 31 (Season 2). Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward.

3. Establish a commercial split season and modify the commercial trip limit for greater amberjack

Currently: The commercial fishing year for greater amberjack in the South Atlantic exclusive economic zone is from March 1 to the end of February. During April each year, no person may sell or purchase greater amberjack harvested from the South Atlantic exclusive economic zone, and the harvest and possession limit is one per person per day or one per person per trip, whichever is more restrictive. The commercial trip limit in March and from May through the end of February each fishing year is 1,200 pounds.

Preferred Alternative 3. Specify two commercial fishing seasons for greater amberjack. Allocate the commercial annual catch limit for greater amberjack into two quotas: 60% to the period March 1 through August 31 (Season 1) and 40% to the period September 1 through the end of February (Season 2). Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward. During April each year, no person may sell or purchase a greater amberjack harvested from the South Atlantic exclusive economic zone and the harvest and possession limit is one per person per day or one per person per trip, whichever is more restrictive.

Preferred Sub-alternative 3a. Season 1 trip limit equals 1,200 pounds whole weight, Season 2 trip limit equals 1,000 pounds whole weight.

Note: The greater amberjack trip limit may currently be harvested and possessed in either whole weight or gutted weight. The conversion factor between the two measurements is 1.04. Hence, the discrepancy in specifying the proposed trip limit in whole weight is statistically insignificant and does not change the outcome of analyses presented in this amendment.

4. Establish a commercial split season and modify the commercial trip limit for red porgy

Currently: The commercial fishing year for red porgy in the South Atlantic exclusive economic zone is from January 1 to December 31. During January 1 through April 30 each year, no person may sell or purchase red porgy harvested from the South Atlantic exclusive economic zone, and the harvest and possession limit is three per person per day or three per person per trip, whichever is more restrictive. From May 1 through December 31 each year, the commercial trip limit for red porgy is 120 fish.

Preferred Alternative 2. Specify two commercial fishing seasons for red porgy. Allocate the commercial red porgy annual catch limit into two quotas: 30% to the period January 1 through April 30 (Season 1) and 70% to the period May 1 through December 31 (Season 2). Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward. Remove the sale and purchase prohibition and the possession limit of three per person per day or three per person per trip, whichever is more restrictive, during January 1 to April 30 each year. Retain the commercial trip limit of 120 fish from May 1 through December 31 and specify a commercial trip limit from January 1 through April 30 of:

Preferred Sub-alternative 2c. 60 fish

5. Modify the commercial trip limit for vermilion snapper

Currently: The commercial fishing year for vermilion snapper in the South Atlantic exclusive economic zone is from January 1 to December 31. The commercial annual catch limit is split into two quotas: 50% to the period January 1 through June 30 and 50% to the period July 1 through December 31. Any remaining quota from Season 1 transfers to Season 2. Any remaining quota from Season 2 is not carried forward. The commercial trip limit for vermilion snapper in the South Atlantic exclusive economic zone is 1,000 pounds gutted weight. For both seasons, when 75% of the vermilion snapper seasonal quota is met or is projected to be met, the trip limit is reduced to 500 pounds gutted weight.

Preferred Alternative 4. Retain the commercial fishing year for vermilion snapper in the South Atlantic exclusive economic zone from January 1 to December 31; and the 50% split quotas of the commercial ACL between the two seasons. Modify the commercial trip limit for both seasons and remove trip limit reductions. Any remaining quota from Season 1 transfers to Season 2. Any remaining quota from Season 2 is not carried forward.

Preferred Sub-alternative 4a. 1,000 pounds gutted weight

6. Establish a minimum size limit for almaco jack for the commercial sector

Currently: There is no commercial minimum size limit specified for almaco jack.

Preferred Alternative 2. Establish a minimum size limit for almaco jack for the commercial sector:

Preferred Sub-alternative 2a. 20 inches fork length

7. Establish a commercial trip limit for the Other Jacks Complex

Currently: There is no commercial trip limit for the Other Jack Complex (lesser amberjack, almaco jack, and banded rudderfish).

Preferred Alternative 2. Establish a commercial trip limit for the Other Jacks Complex.

Preferred Sub-alternative 2a. 500 pounds gutted weight.

8. Remove the commercial minimum size limit for certain deep-water species

Currently: The commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper in the South Atlantic exclusive economic zone is 12 inches total length.

Preferred Alternative 2. Remove the 12-inch total length commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper in the South Atlantic exclusive economic zone.

9. Reduce the commercial minimum size limit for gray triggerfish in the Exclusive Economic Zone off East Florida

Currently: The commercial minimum size limit for gray triggerfish in the exclusive economic zone off east Florida is 14 inches fork length.

Preferred Alternative 2. Reduce the commercial minimum size limit for gray triggerfish in the exclusive economic zone off the east coast of Florida to 12 inches fork length.

Chapter 1. Introduction

1.1 What actions are being proposed in this framework amendment?

Vision Blueprint Regulatory Amendment 27 to the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic Region (Regulatory Amendment 27) proposes to modify commercial regulations for blueline tilefish, snowy grouper, greater amberjack, red porgy, vermilion snapper, almaco jack, Other Jacks Complex (lesser amberjack, almaco jack, and banded rudderfish), queen snapper, silk snapper, blackfin snapper, and gray triggerfish. Actions include modifying fishing seasons, trip limits, and minimum size limits.

South Atlantic Fishery Management Council

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

1.2 Who is proposing the amendment?

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

The South Atlantic Council and NMFS are also responsible for making this document available for public comment. The draft environmental assessment (EA) was made available to the public during the scoping process, public hearings, and in South Atlantic Council meeting briefing books. The final EA/amendment will be published for public comment during the proposed rule stages of the rulemaking process. The final EA/amendment may be found online at: https://www.fisheries.noaa.gov/action/regulatory-amendment-27-vision-blueprint-commercial-measures and on the South Atlantic Council's website at http://www.safmc.net.

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 is conducted under the Snapper Grouper FMP (SAFMC 1983) (**Figure 1.3.1**). There are fifty-five species managed by the South Atlantic Council under the FMP.

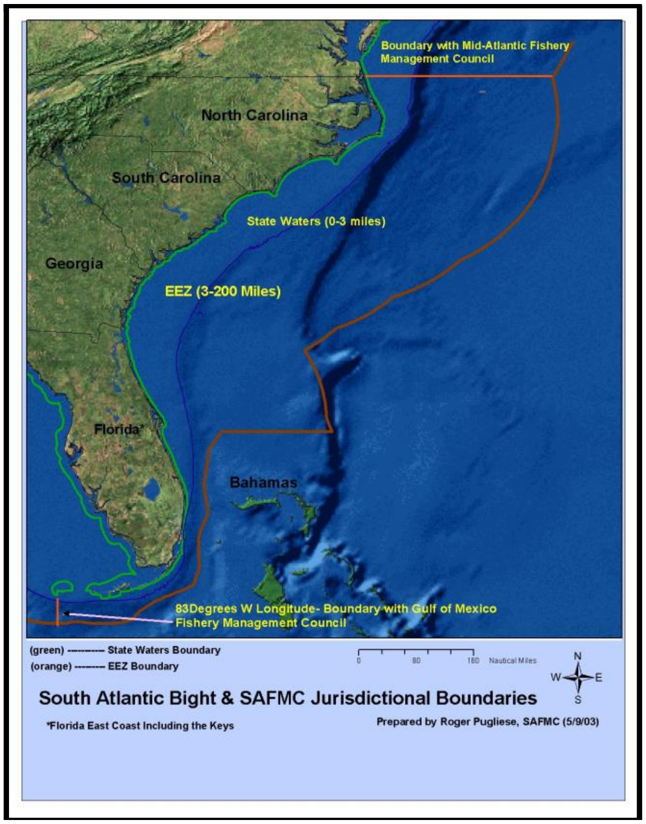

Figure 1.3.1. Jurisdictional boundaries of the South Atlantic Council.

1.4 Why are the South Atlantic Council and NMFS Considering the Actions?

Regulatory Amendment 27 addresses specific action items for the commercial sector in the 2016-2020 Vision Blueprint for the Snapper Grouper Fishery of the South Atlantic Region (Vision Blueprint; SAFMC 2015b). The Vision Blueprint identifies the goals, objectives, strategies, and actions that support the vision for the snapper grouper fishery and centers around four goal areas: Science, Management, Communication, and Governance. During a series of stakeholder meetings in 2014, the South Atlantic Council gathered input from commercial fishermen throughout the region. In 2015, the South Atlantic Council prioritized action items that would be addressed through amendments to the Snapper Grouper FMP over the next five years. The South Atlantic Council chose to focus on actions that would address "seasonality" and "retention" in the fishery and began development of two amendments to address the commercial and recreational sectors, respectively. Regulatory Amendment 27 includes modifications to commercial sector management measures based on stakeholder input and intends to allow more equitable access, minimize discards, and achieve optimum yield.

The use of split seasons for the commercial sector is addressed under the Vision Blueprint's Strategy 2.3 - *Support development of management approaches that account for the seasonality of the snapper grouper fishery*. One of the priority actions under that strategy states *Expand the use of split seasons for the commercial fishery.* The intent is to "line up" harvest for species that are often caught together, level out accessibility in different areas, and to reduce regulatory discards. Factors such as distance to fishing grounds and weather/temperature affect availability of some species to the commercial fleets in different parts of the South Atlantic Council's jurisdiction. Actions 1 through 4 consider split seasons for blueline tilefish, snowy grouper, greater amberjack, and red porgy, respectively.

The use of trip limits for the commercial sector is addressed under the Vision Blueprint's Strategy 2.1 - *Support development of management approaches that address retention of snapper grouper species*. The first priority action under this strategy is to consider trip limit adjustments for the commercial sector to lengthen seasons and better utilize annual catch limits. Modification to trip limits for blueline tilefish, greater amberjack, red porgy, and vermilion snapper are considered under Actions 1, 3, 4, and 5, respectively. Specifying a trip limit for the Other Jacks Complex is addressed in Action 7.

Removal of size limits for deep-water species is addressed in the Vision Blueprint Strategy 4.2 (in Appendix B of the Vision Blueprint) - *Consider management approaches that address the impact of depth on bycatch of snapper grouper species.* Three deep-water snappers, silk snapper, queen snapper, and blackfin snapper, are managed under a 12-inch total length minimum size limit in federal waters. These minimum size limits were put in place early in the management of the snapper grouper fishery, before estimates of discard mortality were available, and before the creation of the various species Complexes. Species in the Deep-water Complex (yellowedge grouper, silk snapper, misty grouper, queen snapper, sand tilefish, and blackfin snapper) are typically associated with high discard mortality. To curb discard losses, the South Atlantic Council is considering action to eliminate minimum size limit requirements for silk snapper, queen snapper, and blackfin snapper in Action 8. The remaining species in the Deep-water Complex do not have a minimum size limit requirement.

Actions 6 and 9 address minimum size limits for almaco jack and gray triggerfish, respectively. Action 6 was suggested due to concern from snapper grouper commercial permit holders about the small size and resulting poor commercial value of some of the fish being landed. In 2015, a commercial minimum size limit of 12 inches fork length was implemented for gray triggerfish in federal waters off North Carolina, South Carolina, and Georgia, and a commercial minimum size limit of 14 inches fork length was put in place in federal waters off east Florida. This was a precautionary action in response to concerns about the status of the South Atlantic gray triggerfish stock, to align east Florida regulations with those in the Gulf of Mexico, and achieve consistency between state and federal regulations off east Florida. However, after the new minimum size limit went into effect (on July 1, 2015), stakeholders in Florida voiced concern to the Florida Fish and Wildlife Conservation Commission (FWC) regarding increasing discards of gray triggerfish in south Florida where the average size of gray triggerfish is smaller than that off northeast Florida. In response, the FWC reduced the recreational minimum size limit of gray triggerfish to 12 inches fork length in 2017 and requested that the South Atlantic Council follow suit in issuing consistent regulations.

1.5 Purpose and need statement

Purpose for Actions

The purpose of this amendment is to address commercial stakeholder input to enable equitable access for fishermen participating in the snapper grouper fishery, and to minimize discards to the extent practicable while improving marketability for some species.

Need for Actions

The need for this amendment is to improve management of the commercial sector of the snapper grouper fishery to achieve optimum yield, while minimizing, to the extent practicable, adverse socio-economic effects for commercial fishermen in the South Atlantic Region.

Definitions

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

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

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

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

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

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

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

1.6 What is the history of management for snapper grouper species considered in this amendment?

Snapper grouper regulations in the South Atlantic were first implemented in 1983. The reader is referred to **Appendix C** for the management history of the species considered in this amendment as well as those in the Snapper Grouper FMP.

Chapter 2. Proposed Actions and Alternatives

2.1 Action 1. Establish a commercial split season and modify the commercial trip limit for blueline tilefish

Alternative 1 (No Action). The commercial fishing year for blueline tilefish in the South Atlantic exclusive economic zone is from January 1 to December 31. The commercial trip limit is 300 pounds gutted weight.

Alternative 2. Specify two commercial fishing seasons for blueline tilefish. Allocate the blueline tilefish commercial annual catch limit into two quotas: 40% to the period January 1 through June 30 (Season 1), and 60% to the period July 1 through December 31 (Season 2). Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward.

> **Sub-alternative 2a**. Season 1 trip limit equals 100 pounds gutted weight, Season 2 trip limit equals 300 pounds gutted weight.
>
> **Sub-alternative 2b**. Season 1 trip limit equals 150 pounds gutted weight, Season 2 trip limit equals 300 pounds gutted weight.

Preferred Alternative 3. Retain the January 1 through December 31 commercial fishing year for blueline tilefish in the South Atlantic exclusive economic zone. Modify the commercial trip limit for blueline tilefish:

> **Preferred Sub-alternative 3a.** 100 pounds gutted weight from January 1 through April 30 and 300 pounds gutted weight from May 1 through December 31.
>
> **Sub-alternative 3b.** 150 pounds gutted weight from January 1 through April 30 and 300 pounds gutted weight from May 1 through December 31.
>
> **Sub-alternative 3c.** 100 pounds gutted weight from January 1 through June 30 and 300 pounds gutted weight from July 1 through December 31.

Discussion:

The commercial fishing year for blueline tilefish in the South Atlantic is from January 1 to December 31. The commercial trip limit is 300 pounds gutted weight (lbs gw) and the current commercial annual catch limit (ACL) is 87,521 pounds whole weight (lbs ww). **Alternative 1 (No Action)** would not modify the January through December commercial fishing year for blueline tilefish or the 300 lbs gw commercial trip limit.

Alternative 2 would establish two commercial seasons and allocate 40% of the blueline tilefish commercial ACL to Season 1 (January 1 through June 30) and 60% to Season 2 (July 1 through December 31) (**Table 2.1.1.1**). In addition, **Sub-alternatives 2a** and **2b** propose different commercial trip limits for each season (**Table 2.1.1.1**). **Preferred Alternative 3** and its sub-alternatives would not divide the commercial ACL and would retain the calendar year as the fishing year and establish different trip limits during certain times of the year.

Table 2.1.1.1. Commercial quotas (lbs ww) for blueline tilefish in Seasons 1 and 2 under Alternative 2.

	Commercial Quota (lbs ww)	Commercial Trip Limit (lbs gw)	
		Sub-alternative 2a	**Sub-alternative 2b**
Season 1 (40%)	**35,008**	**100**	**150**
Season 2 (60%)	**52,513**	**300**	**300**

Preferred Alternative 3 (and its sub-alternatives) differs from **Alternative 2** (and its sub-alternatives) in that the commercial ACL (87,521 lbs ww) would not be divided into two seasonal quotas. Instead, **Preferred Alternative 3** would retain the calendar year as the fishing year for blueline tilefish and reduce the trip limit early in the year to discourage fishermen from trying to "fill" their blueline tilefish allowance once they have caught the trip limit of snowy grouper. The two species co-occur in portions of their range within the South Atlantic Council's jurisdiction. To this end, **Preferred Sub-alternative 3a** would allow fishermen to retain 100 lbs gw of blueline tilefish from January through April. This is a time of the year when fishermen who target blueline tilefish in the northern reaches of the South Atlantic Council's area of jurisdiction (north of Cape Hatteras, North Carolina), where distances to fishing grounds are long, typically do not conduct trips to target deep-water species (i.e., blueline tilefish and snowy grouper) due to unfavorable weather. On the other hand, **Preferred Sub-alternative 3a** would allow fishermen further south in the South Atlantic Council's area of jurisdiction (i.e., off Florida), where weather is more favorable early in the year and the distance to fishing grounds is relatively short, to retain up to 100 lbs gw of incidentally caught blueline tilefish. **Preferred Sub-alternative 3a** would revert to the current 300-lbs gw blueline tilefish trip limit starting on May 1. This would coincide with the time of year when fishermen in northern North Carolina begin targeting blueline tilefish and shallow-water groupers. **Sub-alternative 3b** is similar to **Preferred Sub-alternative 3a** but proposes a slightly higher trip limit (150 lbs gw) from January through April. Lastly, **Sub-alternative 3c** proposes a 100-lbs gw trip limit during a longer timeframe (January through June) than under **Preferred Sub-alternative 3a** and a 300-lbs gw trip limit from July through December.

2.1.1 Comparison of Alternatives:

Alternative 2 and **Preferred Alternative 3**, and their respective sub-alternatives, would maintain commercial harvest of blueline tilefish at the ACL; hence, biological effects of these alternatives would not differ from **Alternative 1 (No Action)** in terms of risk of overfishing. According to analyses, the level of commercial harvest would be highest under **Sub-alternative 3b**, followed by **Sub-alternative 3c**, **Alternative 1 (No Action)**, **Sub-alternatives 2a** and **2b**, and lowest under **Preferred Sub-alternative 3a**. Biological benefits would be expected from more conservative harvest. It is expected that reduced trip limits for blueline tilefish in the earlier part of the year as proposed under **Alternative 2** and **Preferred Alternative 3** (and their respective sub-alternatives) would help reduce snowy grouper discards by allowing retention of blueline tilefish as incidental catch in the northern range of the South Atlantic Council's area of jurisdiction. However, available data on discards preclude any quantitative analyses of the effect of proposed alternatives under this action on the level of snowy grouper discards. As such, **Alternative 2** and **Preferred Alternative 3** and their respective sub-alternatives, would impart biological benefits to the blueline tilefish stock relative to **Alternative 1 (No Action)**. In particular, **Sub-alternative 2b** would be beneficial over other sub-alternatives considered due to an expected reduction in fishing mortality during June as harvest is predicted to close in May and resume at the beginning of Season 2 in July.

Sub-alternative 2b is expected to generate the greatest net economic benefits, while **Alternative 1 (No Action)** is expected to generate the least net economic benefits. However, net economic benefits expected from **Sub-alternative 2a** and **Preferred Sub-alternative 3c** are very similar to those for **Sub-alternative 2b**. Expected net economic benefits from **Sub-alternative 3b** and **Preferred Sub-alternative 3a** are less than **Sub-alternatives 2b**, **2a**, and **3c**, but greater than under **Alternative 1 (No Action)**. **Preferred Sub-alternative 3a** only ranks 5th of the six alternatives being considered in terms of net economic benefits (**Table 4.1.2.3**).

The potential social effects would depend on how fishermen are affected by either higher trip limits and a shorter season, or lower trip limits and longer seasons. In general, longer fishing seasons provide consistent access to the resource and provide for long-term direct social benefits to commercial fishermen and indirect social benefits to communities such as consistent employment opportunities. Under **Alternative 1 (No Action)**, it is expected that commercial harvest of blueline tilefish would close in early July. **Alternative 2** and its sub-alternatives would allow harvest to extend later into the year but would not substantially increase the number of months the commercial sector was open to harvest when compared to **Alternative 1 (No Action)**. Overall, **Sub-alternative 3c** would result in the longest season (number of months open), followed by **Preferred Sub-alternative 3a**, and **Sub-alternative 3b** (**Table 4.1.1.1**).

Since there is one fishing season for blueline tilefish under **Alternative 1 (No Action**) and **Preferred Alternative 3** (and its sub-alternatives), if the quota is projected to be met and harvest is closed, there is potential for a total of two in-season notices (i.e., closure notice and reopening notice if it is subsequently determined that a portion of the ACL was not harvested) that would need to be prepared by fishery managers. Since the yearly quota would be divided into two fishing seasons under **Alternative 2** (and its sub-alternatives), if the quota for each season is projected to be met, there is potential that fishery managers may have to prepare four in-season notices (i.e., closure notice and reopening notice for each of two seasons). Additionally, enforcement personnel would be burdened with an increase in potential harvest closures, which they would have to monitor. Outreach materials for each in-season action would take the form of fishery bulletins and updates to NMFS Southeast Region's web site. Therefore, **Alternative 2** (and its sub-alternatives) would impose the most administrative burden, followed by **Alternative 1 (No Action**) and **Preferred Alternative 3** (and its sub-alternatives).

2.2 Action 2. Establish a commercial split season for snowy grouper

Alternative 1 (No Action). The commercial fishing year for snowy grouper in the South Atlantic exclusive economic zone is from January 1 to December 31.

Alternative 2. Specify two commercial fishing seasons for snowy grouper. Allocate the snowy grouper commercial annual catch limit into two quotas: 60% to the period January 1 through June 30 (Season 1), and 40% to the period July 1 through December 31 (Season 2) . Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward.

Preferred Alternative 3. Specify two commercial fishing seasons for snowy grouper. Allocate the snowy grouper commercial annual catch limit into two quotas: 70% to the period January 1 through June 30 (Season 1), and 30% to the period July 1 through December 31 (Season 2). Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward.

Discussion:

The commercial fishing year for snowy grouper in the South Atlantic is from January 1 to December 31 and the current ACL is 144,315 lbs gw. **Alternative 2** and **Preferred Alternative 3** propose different allocations of the snowy grouper ACL (144,315 lbs gw) to two seasons of equal length (**Table 2.2.1.1**). **Alternative 2** would allocate 60% of the snowy grouper ACL to Season 1 (January through June), whereas, **Preferred Alternative 3** would allocate 70% to the first season. **Alternative 2** and **Preferred Alternative 3** would allocate 40% and 30% of the commercial ACL to Season 2 (July through December), respectively.

Table 2.2.1.1. Commercial quotas (lbs gw) for snowy grouper in Seasons 1 and 2 under Alternative 2 and **Preferred Alternative 3** for 2018 and subsequent years. Preferred indicated in bold.

2018	**Commercial Quota (Alt 2) (60/40)**	**Commercial Quota (Pref Alt 3) (70/30)**
Season 1	86,589	**101,020**
Season 2	57,726	**43,295**
2019 and subsequent years	**Commercial Quota (Alt 2) (60/40)**	**Commercial Quota (Pref Alt 3) (70/30)**
Season 1	92,361	**107,754**
Season 2	61,574	**46,181**

2.2.1 Comparison of Alternatives:

In terms of risk of overfishing, the effects of **Alternative 2** and **Preferred Alternative 3** would not differ relative to **Alternative 1 (No Action)** as commercial landings of snowy grouper would remain at the ACL and split-season quotas, and accountability measures (AMs) would be triggered if the ACL or quotas were exceeded.

In recent years, however, early closures of commercial harvest have reduced fishing pressure on snowy grouper during peak spawning months (May through August) resulting in positive biological effects. However, if a split season were implemented as proposed under **Alternative 2** and **Preferred Alternative 3**, commercial harvest of snowy grouper might continue during peak spawning months resulting in negative biological effects relative to **Alternative 1 (No Action)**. In terms of discards, since blueline tilefish and snowy grouper are commonly caught together in some areas of the South Atlantic Council's jurisdiction, biological benefits may be realized if discards of snowy grouper are reduced as a result of compatible management of blueline tilefish under **Action 1** of this amendment.

In general, alternatives that generate higher expected gross revenue are those that distribute relatively more landings to months with higher average ex-vessel prices. In this case, the primary effect of **Alternative 2** is to redistribute landings from June to September compared to **Alternative 1 (No Action)** and **Preferred Alternative 3**. **Alternative 2** is expected to generate net economic benefits of about $1,038 relative to **Alternative 1 (No Action)** and **Preferred Alternative 3 (Table 4.2.2.2)**. Because projected monthly and annual landings are the same under **Alternative 1 (No Action)** and **Preferred Alternative 3**, **Preferred Alternative 3** is not expected to generate additional gross revenue and thus net economic benefits relative to **Alternative 1 (No Action)**.

In general, a split season would be most beneficial for fishermen targeting other species in the beginning of the year, because it would ensure that a portion of the snowy grouper commercial ACL is available later in the year. Under **Alternative 1 (No Action)**, **Alternative 2**, and **Preferred Alternative 3**, the ACL is projected to be reached by mid-September. Under the split season proposed in **Alternative 2**, there would be a closure during the first season by the end of June (**Table 4.2.1.1)**. **Alternative 2** would result in positive direct and indirect social effects for fishermen operating in Florida where snowy grouper is harvested throughout the fall. Under the split season proposed in **Preferred Alternative 3**, projections indicate there would be no closure in Season 1 (January through June) and Season 2 is projected to close on the same date as under **Alternative 1 (No Action)** (**Table 4.2.1.1)**. **Preferred Alternative 3** would result in a shift in landings from September to June, which would be more beneficial, when compared to **Alternative 2**, for fishermen operating in North Carolina where snowy grouper is harvested in the spring (**Figure 3.2.4** and **Table 4.2.2.1**).

Since there is one fishing season for snowy grouper under **Alternative 1 (No Action**), if the quota is projected to be met and harvest is closed, there is potential for a total of two in-season notices (i.e., closure notice and reopening notice if it is subsequently determined that a portion of the ACL was not harvested) that would need to be prepared by fishery managers. Since the yearly quota would be divided into two fishing seasons under **Alternative 2** and **Preferred Alternative 3**, there is potential that fishery managers may have to prepare four in-season notices (i.e., closure notice and reopening notice for each of two seasons). Additionally, enforcement personnel would be burdened with an increase in potential harvest closures, which they would have to monitor. Outreach materials for each in-season action would take the form of fishery bulletins and updates to NMFS Southeast Region's web site. Therefore, **Alternative 2** and **Preferred Alternative 3** would impose the most administrative burden, followed by **Alternative 1 (No Action**).

2.3 Action 3. Establish a commercial split season and modify commercial trip limit for greater amberjack

Alternative 1 (No Action). The commercial fishing year for greater amberjack in the South Atlantic exclusive economic zone is from March 1 to the end of February. During April each year, no person may sell or purchase greater amberjack harvested from the South Atlantic exclusive economic zone, and the harvest and possession limit is one per person per day or one per person per trip, whichever is more restrictive. The commercial trip limit in March and from May through the end of February each fishing year is 1,200 pounds.

Alternative 2. Specify two commercial fishing seasons for greater amberjack. Allocate the commercial annual catch limit for greater amberjack into two quotas: 50% to the period March 1 through August 31 (Season 1) and 50% to the period September 1 through the end of February (Season 2). Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward. During April each year, no person may sell or purchase a greater amberjack harvested from the South Atlantic exclusive economic zone and the harvest and possession limit is one per person per day or one per person per trip, whichever is more restrictive.

> **Sub-alternative 2a.** Season 1 trip limit equals 1,200 pounds whole weight, Season 2 trip limit equals 1,000 pounds whole weight.
> **Sub-alternative 2b.** Season 1 trip limit equals 1,000 pounds whole weight, Season 2 trip limit equals 800 pounds whole weight.
> **Sub-alternative 2c.** Trip limit equals 1,000 pounds whole weight in both seasons.
> **Sub-alternative 2d.** Trip limit equals 1,000 pounds whole weight in both seasons. A trip limit reduction to 500 pounds whole weight would occur in each season once 75% of the seasonal quota is met or projected to be met. A trip limit reduction would not occur in Season 2 unless 75% of the Season 2 quota is met or is projected to be met by January 31.

Preferred Alternative 3. Specify two commercial fishing seasons for greater amberjack. Allocate the commercial annual catch limit for greater amberjack into two quotas: 60% to the period March 1 through August 31 (Season 1) and 40% to the period September 1 through the end of February (Season 2) . Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward. During April each year, no person may sell or purchase a greater amberjack harvested from the South Atlantic exclusive economic zone and the harvest and possession limit is one per person per day or one per person per trip, whichever is more restrictive.

> **Preferred Sub-alternative 3a.** Season 1 trip limit equals 1,200 pounds whole weight, Season 2 trip limit equals 1,000 pounds whole weight.
> **Sub-alternative 3b.** Season 1 trip limit equals 1,000 pounds whole weight, Season 2 trip limit equals 800 pounds whole weight.
> **Sub-alternative 3c.** Trip limit equals 1,000 pounds whole weight in both seasons.

Alternative 4. Retain the March through February fishing year. During April each year, no person may sell or purchase a greater amberjack harvested from the South Atlantic exclusive economic zone and the harvest and possession limit is one per person per day or one per person per trip, whichever is more restrictive. Reduce the greater amberjack commercial trip limit to:

Sub-alternative 4a. 1,000 pounds whole weight.

Sub-alternative 4b. 800 pounds whole weight.

Discussion:

The commercial fishing year for greater amberjack is March through February with a sale and purchase prohibition during the month of April. A commercial trip limit of 1,200 lbs is currently in place in the South Atlantic. The greater amberjack trip limit may currently be harvested and possessed in either lbs ww or gw. The conversion factor between the two measurements is 1.04. Hence, the discrepancy in specifying the proposed trip limit in whole weight is statistically insignificant and does not change the outcome of analyses presented in this amendment. The commercial ACL is 769,388 lbs ww or gw. All of the alternatives considered under this action would maintain the purchase and sale prohibition during April each year. **Alternative 2** and **Preferred Alternative 3** each propose allocating the commercial ACL into two seasons of equal length, March through August and September through February. **Alternative 2** would split the ACL evenly between the two seasons; whereas, **Preferred Alternative 3** would allocate the ACL 60%/40% between the two seasons (**Table 2.3.1.1**). Trip limit sub-alternatives a-c are the same under **Alternative 2** and **Preferred Alternative 3**. **Sub-alternative 2d** was added for consideration at the request of the South Atlantic Council's Snapper Grouper Advisory Panel to explore whether in-season trip limit reductions would optimize benefits to commercial fishermen. **Alternative 4** differs from **Alternative 2** and **Preferred Alternative 3** in that it only proposes modifications to the trip limit (**Sub-alternatives 4a** and **4b**).

Table 2.3.1.1. Commercial quotas (lbs ww or gw) for greater amberjack in Seasons 1 and 2 under Alternative 2 and **Preferred Alternative 3**. Preferred indicated in bold.

	Commercial Quota (Alt 2) (50/50)	Commercial Quota (Pref Alt 3) (60/40)
Season 1	384,694	**461,633**
Season 2	384,694	**307,755**

2.3.1 Comparison of Alternatives:

The biological effects of **Alternative 2**, **Preferred Alternative 3**, and **Alternative 4**, and their respective sub-alternatives, would not differ from **Alternative 1 (No Action)** in terms of risk of overfishing as overall harvest would be limited to the ACL or split-season quotas, and AMs would be triggered if the ACL or quotas were reached. Under all alternatives considered, retention of the commercial sale and purchase prohibition during April each year would maintain protection during the peak spawning period, thus, imparting biological benefit to the greater amberjack stock. Commercial landings of greater amberjack are projected to be highest under **Alternative 1 (No Action)** and possibly exceed the current ACL. The most conservative projected landings are under **Sub-alternative 2b** (**Table 4.3.2.1**). Therefore, biological benefits would be highest under **Sub-alternative 2b**, followed by **Sub-alternative 2c**, **Sub-alternative 2a**, **Sub-alternative 3b**, **Preferred Sub-alternative 3a**, **Sub-alternative 3c**, **Sub-alternative 4a**, **Sub-alternative 4b**, and **Alternative 1 (No Action)**.

In terms of net economic benefits, **Sub-alternative 4a** is expected to generate the greatest benefit, followed by **Alternative 1 (No Action)**, **Sub-alternative 4b**, **Preferred Sub-alternative 3a**, **Sub-alternative 3c**, **Sub-alternative 2a**, **Sub-alternative 3b**, **Sub-alternative 2c**, **Sub-alternative 2d**, with **Sub-alternative 2b** expected to generate the least net economic benefits. Thus, **Preferred Sub-alternative 3a** ranks 4th of the 10 alternatives being considered (**Table 4.3.2.3**).

Potential social effects would depend on how fishermen are affected by either higher trip limits and shorter seasons, or lower trip limits and longer seasons. Higher trip limits create the potential for higher profit per trip which would provide direct social benefits to fishermen, especially for businesses who target multiple species and do not need one species to be open year-round. High trip limits can also result in the ACL being reached faster, triggering early closures and associated negative social effects. Alternatively, businesses focusing primarily on greater amberjack would benefit from the consistent access provided by a longer fishing season. However, trip limits that are too low can make trips cost prohibitive, particularly for fishermen that require longer travel time to fishing grounds. The trip limit reduction proposed in **Sub-alternative 2d** would likely help decrease the rate of harvest beyond that in **Sub-alternatives 2a**, **2b** and **2c** and decrease the likelihood of negative social effects associated with an in-season closure. The anticipated decrease in commercial fishing vessel revenue may have substantial negative social effects on fishermen and negative indirect effects on dealers and other commercial fishing businesses who operate under small profit margins. Combined, these have considerable social consequences for fishing communities.

Since there is one fishing season for greater amberjack under **Alternative 1 (No Action**) and **Alternative 4** (and its sub-alternatives), if the quota is projected to be met and harvest is closed, there is potential for a total of two in-season notices (i.e., closure notice and reopening notice if it is subsequently determined that a portion of the ACL was not harvested) that would need to be prepared by fishery managers. Since the yearly quota would be divided into two fishing seasons under **Alternative 2** (and its sub-alternatives) and **Preferred Alternative 3** (and its sub-alternatives), there is potential that fishery managers may have to prepare four in-season notices (i.e., closure notice and reopening notice for each of two seasons). Under **Sub-alternative 2d**, there is potential for a trip limit reduction during Season 2, which would require fishery managers to prepare a trip limit reduction notice, in addition to the four other potential notices under **Alternative 2**. Additionally, enforcement personnel would be burdened with an increase in potential harvest closures, which they would have to monitor. Outreach materials for each in-season action would take the form of fishery bulletins and updates to NMFS Southeast Region's web site. Therefore, **Sub-alternative 2d** would impose the most administrative burden, followed by **Sub-alternatives 2a, 2b, 2c** and **Preferred Alternative 3** (and its sub-alternatives), with **Alternative 1 (No Action)** and **Alternative 4** resulting in the least administrative burden, respectively.

2.4 Action 4. Establish a commercial split season and modify the commercial trip limit for red porgy

Alternative 1 (No Action). The commercial fishing year for red porgy in the South Atlantic exclusive economic zone is from January 1 to December 31. During January 1 through April 30 each year, no person may sell or purchase red porgy harvested from the South Atlantic exclusive economic zone, and the harvest and possession limit is three per person per day or three per person per trip, whichever is more restrictive. From May 1 through December 31 each year, the commercial trip limit for red porgy is 120 fish.

Preferred Alternative 2. Specify two commercial fishing seasons for red porgy. Allocate the commercial red porgy annual catch limit into two quotas: 30% to the period January 1 through April 30 (Season 1) and 70% to the period May 1 through December 31 (Season 2). Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward. Remove the sale and purchase prohibition and the possession limit of three per person per day or three per person per trip, whichever is more restrictive, during January 1 to April 30 each year. Retain the commercial trip limit of 120 fish from May 1 through December 31 and specify a commercial trip limit from January 1 through April 30 of:

Sub-alternative 2a. 30 fish.
Sub-alternative 2b. 45 fish.
Preferred Sub-alternative 2c. 60 fish.

Alternative 3. Specify two commercial fishing seasons for red porgy. Allocate the commercial red porgy annual catch limit into two quotas: 50% to the period January 1 through April 30 (Season 1) and 50% to the period May 1 through December 31 (Season 2) . Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward. Remove the sale and purchase prohibition during January 1 to April 30 each year and the possession limit of three per person per day or three per person per trip, whichever is more restrictive. Retain the commercial trip limit of 120 fish from May 1 through December 31 and specify a commercial trip limit from January 1 through April 30 of:

Sub-alternative 3a. 30 fish.
Sub-alternative 3b. 45 fish.
Sub-alternative 3c. 60 fish.

Alternative 4. Remove the sale and purchase prohibition and the possession limit of three per person per day or three per person per trip, whichever is more restrictive, for red porgy from the South Atlantic exclusive economic zone during January 1 to April 30 each year. Specify a commercial trip limit of 120 fish from January 1 through December 31.

Discussion:

The commercial fishing year for red porgy in the South Atlantic is from January 1 to December 31 with a sale and purchase prohibition during January through April. During this time, the possession limit is three fish per person per day or three per person per trip, whichever is more restrictive. From May 1 through December 31 each year, the commercial trip limit for red porgy is 120 fish. The current commercial ACL is 157,692 lbs gw or 164,000 lbs ww. All of the alternatives under this action propose removal of the possession and sale/purchase restriction for the commercial sector during January 1 to April 30 each year but retain the existing 120-fish trip limit that is currently in place from May through December. **Preferred Alternative 2** and **Alternative 3** also propose allocating the commercial ACL to two seasons, January through April and May through December. Under **Preferred Alternative 2** the commercial ACL would be allocated 30%/70% to the two seasons; whereas, **Alternative 3** proposes a 50%/50% allocation (**Table 2.4.1.1**). **Sub-alternatives a-c** under both **Preferred Alternative 2** and **Alternative 3** propose trip limits ranging from 30 to 60 fish during January through April. Lastly, **Alternative 4** does not propose a commercial split season but would impose the current trip limit of 120 fish year round.

Table 2.4.1.1. Commercial quotas (lbs gw) for red porgy in Seasons 1 and 2 under **Preferred Alternative 2** and **Alternative 3**. Preferred indicated in bold.

	Commercial Quota (Pref Alt 2) (30/70)	Commercial Quota (Alt 3) (50/50)
Season 1	**47,308**	78,846
Season 2	**110,384**	78,846

2.4.1 Comparison of Alternatives:

The biological effects of **Preferred Alternative 2** and **Alternative 3**, and their respective sub-alternatives, and **Alternative 4**, would not differ from **Alternative 1 (No Action)** in terms of risk of overfishing as overall harvest of red porgy would be limited to the ACL or split-season quotas, and AMs would be triggered if the ACL or quota is reached and if the ACL were to be exceeded since red porgy are overfished. However, peak spawning of red porgy is during January through April. **Alternative 1 (No Action)** would impart the most direct benefits to the red porgy stock in terms of reducing fishing pressure on the stock during the spawning season since it would maintain the existing sale and purchase prohibition from January through April. Thus, alternatives that increased the harvest of red porgy during the spawning season could be expected to have greater negative biological effects than **Alternative 1 (No Action)**. Red porgy are part of a multi-species fishery. When red porgy are closed, they are taken incidentally when fishermen target co-occurring species such as vermilion snapper and gray triggerfish. From 2014 through 2016, red porgy had among the highest number of discards reported on average annually (**Appendix D**). Further, the release mortality is estimated to be 35%. Thus, the benefits of a spawning season closure for red porgy are reduced by the amount of discards when fishermen target other co-occurring species. **Preferred Sub-alternative 2c** would allow for the smallest amount of harvest relative to the action alternatives considered. If the level of harvest under **Preferred Sub-alternative 2c** were similar to the amount of red porgy that would be discarded dead, then the biological effects would be similar to **Alternative 1 (No Action)**. Projected annual commercial landings of red porgy would be most conservative under **Alternative 1 (No Action)** followed by **Preferred Sub-alternative 2c** and **Sub-alternative 3c**, **Sub-alternatives 2b** and **3b**, **Sub-alternatives 2a** and **3a**, and highest under **Alternative 4** (**Table 4.4.2.1**). Biological benefits to the red porgy stock would be imparted in the same order.

The trip limit from May through December is the same under all the considered alternatives and thus costs are not affected relative to **Alternative 1 (No Action)** during those months.

Therefore, **Sub-alternative 4a** is expected to generate the greatest net economic benefits, followed by **Preferred Sub-alternative 2c** and **Sub-alternative 3c**, **Sub-alternatives 2b** and **3b**, and **Sub-alternatives 2a** and **3a**, with expected net economic benefits being the least under **Alternative 1 (No Action) (Table 4.4.2.3)**.

The potential social effects of **Sub-alternative 2a, 2b** and **Preferred Sub-alternative 2c** and **Sub-alternatives 3a, 3b** and **3c** relative to **Alternative 1 (No Action)** would depend on how fishermen are affected by either higher trip limits and a shorter season, or lower trip limits and longer seasons. However, in-season closures are not anticipated under **Preferred Alternative 2** or **Alternative 3**. Establishing a higher trip limit from January to April would have the direct social benefit of increasing the amount of fish available for harvest per trip. Generally, longer fishing seasons provide positive direct and indirect social effects from continued access for commercial fishermen and consistency for end users, respectively, if trip limits are sufficient to support commercial fishing activity, as anticipated under all proposed alternatives. Removing the purchase and sale prohibition during January through April under **Preferred Alternative 2**, **Alternative 3** and **Alternative 4** may provide positive social effects to the commercial fleet by increasing access and overall harvest. Generally, higher catch limits are expected to be more beneficial to fishermen and communities by increasing access to red porgy, if harvest is not negatively affecting the long-term health of the stock.

Since there is one fishing season for red porgy, under **Alternative 1 (No Action)** and **Alternative 4,** if the quota is projected to be met and harvest is closed, there is potential for a total of two in-season notices (i.e., closure notice and reopening notice if it is subsequently determined that a portion of the ACL was not harvested) that would need to be prepared by fishery managers. Since the yearly quota would be divided into two fishing seasons under **Preferred Alternative 2** and **Alternative 3** (and their sub-alternatives), there is potential that fishery managers may have to prepare four in-season notices (i.e., closure notice and reopening notice for each of two seasons). Additionally, enforcement personnel would be burdened with an increase in potential harvest closures, which they would have to monitor. Outreach materials for each in-season action would take the form of fishery bulletins and updates to NMFS Southeast Region's web site. Therefore, **Preferred Alternative 2** and **Alternative 3** (and their sub-alternatives) would impose the most administrative burden, followed by **Alternative 1 (No Action)** and **Alternative 4**.

2.5 Action 5. Modify the commercial trip limit for vermilion snapper

Alternative 1 (No Action). The commercial fishing year for vermilion snapper in the South Atlantic exclusive economic zone is from January 1 to December 31. The commercial annual catch limit is split into two quotas: 50% to the period January 1 through June 30 (Season 1) and 50% to the period July 1 through December 31 (Season 2). Any remaining quota from Season 1 transfers to Season 2. Any remaining quota from Season 2 is not carried forward. The commercial trip limit for vermilion snapper in the South Atlantic exclusive economic zone is 1,000 pounds gutted weight. For both seasons, when 75% of the vermilion snapper seasonal quota is met or is projected to be met, the trip limit is reduced to 500 pounds gutted weight.

Alternative 2. Retain the commercial fishing year for vermilion snapper in the South Atlantic exclusive economic zone from January 1 to December 31; and the 50% split quotas of the commercial ACL between the two seasons. Retain the commercial trip limit and trip limit reduction in Season 1 (January 1 through June 30). For Season 2 (July 1 through December 31), modify the commercial trip limit to 750 pounds gutted weight and remove the trip limit reduction. Any remaining quota from Season 1 transfers to Season 2. Any remaining quota from Season 2 is not carried forward.

Alternative 3. Retain the commercial fishing year for vermilion snapper in the South Atlantic exclusive economic zone from January 1 to December 31; and the 50% split quotas of the commercial ACL between the two seasons. Retain the commercial trip limit and trip limit reduction in Season 1 (January 1 through June 30). For Season 2 (July 1 through December 31), modify the commercial trip limit to 500 pounds gutted weight and remove the trip limit reduction. Any remaining quota from Season 1 transfers to Season 2. Any remaining quota from Season 2 is not carried forward.

Preferred Alternative 4. Retain the commercial fishing year for vermilion snapper in the South Atlantic exclusive economic zone from January 1 to December 31; and the 50% split quotas of the commercial ACL between the two seasons. Modify the commercial trip limit for both seasons and remove trip limit reductions. Any remaining quota from Season 1 transfers to Season 2. Any remaining quota from Season 2 is not carried forward.

- **Preferred Sub-alternative 4a**. 1,000 pounds gutted weight
- **Sub-alternative 4b.** 850 pounds gutted weight
- **Sub-alternative 4c.** 700 pounds gutted weight

Discussion:

Commercial harvest of vermilion snapper in the South Atlantic is managed under split season quotas during two 6-month seasons. The commercial ACL of 862,920 lbs ww is allocated evenly between the two seasons. The commercial trip limit is 1,000 lbs gw. For both seasons, when 75% of the vermilion snapper seasonal quota is met or is projected to be met, the trip limit is reduced to 500 lbs gw.

None of the proposed alternatives would change the allocation of the commercial ACL between the two seasons. **Alternative 2** and **Alternative 3** would retain the 1,000-pound trip limit and trip limit reduction in the first season and propose a trip limit of 750 or 500 pounds, respectively, with no trip limit reduction for Season 2. **Preferred Alternative 4** and its sub-alternatives would modify the trip limit in both seasons and remove the trip limit reduction.

2.5.1 Comparison of Alternatives:

Differences in projected landings of vermilion snapper among the alternatives and sub-alternatives considered under this action are minor (**Table 4.5.2.1**), hence, there is no expected difference in biological effects in terms of overall harvest relative to **Alternative 1 (No Action)**. In general, trip limits do not result in biological effects, positive or negative, since overall harvest is limited by the ACL and AMs are in place to ensure the ACL is not exceeded. Peak spawning activity for vermilion snapper is from June through August (**Table 3.2.1**). Analyses indicate an in-season closure would still occur under all proposed alternatives during Season 1, thus possibly reducing fishing pressure on vermilion snapper at the onset of the spawning season. As **Alternative 1 (No Action)** is predicted to result in a commercial closure before the end of August, it possibly has a small biological benefit over **Alternative 2** and **Alternatives 3** and **Preferred Alternative 4**, which could result in fishing activity continuing past peak spawning.

Preferred Sub-alternative 4a is expected to generate the greatest net economic benefits, followed by **Sub-alternative 4b, Alternative 1 (No Action), Alternative 2,** and **Sub-alternative 4c**, while **Alternative 3** is expected to generate the least net economic benefits. Some subjectivity is involved in these rankings because the expected changes in private and public costs can only be evaluated qualitatively across alternatives (i.e., ranked), unlike the expected reductions in annual gross revenue.

Alternative 1 (No Action), **Alternative 2**, and **Preferred Sub-alternative 4a** and **Sub-alternative 4b** propose higher trip limits in the second season compared to **Alternative 3** and **Sub-alternative 4b**. A higher trip limit in the second season would have the direct social benefit of increasing trip efficiency, especially for businesses who target multiple species and do not need one species to be open year-round. Removal of trip limit reductions could increase the rate of harvest beyond that in **Alternative 1 (No Action)** and increase the likelihood of an in-season closure, shortening the season and reducing access to the fishery. Alternatively, removing trip limit reductions can have the social benefit of reducing regulatory complexity and increasing compliance, ensuring long-term social benefits are realized by fishing communities.

Of the four alternatives (plus sub-alternatives) considered, **Alternative 1 (No Action)** would impose the most administrative burden. Since the yearly quota is divided into two fishing seasons under **Alternative 1 (No Action**), if the quota for each season is projected to be met and harvest is closed, there is potential for a total of six in-season notices (i.e., trip limit reduction notice, closure notice, and reopening notice, if it is subsequently determined that a portion of the ACL was not harvested, for each of two seasons) that would need to be prepared by fishery managers. Under **Alternative 2** and **Alternative 3**, there is potential that fishery managers may have to prepare five in-season notices since the trip limit reduction would be removed from the second season. Fishery managers would only have to prepare a maximum of four in-season notices under **Preferred Alternative 4** and its sub-alternatives since the trip limit reduction would be removed from both seasons. Because there is already a trip limit in place combined with a trip limit reduction for each 6-month season for vermilion snapper, **Alternative 1 (No**

Action) would impose the most administrative burden, followed by **Alternatives 2** and **3,** and **Preferred Alternative 4** (and its sub-alternatives).

2.6 Action 6. Establish a minimum size limit for almaco jack for the commercial sector

Alternative 1 (No Action). There is no commercial minimum size limit specified for almaco jack.

Preferred Alternative 2. Establish a minimum size limit for almaco jack for the commercial sector:

> **Preferred Sub-alternative 2a.** 20 inches fork length.
> **Sub-alternative 2b.** 22 inches fork length.
> **Sub-alternative 2c.** 24 inches fork length.
> **Sub-alternative 2d.** 26 inches fork length.

Discussion:

Almaco jack is managed under the Other Jacks Complex along with lesser amberjack and banded rudderfish. There is currently no minimum size limit for almaco jack in the South Atlantic.

2.6.1 Comparison of Alternatives:

In 2018, the commercial ACL for the Other Jacks Complex was met, and harvest closed on August 22. Analyses conducted for this amendment using data through 2017 predicted that under **Alternative 1 (No Action)**, the commercial ACL for the Other Jacks Complex would be met in early July; whereas, the proposed minimum size limits under **Sub-alternatives 2a (Preferred)-2d** might allow harvest to continue increasingly longer; from 12 additional days under a 20-inch minimum size limit (**Preferred Sub-alternative 2a**) to 82 additional days under a 26-inch minimum size limit (**Sub-alternative 2d**) (**Table 4.6.1.2**).

Analyses show that 88.5% of almaco jack landed commercially (by weight) in the South Atlantic are above 20 inches fork length (FL) (**Preferred Sub-alternative 2a**) and 66% of the catch is above 26 inches FL; hence, regulatory discards are expected to be minimal. The larger the minimum size limit, the greater the resulting benefits to the population in terms of increased reproductive potential. As such, biological benefits would be higher under **Sub-alternatives 2d**, **2c**, **2b**, and **Preferred Sub-alternative 2a**, in that order. Overall, **Preferred Alternative 2** and its sub-alternatives are expected to result in positive biological impacts to the almaco jack stock relative to **Alternative 1 (No Action)**.

Alternative 1 (No Action) is expected to generate the greatest net economic benefits, followed by **Preferred Sub-alternative 2a**, **Sub-alternative 2c**, **Sub-alternative 2b**, with **Sub-alternative 2d** expected to generate the least net economic benefits. Moreover, because all of the other alternatives are expected to result in lower annual gross revenue and higher private costs relative to **Alternative 1 (No Action)**, the changes in net economic benefits are expected to be negative under these other alternatives.

Specifying a minimum size limit under **Preferred Alternative 2** (and its sub-alternatives) does not reduce harvest below the ACL and would not result in a substantially longer fishing season (**Table 4.6.1.2**). The expected reduction in net economic benefits is not substantial under any alternative and would not be anticipated to result in negative direct or indirect social effects on fishing communities.

Of the alternatives (plus sub-alternatives) considered, **Preferred Alternative 2** (and its sub-alternatives) would impose the greatest administrative burden, followed by **Alternative 1 (No Action)**. However, the impacts associated with **Preferred Alternative 2** (and sub-alternatives) are expected to be minor and would be incurred by rulemaking, outreach, education and enforcement.

2.7 Action 7. Establish a commercial trip limit for the Other Jacks Complex

Alternative 1 (No Action). There is no commercial trip limit for the Other Jacks Complex (lesser amberjack, almaco jack, and banded rudderfish).

Preferred Alternative 2. Establish a commercial trip limit for the Other Jacks Complex:
Preferred Sub-alternative 2a. 500 pounds gutted weight.
Sub-alternative 2b. 400 pounds gutted weight.
Sub-alternative 2c. 300 pounds gutted weight.

Discussion:
There is currently no commercial trip limit for the Other Jacks Complex (almaco jack, lesser amberjack, and banded rudderfish) in the South Atlantic. **Preferred Alternative 2** (and its sub-alternatives) propose establishing commercial trip limits ranging from 300 to 500 lbs gw.

2.7.1 Comparison of Alternatives:

There is no expected difference in the biological effects of implementing a trip limit for the Other Jacks Complex relative to **Alternative 1 (No Action)** in terms of risk of overfishing since overall harvest would continue to be limited to the ACL and AMs would be triggered if the ACL was reached. As discussed previously, since most of the commercial catch of almaco jack is above the proposed 20-inch FL minimum size limit and release mortality is expected to be low, any negative biological effects of **Preferred Alternative 2** and its sub-alternatives would be minimal relative to **Alternative 1 (No Action)**.

Alternative 1 (No Action) is expected to generate the greatest net economic benefits, followed by **Preferred Sub-alternative 2a**, **Sub-alternative 2b**, with **Sub-alternative 2c** expected to generate the least net economic benefits. Moreover, because all of the other alternatives are expected to result in lower annual gross revenue and higher private costs relative to **Alternative 1 (No Action)**, the changes in net economic benefits are expected to be negative under these other alternatives (**Table 4.7.2.7**).

A commercial trip limit under **Preferred Alternative 2** may help slow the rate of harvest and lengthen the season, but trip limits that are too low may make fishing trips inefficient and too costly if fishing grounds are too far away, which would be of most concern under **Sub-alternative 2c**, followed by **Sub-alternative 2b** and **Preferred Sub-alternative 2a**. A longer open season would be beneficial to the commercial fleet and to end users of jacks (restaurant owners, fish houses, and consumers) by improving consistency of availability, and if trip limits are sufficient to support commercial fishing activity. When combined with the minimum size limit for almaco jack proposed in **Action 6**, **Sub-alternative 2c** is projected to keep the fishery open until the beginning of December. **Preferred Sub-alternative 2a** and **Sub-alternative 2b** are projected to result in a shorter season with estimated closures in mid-September and Mid-October, respectively, after harvest of species in the Other Jacks Complex has peaked (**Table 4.7.1.2**). **Alternative 1 (No Action)** would result in the shortest fishing season, with a predicted closure date in early July when harvest of species in the Other Jacks Complex still occurs at moderate levels, resulting in negative social effects associated with a decrease in fishing opportunities (**Table 4.6.1.2**) (Note that in 2018 the commercial ACL for the Other Jacks Complex was met and commercial harvest was closed on August 22). Reductions in annual gross revenue under **Preferred Sub-alternative 2a** for Action 6 and **Preferred Alternative 2a** for **Action 7** are expected to be minimal and are not anticipated to have a negative direct or indirect social effect on fishing communities (**Table 4.7.2.7**).

Under **Alternative 1 (No Action)**, if total effort for species in the Other Jacks Complex remains consistent, it is likely the ACL would continue to be met prior to the end of the fishing year, and fishery managers would have to continue to prepare and issue closure notices. **Alternative 1 (No Action)** and **Preferred Alternative 2a** would impose the most administrative burden, followed by **Sub-alternatives 2b** and **2c,** which may delay or potentially remove the need to prepare a closure notice, since it is likely the ACL would be met later in the fishing year or not at all.

2.8 Action 8. Remove the commercial minimum size limits for certain deep-water species

Alternative 1 (No Action). The commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper in the South Atlantic exclusive economic zone is 12 inches total length.

Preferred Alternative 2. Remove the 12-inch total length commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper in the South Atlantic exclusive economic zone.

Discussion:

Under **Alternative 1 (No Action)**, there would continue to be a 12-inch total length (TL) minimum size limit for queen snapper, blackfin snapper, and silk snapper in the South Atlantic. **Preferred Alternative 2** proposes removing the minimum size limit for these species. The 12-inch TL minimum size limit was put in place for queen snapper, blackfin snapper, and silk snapper early in the management of the snapper grouper fishery, before estimates of discard mortality were available, and long before the creation of the various species complexes. Species in the Deep-water Complex (yellowedge grouper, silk snapper, misty grouper, queen snapper, sand tilefish, and blackfin snapper) are typically associated with a very high discard mortality. **Preferred Alternative 2** is the only reasonable alternative to taking no action to reduce the discarding of dead fish.

2.8.1 Comparison of Alternatives:

Available data, which is limited (Bycatch Practicability Analysis; **Appendix D**), indicates that no blackfin snapper or queen snapper are discarded, and the number of silk snapper that are discarded is minimal. Thus, minimal changes in discard or harvest rates would be expected under **Preferred Alternative 2**. Biological effects of **Preferred Alternative 2** would be neutral compared to **Alternative 1 (No Action)** in terms of the risk of overfishing, as removing the size limit would have no effect on overall harvest, which is limited by the ACL and AMs that are in place. Queen snapper, blackfin snapper, and silk snapper inhabit deep water; hence, discard mortality is expected to be very high. Although there is limited information on the level of discards for these species, it is expected that removing the minimum size limit would encourage fishermen to retain queen snapper, blackfin snapper, and silk snapper less than 12 inches TL; thus, diminishing losses to discard mortality.

Since minimal changes in discards or landings would be expected under **Preferred Alternative 2**, any potential changes in ex-vessel revenue relative to **Alternative 1 (No Action)** would also be expected to be minimal. If in fact harvest rates increase noticeably as a result of **Preferred Alternative 2**, it could result in an overall increase in aggregate annual ex-vessel revenue relative to the status quo. With the elimination of the minimum size limit, vessels could potentially increase landings of these species per unit of effort. Thus, the costs of harvesting these species would also be expected to decrease on a per pound basis. So, net economic benefits under **Preferred Alternative 2** would be expected to be higher than under **Alternative 1 (No Action).**

Some social effects of removing the minimum size limits for the queen snapper, blackfin snapper, and silk snapper considered under this action would be associated with the positive and negative biological effects on the species (see **Section 4.8.1**). Removing the minimum size limit under **Preferred Alternative 2** would likely have minimal or no effects on current commercial trips and would be similar to the expected effects of **Alternative 1 (No Action)** because these species are not caught or discarded in large numbers.

Beneficial administrative effects would be expected from **Preferred Alternative 2**, when compared with **Alternative 1 (No Action)**. Removing the minimum size limit for deep-water species would create consistent regulations with other managed deep-water species, which would help the public avoid confusion with regulations and aid law enforcement. Administrative impacts on the agency associated with the action alternatives would be incurred by rulemaking, outreach, education and enforcement.

2.9 Action 9. Reduce the commercial minimum size limit for gray triggerfish in the Exclusive Economic Zone off east Florida

Alternative 1 (No Action). The commercial minimum size limit for gray triggerfish in the exclusive economic zone off the east coast of Florida is 14 inches fork length.

Preferred Alternative 2. Reduce the commercial minimum size limit for gray triggerfish in the exclusive economic zone off the east coast of Florida to 12 inches fork length.

Discussion:

Alternative 1 (No Action) would retain the current commercial minimum size limit of 14 inches FL for gray triggerfish off the east coast of Florida. This regulation is inconsistent with the current Florida state regulation which established a 12-inch FL minimum size limit for gray triggerfish off the east coast of Florida. As such, the only reasonable alternative is **Preferred Alternative 2**, which would reduce the minimum size limit to 12 inches FL in the EEZ off the east coast of Florida. Furthermore, **Preferred Alternative 2** would also align regulations with those currently in place in federal waters off the rest of the South Atlantic states, thus promoting a more consistent regulatory environment for stakeholders and enforcement agencies.

2.9.1 Comparison of Alternatives:

The biological effects of **Preferred Alternative 2** could be negative even with overall harvest limited to the ACL and with the AMs in place. The reduction in discarded fish during the fishing season may have minimal impact due to the low discard mortality rate of 12.5% estimated in Southeast Data, Assessment, and Review (SEDAR) 41 (2016) and the loss in egg production. However, a decrease in the minimum size limit, as proposed under **Preferred Alternative 2**, could have negative biological effects relative to **Alternative 1 (No Action)** if larger fish produce more eggs.

The difference in the projected annual landings between **Alternative 1 (No Action)** and **Preferred Alternative 2** is relatively small, and the differences in expected annual gross revenue are also relatively small. Reducing the minimum size limit would also allow commercial fishing vessels to harvest these species with less effort. As such, **Preferred Alternative 2** would also be expected to decrease costs to the private sector (e.g., harvesting costs of commercial fishing vessels) by decreasing the cost per pound of harvest. Thus, in combination with the expected increase in annual gross revenue, **Preferred Alternative 2** is expected to generate greater net economic benefits relative to **Alternative 1 (No Action) (Table 4.9.2.2)**.

The benefits and costs to commercial fishermen would depend on the balance of increasing the number of fish that can be kept while ensuring that an increased harvest rate would not result in a shortened commercial season. When compared to **Alternative 1 (No Action)**, **Preferred Alternative 2** is anticipated to reduce the season length minimally and is not anticipated to result in substantial negative social effects.

Alternatives that specify a consistent minimum size limit in federal waters throughout the South Atlantic Council's jurisdiction would help the public avoid confusion with regulations and aid law enforcement. Administrative impacts on the agency associated with the action alternatives would be incurred by rulemaking, outreach, education and enforcement. Therefore, beneficial administrative effects would be expected from **Preferred Alternative 2**, when compared with **Alternative 1 (No Action).**

Chapter 3. Affected Environment

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

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

3.1 Habitat Environment

3.1.1 Inshore/Estuarine Habitat

Many snapper grouper species utilize both pelagic and benthic habitats during several stages of their life histories; larval stages of these species live in the water column and feed on plankton. Most juveniles and adults are demersal (bottom dwellers) and associate with hard structures on the continental shelf that have moderate to high relief (e.g., coral reef systems and artificial reef structures, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings). Juvenile stages of some snapper grouper species also utilize inshore seagrass beds, mangrove estuaries, lagoons, oyster reefs, and embayment systems. In many species, various combinations of these habitats may be utilized during daytime feeding migrations or seasonal shifts in cross-shelf distributions. Additional information on the habitat utilized by species in the Snapper Grouper Complex is included in Volume II of the Fishery Ecosystem Plan[1] (FEP; SAFMC 2009) and incorporated here by reference.

3.1.2 Offshore Habitat

Predominant snapper grouper offshore fishing areas are located in live bottom and shelf-edge habitats where water temperatures range from 11º to 27º C (52º to 81º F) due to the proximity of the Gulf Stream, with lower shelf habitat temperatures varying from 11º to 14º C (52º to 57º F). Water depths range from 16 to 55 meters (54 to 180 ft) or greater for live-bottom habitats, 55 to 110 meters (180 to 360 ft) for the shelf-edge habitat, and from 110 to 183 meters (360 to 600 ft) for lower-shelf habitat areas.

[1] The FEP can be found at: http://safmc.net/ecosystem-management/fishery-ecosystem-plan/.

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

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

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

The distribution of coral and live hard bottom habitat as presented in the Southeast Marine Assessment and Prediction Program (SEAMAP) bottom mapping project is a proxy for the distribution of the species within the snapper grouper complex. The method used to determine hard bottom habitat relied on the identification of reef obligate species including members of the snapper grouper complex. The Florida Fish and Wildlife Research Institute (FWRI), using the best available information on the distribution of hard bottom habitat in the South Atlantic region, prepared ArcView maps for the four-state project. These maps, which consolidate known distribution of coral, hard/live bottom, and artificial reefs as hard bottom, are available on the

South Atlantic Council's online map services provided by the newly developed SAFMC Habitat and Ecosystem Atlas[2].

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 South Atlantic Council's Internet Mapping System at the above address.

Additional information on the habitat utilized by snapper grouper species is included in the South Atlantic Council's EcoSpecies Database[3].

3.1.3 Essential Fish Habitat

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

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

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

---

[2] http://ocean.floridamarine.org/safmc_atlas/.
An introduction to the system is found at: http://www.safmc.net/ecosystem-management/mapping-and-gis-data.
[3] http://saecospecies.azurewebsites.net

unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom habitats.

3.1.4 Habitat Areas of Particular Concern

Areas which meet the criteria for Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs) for species in the snapper grouper management unit include medium to high profile offshore hard bottoms where spawning normally occurs; localities of known or likely periodic spawning aggregations; 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; South Atlantic Council-designated Artificial Reef Special Management Zones (SMZs); and deep-water Marine Protected Areas (MPAs). Areas that meet the criteria for EFH-HAPCs include habitats required during each life stage (including egg, larval, post-larval, juvenile, and adult stages).

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

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

3.2 Biological and Ecological Environment

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

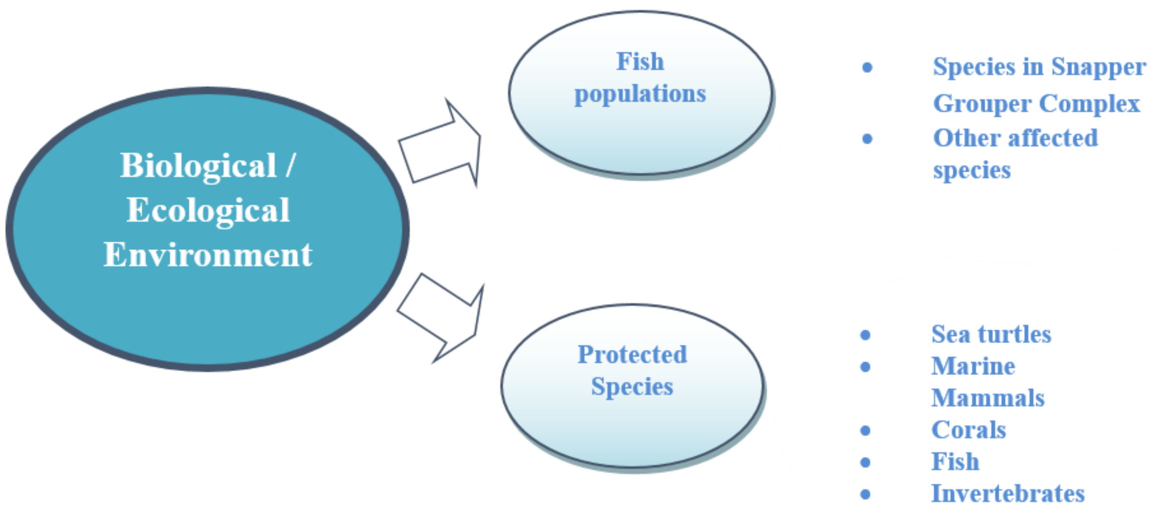

Figure 3.2.1. Two components of the biological environment described in this document.

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

3.2.1 Fish Populations Affected by this Amendment

Additional life history information for snapper grouper species affected by this amendment may be found in the South Atlantic EcoSpecies Database[4]. In addition, the timing of spawning for several snapper grouper species in the South Atlantic region is summarized in **Table 3.2.1**.

Table 3.2.1. Timing of spawning (gray shading) and peak spawning (black shading) for exploited Atlantic Ocean reef fish stocks off the southeastern United States.

[4] http://saecospecies.azurewebsites.net

Months in bold denote core Southeast Reef Fish Survey (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.

3.2.1.1 Blueline Tilefish

Life History

Blueline tilefish, *Caulolatilus microps*, occurs in the Western Atlantic Ocean, from Virginia to southern Florida and Mexico, including the Gulf of Mexico (Dooley 1978). Recent data show the species is distributed throughout the U.S. Mid-Atlantic region (Virginia through Massachusetts) (SEDAR 50 2017, Schmidtke 2017). Blueline tilefish are found along the outer continental shelf, shelf break, and upper slope on irregular bottom with ledges or crevices, and around boulders or rubble piles in depths of 30-236 m (98-774 ft) and temperatures ranging from 15 to 23° C (59-73.4º F) (Ross 1978; Ross and Huntsman 1982; Robins and Ray 1986; Parker and Mays 1998). Maximum reported size is 90 cm (35.4 in) FL (SEDAR 32 2013) and 7 kg (15 pounds [lbs]) (Dooley 1978). Maximum reported age is 43 years (SEDAR 32 2013); however, a more recent evaluation of ageing data (SEDAR 50 2017) determined that age determinations are not reliable for this species. Spawning occurs at night, from March to October, with a peak in May (SEDAR 32 2013, Harris et al. 2004). Blueline tilefish primarily feeds on benthic invertebrates and fishes (Dooley 1978).

Landings

Commercial landings of blueline tilefish in the South Atlantic region from 2014 through 2017 have reached or exceeded the ACL (**Table 3.2.2)**. North Carolina has dominated blueline tilefish commercial landings until recently **(Figures 3.2.2** and **3.2.3)**.

Table 3.2.2. Blueline tilefish total commercial landings in pounds whole weight (lbs ww) and closure dates, 2012-2017.

Fishing Year	Landings	ACL	% ACL	Closure Date
2017	86,507	87,521	98.84	7/18/17; Reopened 10/24/17-11/1/17
2016	97,798	87,521	111.74	6/1/16; reopened 7/13/16, closed 8/30/16
2015	78,303	17,841	438.89	4/7/2015
2014	156,371	112,207	139.36	6/23/2014

Source: SERO ACL Monitoring Webpage [accessed 2/6/2018].

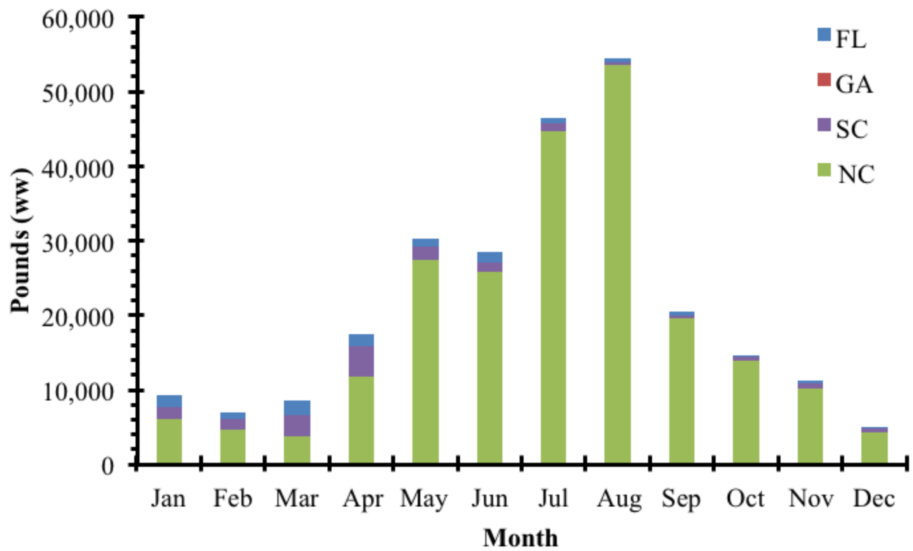

Figure 3.2.2. The average monthly South Atlantic blueline tilefish commercial landings by state from 2004-2013 (lbs ww). The years 2014-2016 were excluded due to closures.
Source: SERO with data from Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

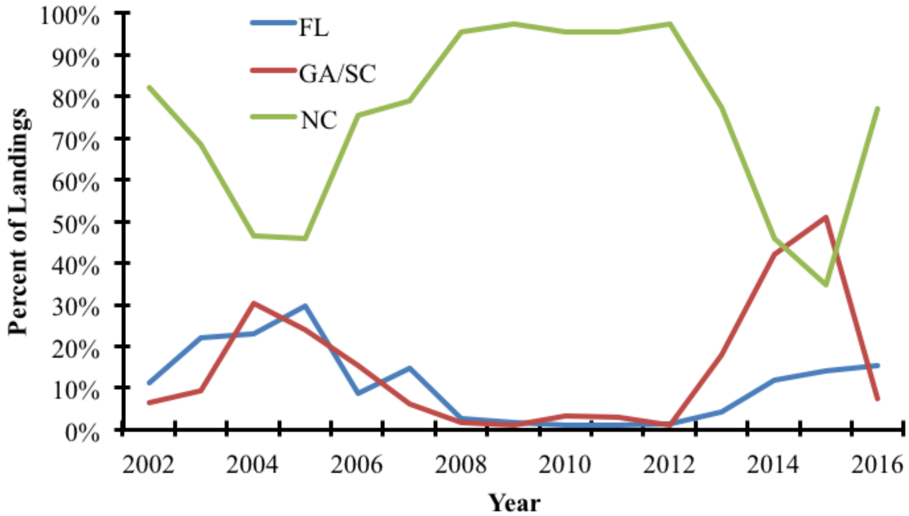

Figure 3.2.3. The percentage of annual South Atlantic blueline tilefish commercial landings by state from 2002-2016 (lbs ww). Georgia and South Carolina were combined due to confidentiality concerns. Source: SERO with data from Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

Stock Status

A recent assessment of the stock status of blueline tilefish in the South Atlantic region (SEDAR 50 2017) was unable to determine stock status for this species based on existing jurisdictional boundaries and available data. However, based on the Scientific and Statistical Committee (SSC)'s review of the latest stock assessment (SEDAR 50) in October 2017, NMFS determined that the South Atlantic stock of blueline tilefish (Florida Keys to Cape Hatteras, North Carolina) is not overfished and not undergoing overfishing.

3.2.1.2 Snowy Grouper

Life History

The snowy grouper, *Epinephelus niveatus*, is a commercially important deep-water species that occurs in the western Atlantic from Massachusetts to Brazil, including Bermuda, Cuba, the Bahamas, and the Gulf of Mexico (Carpenter 2002). Stray specimens have been collected in the Canadian Atlantic (Scott and Scott 1988). Along the coast of the southeast United States, adult snowy grouper are predominantly found on the upper continental slope (> 75 m; Lee et al. 1985) at depths of 116-259 m (Low and Ulrich 1983; Moore and Labisky 1984; Parker and Ross 1986), whereas juveniles are more common at shallower depths (Moore and Labisky 1984). Low and Ulrich (1983) and Wyanski et al. (2000) noted a positive correlation between total length (TL) and water depth off South Carolina. Snowy grouper feed on fish, crabs and other crustaceans, squid, and snails (Heemstra and Randall 1993). Information on predators of snowy grouper is limited.

Snowy grouper are protogynous; fish begin life as females and the older and larger fish in the population are males. Female snowy grouper reach sexual maturity between the ages of three and eight years (Wyanski et al. 2000), most by the age of five years (Moore and Labisky 1984) to seven years (Wyanski et al. 2000). Wyanski et al. (2000) found evidence that the number of males in the population decreased between the 1970s and the 1990s off North Carolina and

South Carolina, which may have been a function of the removal of older and larger snowy grouper through fishing pressure. The maximum age of snowy grouper reported by Wyanski et al. (2013) is 35 years. The spawning season for snowy grouper is from April through September (Wyanski et al. 2000, 2013). Snowy grouper are slow growing, reaching a size of 1.2 m (4 ft) in length and 30 kg (66 lbs) in weight (Heemstra and Randall 1993).

Landings

High snowy grouper landings have generally occurred in North Carolina during the spring whereas Florida sees higher landings in the fall **(Figure 3.2.4)**. North Carolina and Florida landed about the same percentage of snowy grouper in 2016 **(Figure 3.2.5)**. More vessels homeported in Florida have reported landings of snowy grouper from 2006 through 2016 **(Figure 3.2.6)**. Note this analysis was performed at the state level, so vessels landing in multiple states would be counted for each state.

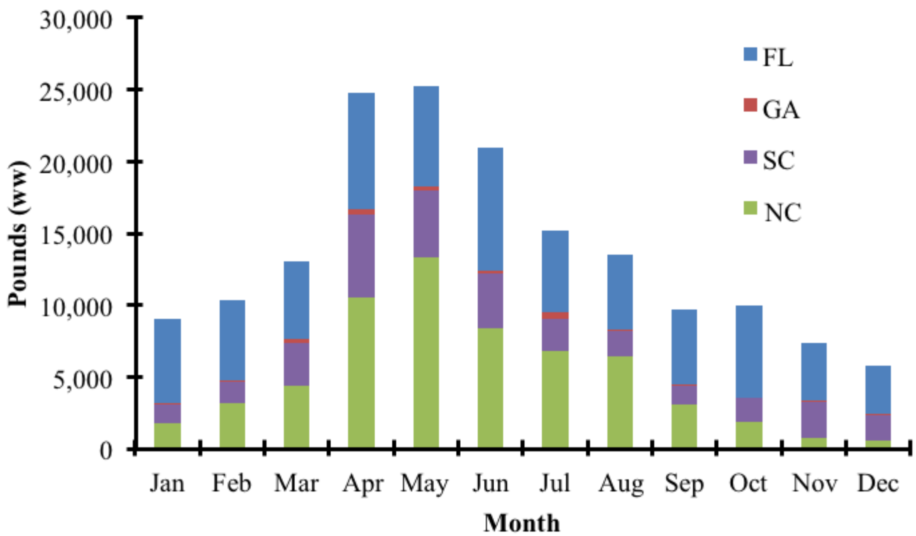

Figure 3.2.4. The average monthly commercial South Atlantic snowy grouper landings by state from 2002-2005 and 2007-2011 (lbs ww). The years 2006 and 2012-2016 were excluded due to closures. Source: SERO with data from Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

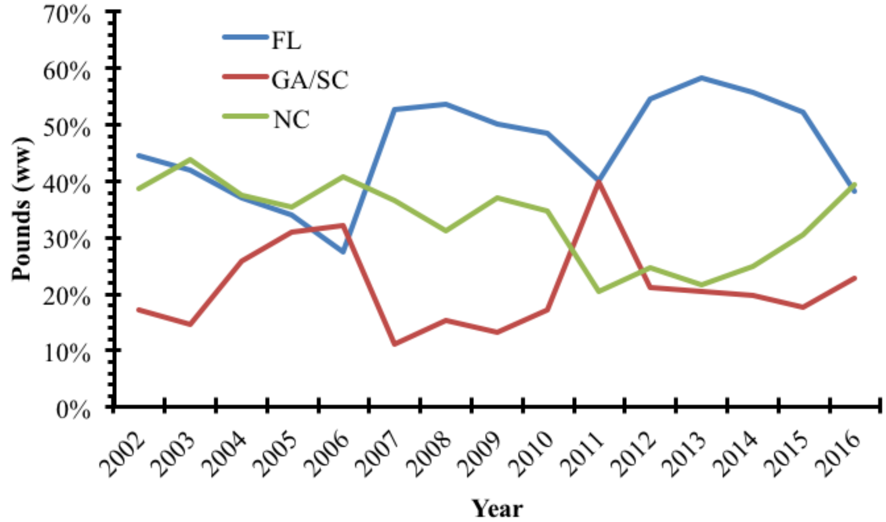

Figure 3.2.5. The percentage of annual South Atlantic snowy grouper commercial landings by state from 2002-2016 (lbs ww). Georgia and South Carolina were combined due to confidentiality concerns. Source: SERO with data from Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

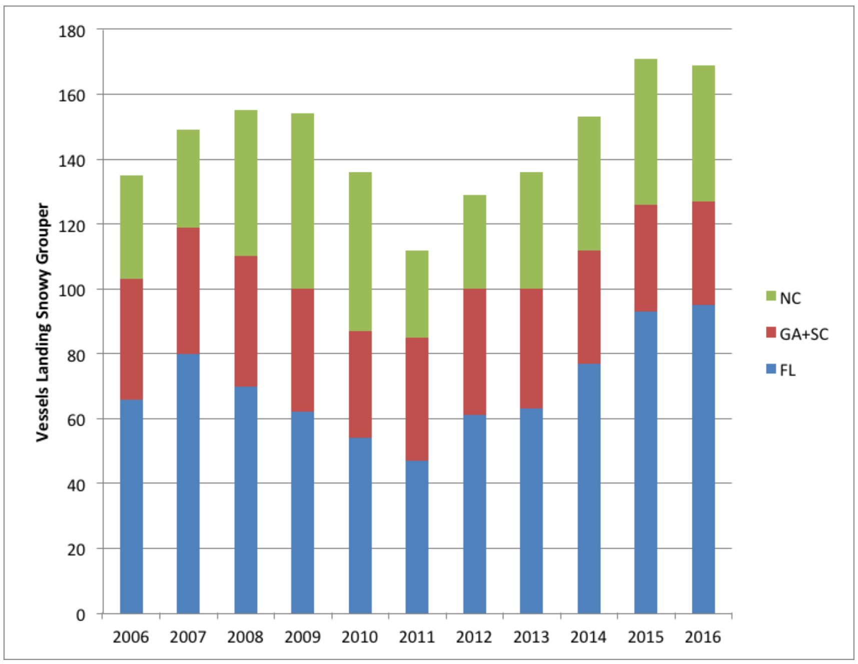

Figure 3.2.6. Number of vessels reporting landings of snowy grouper, by state and year. Note that Georgia and South Carolina have been aggregated to protect confidentiality.
Source: SERO

Commercial landings of snowy grouper remained at or below the ACL from 2004 through 2011 with the exception of 2006 **(Table 3.2.3)**. Landings have generally exceeded the ACL since 2012 triggering in-season closures mainly in the summer months.

Table 3.2.3. Snowy grouper total commercial landings in pounds gutted weight (lbs gw) and closure dates, 2004-2017.

Fishing Year	Landings	ACL	%ACL	Closure
2017	136,561	135,380	100.87	6/22/2017
2016	151,999	125,760	120.86	6/14/2016
2015	131,063	115,451	113.52	9/22/2015
2014	94,491	82,900	113.98	7/25/2014
2013	79,695	82,900	96.13	8/10/2013
2012	89,143	82,900	107.53	12/19/2012
2011	37,461	82,900	45.19	-
2010	86,692	82,900	104.57	-
2009	75,614	82,900	91.21	-
2008	72,971	84,000	86.87	-
2007	112,385	118,000	95.24	-
2006	214,064	151,000	141.76	10/23/2006
2005	206,636	344,508	59.98	-
2004	220,958	344,508	64.14	-

Source: SERO ACL Monitoring Webpage [accessed 2/6/2018].

Stock Status

In 2013, the snowy grouper stock was assessed through SEDAR as a standard assessment (SEDAR 36 2013) with data through 2012. The assessment indicated that the snowy grouper stock is not undergoing overfishing and is rebuilding but remains overfished. This stock status remains unchanged in the 2nd quarter 2018 update to the status of stocks, in the report to Congress (https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates#2018-quarterly-updates).

3.2.1.3 Greater Amberjack

Life History

Greater amberjack, *Seriola dumerili*, is a pelagic species in the Jacks family (Carangidae) (Manooch and Potts 1997a). This species occurs in the Indo-West Pacific, and in the Western and Eastern Atlantic Oceans. In the Western Atlantic, it occurs as far north as Nova Scotia, Canada, southward to Brazil, including the Gulf of Mexico (Carpenter 2002, Manooch and Potts 1997a, Manooch and Potts 1997b).

Spawning in the South Atlantic region occurs from January through June, with a peak in April and May. Harris et al. (2007) caught fish in spawning condition from North Carolina through the Florida Keys; however, spawning appears to occur primarily off south Florida and the Florida Keys (Harris et al. 2007). Greater amberjack in spawning condition were found in different depths, although the bulk of samples were from the shelf break. Tagging data indicated that greater amberjack are capable of extensive movement that might be related to spawning activity. Greater amberjack tagged off South Carolina have been recaptured off Georgia, east Florida, Florida Keys, west Florida, Cancun Mexico, Cuba, and the Bahamas (MARMAP, unpublished data). This species is the largest jack with a maximum reported size of 190 cm (75 in) and 80.6 kg (177.7 pounds) (Paxton et al. 1989). Female greater amberjack are generally larger at age than males (Harris et al. 2007). Maximum reported age is 17 years (Manooch and Potts 1997a). According to Harris et al. (2007), the size at which 50% of males are mature is 644 mm FL (25 in), whereas all males are mature at 751-800 mm FL (29.5-31 in) and age six. The size at 50% maturity among female greater amberjack is 733 mm FL (29 in). Age at 50% maturity for females was 1.3 years and all females were mature by 851-900 mm FL (33.5-35 in) and age six.

Primary food items include fishes, such as bigeye scad, and invertebrates (Paxton et al. 1989).

Landings

Average monthly commercial landings for greater amberjack from 2005-2015 have peaked in May **(Figure 3.2.7)** with the vast majority landings occurring in Florida **(Figure 3.2.8)**. State landings of greater amberjack were restricted to the most recent five years of data due to high proportions of unclassified amberjacks prior to 2012. Even after 2012, some unclassified amberjacks (greater amberjack, lesser amberjacks, banded rudderfish, and almaco jack) were present in North Carolina landings. North Carolina's seafood dealers began using species-specific codes for greater amberjack in 2011, but it was not until 2015 that unclassified amberjack was completely removed as an option for all dealers.

The commercial fishing year for greater amberjack is from March 1 through the end of February. In 2016 and 2017, commercial harvest of greater amberjack closed in October (**Table 3.2.4**).

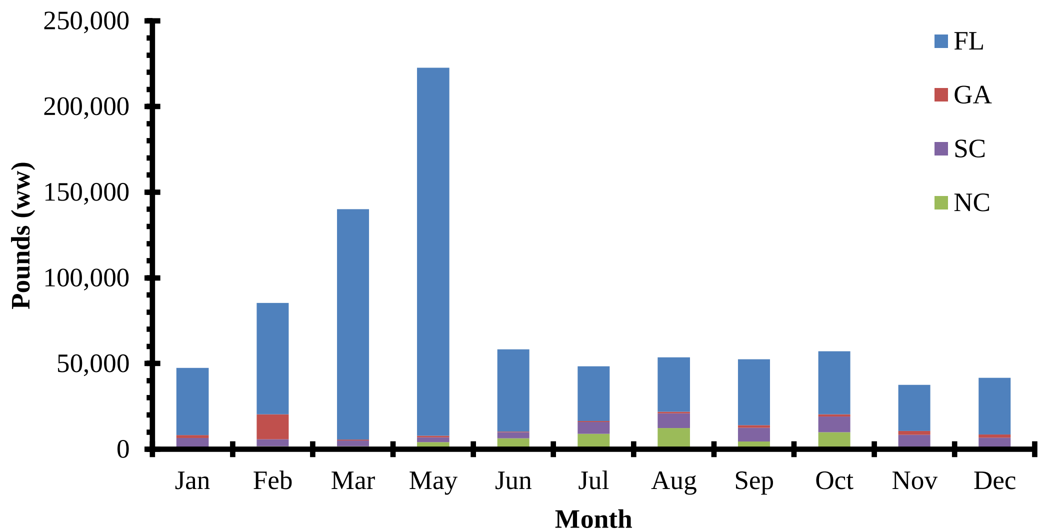

Figure 3.2.7. The average monthly South Atlantic greater amberjack landings by state from 2005-2015 (lbs ww). Data from the month of April were not available due to the seasonal closure in place since 1999. The year 2016 was excluded due to a closure.
Source: Southeast Fisheries Science Center commercial (10/5/2017) ACL dataset.

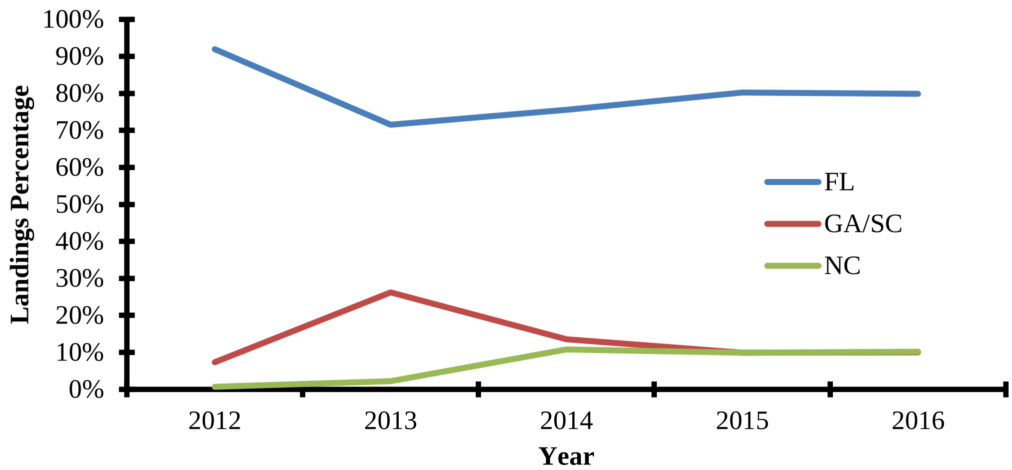

Figure 3.2.8. The percentage of annual South Atlantic greater amberjack landings by state from 2012-2016. Georgia and South Carolina were combined due to confidentiality concerns.
Source: Southeast Fisheries Science Center commercial (10/5/2017) ACL dataset. Note: North Carolina's seafood dealers began using a species-specific code for greater amberjack in 2011, but it was not until 2015 that "unclassified amberjacks" was completely removed as an option.

Table 3.2.4. Greater amberjack total commercial landings in pounds gutted weight (lbs gw) and closure dates, 2007-2017.

Fishing Year	Landings	ACL	%ACL	Closure Date
March 1, 2017 – February 28, 2018	796,206	769,388	103.5	10/18/2017
March 1, 2016 – February 28, 2017	748,950	769,388	97.34	10/4/2016
March 1, 2015 - Feb 28, 2016	709,130	769,388	92.17	1/21/2016
May 1, 2014 - Feb 28, 2015	754,429	769,388	98.06	-
May 1, 2013 - April 30, 2014	882,127	800,163	110.24	-
May 1, 2012 - April 30, 2013	972,308	800,163	121.51	-
May 1, 2011 - April 30, 2012	1,032,080	1,169,931	88.22	-
May 1, 2010 - April 30, 2011	857,839	1,169,931	73.32	-
May 1, 2009 - April 30, 2010	837,077	1,169,931	71.55	-
May 1, 2008 - April 30, 2009	648,247	1,169,931	55.41	-
May 1, 2007 - April 30, 2008	542,438	1,169,931	46.36	-

Source: SERO ACL Monitoring Webpage [accessed 2/6/2018].

Stock Status

The SEDAR 15 benchmark assessment (2008) was the first peer-reviewed assessment of South Atlantic greater amberjack. The assessment was completed in 2008 using data through 2006 and concluded that greater amberjack in the South Atlantic were not overfished and overfishing was not occurring. This stock status remains unchanged in the 2nd quarter 2018 update to the status of stocks, in the report to Congress (https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates#2018-quarterly-updates). A standard assessment of the South Atlantic stock of greater amberjack (SEDAR 59) is being conducted in 2018.

3.2.1.4 Red Porgy

Life History

Red porgy, *Pagrus pagrus*, are distributed throughout the Atlantic Ocean at depths of 18 to 280 meters (Manooch and Hassler 1978). In the South Atlantic region, red porgy are commonly associated with "live bottom" habitat with rocky outcrops and rocky ledges (Manooch and Hassler 1978, Grimes et al. 1982). Red porgy are protogynous, meaning the begin life as female and change to male later on. Therefore, most of the smaller fish are females, but males occur in all age groups (SEDAR 1 2002). In the Northeast Gulf of Mexico, red porgy appear to be pair spawners (do not form aggregations), and change sex over a wide range of sizes and ages (DeVries 2006). Peak spawning occurs in March and April (Manooch 1976). Red porgy grow slowly and live relatively long (an 18-year-old specimen is the oldest on record), but maturity occurs at younger ages. Roumillat and Waltz (1993) collected red porgy along the continental shelf between Cape Fear, North Carolina, and Cape Canaveral, Florida. The study determined the vast majority of females were mature by age two.

Landings

Commercial harvest of red porgy has been highest in July with North Carolina landing slightly more, on average, than other South Atlantic states **(Figures 3.2.9** and **3.2.10)**. There has been one recent closure of red porgy commercial harvest, and landings from 2015 through 2017 have been below the commercial ACL (**Table 3.2.5**).

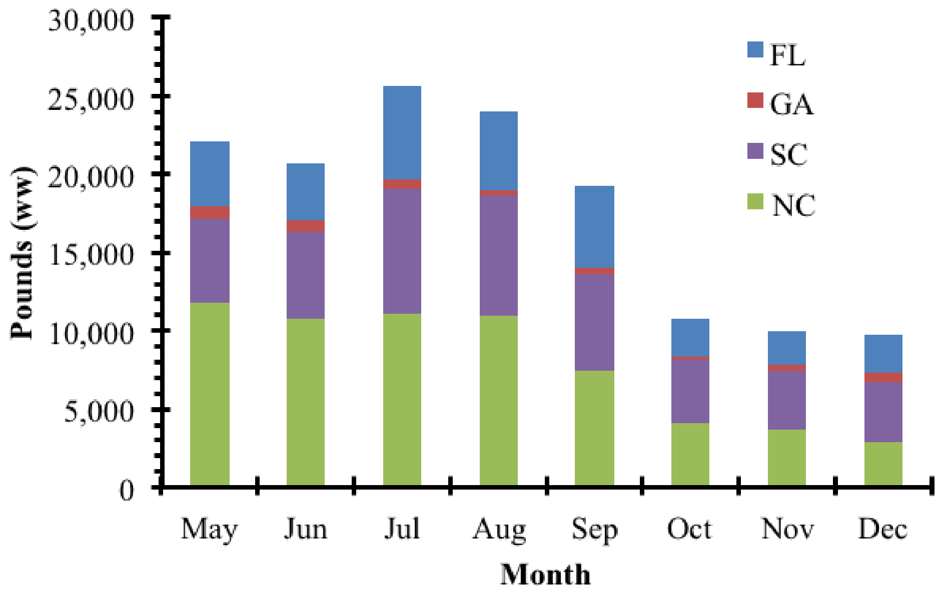

Figure 3.2.9. The average monthly South Atlantic red porgy commercial landings by state from 2005-2012 and 2014-2016 (lbs ww). The year 2013 was excluded due to a closure. Data from the months of January to April were not available due to the seasonal closure in place since 2000.
Source: SERO with data from Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

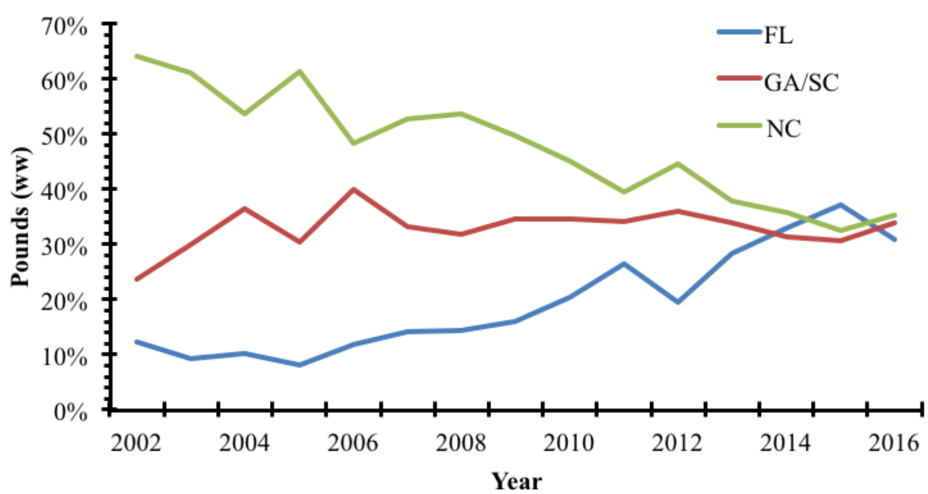

Figure 3.2.10. The percentage of annual South Atlantic red porgy commercial landings by state from 2002-2016 (lbs ww). Georgia and South Carolina were combined due to confidentiality concerns.
Source: SERO with data from Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

Table 3.2.5. Red porgy total commercial landings in pounds whole weight (lbs ww) and pounds gutted weight (lbs gw) and closure dates, 2004-2017.

Fishing Year	Landings	ACL	Units	%ACL	Closure
2017	114,874	164,000	ww	70.05	-
2016	120,104	164,000	ww	73.23	-
2015	146,056	164,000	ww	89.06	-
2014	155,546	154,500	ww	100.68	-
2013	163,337	153,000	gw	106.76	12/02/13
2012	155,743	190,050	gw	81.95	-
2011	195,215	190,050	gw	102.72	-
2010	152,743	190,050	gw	80.37	-
2009	158,219	190,050	gw	83.25	-
2008	165,365	127,000	gw	130.21	-
2007	138,737	127,000	gw	109.24	-
2006	80,619	127,000	gw	63.48	-
2005	46,821	None	gw	-	-
2004	47,814	None	gw	-	-

Source: SERO ACL Monitoring Webpage [accessed 2/6/2018].

Stock Status

An update to the red porgy assessment was conducted in 2012 with data through 2011 (SEDAR 1 Update 2012). The update included seven additional years of data since the last update in 2006 (SEDAR 1 Update 2006). The 2012 update showed that red porgy were overfished, but overfishing was not occurring. Landings of red porgy have been well below the maximum sustainable yield since the first size limit was implemented in 1992 but recruitment has been below R_{MSY} (recruitment when the population is at B_{MSY}) since the early 1990s. This lack of recruitment explains why recovery has been slow. This stock status remains unchanged in the 2nd quarter 2018 update to the status of stocks, in the report to Congress (https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates#2018-quarterly-updates). A standard assessment of the red porgy stock in the South Atlantic (SEDAR 60) is currently underway.

3.2.1.5 Vermilion Snapper

Life History

Vermilion snapper, *Rhomboplites aurorubens*, occur in the Western Atlantic, from North Carolina to Rio de Janeiro, Brazil. The species is most abundant off the southeastern United States and in the Gulf of Campeche, Mexico (Hood and Johnson 1999). Vermilion snapper are bottom-dwelling, commonly found over rock, ledges, live-bottom, gravel, or sand bottoms near the edge of the continental and island shelves (Froese and Pauly 2003). The species occurs at depths from 18 to 122 meters (59 to 400 feet) but is most abundant at depths less than 76 meters (250 feet). Individuals often form large schools.

This species spawns in aggregations (Lindeman et al. 2000). The spawning season extends from April through late September in the southeastern United States with a peak in June-August (Cuellar et al. 1996; Zhao et al. 1997; Sedberry et al. 2006; Farmer et al. 2017).

Vermilion snapper do not change sex during their lifetime. Very few immature vermilion snapper have been collected in the South Atlantic region (Cuellar et al. 1996, Zhao and McGovern 1997, SEDAR 17 2008). Based on the information available, most vermilion snapper are mature by age one (80%) and all are mature by age two (SEDAR 17 2008). The size of maturity is unclear since most fish are mature when they are collected. However, the smallest mature male sampled was 5.6 inches TL and the smallest female sampled was 7.1 inches (Zhao and McGovern 1997). The maximum size of vermilion snapper is 24.2 inches (61.5 centimeters) TL (SEDAR 17 2008). Maximum reported age in the South Atlantic is 19 years (SEDAR 17 2008).

This species preys on fishes, shrimp, crabs, polychaete worms, and other bottom-dwelling invertebrates, as well as cephalopods and planktonic organisms (Allen 1985). Sedberry and Cuellar (1993) reported that small crustaceans (especially copepods), sergestid decapods, barnacle larvae, stomatopods, and decapods dominated the diets of small (< 2 inches standard length (50 millimeters)) vermilion snapper off the southeastern United States. Larger decapods, fishes, and cephalopods are more important in the diet of larger vermilion snapper.

Landings

Commercial harvest of vermilion snapper from 2000 through 2016 has been relatively evenly distributed among the four South Atlantic states (**Figure 3.2.11**) and total commercial landings relative were below the commercial quotas/ACLs except from 2009 through 2013 (**Figure 3.2.12**). There have been several in-season quota closures in recent years (**Table 3.2.6**).

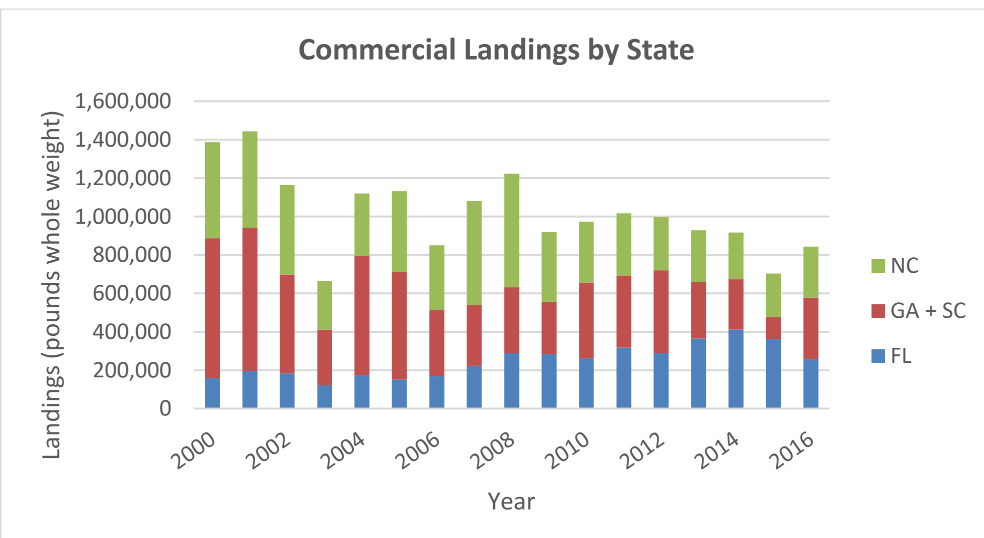

Figure 3.2.11. Commercial landings (pounds whole weight) of vermilion snapper in the South Atlantic region from 2000 through 2016 by state. Data for Georgia and South Carolina were aggregated due to confidentiality concerns.

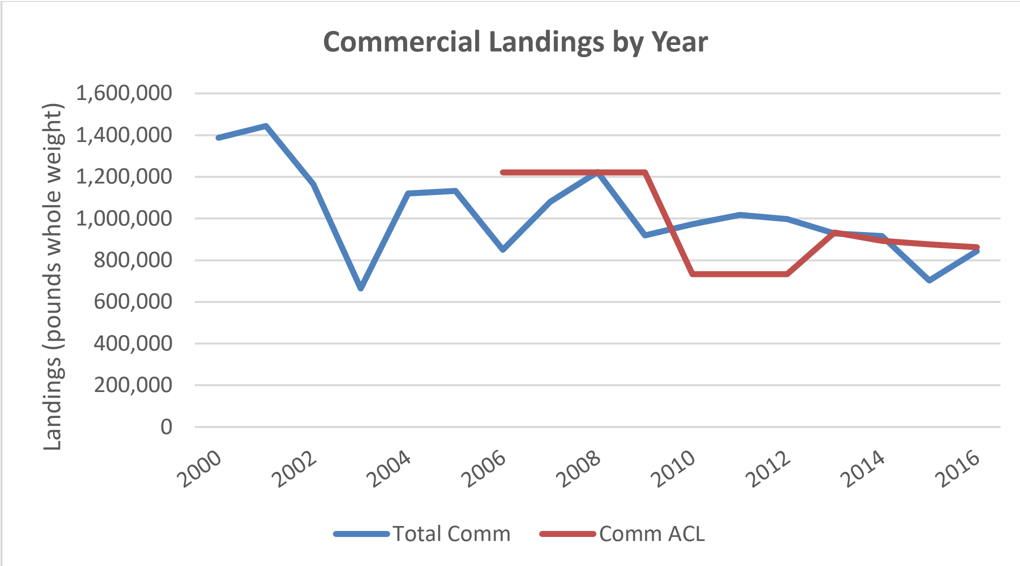

Figure 3.2.12. Commercial landings (pounds whole weight) of vermilion snapper in the South Atlantic region from 2000 through 2016 (blue line). Quotas/commercial ACLs are shown since 2007, when first implemented (red line).

Table 3.2.6. Vermilion snapper total commercial landings in pounds whole weight (lbs ww) and pounds gutted weight (lbs gw) and closure dates, 2008-2017.

Fishing Year	Landings	ACL	Units	ACL	Trip Limit	Closure
January 1 -June 30, 2017	410,786	431,460	ww	95.21	3/22/2017	5/17/17
July 1 - Dec 31, 2017	465,905	431,460		103.05	10/2/17	10/17/17
January 1 - June 30, 2016	393,911	431,460		91.30	3/2/2016	3/29/2016
July 1 - Dec 31, 2016	393,506	432,305		91.03	8/28/2016	10/11/16; reopened 12/14-12/15/16
Jan 1 - June 30, 2015	431,760	438,260		98.52	3/2/2015	4/15/2015
July 1 - Dec 31, 2015	452,519	438,260		103.25	9/10/2015	9/22/2015
Jan 1 - June 30, 2014	463,881	446,080		103.99	3/11/2014	4/19/2014
July 1 - Dec 31, 2014	461,061	446,080		103.36	8/23/2014	9/12/2014
Jan 1 - June 30, 2013	312,150	466,480		66.92	-	2/13/2013
July 1 - Dec 31, 2013	665,613	613,278		108.53	-	12/2/2013
Jan 1 - June 30, 2012	395,733	315,523	gw	125.42	-	2/29/2012
July 1 - Dec 31, 2012	499,980	302,523		165.27	-	9/28/2012
Jan 1 - June 30, 2011	333,148	315,523		105.04	-	3/10/11; Re-opened 5/1/11-5/8/11
July 1 - Dec 31, 2011	585,742	302,523		193.62	-	9/30/2011
Jan 1 - June 30, 2010	356,823	315,523		113.09	-	3/19/2010
July 1 - Dec 31, 2010	520,067	302,523		171.91	-	10/6/2010
Jan 1 - June 30, 2009	421,831	315,523		133.69	-	-
July 1 - Dec 31, 2009	406,166	302,523		134.26	-	9/18/2009
Jan 1 - Dec 31, 2008	1,100,812	1,100,000		100.07	-	-
	983,909	1,100,000		89.45	-	-
	768,193	1,100,000		69.84	-	-
	1,019,557	None		-	-	-
	1,008,714	None		-	--	-

Source: SERO ACL Monitoring Webpage [accessed 2/6/2018].

Stock Status

An update to the vermilion snapper assessment was conducted in 2012 with data through 2011 (SEDAR 17 Update 2012). Most of the data sources were simply updated with the four additional years of observations available since the SEDAR 17 (SEDAR 17 2008) benchmark. The SEDAR 17 Update (2012) showed that vermilion snapper were not overfished and overfishing was not occurring. This stock status remains unchanged in the 2nd quarter 2018 update to the status of stocks, in the report to Congress (https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates#2018-quarterly-updates). Evidence suggests that the stock is reaching equilibrium and that the stock is being sustainably harvested. A vermilion snapper stock assessment (SEDAR 55 2018) indicates the stock is not overfished nor undergoing overfishing.

3.2.1.6 Almaco Jack and Other Jacks Complex

Life History

Almaco jack (*Seriola rivoliana*) is included in the 'Other Jacks Complex' along with lesser amberjack (*Seriola fasciata*) and banded rudderfish (*Seriola zonata*). Species groupings, or complexes, for species managed under the Snapper Grouper FMP were created with implementation of the Comprehensive ACL Amendment (SAFMC 2011).

Almaco jack is distributed from Cape Cod, Massachusetts south along the U.S., Bermuda, the Bahamas, throughout the Gulf of Mexico and Caribbean Sea, and along South America to Argentina (Simon et al. 2013). Almaco jack is rarely found inshore. Prey items consist mostly of fish. Maximum size is to 80 cm fork length (FL), but common to 55 cm FL (Smith-Vaniz 2002). Almaco jack form spawning aggregations in Gladden Spit, Belize (Heyman 2001). Thompson and Munro (1974) report size at maturity at 53 cm FL (21 inches). However, this estimate is based on a sample of one male fish. Thompson et al. (1996) reported length at maturity for lesser amberjack (*Seriola fasciata*) at 30 to 33 cm FL (12-13 inches) based on a sample of 86 female fish.

Little is known about the life history of lesser amberjack and banded rudderfish. According to the Florida Fish and Wildlife Conservation Commission[5], banded rudderfish are found nearshore and offshore over hard bottom, generally in shallower water than other amberjacks. Young rudderfish are associated with weed lines or floating debris and may follow sharks and other large fish. Lesser amberjack also inhabit nearshore and offshore waters, typically deeper than other *Seriola* species (commonly 180 - 410 feet deep). Lesser amberjack are the smallest of the amberjacks and are believed to spawn offshore. Adults eat fish and squid.

Landings

Annual commercial landings for the Other Jacks Complex from 2012 through 2017 have met or exceeded the commercial ACL (**Table 3.2.7**). Monthly landings show a clear pattern, or season, for Other Jacks that starts in April and is over by August (**Figure 3.2.13**). Landings occur over the rest of the year but at a much lower level. It should be noted that the 95% CI around these monthly estimates are very wide.

[5] http://myfwc.com/wildlifehabitats/profiles/saltwater/jacks/banded-rudderfish/. Accessed July 11, 2018

Table 3.2.7. Other Jacks Complex total commercial landings in pounds whole weight (lbs ww) and quota closures, 2012-2017.

Fishing Year	Current Landings	ACL	ACL	Closure Date
2017	189,033	189,422	99.79	8/4/2017
2016	203,052	189,422	107.20	8/9/2016
2015	187,189	189,422	98.82	6/23/2015
2014	236,453	189,422	124.83	7/15/2014
2013	205,947	189,422	108.72	6/18/2013
2012	333,590	193,999	171.95	7/2/2012

Source: SERO ACL Monitoring Webpage [accessed 2/6/2018].

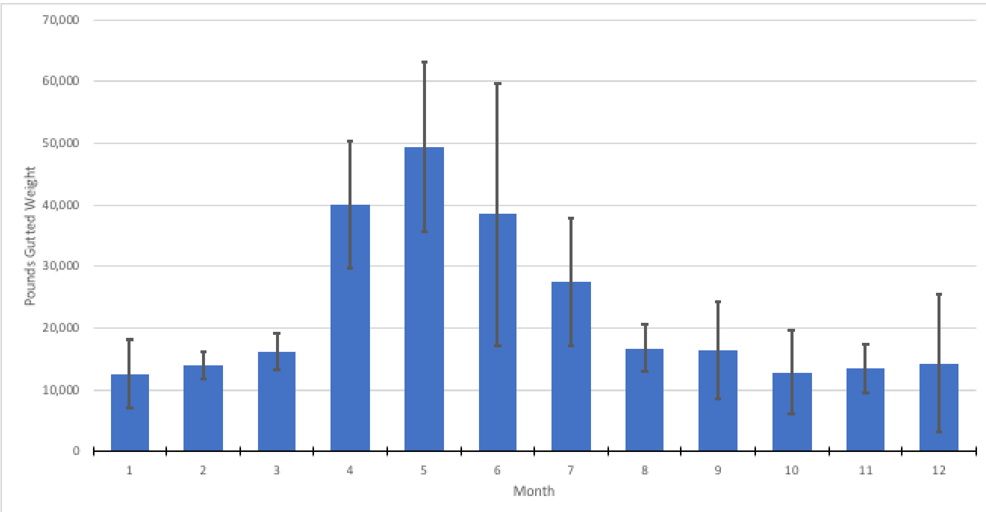

Figure 3.2.13. Average monthly commercial landings (lbs ww) of Other Jacks with 95% CI, 2014-2016.

Stock status

The status of the Other Jacks Complex in the South Atlantic region is currently unknown.

3.2.1.7 Silk Snapper, Blackfin Snapper, Queen Snapper

Life History

Silk snapper, *Lutjanus vivanus*, is distributed in the western Atlantic in waters from 90 to 140 m (295 to 460 feet) from North Carolina, and Bermuda to São Paulo, Brazil but is most abundant around the Antilles and the Bahamas. Spawning occurs over most of the year in lower latitudes but is seasonal (spring and summer) toward the northern and southern limits of the distribution (Allen 1985).

Blackfin snapper, *Lutjanus buccanella*, has a similar distribution to silk snapper and inhabits similar depths, usually 80 to 150 m (262 to 492 feet). Adults inhabit deeper waters over sandy or rocky bottoms and near drop-offs and ledges. Young occur in shallower water, often between about 35 and 50 m (115 to 164 feet) (Allen 1985).

Queen snapper, *Etelis oculatus*, occurs from North Carolina to Sao Paulo, Brazil, including throughout the Gulf of Mexico and the Caribbean over rocky bottoms and near oceanic islands. Queen snapper is a bathydemersal species inhabiting depths of 100 to 450 m (328 to 1,476 feet) (Allen 1985).

Landings

Silk, blackfin, and queen snappers are included in the Deep-water Complex, along with yellowedge grouper, misty grouper, and sand tilefish and managed under a Complex ACL. Commercial landings for the Deep-water Complex in recent years have been below the commercial ACL (**Table 3.2.8**).

Table 3.2.8. Total commercial landings in pounds whole weight (lbs ww) and closures dates for the Deep-water Complex (yellowedge grouper, silk snapper, misty grouper, queen snapper, blackfin snapper, and sand tilefish), 2012-2016.

Year	Fishing Year	Total Landings	ACL	ACL %	Closure Date
2016*	Jan 1 - Dec 31	43,761	131,268	33.3	-
2015		70,265	131,634	53.4	-
2014**		48,617	60,371	80.5	7/10/14
2013		310,166	376,469	82.4	-
2012		378,664	343,869	110.1	9/8/12

*Black snapper was removed from the complex beginning June 22, 2016.
**Blueline tilefish was removed from the complex beginning January 1, 2014 and is now managed under a species-specific ACL.

Stock Status

The status of the silk snapper, blackfin snapper, and queen snapper stocks in the South Atlantic is unknown.

3.2.1.8 Gray Triggerfish

Life History

According to Kolmos et al. (2014) and references therein, gray triggerfish, *Balistes capriscus*, is distributed in coastal waters of the western Atlantic Ocean from Nova Scotia (Canada) to Argentina, including the Gulf of Mexico and off Bermuda at depths of 0-100 m.

Gray triggerfish are gonochorists (separate sexes), building nests and exhibiting biparental care. Little is known about female reproductive potential or spawning frequency. Kolmos et al. (2014) found that 50% of females were mature at 177 mm (7 inches) FL. Mature gonads were present in 68% of females at age zero, 83% at age one, 97% at age two, 99% at age three, and 100% above age three. The authors found that 50% of male gray triggerfish were mature at 179 mm (7 inches) fork length. Mature gonads were present in 64% of males at age zero, 84% at age one, 97% at age two, and 100% at and above age three. The results of all modeling indicate that a large portion (> 60% for males and females) of gray triggerfish reach sexual maturity before age one.

Landings

Commercial landings of gray triggerfish have generally met the commercial ACL in recent years, with overages occurring in some years triggering in-season closures (**Table 3.2.9**).

Table 3.2.9. Total commercial landings of gray triggerfish in pounds whole weight (lbs ww) and closure dates, 2012-2017.

Fishing Year	Fishing Season	Total Landings	ACL	Quota %	Closure Date
2017	Jan 1 - June 30	135,884	156,162	87.01	-
	July 1 - Dec 31	189,189	176,440*	107.23*	11/8/17
2016	Jan 1 - June 30	134,733	156,162	86.28	4/2/16; reopened 6/13/16
	July 1 - Dec 31	146,142	172,178	84.88	12/16/16
2015	Jan 1 - June 30	223,462	272,880	81.89	5/8/15
	July 1 - Dec 31	88,754	63,918	138.86	9/8/15
2014	Jan 1 - Dec 31	262,838	272,880	96.32	5/12/14
2013		329,837	272,880	120.87	7/7/2013
2012		317,146	305,262	103.89	9/11/12; Re-opened 12/12/12-12/19/12

Source: SERO ACL monitoring website [accessed 2/6/2018].
*unused portion of the quota from the January 1 through June 30 season was added to the July 1 through December 31 quota.

Stock status

There have been attempts to assess the status of the gray triggerfish stock in the South Atlantic (SEDAR 32 2013, SEDAR 41 2016). Issues with ageing and fits to the model prevented outcomes that would infer stock status. According to the 2nd quarter 2018 update to the status of stocks, in the report to Congress (https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates#2018-quarterly-updates), gray triggerfish stock in the South Atlantic is not undergoing overfishing, and the overfished status is unknown.

3.2.2 Bycatch

As summarized in the Bycatch Practicability Analysis (**Appendix D**), the actions in Regulatory Amendment 27 are not expected to increase bycatch. In addition, Regulatory Amendment 29 to the Snapper Grouper FMP (under development) considers requiring or encouraging the use of descending devices to help reduce discard mortality. The Commercial Landings Monitoring System and actions in the Joint Generic Dealer (requiring electronic reporting from dealers) and Generic For-Hire Reporting (requiring electronic reporting from charter fishermen) amendments (under development and under review, respectively) are expected to provide more timely and accurate data reporting which reduces uncertainty with the data, and would thus reduce the incidence of quota overages, and generate better management decisions, overall.

Analyses contained in **Appendix D** for the species affected by this amendment, suggest that certain species had other species landed on greater than 60% of the trips; most notably vermilion snapper on trips landing gray triggerfish, and snowy grouper on trips landing blueline tilefish. Additionally, due to the high release mortality associated with the capture depths of blueline tilefish and snowy grouper (95% and 100%, respectively), efforts should be made to align any seasonal or quota closures to avoid regulatory discarding. The most common species being landed with greater amberjack was gag on 29.5% of the trips. Species of interest with no dominant co-occurring species may be due to the ability of fishers to selectively target the species of interest using specific gear, locations, seasonal patterns, or a combination of these thus avoiding unnecessary bycatch. It is not possible to do a meaningful analysis of any long-term population effects due to changes in effort based on the high connectivity between many of the species being landed in the fishery together; however, efforts to align any seasonal or quota closures between species with high co-occurrence should be beneficial.

In terms of discards, from 2014 through 2016, the commercial sector of the South Atlantic snapper grouper fishery had a wide range of mean annual discards (0 - 27,222 individuals) reported for the species potentially affected in Regulatory Amendment 27 (see **Table D-2 in Appendix D**). It is difficult to compare the ratio of commercial landings to discards because commercial landings are reported in pounds whole weight and discards are reported in numbers of fish. However, based on the information available, red porgy had high numbers of discards (24,754) relative to landings, compared to other species. On the contrary, greater amberjack had on average only 3,630 fish being reported discarded annually with the second highest average annual landings (857,415 lbs ww). Greater amberjack discard data in conjunction with the trip co-occurrence analyses indicates fishers are likely able to selectively harvest greater amberjack. Vermilion snapper, red porgy, and gray triggerfish had the highest number of discards reported on average annually. Vermilion snapper, red porgy, and gray triggerfish also co-occurred on a high percentage of trips, and the high number of discards for these species may be due to inability of fishers to selectively target one of the species during a seasonal or quota closure for a co-occurring species, e.g., targeting vermilion snapper when red porgy is closed.

3.2.3 Other Species Affected

Regulatory Amendment 27 affects several species in the Snapper Grouper Complex (blueline tilefish, snowy grouper, greater amberjack, red porgy, vermilion snapper, Other Jacks Complex, silk snapper, blackfin snapper, queen snapper, and gray triggerfish). For life history information of the remainder of species in the Fishery Management Unit that are not directly affected by actions in this amendment, refer to the South Atlantic Ecospecies Database[6].

3.2.4 The Stock Assessment Process

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

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

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

3.2.5 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.

[6] http://saecospecies.azurewebsites.net

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/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries.

Five of the marine mammal species (NARW, and sperm, sei, fin, and blue whales) 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 South Atlantic Council's jurisdiction.

NMFS has conducted specific analyses ("Section 7 consultations") to evaluate the potential adverse 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 this fishery's continued authorization is likely to adversely affect but is not likely to jeopardize the continued existence of the NARW, loggerhead sea turtle Northwest Atlantic DPS, leatherback sea turtle, Kemp's ridley sea turtle, green sea turtle North Atlantic DPS, green sea turtle South Atlantic DPS, hawksbill sea turtle, smalltooth sawfish U.S. DPS, or Nassau grouper. NMFS also concluded that designated critical habitat and other ESA-listed species in the South Atlantic Region were not likely to be adversely affected. Summary information on the species that may be adversely affected by the snapper grouper fishery and how they are affected is presented below. The 2016 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.

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.

3.2.5.1 North Atlantic Right Whales (NARW)

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

The coastal waters of the southeastern U.S. are a wintering and the sole known calving area for NARW. NARW generally occur off South and North Carolina from November 1 through April 30 and have been sighted as far as about 30 nautical miles (nmi) offshore (Knowlton et al. 2002; Pabst et al. 2009). Sighting records of NARW spotted in the core calving area off Georgia and Florida consist of mostly mother-calf pairs and juveniles but also some adult males and females without calves (Cole et al. 2013; Kraus and Rolland 2007; Parks et al. 2007). The NARW minimum stock size is based on a census of individual whales identified using photo-identification techniques. A review of the photo-ID recapture database as it existed on 17 November 2015 indicated that 440 individually recognized whales in the catalog were known to be alive during 2012. This number represents a minimum population size. This is a direct count and has no associated coefficient of variation (Hayes et al. 2017). Since June 7, 2017, elevated NARW mortalities began in 2017, primarily in Canada and were declared an Unusual Mortality Event (UME). In 2017 a total of 17 confirmed dead stranded whales (12 in Canada; 5 in the U.S.), and five live whale entanglements in Canada have been documented. To date in 2018, one whale stranded in the U.S. bringing the total mortalities to 18 confirmed dead stranded whales (12 in Canada; 6 in the U.S.). More information on this UME is provided at: https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2018-north-atlantic-right-whale-unusual-mortality-event.

Right whale concentrations are highest in the core calving area from November 15 through April 15 (71 FR 36299, June 26, 2006); on rare occasions, right whales have been spotted as early as September and as late as July (Taylor et al. 2010). Most calves are likely born early in the calving season. NARW distribution off Georgia and Florida is restricted to the south and east by the warm waters of the Gulf Stream, which serves as a thermal limit for NARW (Keller et al. 2006). Water temperature, bathymetry, and surface chop are factors in the distribution of calving NARW in the southeastern U.S. (Good 2008; Keller et al. 2012). Systematic surveys conducted off the coast of North Carolina during the winters of 2001 and 2002 sighted eight calves, suggest the calving grounds may extend as far north as Cape Fear. Four of the calves were not sighted by surveys conducted further south. One of the cows photographed was new to researchers, having effectively eluded identification over the period of its maturation (McLellan et al. 2003).

Commercial and recreational fishers in the South Atlantic snapper grouper fishery use hook-and-line gear, spear/powerheads, and pot/traps to target black sea bass, but only pots may adversely affect NARWs (NMFS 2016). The black seas bass pot component of the snapper grouper fishery is the only component of the fishery that may adversely affect NARWs; effects from all the other gear types were discounted in the 2016 Opinion. NMFS estimated that the number of annual lethal takes for NARWs from black sea bass trap/pot gear ranged from an estimated minimum of 0.005 to a maximum of 0.08. This equates to 1 estimated lethal entanglement approximately every 25 to 42 years.

3.2.5.2 ESA-Listed Sea Turtles

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

Green sea turtle (*Chelonia mydas*) hatchlings are thought to occupy pelagic areas of the open ocean and are often associated with *Sargassum* rafts (Carr 1987, Walker 1994). Pelagic stage green sea turtles are thought to be carnivorous. Stomach samples of these animals found ctenophores and pelagic snails (Frick 1976, Hughes 1974). At approximately 20 to 25 cm carapace length, juveniles migrate from pelagic habitats to benthic foraging areas (Bjorndal 1997). As juveniles move into benthic foraging areas a diet shift towards herbivory occurs. They consume primarily seagrasses and algae, but are also know to consume jellyfish, salps, and sponges (Bjorndal 1980, 1997; Paredes 1969; Mortimer 1981, 1982). The diving abilities of all sea turtle species vary by their life stages. The maximum diving range of green sea turtles is estimated at 110 m (360 ft) (Frick 1976), but they are most frequently making dives of less than 20 m (65 ft.) (Walker 1994). The time of these dives also varies by life stage. The maximum dive length is estimated at 66 minutes with most dives lasting from 9 to 23 minutes (Walker 1994). On April 6, 2016, NMFS and the U.S. Fish and Wildlife Service published a Final Rule in the Federal Register (81 FR 20057) removing the range-wide and breeding population ESA listings of the green sea turtle, and in their place, listing 8 green sea turtle DPSs as threatened and 3 green sea turtle DPSs as endangered, effective May 6, 2016. Two of the green sea turtle DPSs, the North Atlantic DPS and the South Atlantic DPS, occur in the South Atlantic Region.

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

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

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

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

On September 22, 2011, NMFS and the U.S. Fish and Wildlife Service determined the loggerhead sea turtle population consists of nine DPSs (76 FR 58868). Previously, loggerhead sea turtles were listed as threatened species throughout their global range. The snapper grouper fishery interacts with loggerhead sea turtles from what is now considered the Northwest Atlantic DPS, which remains listed as threatened. The February 15, 2012, memorandum stated that because the 2006 Opinion (NMFS 2006) had evaluated the impacts of the fishery on the loggerhead subpopulations now wholly contained within the Northwest Atlantic DPS, the 2006 Opinion's conclusion that the fishery is not likely to jeopardize the continued existence of loggerhead sea turtles remains valid.

Sea turtles are vulnerable to capture by bottom longline and vertical hook-and-line gear. Hook-and-line gear used in the fishery includes commercial bottom longline gear and commercial and recreational vertical line gear (e.g., handline, bandit gear, and rod-and-reel). The magnitude of the interactions between sea turtles and the South Atlantic snapper grouper fishery was most recently evaluated in the 2016 Opinion (NMFS 2016). In **Table 3.2.10** the 3-year estimated captures and mortalities authorized for the fishery in the 2016 Opinion are specified. Section 5.2 of the 2016 Opinion presents a summary of the data sources considered for the sea turtle analyses, estimation methods, and data limitations and assumptions associated with the estimates for each fishery component. Loggerhead sea turtles are the species most affected by the snapper grouper fishery; however, the majority of estimated sea turtle captures appear to occur in the recreational vertical lines targeting snapper grouper species due to the large amount of recreational fishing effort. It is also important to recognize that the sea turtle capture estimates for the recreational vertical line are also likely the most uncertain.

Table 3.2.10. Estimated 3-year sea turtle (T) and mortalities (M) estimates in the South Atlantic Snapper Grouper Fishery by fishery component and overall.

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

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

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

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

3.2.5.3 ESA-Listed Marine Fish

Smalltooth sawfish (*Pristis pectinata*)

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

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

Of the 3 basic types of gear used in the South Atlantic snapper grouper fishery by commercial and/or recreational fishers (i.e., hook-and-line gear, spear/powerheads, and black sea bass pots), NMFS believe only snapper grouper hook-and-line gear may adversely affect smalltooth sawfish and Nassau grouper. Interactions with smalltooth sawfish are limited to the coast of Florida; and are quite rare. In the 2016 Opinion, NMFS anticipates only eight smalltooth sawfish interactions every three years in all snapper grouper hook-and-line-gear components combined and they are anticipated to all be non-lethal. Nassau grouper incidental captures appear to be more frequent. Farmer (2016) estimated that over the last 10 years, a total of approximately 1,387 Nassau grouper have been captured annually in the fishery. Based on an estimated 20% mortality rate, Farmer (2016) estimated an annual average expected mortality of approximately 282 fish. Future anticipated captures and mortalities are expected to remain at these same levels.

Giant Manta Ray (*Manta birostris*)

Giant manta rays are circumglobal in range, but within this broad distribution, individual populations are scattered and highly fragmented (CITES 2013). The giant manta ray can be found in all ocean basins. In terms of range, within the Northern Hemisphere, the species has been documented as far north as southern California and New Jersey on the United States west and east coasts, respectively (CITES 2013; Gudger 1922; Kashiwagi et al. 2010; Moore 2012). Clark (2010) suggests that giant manta rays may forage in less productive pelagic waters and conduct seasonal migrations following prey abundance. Satellite tracking studies using pop-up satellite archival tags registering movements of the giant manta ray from the Yucatan, Mexico, into the Gulf of Mexico (Gulf) (448 km) (Marshall et al. 2011a). Despite this large range, sightings are often sporadic. The timing of these sightings also varies by region (for example, the majority of sightings in Brazil occur during June and September, while in New Zealand sightings mostly occur between January and March) and seems to correspond with the movement of zooplankton, current circulation and tidal patterns, seawater temperature, and possibly mating behavior (Armstrong et al. 2016; Couturier et al. 2012; De Boer et al. 2015). However, a recent study by Stewart et al. (2016a) suggests that the species may not be as highly migratory as previously thought. Using pop-up satellite archival tags in combination with analyses of stable isotope and genetic data, the authors found evidence that giant manta rays may actually exist as well-structured subpopulations off Mexico's coast that exhibit a high degree of residency (Stewart et al. 2016a). Additional research is required to better understand the distribution and movement of the species throughout its range. Within its range, the giant manta ray inhabits tropical, subtropical, and temperate bodies of water and is commonly found offshore, in oceanic waters, and near productive coastlines (Kashiwagi et al. 2011; Marshall et al. 2009). As such, giant manta rays can be found in cooler water, as low as 19 °C, although temperature preference appears to vary by region (Duffy and Abbott 2003; Freedman and Roy 2012; Graham et al. 2012; Marshall et al. 2009). Additionally, giant manta rays exhibit a high degree of plasticity in terms of their use of depths within their habitat, with tagging studies that show the species conducting night descents of 200-450 meters (m) depths (Rubin et al. 2008; Stewart et al. 2016b) and capable of diving to depths exceeding 1,000 m (A. Marshall et al. unpubl. data 2011 cited in Marshall et al. [2011a]). In areas where the species is not subject to fishing, populations may be stable. For example, Rohner et al. (2013) reported that giant manta ray sightings remained constant off the coast of Mozambique over a period of eight years. Given the migratory nature of this species, population declines in waters where the manta rays are protected have also been observed but attributed to overfishing of the species in adjacent areas within its large home range.

Although manta rays have been reported to live for at least 40 years (Kitchen-Wheeler 2013; Marshall and Bennett 2010; Marshall et al. 2011b) with low rates of natural mortality (Couturier et al. 2012), the time needed to grow to maturity and the low reproductive rates mean that a female will be able to produce only 5-15 pups in her lifetime (CITES 2013). Generation time (based on *M. alfredi* life history parameters) is estimated to be 25 years (Marshall et al. 2011a; Marshall et al. 2011b). In the Atlantic, very little information on *M. birostris* populations is available, but there is a known, protected population within the Flower Garden Banks National Marine Sanctuary in the Gulf. However, researchers are still trying to determine whether the manta rays in this area are only giant manta ray individuals or potentially also comprise individuals of a new, undescribed species (Hinojosa-Alvarez et al. 2016; Marshall et al. 2009). With populations potentially ranging from around 100 to 1,500 individuals (see Table 4 in Miller and Klimovich [2016]), their life history traits and productivity estimates, particularly their low reproductive output and sensitivity to changes in adult survival rates, giant manta ray populations are inherently vulnerable to depletions, with low likelihood of recovery.

The most serious threat to giant manta rays is overfishing. Manta rays are caught throughout their global warm water range in the Atlantic, Pacific, and Indian Oceans in commercial and artisanal fisheries. Fishermen targeting manta rays primarily use harpoons and nets, while significant manta ray bycatch occurs in purse seine, gillnet, and trawl fisheries targeting other species. The prebranchial appendages (or gill plates), which *Manta spp.* use to filter planktonic food from the water, are highly valued in international trade for use in traditional medicine. Cartilage and skins are also traded internationally while meat is consumed or used for bait locally. Due to their association with nearshore habitats, manta rays are at elevated risk for exposure to a variety of contaminants and pollutants, including brevetoxins, heavy metals, polychlorinated biphenyls, and plastics. Many pollutants in the environment have the ability to bioaccumulate in fish species, however, only a few studies have specifically examined the accumulation of heavy metals in the tissues of manta rays (Essumang 2010; Ooi et al. 2015).

Plastics within the marine environment may also be a threat to the giant manta ray, as the animals ingest microplastics (through filter feeding) or become entangled in plastic debris, potentially contributing to increased mortality rates. Because giant manta rays are migratory and considered ecologically flexible (e.g., low habitat specificity), they may be less vulnerable to the impacts of climate change compared to other sharks and rays (Chin et al. 2010). However, as giant manta rays frequently rely on coral reef habitat for important life history functions (e.g., feeding, cleaning) and depend on planktonic food resources for nourishment, both of which are highly sensitive to environmental changes (Brainard et al. 2011; Guinder and Molinero 2013), climate change is likely to have an impact on the distribution and behavior of the giant manta ray. There is insufficient information to indicate how and to what extent changes in the reef community structure will affect the status of the giant manta ray.

Oceanic Whitetip Shark (*Carcharinus longimanus*)

The oceanic whitetip is considered the only truly oceanic (i.e., pelagic) shark of its genus (Bonfil et al. 2008). They are distributed worldwide in epipelagic tropical and subtropical waters between 30° North latitude and 35° South latitude (Baum et al. 2006). In the western Atlantic, oceanic whitetips occur from Maine to Argentina, including the Caribbean and Gulf. The oceanic whitetip shark is a highly migratory species of shark that is usually found offshore in the open ocean, on the outer continental shelf, or around oceanic islands in deep water, occurring from the surface to at least 152 m depth. It has a clear preference for open ocean waters between 10° South latitude and 10° North latitude (Backus et al. 1956; Bonfil et al. 2008; Compagno 1984; Strasburg 1958). The species can be found in water temperatures between 15°C and 28°C, but it exhibits a strong preference for the surface mixed layer in water with temperatures above 20°C, and is considered a surface-dwelling shark. Little is known about the movement or possible migration paths of the oceanic whitetip shark. Although the species is considered highly migratory and capable of making long distance movements, tagging data provides evidence that this species also exhibits a high degree of philopatry (i.e., site fidelity) in some locations. To date, there have been three tagging studies conducted on oceanic whitetip sharks in the Atlantic. Mark recapture data (number tagged=645 and recaptures=8) from the NMFS Cooperative Shark Tagging Program between 1962 and 2015 provide supporting evidence that the range of movement of oceanic whitetip sharks is large, with potential for transatlantic movements (Kohler et al. 1998; NMFS unpublished data).

The oceanic whitetip has an estimated maximum age of 17 years, with confirmed maximum ages of 12 and 13 years in the North Pacific and South Atlantic, respectively (Lessa et al. 1999; Seki et al. 1998). However, other information from the South Atlantic suggests the species likely lives up to around 20 years old based on observed vertebral ring counts (Rodrigues et al. 2015). Sexual maturity is estimated to occur at ages of 6-7 years and the gestation period is 10-12 months. The number of pups in a litter ranges from 1-14 (mean=6) (Bonfil et al. 2008; Compagno 1984; IOTC 2015; Seki et al. 1998). Oceanic whitetip sharks are considered to have low genetic diversity and rank the fourth lowest in global mtCR genetic diversity (Ruck 2016). Ruck (2016) also notated that the relatively low mtDNA genetic diversity raises potential concern for the future genetic health of the species. Furthermore, Camargo et al. (2016) observed low levels of genetic variability for the species throughout his study area and noted that these low genetic variability rates may represent a risk to the adaptive potential of the species leading to a weaker ability to respond to environmental changes (Camargo et al. 2016). Overall, the best available data indicate that the oceanic whitetip shark is a long-lived species (at least 20 years) and can be characterized as having relatively low productivity (based on the Food and Agriculture Organization of the United Nations productivity indices for exploited fish species, where $r < 0.14$ is considered low productivity), making them generally vulnerable to depletion and potentially slow to recover from overexploitation.

Currently, the most significant threat to oceanic whitetip sharks is mortality in commercial fisheries, largely driven by demand of the international shark fin trade, bycatch related mortality, as well as illegal, unreported, and unregulated fishing. Although generally not targeted, oceanic whitetip sharks are frequently caught as bycatch in many fisheries, including pelagic longline fisheries targeting tuna and swordfish, purse seine, gillnet, and artisanal fisheries. Oceanic whitetip sharks are also a preferred species for their large, morphologically distinct fins, as they obtain a high price in the Asian fin market. The oceanic whitetip shark's vertical and horizontal distribution significantly increases its exposure to industrial fisheries, including pelagic longline and purse seine fisheries operating within the species' core tropical habitat throughout its global range. The oceanic whitetip population size has likely declined significantly in the South Atlantic region due to historical exploitation of the species since the onset of industrial fishing; however, results of the extinction risk analysis team's analysis show that the oceanic whitetip shark population in the South Atlantic region has potentially stabilized since the 1990s/early 2000s (Young et al. 2016). The potential stabilization of oceanic whitetip sharks occurred concomitantly with the first Federal Fishery Management Plan for Sharks in the Northwest Atlantic Ocean and Gulf of Mexico, which directly manages oceanic whitetip shark under the pelagic shark group and includes regulations on trip limits and quotas.

3.3 Economic Environment

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

3.3.1 Economic Description of the Commercial Sector

The major sources of data summarized in this description are the NMFS SERO Permits Information Management System (PIMS) and the SEFSC Social Science Research Group (SSRG) Socioeconomic Panel[7] data set. Inflation adjusted revenues and prices are reported in 2016 dollars. All nominal dollar values were converted to 2016 dollars using the annual GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

3.3.1.1 Permits

Any fishing vessel that harvests and sells any of the snapper grouper species from the South Atlantic Exclusive Economic Zone (EEZ) must have a valid South Atlantic commercial snapper grouper permit, which is a limited access permit. After a permit expires, it can be renewed or transferred up to one year after the date of expiration. The number of valid or renewable snapper grouper permits declined steadily from 2012 through 2016 (**Table 3.3.1.1**).

Table 3.3.1.1. Number of valid or renewable South Atlantic commercial snapper grouper permits, 2012-2016.

	Unlimited Permits	225-lb Trip-limited	Total Permits
2012	604	132	736
2013	592	129	721
2014	584	125	709
2015	571	121	692
2016	565	116	681
Average	583	125	708

Source: NMFS SERO Permits Dataset, 2018.

Dealers that want to purchase, receive, trade, or barter snapper grouper species or species complexes, excluding wreckfish, caught by federal commercially permitted fishing vessels must have a Gulf and South Atlantic dealer permit. As of March 23, 2016, there were 418 dealer permits issued, with over half (57%) residing in Florida (**Table 3.3.1.2**).

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

Table 3.3.1.2. Number and percentage of Gulf and South Atlantic dealer permits by state of residence of permit holder as of March 23, 2016.

State	Number	Percent
FL	240	57.4%
GA	4	1.0%
NC	56	13.4%
SC	25	6.0%
Subtotal	325	77.8%
All Other	93	22.2%
Total	418	100%

Source: NMFS SERO Permits Dataset, accessed March 23, 2016.

3.3.1.2 Landings, Revenue, and Effort

The following focuses on commercial landings and revenues for the following key species in this amendment: blueline tilefish, snowy grouper, greater amberjack, red porgy, vermilion snapper, the Other Jacks complex (lesser amberjack, almaco jack, banded rudderfish), queen snapper, silk snapper, blackfin snapper, and gray triggerfish as well as the Snapper Grouper fishery as a whole. Landings data for Georgia were often confidential due to the low number of commercial participants in the snapper grouper fishery originating from this state. As a result, commercial landings from Georgia were combined with those from Florida and are displayed as either Florida/Georgia or FL/GA in many of the following tables and figures examining landings by state.

3.3.1.3 Species

Blueline Tilefish

Blueline tilefish is within the tilefishes group (Malacanthidae) of the snapper grouper fishery, that includes two other species. Average monthly commercial landings of blueline tilefish from 2012-2016 are displayed in **Figure 3.3.1.1**. The landings tend to be the highest in the late spring and summer months. Among the South Atlantic states, North Carolina accounted for most of the blueline tilefish landings in most years (**Figure 3.3.1.2**), however South Carolina accounted for a much larger share in 2014 and 2015.

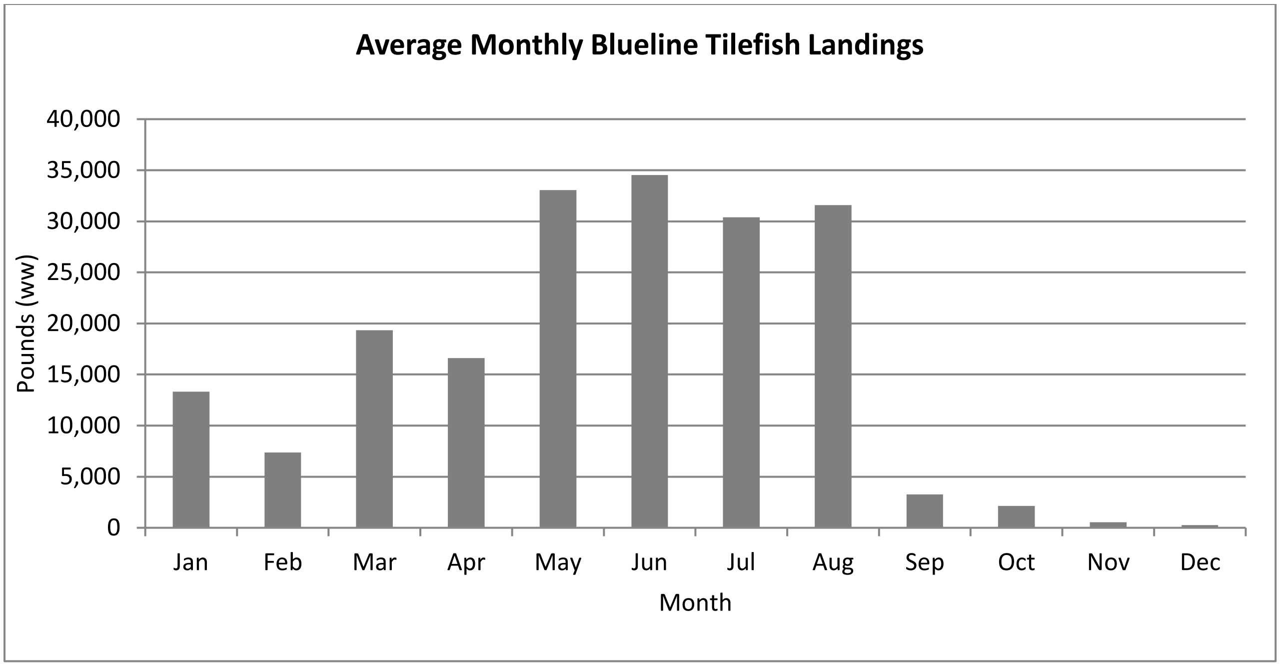

Figure 3.3.1.1. Average monthly commercial landings (lbs ww) of blueline tilefish harvested from the South Atlantic, 2012-2016.
Source: NMFS Commercial ALS Dataset.

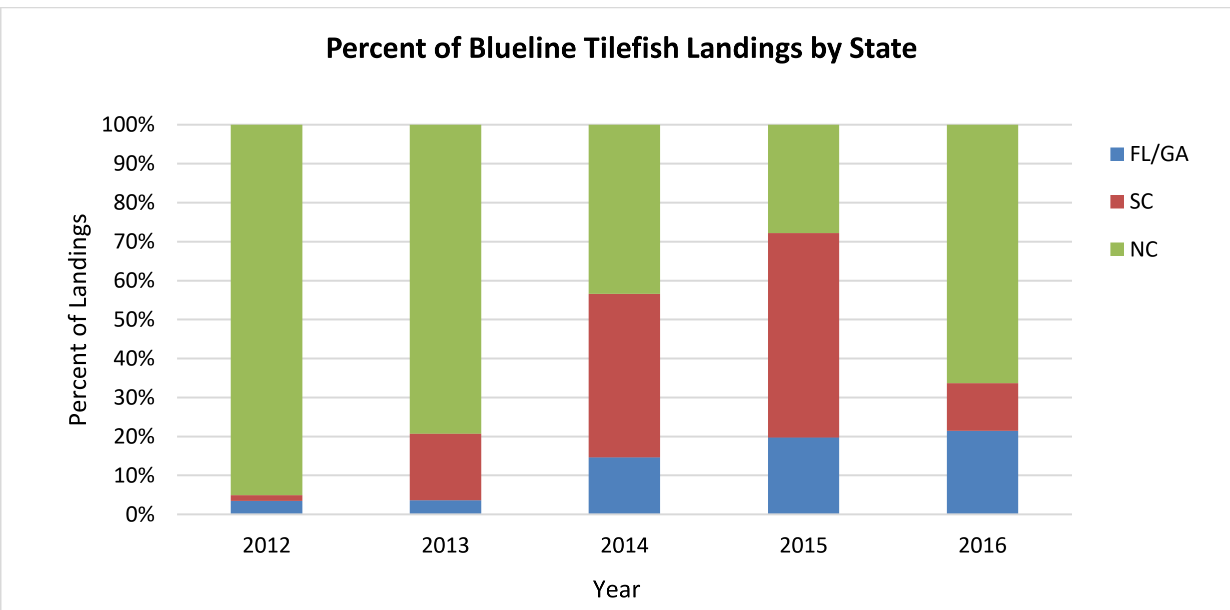

Figure 3.3.1.2. Percent of blueline tilefish landings (lbs gw) by state, 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Annual commercial landings of blueline tilefish in the South Atlantic ranged from approximately 89,000 pounds gutted weight (lbs gw) to 297,000 lbs gw and averaged 174,059 lbs gw from 2012 through 2016 (**Figure 3.3.1.3, Table 3.3.1.3**). Dockside revenues from those landings ranged from about $234,000 to $731,000 and averaged $468,042 (2016 dollars) (**Figure 3.3.1.3**, **Table 3.3.1.4**). The average dockside price during those five years was $2.76 per lb gw

(2016 dollars) and an annual average of 134 vessels took 592 commercial trips landing blueline tilefish. Average annual dockside revenue from blueline tilefish landings represented approximately 23% of total dockside revenue from trips that landed blueline tilefish from 2012 through 2016.

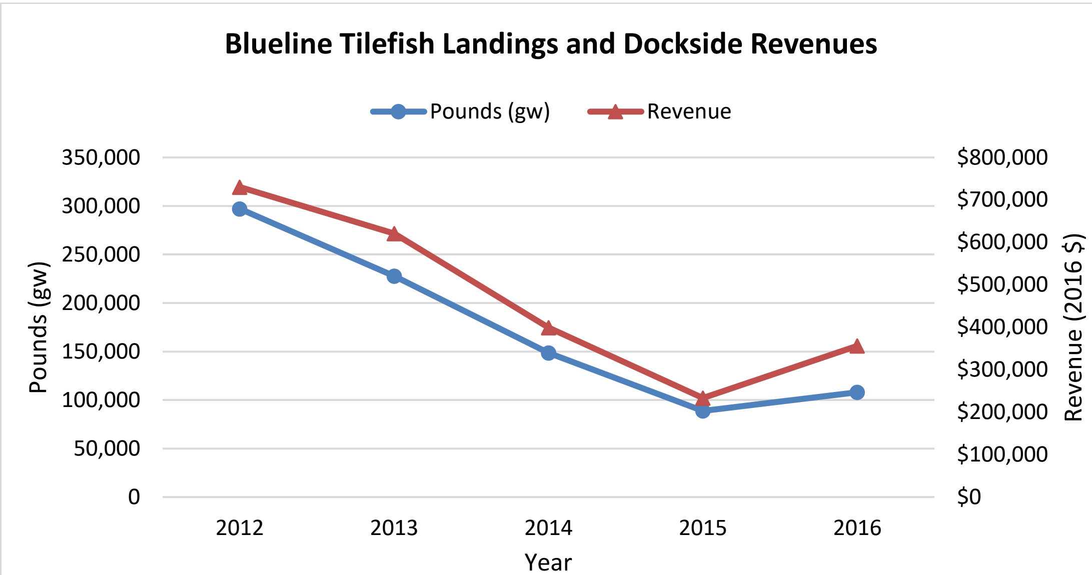

Figure 3.3.1.3. Annual commercial landings of blueline tilefish by weight (lbs gw) and dockside revenue (2016 dollars), 2012–2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Table 3.3.1.3. Number of vessels, number of trips, and landings by year for vessels that landed blueline tilefish from the South Atlantic, 2012-2016.

Year	Number of vessels that caught blueline tilefish	Number of trips that caught blueline tilefish	Blueline tilefish landings (lbs gw)	Other species' landings jointly caught with blueline tilefish (lbs gw)	Number of SATL trips that only caught other species	Other species' landings on SATL trips without blueline tilefish (lbs gw)	All species landings on Gulf trips (lbs gw)
2012	125	537	297,238	386,319	3,627	2,671,637	202,901
2013	129	641	227,734	552,690	3,120	2,638,927	80,217
2014	138	532	148,484	523,220	4,544	3,602,319	172,818
2015	124	356	88,785	289,254	3,947	2,885,370	237,700
2016	155	896	108,055	541,533	4,801	3,472,017	238,618
Average	134	592	174,059	458,603	4,008	3,054,054	186,451

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Table 3.3.1.4. Number of vessels and dockside revenues by year for vessels that landed blueline tilefish from the South Atlantic, 2012-2016 (2016 dollars).

Year	Number of vessels that caught blueline tilefish	Gross ex-vessel revenue from blueline tilefish	Gross ex-vessel revenue from 'other species' jointly caught with blueline tilefish	Gross ex-vessel revenue from 'other species' caught on SATL trips without blueline tilefish	Gross ex-vessel revenue from all species caught on Gulf trips	Total gross ex-vessel revenue	Average total gross ex-vessel revenue per vessel
2012	125	$730,580	$1,122,941	$7,389,313	$598,485	$9,841,319	$78,731
2013	129	$620,582	$1,752,682	$7,813,566	$193,055	$10,379,885	$80,464
2014	138	$398,833	$1,684,712	$9,802,364	$522,476	$12,408,385	$89,916
2015	124	$233,927	$1,062,592	$8,120,484	$822,735	$10,239,738	$82,579
2016	155	$356,290	$2,017,875	$9,269,234	$813,393	$12,456,792	$80,366
Average	134	$468,042	$1,528,160	$8,478,992	$590,029	$11,065,224	$82,411

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Snowy Grouper

Snowy grouper is within the sea basses and groupers (Serranidae) group of the snapper grouper fishery that includes 19 other species. Average monthly commercial landings of snowy grouper from 2012-2016 are displayed in **Figure 3.3.1.4**. The landings tend to be the highest in the late spring and summer months, with peak landings occurring in May. Among the South Atlantic states, Florida/Georgia typically accounts for the majority of commercial snowy grouper landings (**Figure 3.3.1.5**). On average, over half of the commercial snowy grouper landings are landed in this area, although North Carolina has been accounting for a larger portion in recent years.

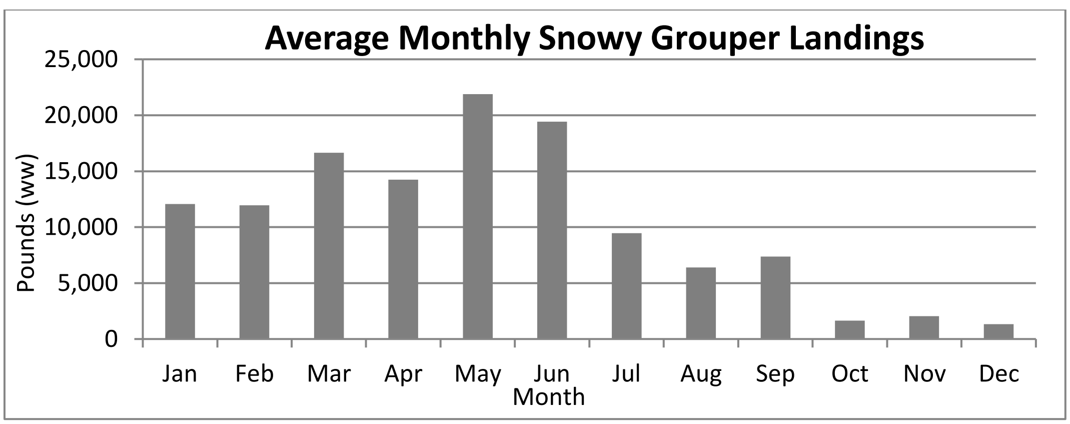

Figure 3.3.1.4. Average monthly commercial landings (lbs ww) of snowy grouper harvested from the South Atlantic, 2012-2016.
Source: NMFS Commercial ALS Dataset.

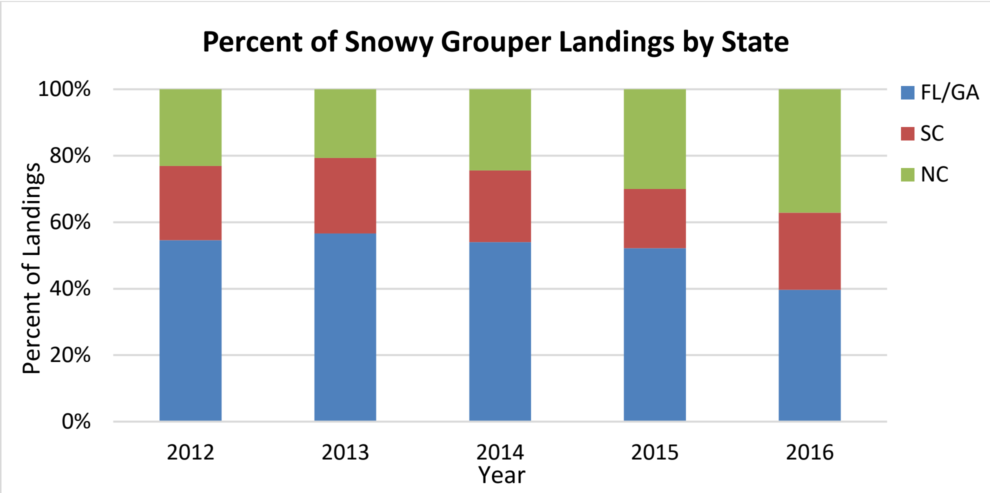

Figure 3.3.1.5. Percent of snowy grouper landings (lbs gw) by state, 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Annual commercial landings of snowy grouper in the South Atlantic ranged from approximately 74,000 lbs gw to 144,000 lbs gw and averaged 101,748 lbs gw from 2012 through 2016 (**Figure 3.3.1.6**, **Table 3.3.1.5**). Dockside revenues from those landings ranged from about $343,000 to $731,000 and averaged $489,880 (2016 dollars) (**Figure 3.3.1.7**, **Table 3.3.1.6**). The average dockside price during those five years was $4.76 per lb gw (2016 dollars) and an annual average of 149 vessels took 1,132 commercial trips landing snowy grouper. Average annual dockside revenue from snowy grouper landings represented approximately 14% of total dockside revenue from trips that landed snowy grouper from 2012 through 2016.

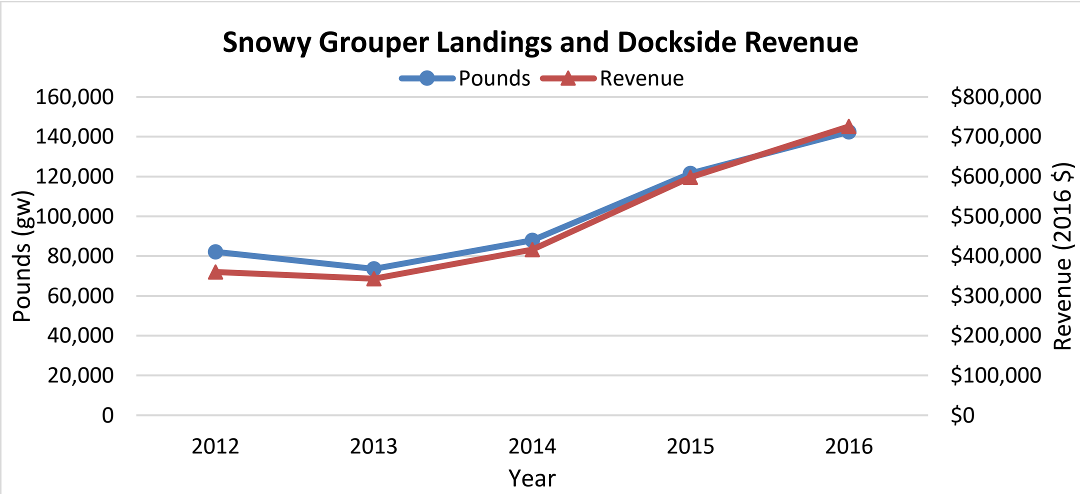

Figure 3.3.1.6. Annual commercial landings of snowy grouper by weight (lbs gw) and dockside revenue (2016 dollars), 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Table 3.3.1.5. Number of vessels, number of trips, and landings by year for vessels that landed snowy grouper from the South Atlantic, 2012-2016.

Year	Number of vessels that caught snowy grouper	Number of trips that caught snowy grouper	Snowy grouper landings (lbs gw)	Other species' landings jointly caught with snowy grouper (lbs gw)	Number of SATL trips that only caught other species	Other species' landings on SATL trips without snowy grouper (lbs gw)	All species landings on Gulf trips (lbs gw)
2012	129	1,100	82,078	839,557	3,374	2,874,220	311,429
2013	133	970	73,573	842,923	3,525	2,838,171	142,817
2014	151	1,096	88,114	1,000,711	4,584	3,979,181	210,339
2015	170	1,355	121,514	978,059	4,588	3,364,468	392,906
2016	162	1,140	143,460	791,940	4,624	3,277,269	272,649
Average	149	1,132	101,748	890,638	4,139	3,266,662	266,028

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Table 3.3.1.6. Number of vessels and dockside revenues by year for vessels that landed snowy grouper from the South Atlantic, 2012-2016 (2016 dollars).

Year	Number of vessels that caught snowy grouper	Gross ex-vessel revenue from snowy grouper	Gross ex-vessel revenue from 'other species' jointly caught with snowy grouper	Gross ex-vessel revenue from 'other species' caught on SATL trips without snowy grouper	Gross ex-vessel revenue from all species caught on Gulf trips	Total gross ex-vessel revenue	Average total gross ex-vessel revenue per vessel
2012	129	$359,987	$2,432,990	$7,384,070	$816,580	$10,993,627	$85,222
2013	133	$343,189	$2,577,916	$7,969,940	$389,200	$11,280,245	$84,814
2014	151	$417,326	$3,163,307	$10,310,423	$649,658	$14,540,714	$96,296
2015	170	$598,235	$3,275,221	$8,619,238	$1,147,673	$13,640,367	$80,237
2016	162	$730,662	$2,906,072	$8,572,748	$881,064	$13,090,546	$80,806
Average	149	$489,880	$2,871,101	$8,571,284	$776,835	$12,709,100	$85,475

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Greater Amberjack

Greater amberjack is within the jacks group (Carangidae) of the snapper grouper fishery that includes 3 other species. Average monthly commercial landings of greater amberjack from 2012-2016 are displayed in **Figure 3.3.1.7**. The landings tend to be the highest in the spring months, with peak landings occurring in May, directly after the annual April commercial harvest closure for the spawning season. Among the South Atlantic states, Florida/Georgia accounts for most commercial greater amberjack landings (**Figure 3.3.1.8**). On average, this area accounts for approximately 80% of commercial greater amberjack landings annually.

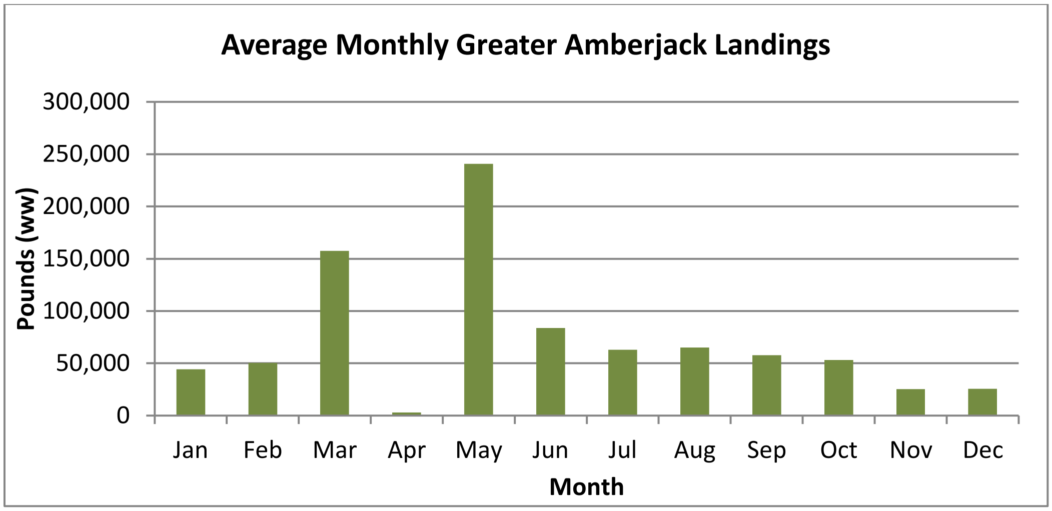

Figure 3.3.1.7. Average monthly commercial landings (lbs ww) of greater amberjack harvested from the South Atlantic, 2012-2016.
Source: NMFS Commercial ALS Dataset

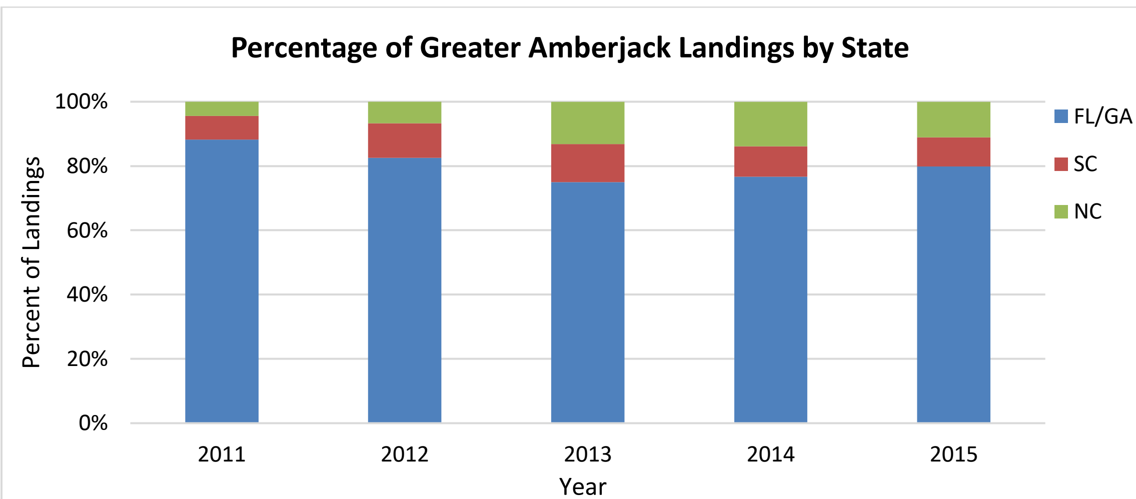

Figure 3.3.1.8. Percent of greater amberjack landings (lbs gw) by state, 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Annual commercial landings of greater amberjack in the South Atlantic ranged from approximately 759,000 lbs gw to 930,000 lbs gw and averaged 850,981 lbs gw from 2012 through 2016 (**Figure 3.3.1.9**, **Table 3.3.1.7**). Dockside revenues from those landings ranged from about $1,122,000 to $1,377,000 and averaged $1,240,479 (2016 dollars) (**Figure 3.3.1.9**, **Table 3.3.1.8**). The average dockside price during those five years was $1.47 per lb gw (2016 dollars) and an annual average of 263 vessels took 2,187 commercial trips landing greater amberjack. Average annual dockside revenue from greater amberjack landings represented approximately 23% of total dockside revenue from trips that landed greater amberjack from 2012 through 2016.

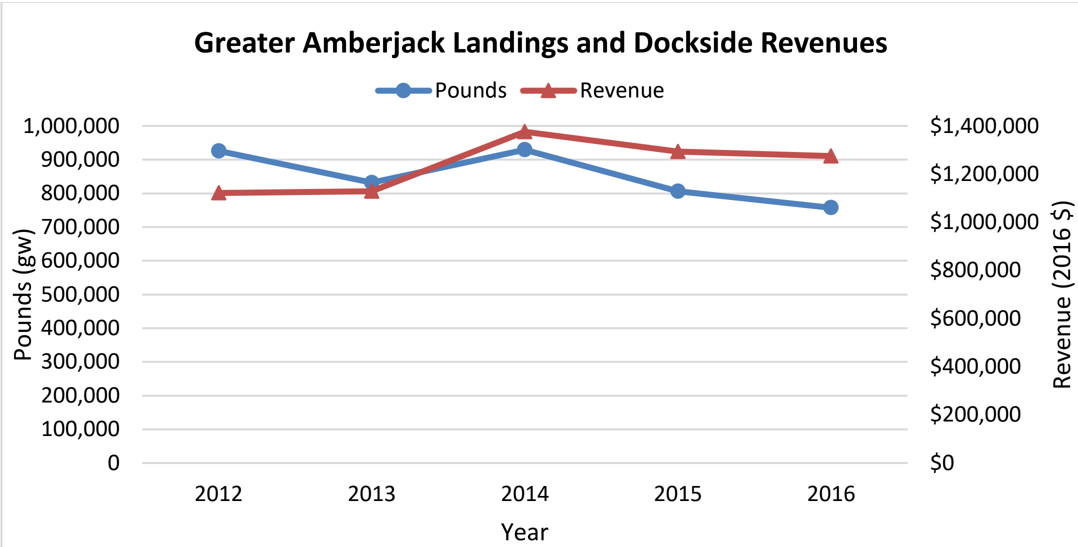

Figure 3.3.1.9. Annual commercial landings of greater amberjack by weight (lbs gw) and dockside revenue (2016 dollars), 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Table 3.3.1.7. Number of vessels, number of trips, and landings by year for vessels that landed greater amberjack from the South Atlantic, 2012-2016.

Year	Number of vessels that caught greater amberjack	Number of trips that caught greater amberjack	Greater amberjack landings (lbs gw)	Other species' landings jointly caught with greater amberjack (lbs gw)	Number of SATL trips that only caught other species	Other species' landings on SATL trips without greater amberjack (lbs gw)	All species landings on Gulf trips (lbs gw)
2012	249	2,063	925,820	1,234,821	6,192	3,144,165	285,534
2013	264	2,085	832,216	1,425,240	6,221	3,139,264	295,089
2014	269	2,472	930,042	1,329,582	7,319	3,417,803	307,619
2015	273	2,342	807,488	1,237,075	7,171	3,647,273	381,514
2016	260	1,975	759,337	942,048	7,534	3,542,341	321,760
Average	263	2,187	850,981	1,233,753	6,887	3,378,169	318,303

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Table 3.3.1.8. Number of vessels and dockside revenues by year for vessels that landed greater amberjack from the South Atlantic, 2012-2016 (2016 dollars).

Year	Number of vessels that caught greater amberjack	Gross ex-vessel revenue from greater amberjack	Gross ex-vessel revenue from 'other species' jointly caught with greater amberjack	Gross ex-vessel revenue from 'other species' caught on SATL trips without greater amberjack	Gross ex-vessel revenue from all species caught on Gulf trips	Total gross ex-vessel revenue	Average total gross ex-vessel revenue per vessel
2012	249	$1,121,551	$4,018,343	$9,681,158	$622,321	$15,443,373	$62,022
2013	264	$1,128,772	$4,891,111	$9,769,647	$797,073	$16,586,603	$62,828
2014	269	$1,376,808	$4,835,660	$10,721,676	$734,658	$17,668,802	$65,683
2015	273	$1,296,118	$4,393,106	$10,475,208	$870,455	$17,034,887	$62,399
2016	260	$1,279,145	$3,363,156	$10,164,010	$782,362	$15,588,673	$59,956
Average	263	$1,240,479	$4,300,275	$10,162,340	$761,374	$16,464,468	$62,578

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018)

Red Porgy

Red porgy is within the porgies group (Sparidae) of the snapper grouper fishery, that includes 6 other species. Average monthly commercial landings of red porgy from 2012-2016 are displayed in **Figure 3.3.1.10**. The landings tend to be the highest in the summer and early fall months. There is a seasonal purchase and sale prohibition from January through April each year. Among the South Atlantic states, commercial red porgy landings tend to be relatively evenly split among the states (**Figure 3.3.1.11**).

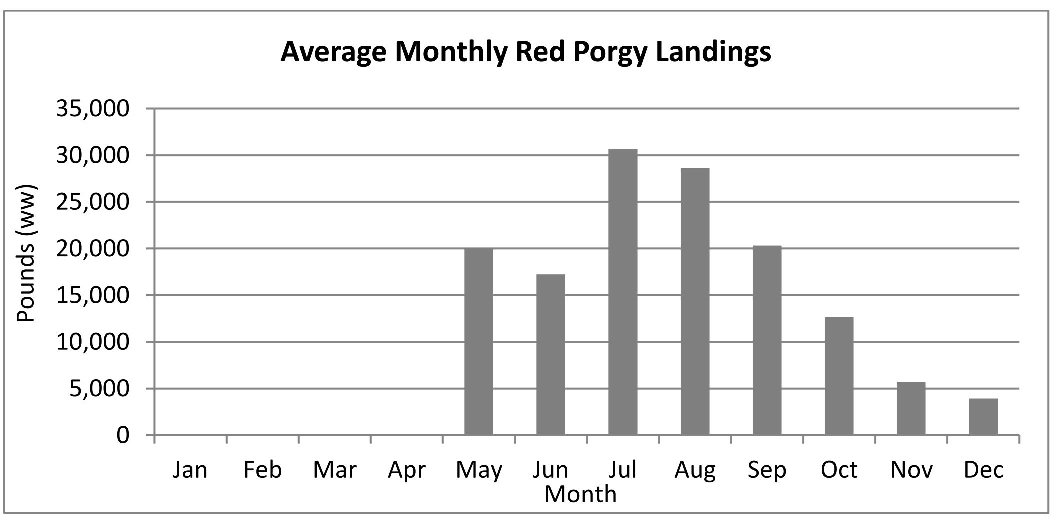

Figure 3.3.1.10. Average monthly commercial landings (lbs ww) of red porgy harvested from the South Atlantic, 2012-2016.
Source: NMFS Commercial ALS Dataset.

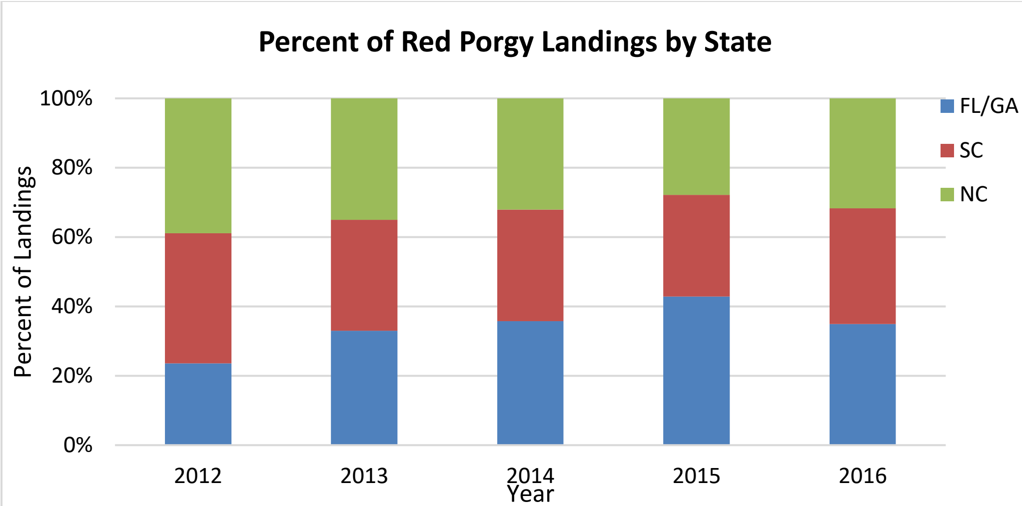

Figure 3.3.1.11. Percent of red porgy landings (lbs gw) by state, 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Annual commercial landings of red porgy in the South Atlantic ranged from approximately 103,000 lbs gw to 136,000 lbs gw and averaged 125,464 lbs gw from 2012 through 2016 (**Figure 3.3.1.12**, **Table 3.3.1.9**). Dockside revenues from those landings ranged from about $225,000 to $275,000 and averaged $262,293 (2016 dollars) (**Figure 3.3.1.12**, **Table 3.3.1.10**). The average dockside price during those five years was $2.10 per lb gw (2016 dollars) and an annual average of 160 vessels took 1,410 commercial trips landing red porgy. Average annual dockside revenue from red porgy landings represented approximately 5% of total dockside revenue from trips that landed red porgy from 2012 through 2016.

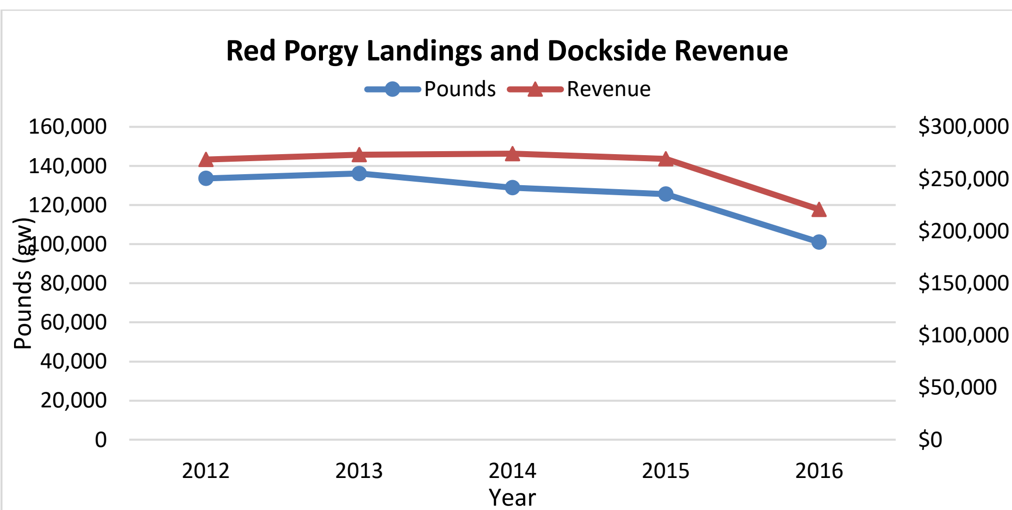

Figure 3.3.1.12. Annual commercial landings of red porgy by weight (lbs gw) and dockside revenue (2016 dollars), 2012–2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Table 3.3.1.9. Number of vessels, number of trips, and landings by year for vessels that landed red porgy from the South Atlantic, 2012-2016.

Year	Number of vessels that caught red porgy	Number of trips that caught red porgy	Red porgy landings (lbs gw)	Other species' landings jointly caught with red porgy (lbs gw)	Number of SATL trips that only caught other species	Other species' landings on SATL trips without red porgy (lbs gw)	All species landings on Gulf trips (lbs gw)
2012	160	1,389	133,652	1,508,907	2,513	1,773,040	161,254
2013	170	1,533	136,166	1,617,082	3,189	2,197,052	332,872
2014	163	1,540	129,241	1,436,144	3,403	2,269,717	293,950
2015	159	1,350	125,587	1,290,301	3,346	2,394,907	171,264
2016	146	1,238	102,673	1,157,945	3,040	2,062,890	2,165
Average	160	1,410	125,464	1,402,076	3,098	2,139,521	192,301

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Table 3.3.1.10. Number of vessels and dockside revenues by year for vessels that landed red porgy from the South Atlantic, 2012-2016 (2016 dollars).

Year	Number of vessels that caught red porgy	Gross ex-vessel revenue from red porgy	Gross ex-vessel revenue from 'other species' jointly caught with red porgy	Gross ex-vessel revenue from 'other species' caught on SATL trips without red porgy	Gross ex-vessel revenue from all species caught on Gulf trips	Total gross ex-vessel revenue	Average total gross ex-vessel revenue per vessel
2012	160	$268,642	$5,007,697	$4,613,070	$557,889	$10,447,298	$65,296
2013	170	$273,391	$5,602,505	$5,779,733	$1,061,443	$12,717,072	$74,806
2014	163	$275,179	$4,995,347	$6,607,755	$1,136,361	$13,014,642	$79,844
2015	159	$269,371	$4,549,664	$6,574,711	$652,887	$12,046,633	$75,765
2016	146	$224,881	$4,093,254	$6,060,951	$4,334	$10,383,420	$71,119
Average	160	$262,293	$4,849,693	$5,927,244	$682,583	$11,721,813	$73,366

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Vermilion Snapper

Vermilion snapper is within the snappers group (Lutjanidae) of the snapper grouper fishery that includes 13 other species. Average monthly commercial landings of vermilion snapper from 2012-2016 are displayed in **Figure 3.3.1.13**. The landings tend to be the highest in January and February, and again in July, August, and September. This reflects the split season currently in place for vermilion snapper where half of the commercial annual catch limit is allocated January through June and half the annual catch limit is allocated July through December. The commercial fishery often closes in between the two seasons when the ACL has been met or is projected to be met. Among the South Atlantic states, South Carolina accounted for the majority of vermilion snapper landings in 2012 (**Figure 3.3.1.14**). In recent years, Florida/Georgia has accounted for a larger share of the landings and in 2016 landings were split fairly evenly across the states.

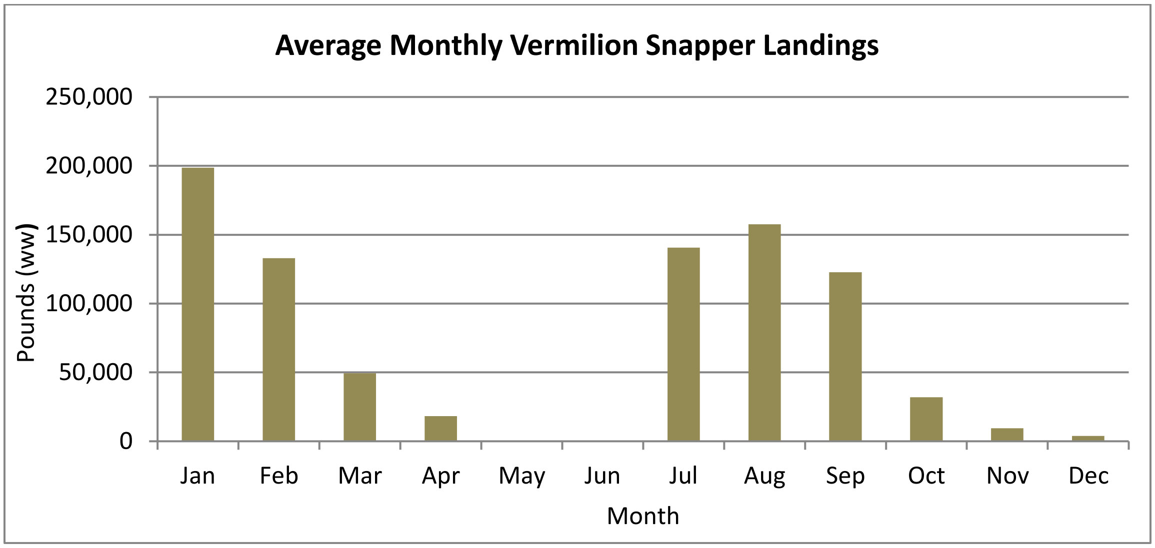

Figure 3.3.1.13. Average monthly commercial landings (lbs gw) of vermilion snapper harvested from the South Atlantic, 2012-2016.
Source: NMFS Commercial ALS Dataset.

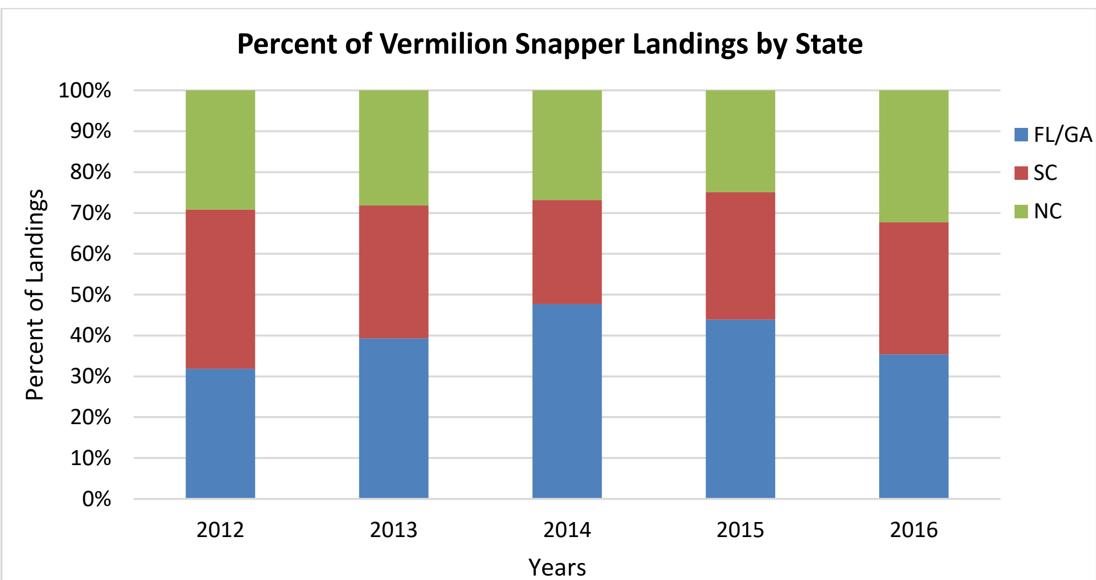

Figure 3.3.1.14. Percent of vermilion snapper landings (lbs gw) by state, 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Annual commercial landings of vermilion snapper in the South Atlantic ranged from approximately 761,000 lbs gw to 857,000 lbs gw and averaged 813,242 lbs gw from 2012 through 2016 (**Figure 3.3.1.15**, **Table 3.3.1.11**). Dockside revenues from those landings ranged from about $2,902,000 to $3,186,000 and averaged $3,057,986 (2016 dollars) (**Figure 3.3.1.15**,

Table 3.3.1.12). The average dockside price during those five years was $3.76 per lb gw (2016 dollars) and an annual average of 206 vessels took 1,653 commercial trips landing vermilion snapper. Average annual dockside revenue from vermilion snapper landings represented approximately 54% of total dockside revenue from trips that landed vermilion snapper from 2012 through 2016.

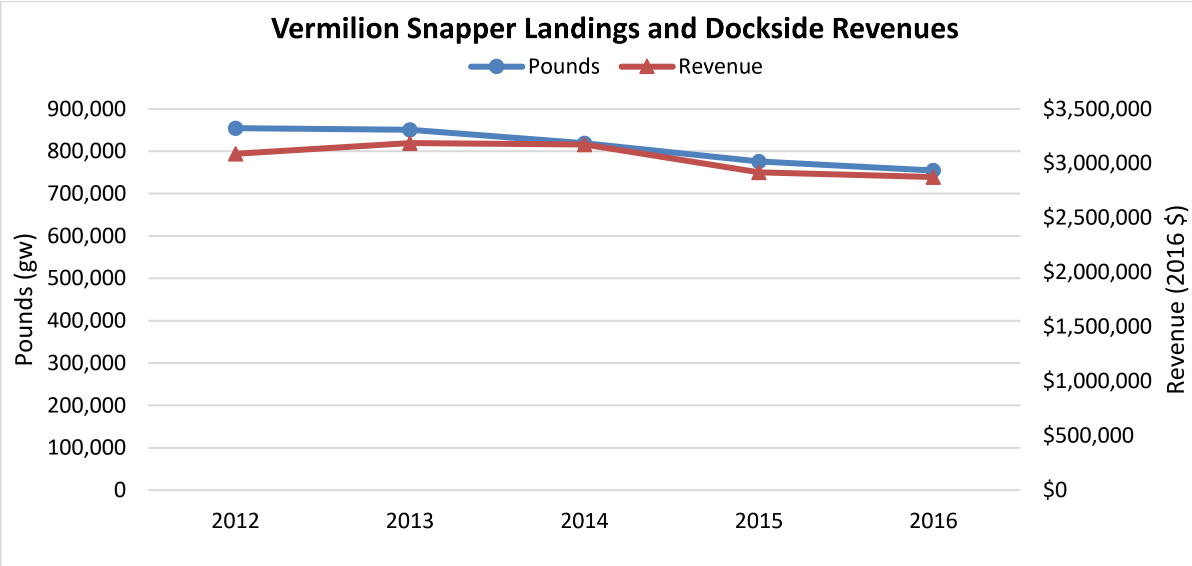

Figure 3.3.1.15. Annual commercial landings of vermilion snapper by weight (lbs gw) and dockside revenue (2016 dollars), 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Table 3.3.1.11. Number of vessels, number of trips, and landings by year for vessels that landed vermilion snapper from the South Atlantic, 2012-2016.

Year	Number of vessels that caught vermilion snapper	Number of trips that caught vermilion snapper	Vermilion snapper landings (lbs gw)	Other species' landings jointly caught with vermilion snapper (lbs gw)	Number of SATL trips that only caught other species	Other species' landings on SATL trips without vermilion snapper (lbs gw)	All species landings on Gulf trips (lbs gw)
2012	190	1,354	856,787	840,234	3,608	2,279,943	211,370
2013	202	1,645	850,383	1,011,293	3,567	2,178,460	378,729
2014	220	1,801	821,569	981,296	5,462	2,921,642	268,824
2015	207	1,734	776,206	964,767	4,825	2,119,958	162,216
2016	212	1,733	761,267	955,091	4,825	2,333,212	244,834
Average	206	1,653	813,242	950,536	4,457	2,366,643	253,195

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Table 3.3.1.12. Number of vessels and dockside revenues by year for vessels that landed vermilion snapper from the South Atlantic, 2012-2016 (2016 dollars).

Year	Number of vessels that caught vermilion snapper	Gross ex-vessel revenue from vermilion snapper	Gross ex-vessel revenue from 'other species' jointly caught with vermilion snapper	Gross ex-vessel revenue from 'other species' caught on SATL trips without vermilion snapper	Gross ex-vessel revenue from all species caught on Gulf trips	Total gross ex-vessel revenue	Average total gross ex-vessel revenue per vessel
2012	190	$3,097,201	$2,111,499	$6,100,983	$661,838	$11,971,521	$63,008
2013	202	$3,186,161	$2,730,220	$6,810,067	$1,240,321	$13,966,769	$69,142
2014	220	$3,184,386	$2,697,817	$9,515,102	$902,267	$16,299,572	$74,089
2015	207	$2,920,598	$2,689,869	$6,990,105	$468,435	$13,069,007	$63,135
2016	212	$2,901,586	$2,732,541	$6,761,411	$806,971	$13,202,509	$62,276
Average	206	$3,057,986	$2,592,389	$7,235,534	$815,966	$13,701,876	$66,330

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Other Jacks Complex

The Other Jacks Complex (lesser amberjack, almaco jack, banded rudderfish) falls within the jacks group (Carangidae) of the snapper grouper fishery that includes one other species. Average monthly commercial landings of the Other Jacks Complex from 2012-2016 are displayed in **Figure 3.3.1.16**. The landings tend to be the highest in the late spring and early summer months, with the commercial landings for the complex typically dominated by almaco jack. Among the South Atlantic states, Florida/Georgia accounted for the majority of landings of the Other Jacks Complex (**Figure 3.3.1.17**).

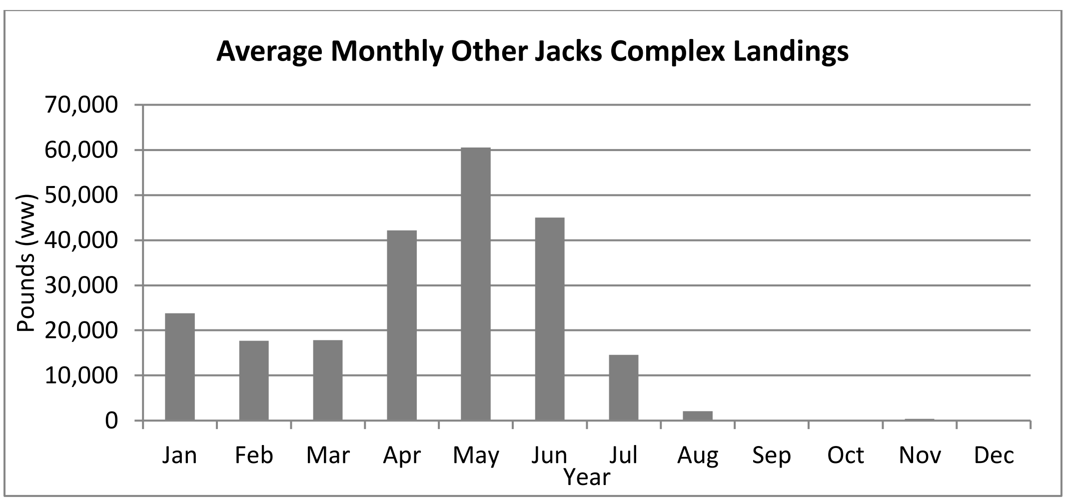

Figure 3.3.1.16. Average monthly commercial landings (lbs ww) of the Other Jacks Complex harvested from the South Atlantic, 2012-2016.
Source: NMFS Commercial ALS Dataset.

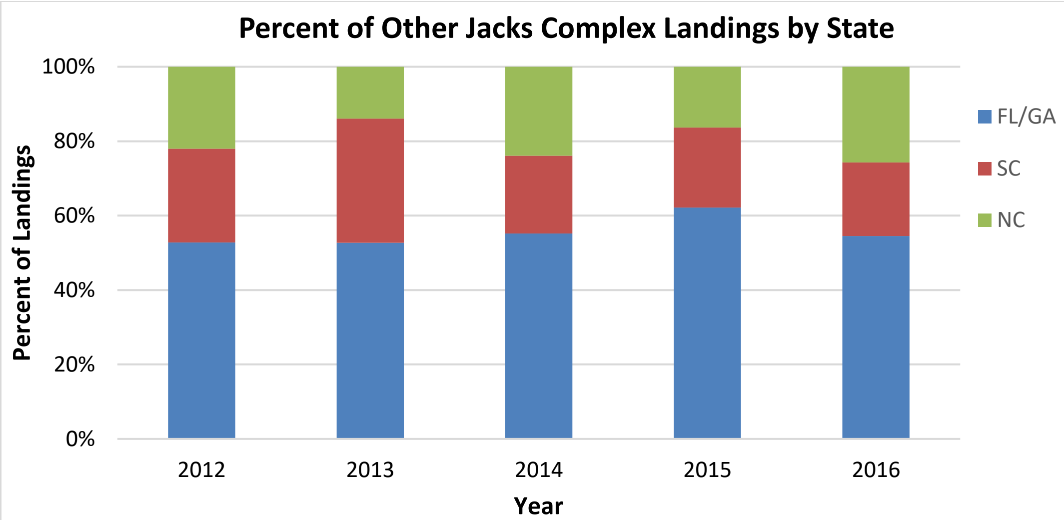

Figure 3.3.1.17. Percent of Other Jacks Complex landings (lbs gw) by state, 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Annual commercial landings of the Other Jacks Complex in the South Atlantic ranged from approximately 173,000 lbs gw to 315,000 lbs gw and averaged 219,536 lbs gw from 2012 through 2016 (**Figure 3.3.1.18**, **Table 3.3.1.14**). Dockside revenues from those landings ranged from about $188,000 to $300,000 and averaged $230,682 (2016 dollars) (**Figure 3.3.1.18**, **Table 3.3.1.14**). The average dockside price during those five years was $1.06 per lb gw (2016 dollars) and an annual average of 210 vessels took 1,323 commercial trips landing species from the Other Jacks Complex. Average annual dockside revenue from landings of the Other Jacks Complex represented approximately 6% of total dockside revenue from trips that landed species from the Other Jacks Complex from 2012 through 2016.

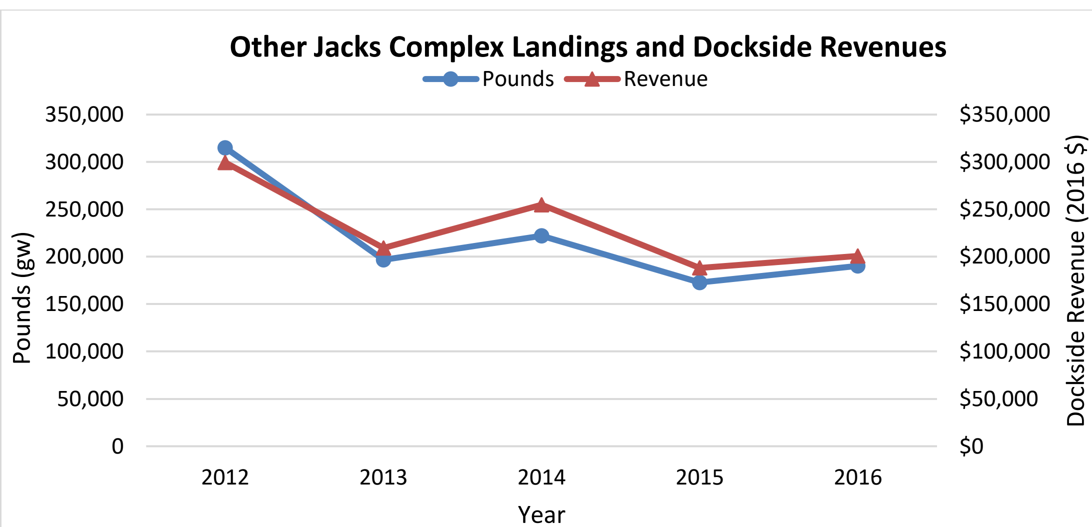

Figure 3.3.1.18. Annual commercial landings species from the Other Jacks Complex by weight (lbs gw) and dockside revenue (2016 dollars), 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Table 3.3.1.13. Number of vessels, number of trips, and landings by year for vessels that landed species from the Other Jacks Complex from the South Atlantic, 2012-2016.

Year	Number of vessels that caught species from the Other Jacks Complex	Number of trips that caught species from the Other Jacks Complex	Species from the Other Jacks Complex landings (lbs gw)	Other species' landings jointly caught with species from the Other Jacks Complex (lbs gw)	Number of SATL trips that only caught other species	Other species' landings on SATL trips without species from the Other Jacks Complex (lbs gw)	All species landings on Gulf trips (lbs gw)
2012	222	1,342	315,151	1,217,253	5,850	3,236,418	398,428
2013	189	1,027	196,828	1,051,338	5,196	3,186,902	172,271
2014	209	1,421	222,006	1,301,405	6,503	3,402,607	510,031
2015	208	1,271	172,826	1,117,889	6,345	3,266,816	206,392
2016	222	1,552	190,867	1,363,724	6,322	3,381,169	197,731
Average	210	1,323	219,536	1,210,322	6,043	3,294,782	296,971

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Table 3.3.1.14. Number of vessels and dockside revenues by year for vessels that landed species from the Other Jacks Complex from the South Atlantic, 2012-2016 (2016 dollars).

Year	Number of vessels that caught species from the Other Jacks Complex	Gross ex-vessel revenue from species from the Other Jacks Complex	Gross ex-vessel revenue from 'other species' jointly caught with species from the Other Jacks Complex	Gross ex-vessel revenue from 'other species' caught on SATL trips without species from the Other Jacks Complex	Gross ex-vessel revenue from all species caught on Gulf trips	Total gross ex-vessel revenue	Average total gross ex-vessel revenue per vessel
2012	222	$299,572	$3,717,650	$9,144,860	$1,021,736	$14,183,818	$63,891
2013	189	$209,346	$3,354,253	$9,660,423	$496,712	$13,720,734	$72,596
2014	209	$254,998	$4,327,112	$10,184,294	$1,601,362	$16,367,766	$78,315
2015	208	$188,150	$3,756,004	$9,533,890	$514,376	$13,992,420	$67,271
2016	222	$201,346	$4,657,836	$8,985,996	$527,355	$14,372,533	$64,741
Average	210	$230,682	$3,962,571	$9,501,893	$832,308	$14,527,454	$69,363

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Almaco Jack

Average monthly commercial landings of almaco jack from 2012-2016 are displayed in **Figure 3.3.1.19**. Commercial landings tend to be the highest in May and June. Among the South Atlantic states, Florida/Georgia accounted for the majority of almaco jack landings (**Figure 3.3.1.20**), typically followed by South Carolina and North Carolina.

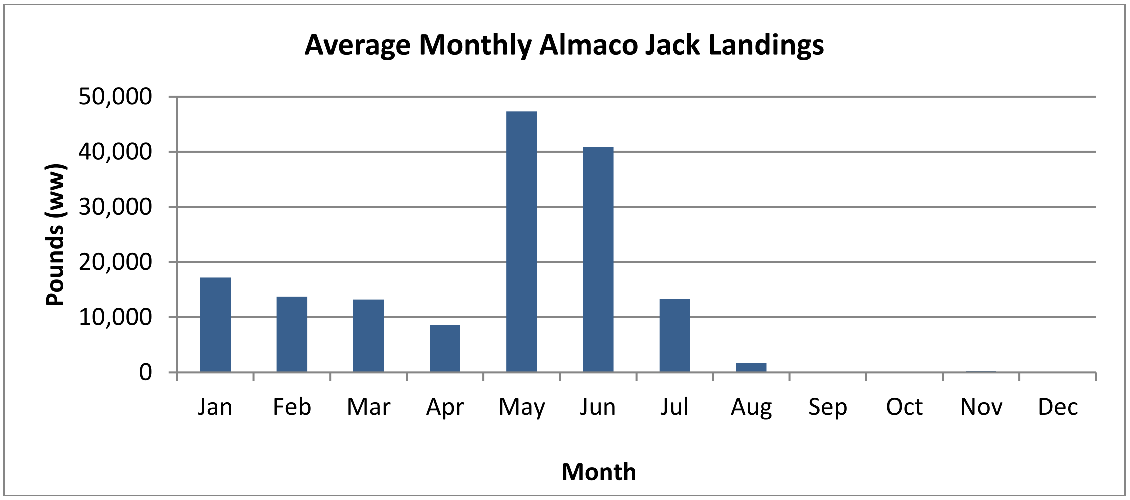

Figure 3.3.1.19. Average monthly commercial landings (lbs ww) of almaco jack harvested from the South Atlantic, 2012-2016.
Source: NMFS Commercial ALS Dataset.

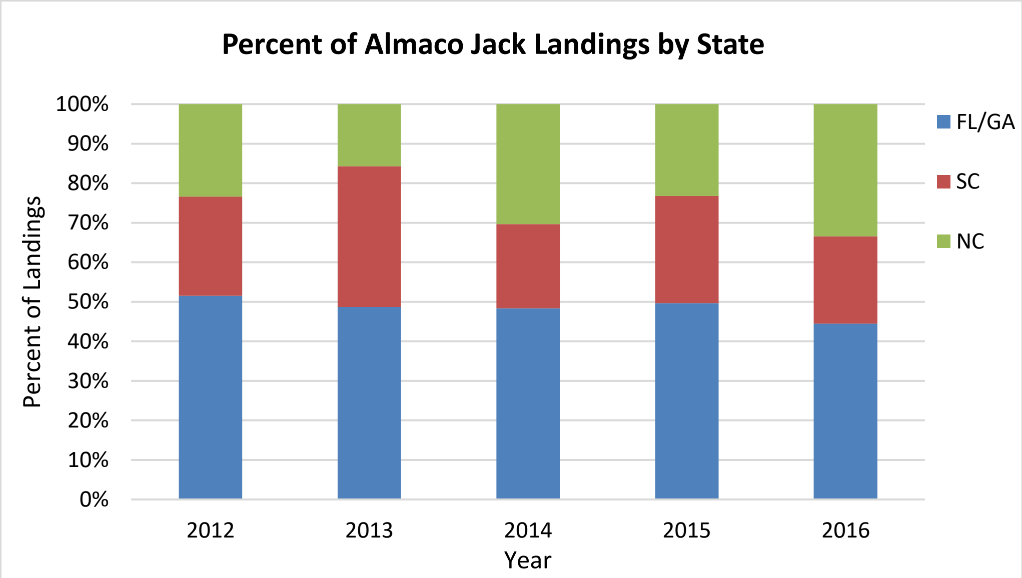

Figure 3.3.1.20. Percent of almaco jack landings (lbs gw) by state, 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Annual commercial landings of almaco jack in the South Atlantic ranged from approximately 110,000 lbs gw to 217,000 lbs gw and averaged 150,911 lbs gw from 2012 through 2016 (**Figure 3.3.1.21**, **Table 3.3.1.15**). Dockside revenues from those landings ranged from about $124,000 to $220,000 and averaged $165,049 (2016 dollars) (**Figure 3.3.1.21**, **Table 3.3.1.16**). The average dockside price during those five years was $1.10 per lb gw (2016 dollars) and an annual average of 165 vessels took 1,035 commercial trips landing almaco jack. Average annual dockside revenue from landings of almaco jack represented approximately 4% of total dockside revenue from trips that landed almaco jack from 2012 through 2016.

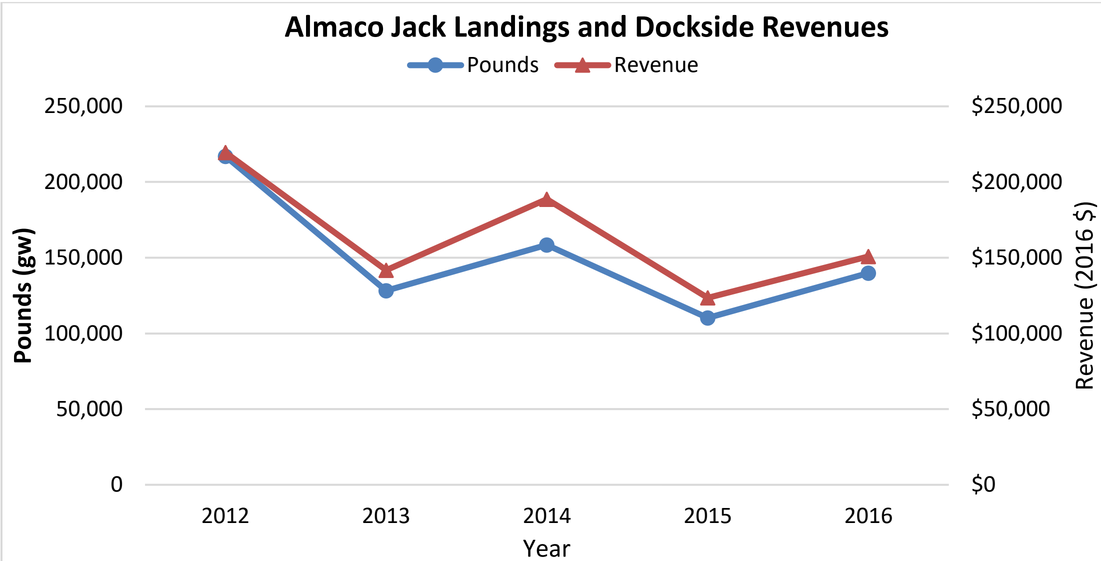

Figure 3.3.1.21. Annual commercial landings of almaco jack by weight (lbs gw) and dockside revenue (2016 dollars), 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (January 2018).

Table 3.3.1.15. Number of vessels, number of trips, and landings by year for vessels that landed almaco jack from the South Atlantic, 2012-2016.

Year	Number of vessels that caught almaco jack	Number of trips that caught almaco jack	Almaco jack landings (lbs gw)	Other species' landings jointly caught with almaco jack (lbs gw)	Number of SATL trips that only caught other species	Other species' landings on SATL trips without almaco jack (lbs gw)	All species landings on Gulf trips (lbs gw)
2012	168	1,000	217,221	1,116,464	4,220	2,713,820	300,863
2013	149	768	128,232	962,471	3,894	2,730,672	114,641
2014	160	1,067	158,530	1,098,743	5,132	3,123,407	87,554
2015	162	1,018	110,241	1,009,266	5,062	2,952,944	128,629
2016	185	1,320	140,332	1,269,263	5,142	3,021,466	122,163
Average	165	1,035	150,911	1,091,241	4,690	2,908,462	150,770

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Table 3.3.1.16. Number of vessels and dockside revenues by year for vessels that landed almaco jack from the South Atlantic, 2012-2016 (2016 dollars).

Year	Number of vessels that caught almaco jack	Gross ex-vessel revenue from almaco jack	Gross ex-vessel revenue from 'other species' jointly caught with almaco jack	Gross ex-vessel revenue from 'other species' caught on SATL trips without almaco jack	Gross ex-vessel revenue from all species caught on Gulf trips	Total gross ex-vessel revenue	Average total gross ex-vessel revenue per vessel
2012	168	$219,686	$3,357,438	$7,933,954	$803,543	$12,314,621	$73,301
2013	149	$141,765	$3,038,805	$8,589,674	$340,490	$12,110,734	$81,280
2014	160	$188,796	$3,666,010	$9,487,385	$203,648	$13,545,839	$84,661
2015	162	$123,495	$3,403,988	$8,606,915	$290,894	$12,425,292	$76,699
2016	185	$151,505	$4,308,723	$8,203,649	$358,412	$13,022,289	$70,391
Average	165	$165,049	$3,554,993	$8,564,315	$399,397	$12,683,755	$77,267

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Queen, Silk, and Blackfin Snappers

Queen, silk, and blackfin snapper fall within the Snappers (Lutjanidae) group of the snapper grouper fishery that includes 11 other species. Average monthly commercial landings of queen, silk, and blackfin snapper from 2012-2016 are displayed in **Figure 3.3.1.22**. The landings tend to be the highest in May, June, and July, but occur throughout the year. Among the South Atlantic states, landings of queen, silk, and blackfin snapper varied greatly over the five-year timeframe examined (**Figure 3.3.1.23**). In 2012, the majority of landings occurred in North Carolina, with Florida/Georgia and South Carolina accounting for a smaller share of the landings. In the other years examined, Florida/Georgia played a larger role in the commercial landings.

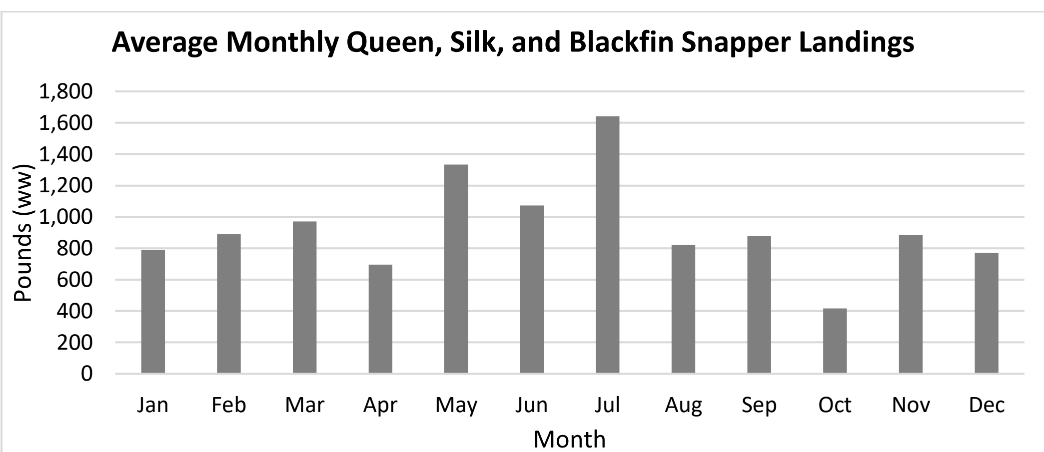

Figure 3.3.1.22. Average monthly commercial landings (lbs ww) of queen, silk, and blackfin snapper harvested from the South Atlantic, 2012-2016.

Source: NMFS Commercial ALS Dataset.

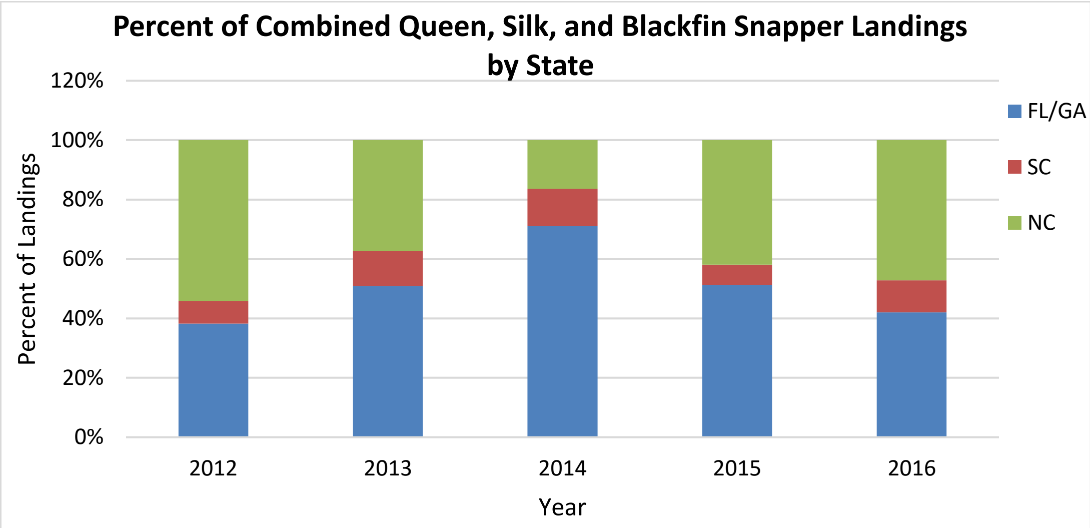

Figure 3.3.1.23. Percent of combined queen snapper, silk snapper, and blackfin snapper landings (lbs gw) by state, 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Annual commercial landings of queen, silk, and blackfin snapper in the South Atlantic ranged from approximately 7,000 lbs gw to 22,000 lbs gw and averaged 13,869 lbs gw from 2012 through 2016 (**Figure 3.3.1.24**, **Table 3.3.1.17**). Dockside revenues from those landings ranged from about $27,000 to $90,000 and averaged $53,822 (2016 dollars) (**Figure 3.3.1.24**, **Table 3.3.1.18**). The average dockside price during those five years was $3.84 per lb gw (2016 dollars) and an annual average of 93 vessels took 270 commercial trips landing queen, silk, and blackfin snapper. Average annual dockside revenue from landings of queen, silk, and blackfin snapper represented approximately 5% of total dockside revenue from trips that landed one or more of these snapper species from 2012 through 2016.

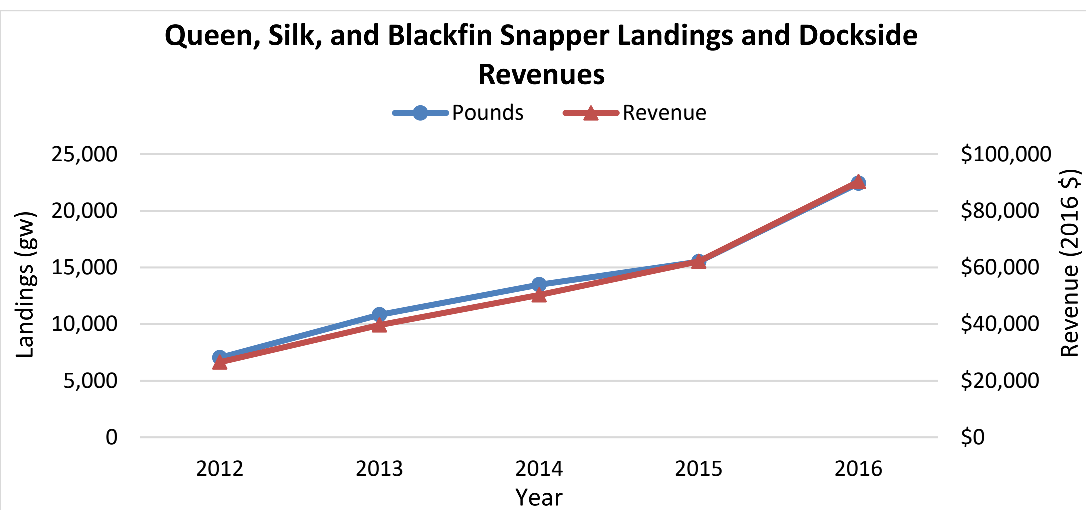

Figure 3.3.1.24. Annual commercial landings of queen, silk, and blackfin snapper by weight (lbs gw) and dockside revenue (2016 $).
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Table 3.3.1.17. Number of vessels, number of trips, and landings by year for vessels that landed queen snapper, silk snapper, and blackfin snapper from the South Atlantic, 2012-2016.

Year	Number of vessels that caught queen, silk, or blackfin snapper	Number of trips that caught queen, silk, or blackfin snapper	Queen, silk, or blackfin snapper landings (lbs gw)	Other species' landings jointly caught with queen, silk, or blackfin snapper (lbs gw)	Number of SATL trips that only caught other species	Other species' landings on SATL trips without queen, silk, or blackfin snapper (lbs gw)	All species landings on Gulf trips (lbs gw)
2012	93	224	7,024	265,159	2,448	2,109,752	236,765
2013	81	231	10,813	275,657	2,028	1,790,122	193,553
2014	88	192	13,528	236,187	2,746	2,218,612	274,418
2015	105	316	15,509	305,469	3,228	2,447,566	274,950
2016	101	391	22,469	399,363	3,477	2,233,328	258,261
Average	94	271	13,869	296,367	2,785	2,159,876	247,589

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Table 3.3.1.18. Number of vessels and gross dockside revenues by year for vessels that landed queen, silk, and blackfin snapper from the South Atlantic, 2012-2016 (2016 dollars).

Year	Number of vessels that caught queen, silk, or blackfin snapper	Gross ex-vessel revenue from queen, silk, or blackfin snapper	Gross ex-vessel revenue from 'other species' jointly caught with queen, silk, or blackfin snapper	Gross ex-vessel revenue from 'other species' caught on SATL trips without queen, silk, or blackfin snapper	Gross ex-vessel revenue from all species caught on Gulf trips	Total gross ex-vessel revenue	Average total gross ex-vessel revenue per vessel
2012	93	$26,520	$774,654	$6,635,367	$682,648	$8,119,189	$87,303
2013	81	$39,630	$834,724	$6,238,917	$617,963	$7,731,234	$95,447
2014	88	$50,382	$725,227	$7,934,176	$941,777	$9,651,562	$109,677
2015	105	$62,153	$1,026,814	$6,693,503	$992,837	$8,775,307	$83,574
2016	101	$90,425	$1,324,231	$6,801,671	$850,230	$9,066,557	$89,768
Average	94	$53,822	$937,130	$6,860,727	$817,091	$8,668,770	$93,154

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Gray Triggerfish

Gray triggerfish is within the triggerfishes group (Balistidae) of the snapper grouper fishery that includes one other species. Average monthly commercial landings of gray triggerfish from 2012 through 2016 are displayed in **Figure 3.3.1.25**. The landings tend to be the highest in the winter and spring months. Among the South Atlantic states, North Carolina accounted for the most gray triggerfish landings in most years (**Figure 3.3.1.26**).

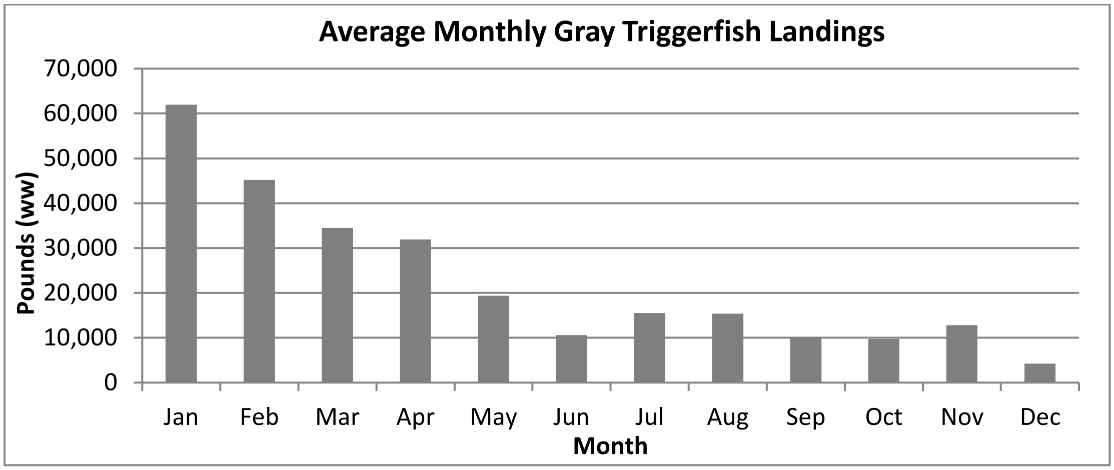

Figure 3.3.1.25. Average monthly commercial landings (lbs ww) of gray triggerfish harvested from the South Atlantic, 2012-2016.
Source: NMFS Commercial ALS Dataset.

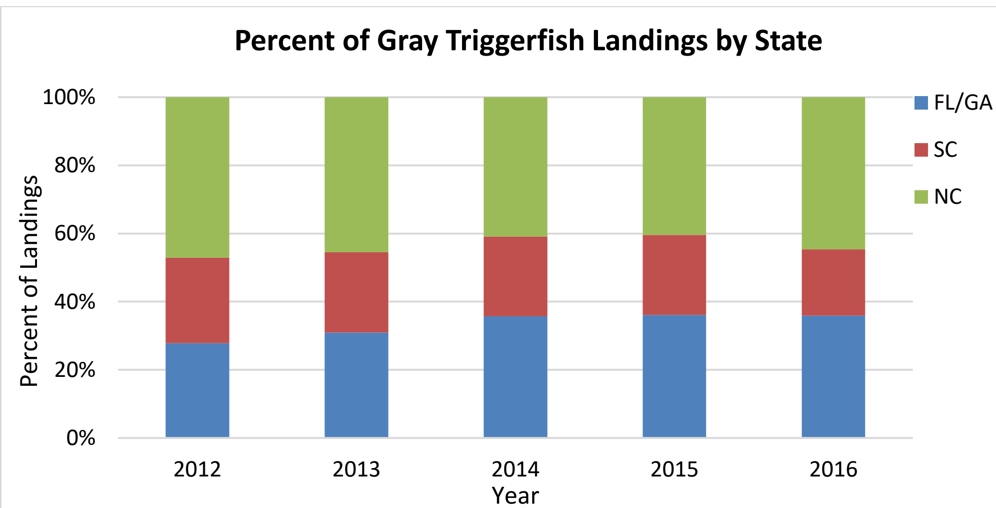

Figure 3.3.1.26. Percent of gray triggerfish landings (lbs gw) by state, 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Annual commercial landings of gray triggerfish in the South Atlantic ranged from approximately 241,000 lbs gw to 289,000 lbs gw and averaged 271,088 lbs gw from 2012 through 2016 (**Figure 3.3.1.27**, **Table 3.3.1.19**). Dockside revenues from those landings ranged from about $438,000 to $713,000 and averaged $597,059 (2016 dollars) (**Figure 3.3.1.27**, **Table 3.3.1.20**). The average dockside price during those five years was $2.20 per lb gw (2016 dollars) and an annual average of 213 vessels took 1,417 commercial trips landing gray triggerfish. Average annual dockside revenue from gray triggerfish landings represented approximately 14% of total dockside revenue from trips that landed gray triggerfish from 2012 through 2016.

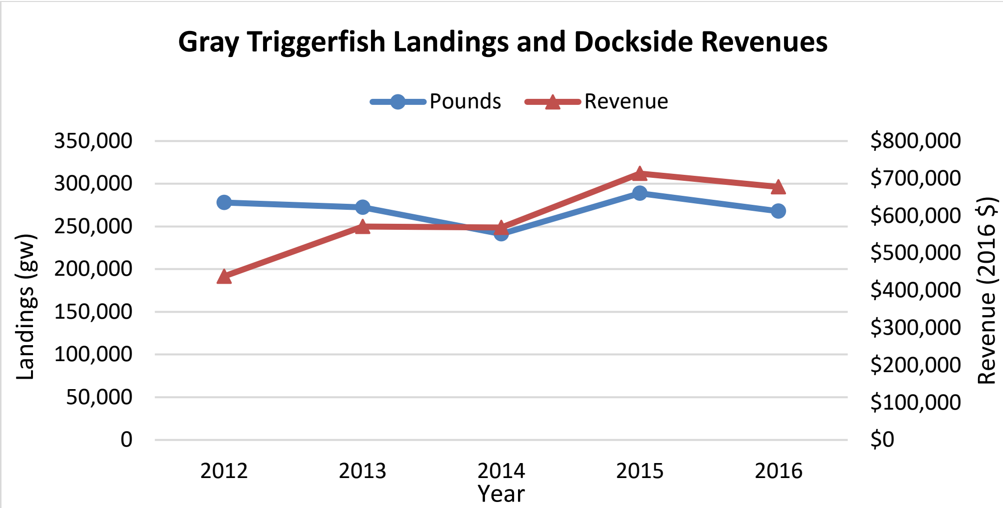

Figure 3.3.1.27. Annual commercial landings of gray triggerfish by weight (lbs gw) and dockside revenue (2016 dollars), 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

Table 3.3.1.19. Number of vessels, number of trips, and landings by year for vessels that landed gray triggerfish from the South Atlantic, 2012-2016.

Year	Number of vessels that caught gray triggerfish	Number of trips that caught gray triggerfish	Gray triggerfish landings (lbs gw)	Other species' landings jointly caught with gray triggerfish (lbs gw)	Number of SATL trips that only caught other species	Other species' landings on SATL trips without gray triggerfish (lbs gw)	All species landings on Gulf trips (lbs gw)
2012	245	1,742	277,843	1,623,481	6,298	3,315,499	158,677
2013	205	1,153	272,329	1,048,901	5,074	2,930,000	236,587
2014	197	979	241,185	732,971	6,344	3,617,795	168,232
2015	213	1,496	288,784	1,226,571	4,653	2,317,046	188,935
2016	203	1,716	275,300	1,450,900	4,773	2,384,635	115,994
Average	213	1,417	271,088	1,216,565	5,428	2,912,995	173,685

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Table 3.3.1.20. Number of vessels and gross ex-vessel revenues by year for vessels that landed gray triggerfish from the South Atlantic, 2012-2016 (2016 dollars).

Year	Number of vessels that caught gray triggerfish	Gross ex-vessel revenue from gray triggerfish	Gross ex-vessel revenue from 'other species' jointly caught with gray triggerfish	Gross ex-vessel revenue from 'other species' caught on SATL trips without gray triggerfish	Gross ex-vessel revenue from all species caught on Gulf trips	Total gross ex-vessel revenue	Average total gross ex-vessel revenue per vessel
2012	245	$437,998	$5,121,085	$8,654,809	$348,769	$14,562,661	$59,439
2013	205	$571,027	$3,397,669	$9,491,235	$695,490	$14,155,421	$69,051
2014	197	$568,634	$2,443,563	$11,544,854	$526,237	$15,083,288	$76,565
2015	213	$712,957	$4,183,204	$7,397,623	$579,855	$12,873,639	$60,440
2016	203	$694,679	$5,018,077	$6,745,230	$292,646	$12,750,632	$62,811
Average	213	$597,059	$4,032,720	$8,766,750	$488,599	$13,885,128	$65,661

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

All Snapper Grouper Complex Species

Annual commercial landings of species in the snapper grouper complex in the South Atlantic ranged from approximately 5,465,000 lbs gw to 5,715,000 lbs gw and averaged 5,452,712 lbs gw from 2012 through 2016 (**Figure 3.3.1.28**, **Table 3.3.1.21**). Dockside revenues from those landings ranged from about $16,589,000 to $17,958,000 and averaged $17,291,563 (2016 dollars) (**Figure 3.3.1.28**, **Table 3.3.1.22**). The average dockside price during those five years was $3.18 per lb gw (2016 dollars) and an annual average of 584 vessels took 11,119 commercial trips landing species in the snapper grouper complex. Average annual dockside revenue from species in the snapper grouper complex landings represented approximately 90% of total dockside revenue from trips that landed species in the snapper grouper complex from 2012 through 2016.

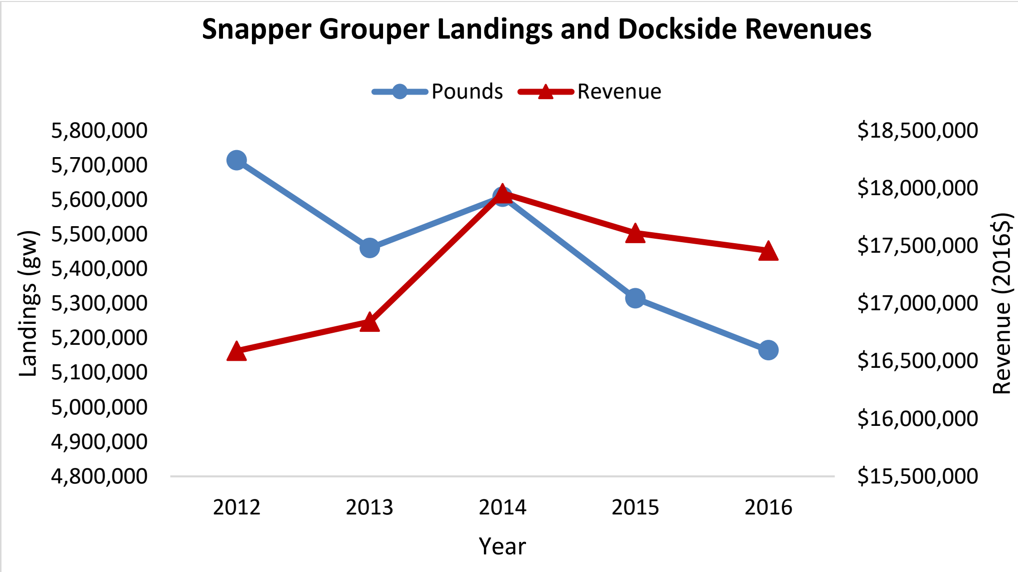

Figure 3.3.1.28. Annual commercial landings of species within the snapper grouper complex by weight (lbs gw) and dockside revenue (2016 dollars), 2012-2016.
Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Table 3.3.1.21. Number of vessels, number of trips, and landings by year for vessels that landed gray triggerfish from the South Atlantic, 2012-2016.

Year	Number of vessels that caught snapper grouper species	Number of trips that caught snapper grouper species	Snapper grouper species landings (lbs gw)	Other species' landings jointly caught with snapper grouper species (lbs gw)	Number of SATL trips that only caught other species	Other species' landings on SATL trips without snapper grouper species (lbs gw)	All species landings on Gulf trips (lbs gw)
2012	627	10,842	5,714,585	662,839	5,242	2,276,644	863,006
2013	574	10,221	5,460,670	572,321	4,329	1,841,512	923,495
2014	576	12,019	5,608,706	660,232	5,152	2,633,809	1,245,200
2015	580	11,016	5,315,016	518,598	4,497	2,089,127	1,012,701
2016	561	11,495	5,164,583	609,895	4,702	2,227,249	793,431
Average	584	11,119	5,452,712	604,777	4,784	2,213,668	967,567

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

Table 3.3.1.22. Number of vessels and gross ex-vessel revenues by year for vessels that landed species in the snapper grouper complex from the South Atlantic, 2012-2016 (2016 dollars).

Year	Number of vessels that caught snapper grouper species	Gross ex-vessel revenue from snapper grouper species	Gross ex-vessel revenue from 'other species' jointly caught with snapper grouper species	Gross ex-vessel revenue from 'other species' caught on SATL trips without snapper grouper species	Gross ex-vessel revenue from all species caught on Gulf trips	Total gross ex-vessel revenue	Average total gross ex-vessel revenue per vessel
2012	627	$16,588,820	$1,997,388	$3,917,117	$2,163,851	$24,667,176	$39,342
2013	574	$16,841,150	$1,854,186	$3,388,336	$2,909,195	$24,992,867	$43,542
2014	576	$17,957,542	$2,256,568	$4,021,184	$3,904,251	$28,139,545	$48,853
2015	580	$17,611,508	$1,516,666	$3,253,017	$2,979,488	$25,360,679	$43,725
2016	561	$17,458,795	$1,674,092	$3,494,205	$2,198,233	$24,825,325	$44,252
Average	584	$17,291,563	$1,859,780	$3,614,772	$2,831,004	$25,597,118	$43,943

Source: SEFSC Coastal Fisheries Logbook (Accessed June 2018).

3.3.1.4 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 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 domestic harvest of snappers and groupers, including the species in this amendment.

Snappers

Imports[8] of fresh snapper were 22.7 million lbs product weight (pw) in 2012. They increased steadily to 30.5 million lbs pw in 2016. Total revenue from fresh snapper imports increased from $69.4 million (2016 dollars) in 2012 to a five-year high of $90.2 million in 2016. Imports of fresh snapper primarily originated in Mexico or Central America and entered the U.S. through the port of Miami. Imports of fresh snapper were highest on average (2012 through 2016) during the months March through July.

[8] 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.

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

Groupers

Imports of fresh grouper were 9.2 million lbs pw in 2012. They increased to 11.5 million lbs pw in 2016. Total revenue from fresh grouper imports increased from $33.1 million (2016 dollars) in 2012 to a five-year high of $47.3 million in 2016. Imports of fresh grouper primarily originated in Mexico or Central America and entered the U.S. through the ports of Tampa and Miami. Imports of fresh grouper were highest on average (2012 through 2016) during the months of January, July, and August.

Imports of frozen grouper were substantially less than imports of fresh grouper from 2012 through 2016. Imports of frozen grouper were 1.3 million lbs pw in 2012. They increased to 1.8 million lbs pw in 2014 before dropping to 0.8 million lbs pw. The annual value of frozen grouper imports ranged from $1.5 million (2016 dollars) to $3.7 million (2016 dollars) during the time period, with the peak in 2014. Imports of frozen grouper primarily originated in Mexico, India, and China. The majority of frozen grouper imports entered the U.S. through the ports of Tampa, Miami, and New York. Imports of frozen grouper were highest on average (2012 through 2016) during the months of February, March, and May.

3.3.1.5 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 vermilion snapper purchased at a local fish market and served during restaurant visits. These expenditures spur additional business activity in the region(s) where the harvest and purchases are made, such as jobs in local fish markets, grocers, restaurants, and fishing supply establishments. In the absence of the availability of a given species for purchase, consumers would 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 this amendment, and all species harvested by the vessels that harvested these species, were derived using the model[9] developed for and applied in NMFS (2017) and are provided in **Table 3.3.1.23-Table 3.3.1.32**. This business activity is characterized as jobs (full- and part-time), income impacts (wages, salaries, and self-employed

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

income), output (sales) impacts (gross business sales), and value-added impacts, which represent the contribution made to the U.S. Gross Domestic Product (GDP). These impacts should not be added together because this would result in double counting. It should be noted that the results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species. Separate models to address individual species are not available. For example, the results provided in **Table 3.3.1.23** apply to a general reef fish category rather than just blueline tilefish, and a harvester job is "generated" for approximately every $32,000 (2016 dollars) in ex-vessel revenue. These results contrast with the number of harvesters (vessels) with recorded landings of blueline tilefish presented in **Table 3.3.1.4**.

Table 3.3.1.23. Average annual business activity (2012 through 2016) associated with the commercial harvest of blueline tilefish and the harvest of all species by vessels that landed blueline tilefish. All monetary estimates are in 2016 dollars.

Species	Average Ex-vessel Revenue	Total Jobs	Harvester Jobs	Income Impacts ($ thousands)	Value-Added Impacts ($ thousands)	Output (Sales) Impacts ($ thousands)
Blueline tilefish	$468,042	62	15	$1,705	$2,408	$4,641
All species on all trips made by vessels that landed greater than one pound of blueline tilefish	$11,065,224	1,477	351	$40,297	$56,935	$109,732

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).

Table 3.3.1.24. Average annual business activity (2012 through 2016) associated with the commercial harvest of snowy grouper and the harvest of all species by vessels that landed snowy grouper. All monetary estimates are in 2016 dollars.

Species	Average Ex-vessel Revenue	Total Jobs	Harvester Jobs	Income Impacts ($ thousands)	Value-Added Impacts ($ thousands)	Output (Sales) Impacts ($ thousands)
Snowy grouper	$489,880	65	16	$1,784	$2,521	$4,858
All species on all trips made by vessels that landed snowy grouper	$12,709,100	1,697	403	$46,284	$65,394	$126,034

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).

Table 3.3.1.25. Average annual business activity (2012 through 2016) associated with the commercial harvest of greater amberjack and the harvest of all species by vessels that landed greater amberjack. All monetary estimates are in 2016 dollars.

Species	Average Ex-vessel Revenue	Total Jobs	Harvester Jobs	Income Impacts ($ thousands)	Value-Added Impacts ($ thousands)	Output (Sales) Impacts ($ thousands)
Greater amberjack	$1,240,479	166	39	$4,518	$6,383	$12,302
All species on all trips made by vessels that landed greater amberjack	$16,464,468	2,198	522	$59,960	$84,717	$163,275

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).

Table 3.3.1.26. Average annual business activity (2012 through 2016) associated with the commercial harvest of red porgy and the harvest of all species by vessels that landed red porgy. All monetary estimates are in 2016 dollars.

Species	Average Ex-vessel Revenue	Total Jobs	Harvester Jobs	Income Impacts ($ thousands)	Value-Added Impacts ($ thousands)	Output (Sales) Impacts ($ thousands)
Red porgy	$262,293	35	8	$955	$1,350	$2,601
All species on all trips made by vessels that landed red porgy	$11,721,813	1,565	371	$42,689	$60,314	$116,243

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).

Table 3.3.1.27. Average annual business activity (2012 through 2016) associated with the commercial harvest of vermilion snapper and the harvest of all species by vessels that landed vermilion snapper. All monetary estimates are in 2016 dollars.

Species	Average Ex-vessel Revenue	Total Jobs	Harvester Jobs	Income Impacts ($ thousands)	Value-Added Impacts ($ thousands)	Output (Sales) Impacts ($ thousands)
Vermilion snapper	$3,057,986	408	97	$11,137	$15,735	$30,325
All species on all trips made by vessels that landed vermilion snapper	$13,701,876	1,829	434	$49,900	$70,502	$135,879

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).

Table 3.3.1.28. Average annual business activity (2012 through 2016) associated with the commercial harvest of species within the Other Jacks Complex and the harvest of all species by vessels that landed species within the Other Jacks Complex. All monetary estimates are in 2016 dollars.

Species	Average Ex-vessel Revenue	Total Jobs	Harvester Jobs	Income Impacts ($ thousands)	Value-Added Impacts ($ thousands)	Output (Sales) Impacts ($ thousands)
Other Jacks Complex	$230,682	31	7	$840	$1,187	$2,288
All species on all trips made by vessels that landed other jacks	$14,527,454	1,939	460	$52,906	$74,750	$144,066

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).

Table 3.3.1.29. Average annual business activity (2012 through 2016) associated with the commercial harvest of almaco jack and the harvest of all species by vessels that landed almaco jack. All monetary estimates are in 2016 dollars.

Species	Average Ex-vessel Revenue	Total Jobs	Harvester Jobs	Income Impacts ($ thousands)	Value-Added Impacts ($ thousands)	Output (Sales) Impacts ($ thousands)
Almaco jack	$165,049	22	5	$601	$849	$1,637
All species on all trips made by vessels that landed almaco jack	$12,683,755	1,693	402	$46,192	$65,264	$125,782

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).

Table 3.3.1.30. Average annual business activity (2012 through 2016) associated with the commercial harvest of queen, silk, and blackfin snapper and the harvest of all species by vessels that landed queen, silk, and blackfin snapper. All monetary estimates are in 2016 dollars.

Species	Average Ex-vessel Revenue	Total Jobs	Harvester Jobs	Income Impacts ($ thousands)	Value-Added Impacts ($ thousands)	Output (Sales) Impacts ($ thousands)
Queen, silk, and blackfin snapper	$53,822	7	2	$196	$277	$534
All species on all trips made by vessels that landed queen, silk, and blackfin snapper	$8,668,770	1,157	275	$31,570	$44,605	$85,967

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).

Table 3.3.1.31. Average annual business activity (2012 through 2016) associated with the commercial harvest of gray triggerfish and the harvest of all species by vessels that landed gray triggerfish. All monetary estimates are in 2016 dollars.

Species	Average Ex-vessel Revenue	Total Jobs	Harvester Jobs	Income Impacts ($ thousands)	Value-Added Impacts ($ thousands)	Output (Sales) Impacts ($ thousands)
Gray triggerfish	$597,059	80	19	$2,174	$3,072	$5,921
All species on all trips made by vessels that landed gray triggerfish	$13,885,128	1,854	440	$50,567	$71,445	$137,696

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).

Table 3.3.1.32. Average annual business activity (2012 through 2016) associated with the commercial harvest of species within the snapper grouper complex and the harvest of all species by vessels that landed species within the snapper grouper complex. All monetary estimates are in 2016 dollars.

Species	Average Ex-vessel Revenue	Total Jobs	Harvester Jobs	Income Impacts ($ thousands)	Value-Added Impacts ($ thousands)	Output (Sales) Impacts ($ thousands)
Species within the snapper grouper complex	$17,291,563	2,308	548	$62,972	$88,973	$171,477
All species on all trips made by vessels that landed species within the snapper grouper complex	$25,597,118	3,417	811	$93,220	$131,708	$253,842

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).

3.4 Social Environment

Since 2001, South Atlantic Snapper Grouper Unlimited Permits and Snapper Grouper 225-pound Trip Limit Permits have shown a downward trend (**Figure 3.4.1**) as would be expected with a limited entry program in place since 1998 and a "2 for 1" requirement for new permits. That trend will likely continue as long as the criteria are a continued part of management for the snapper grouper commercial fishery. The decline in the number of permits has slowed in recent years but continues to trend lower with the number of unlimited permits in 2013 going from 593 to 565 in 2016 and limited permits dropping from 130 in 2013 to 116 in 2016.

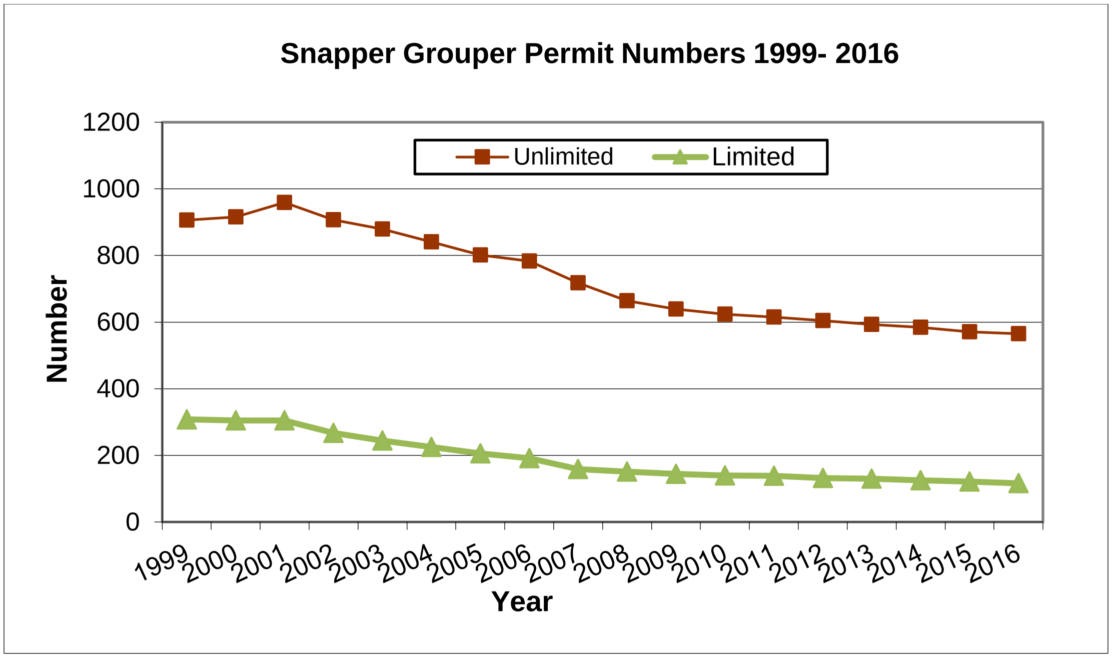

Figure 3.4.1. Snapper grouper Unlimited and 225-pound trip limit permits 1999-2016. Source: NMFS SERO Permits (2017).

The geographical distribution of South Atlantic Snapper Grouper Unlimited and Limited Permits appears in **Figure 3.4.2**. There are several concentrations of unlimited permits with the largest in the Florida Keys and a smaller concentration near Jacksonville, Florida. The northern South Carolina coast and southern North Carolina coast have the second largest concentration of unlimited permits with a smaller concentration in the Outer Banks and Wanchese in North Carolina. Although not concentrated in any particular zip code, Florida's southeastern coast does have a considerable number of permits spread throughout many different zip codes. Unlimited permits are concentrated in Southern Florida with the majority in the Florida Keys communities.

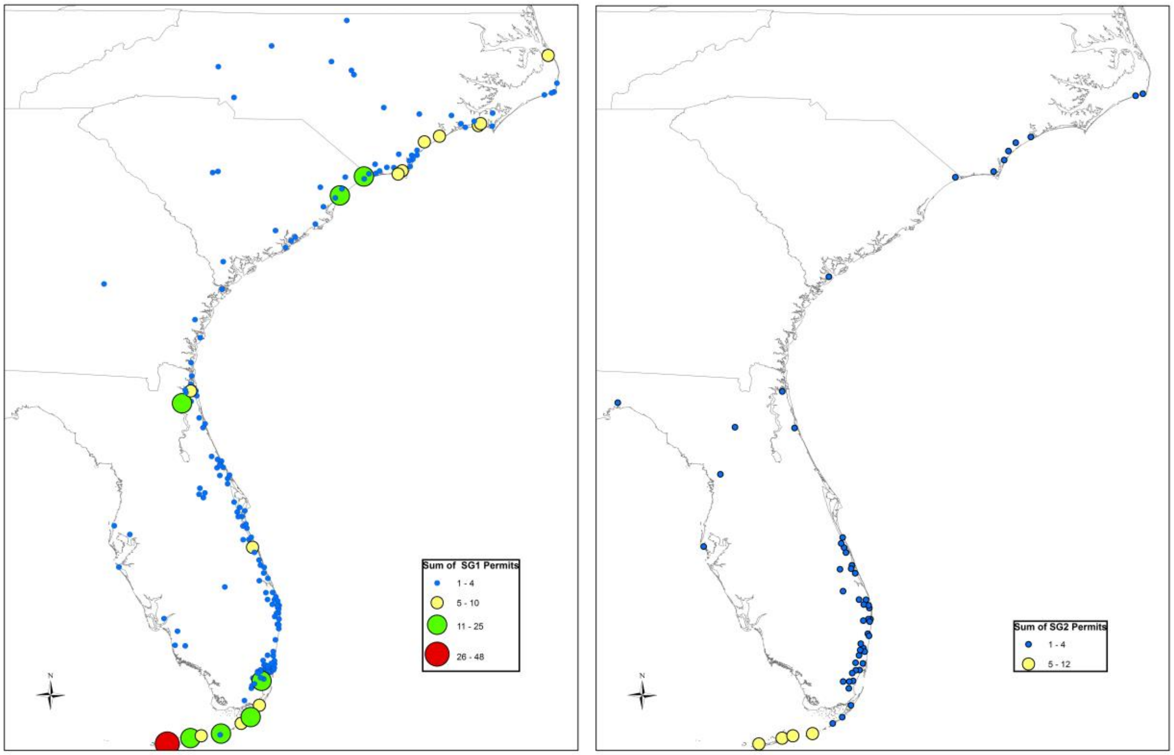

Figure 3.4.2. Snapper grouper unlimited and limited permits by owner's zip code.
Source: NMFS SERO Permits (2017).

A regional quotient (RQ) measure was used to identify commercial fishing involvement at the community level by species or species group. The RQ measures the relative importance of a given species or species group across all communities in the region and represents the proportional distribution of commercial landings. This proportional measure does not provide the actual number of pounds or the value of the catch; data that might be confidential at the community level. The RQ is calculated by dividing the total pounds (or value) of a species landed in a given community, by the total pounds (or value) for that species for all communities in the region. The measure is a way to quantify the importance of a particular species or species group to communities around the South Atlantic and suggest where impacts from management actions are more likely to be experienced. The time series for the describing the RQ was from 2005 to 2014. The data used for the RQ measure were assembled from the accumulated landings system (ALS), which includes commercial landings of all species from both state and federal waters and is based on dealers' reports. These data were converted to provide landings by (dealer's) address.

Blueline Tilefish

The communities that are most highly involved in the **blueline tilefish** fishery are listed in **Figure 3.4.3**. For most communities, involvement in the blueline tilefish fishery has remained fairly stable over time. Yet, some communities like Wanchese, North Carolina, have seen some rather significant swings in participation over time with a spike in landings in 2008 and 2009 and a steep decline since. Little River, South Carolina, was the top community in 2005 and saw a decline in landings in 2008 and 2009, but most recently has seen a rise in RQ and is second to Port Orange, Florida, which has seen a steady rise in its RQ since 2009.

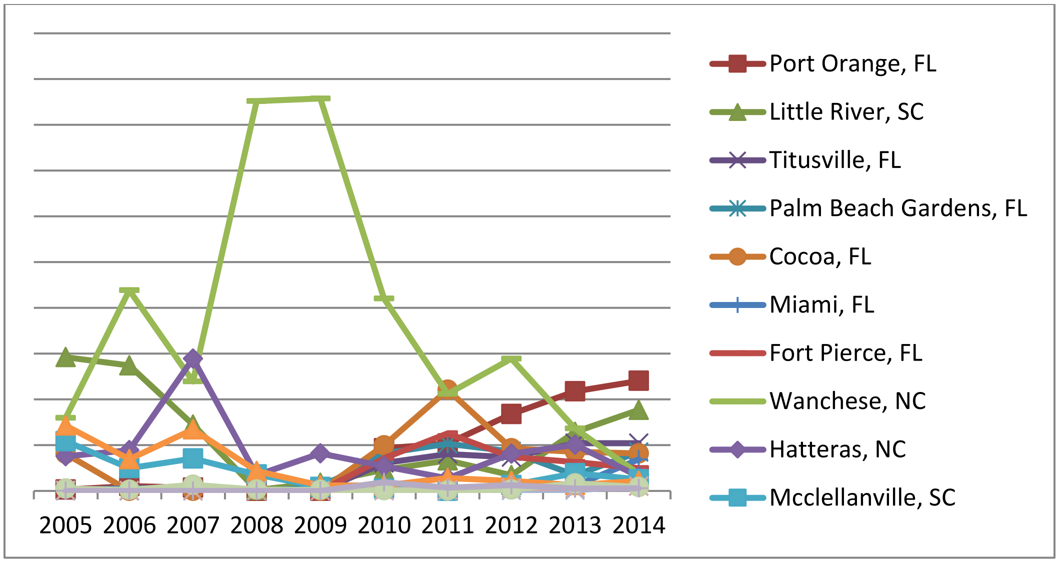

Figure 3.4.3. Blueline Tilefish community RQ for pounds from 2005 to 2014 ranked initially by 2014 top ten.
Source: NMFS SERO ALS Database (with dealer address) (2017).

Snowy Grouper

The communities involved in harvesting **snowy grouper** (**Figure 3.4.4**) demonstrate some large fluctuations in RQ similar to those seen in blueline tilefish. The community of Key West, Florida, has remained the top community, but has seen dramatic increases and declines in RQ over time. Little River, South Carolina has also seen substantial changes over time, but not of the same magnitude as Key West. Many communities have seen a recent increase in their landings since 2012.

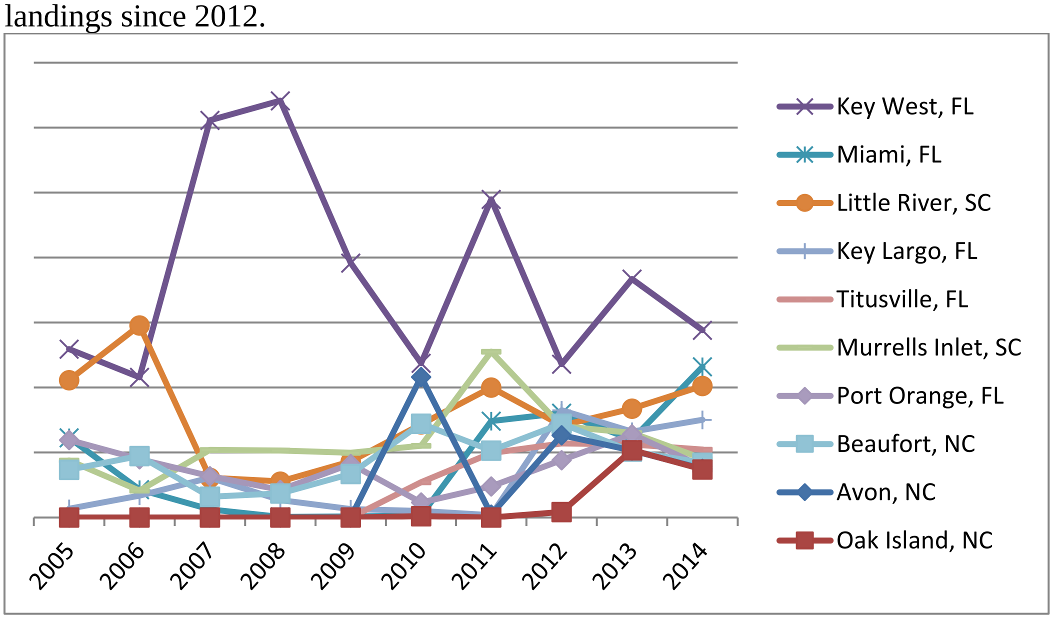

Figure 3.4.4. Snowy grouper community RQ for pounds from 2005 to 2014 ranked initially by 2014 top ten.
Source: NMFS SERO ALS Database

Greater Amberjack

Communities harvesting **greater amberjack** seem to also demonstrate large fluctuations over time in their harvesting of that species (**Figure 3.4.5**). The community of Key Largo, Florida, was the top community in 2014 and in 2005, was surpassed by Cocoa, Florida, in 2011, and has since seen a big increase in RQ. Cocoa, Florida, on the other hand, has seen a significant drop in its RQ since 2011 but still ranked third in RQ in 2014. Mayport, Florida, was once ranked fifth in terms of its RQ for greater amberjack and ranked second in 2014. The community of Islamorada, Florida, was third in 2005 and has since dropped to sixth in terms of its RQ for greater amberjack.

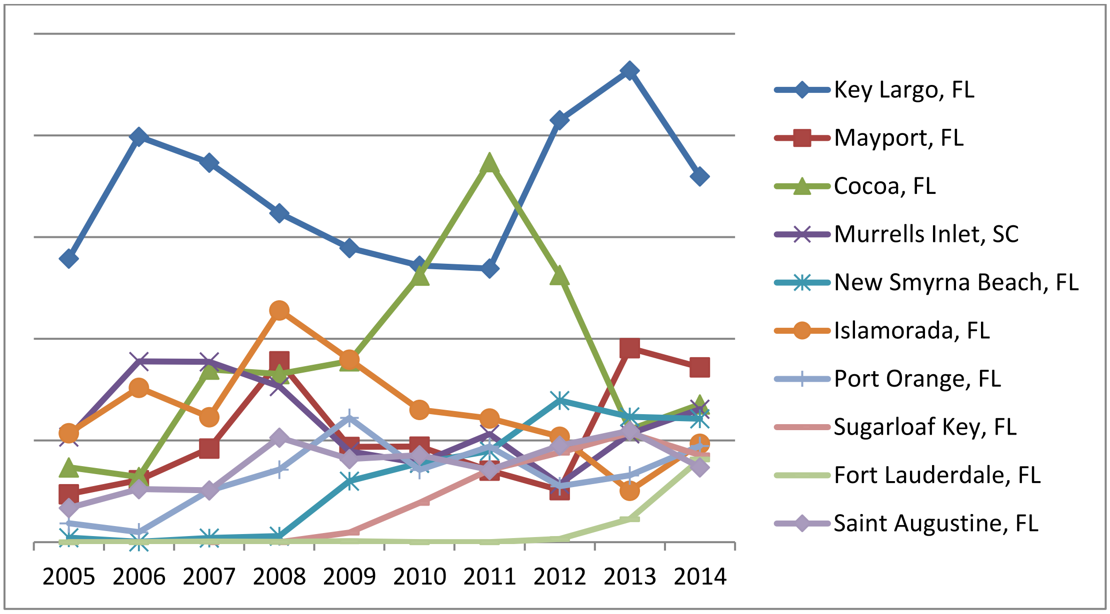

Figure 3.4.5. Greater amberjack community RQ for pounds from 2005 to 2014 ranked initially by 2014 top ten.
Source: NMFS SERO ALS Database (with dealer address) (2017).

Red Porgy

The top communities currently involved in the harvest of **red porgy** are depicted in **Figure 3.4.6**. The red porgy fishery does not exhibit swings in RQ as great as those in blueline tilefish, but there are some communities with substantial increases and decreases over time. The community of Mayport, Florida, has seen a rather steady increase in its landings of red porgy since 2005 and is now ranked ahead of Murrell's Inlet, South Carolina, which had held the top spot for most of the timeframe. The community of Southport, North Carolina, once was the top community in red porgy landings but has seen a steady decline and now ranks just below St. Augustine, Florida. Supply, North Carolina, saw a significant drop in 2009 from which it has only recently recovered and is now even with Beaufort, North Carolina, and Charleston, South Carolina.

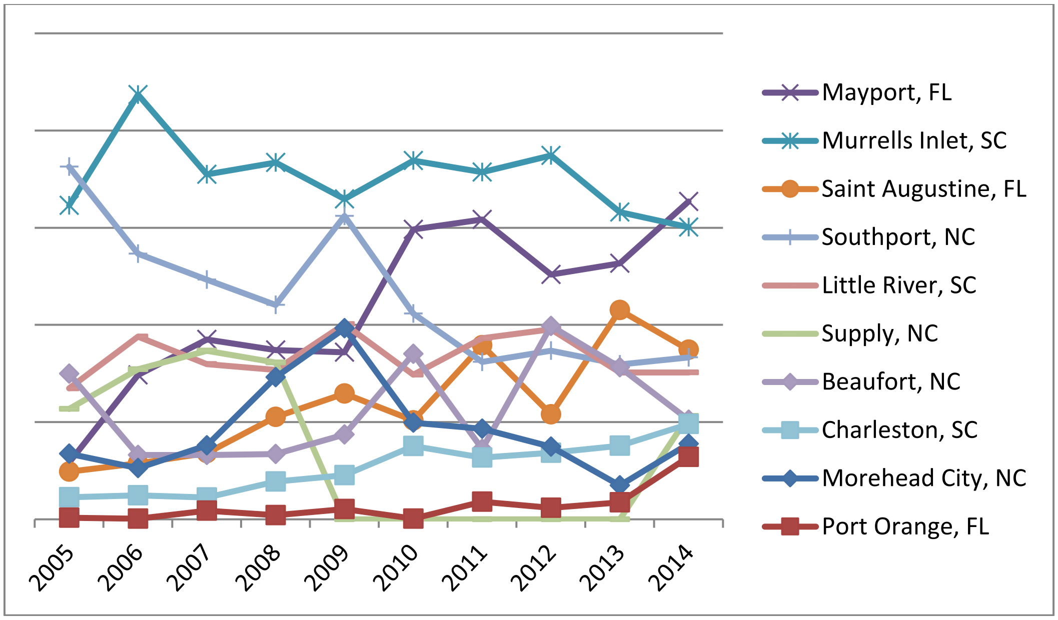

Figure 3.4.6. Red porgy community RQ for pounds from 2005 to 2014 ranked initially by 2014 top ten.
Source: NMFS SERO ALS Database (with dealer address) (2017).

Vermilion Snapper

In terms of vermilion snapper RQ there seems to be considerable fluctuations among the top ten communities (**Figure 3.4.7**). Mayport, Florida, ranked highest in 2014 but was well into the middle of the group in 2005. Other communities, like Murrells Inlet and Little River, South Carolina, seem to rank high in early years but drop down and then regain their rankings and drop again in the most recent years. Supply, North Carolina, ranked in the top 5 and then drops to zero with some landings appearing in 2014.

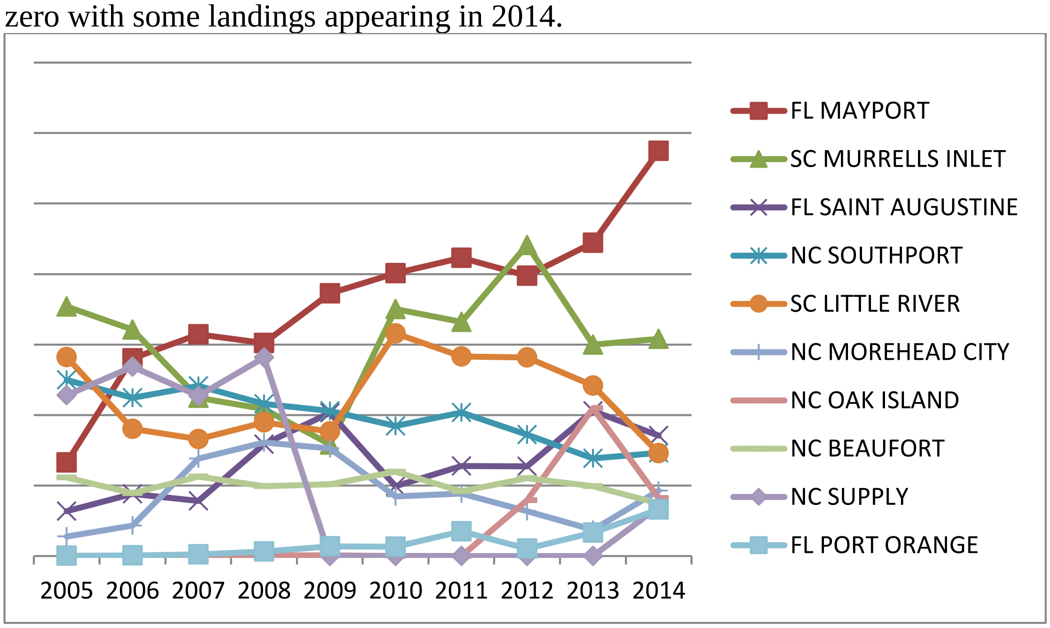

Figure 3.4.7. Vermilion snapper community RQ for pounds from 2005 to 2014 ranked initially by 2014 top ten.
Source: NMFS SERO ALS Database (with dealer address) (2017).

Other Jacks Complex

The harvest of Other Jack species (lesser amberjack, banded rudderfish, almaco jack) in **Figure 3.4.8** shows a rather stable trend for community RQ in the early years, but after 2009 there are large fluctuations for some communities. The community of Palm Beach, Florida, shows a significant increase in its RQ for Other Jacks in 2010 and just as significant decline afterward with a mild recovery to rank just below Islamorada, Florida, in 2014. Murrells Inlet, South Carolina, saw a sharp increase in 2012 but has since dropped well below the other communities.

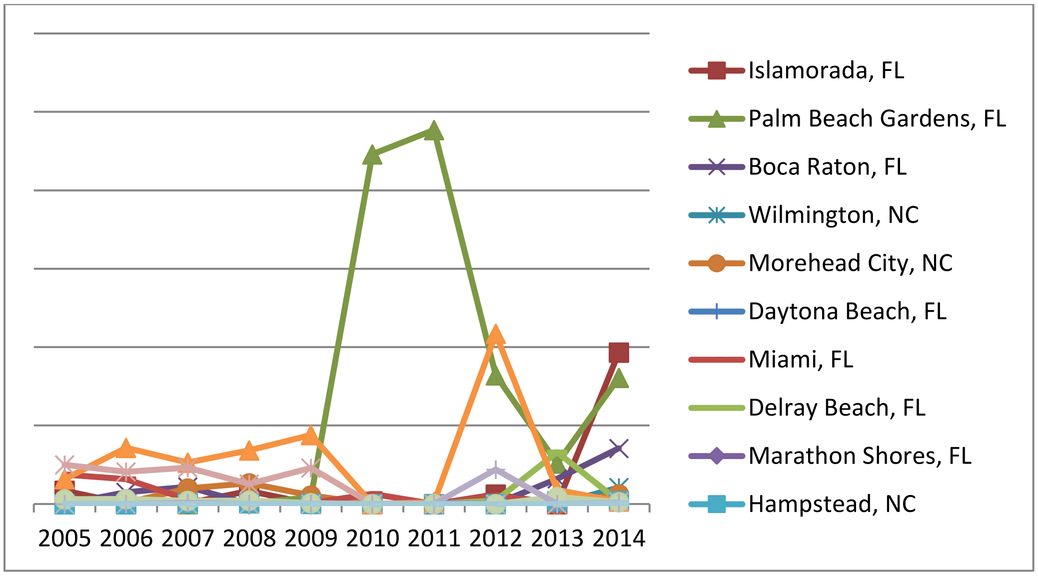

Figure 3.4.8. Other jack community RQ for pounds from 2005 to 2014 ranked initially by 2014 top ten. Source: NMFS SERO ALS Database (with dealer address) (2017).

Deep-water Snappers

The community of Key West, Florida, has remained the top community in terms of harvest for the selected **deep-water snapper** species (queen snapper, silk snapper, and blackfin snapper) in **Figure 3.4.9.** Over time, there have been rather steady declines and sharp increases, however. Miami, Florida, saw a spike in its RQ for the three deep-water snapper species in 2010, but has since dropped in its ranking, although still second, well below Key West. The other communities involved have rather stable involvement, but well below the top community of Key West.

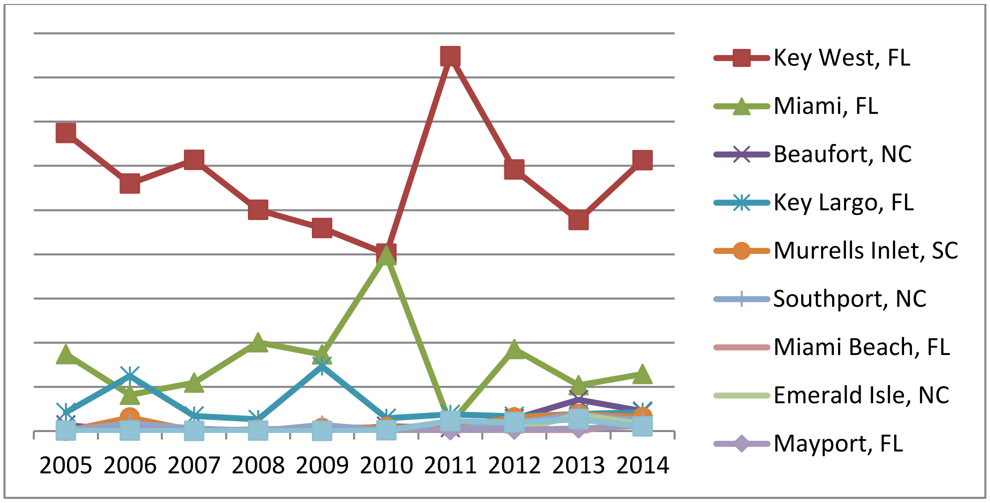

Figure 3.4.9. Selected deep-water species community RQ for pounds from 2005 to 2014 ranked initially by 2014 top ten.
Source: NMFS SERO ALS Database (with dealer address) (2017).

Gray triggerfish

In terms of **gray triggerfish** RQ there are considerable fluctuations among the top ten communities (**Figure 3.4.10**). Mayport, Florida, ranked highest in 2014 but was well into the middle of the group in 2005 for this species. Other communities, like Murrells Inlet and Little River, South Carolina, rank high in early years but drop down and then regain their rankings and drop again in the most recent years. Oak Island, North Carolina, has no landings in the early years, but ranks in the top 5 communities in 2014. Other communities have substantial fluctuations throughout the time period.

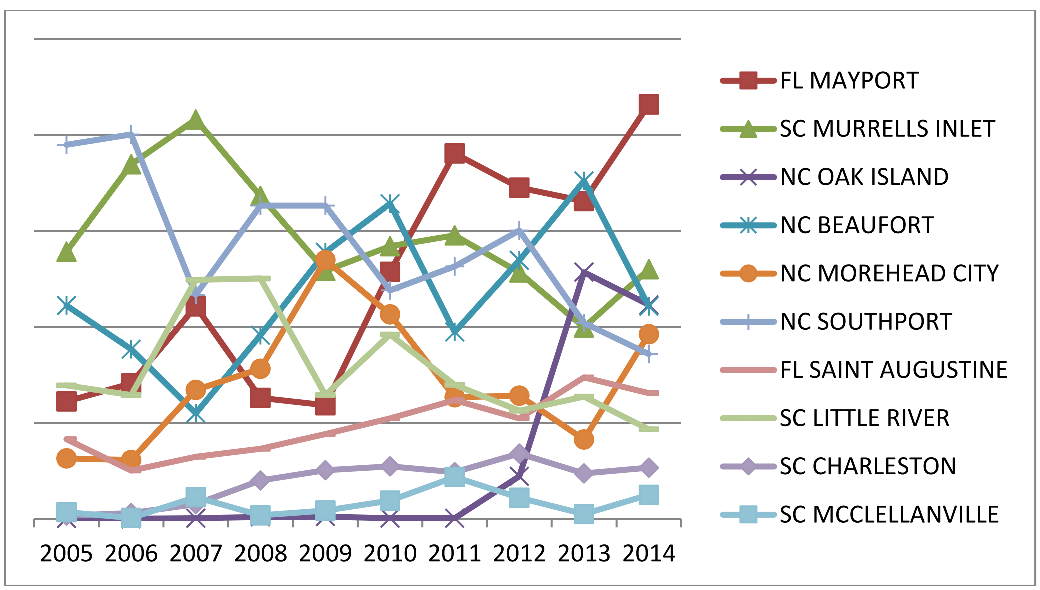

Figure 3.4.10. Gray triggerfish community RQ for pounds from 2005 to 2014 ranked initially by 2014 top ten.
Source: NMFS SERO ALS Database (with dealer address) (2017).

Commercial Fishing Engagement

While we can characterize those communities that have high regional quotients for landings and value, it is more difficult to characterize the fleet and its labor force regarding demographics and places of residence for captains and crew of vessels. There is little to no information on captains and crew, including demographic makeup of crew, so we are left with descriptions regarding the engagement and reliance of fishing communities and their social vulnerability. To further delineate which communities are more dependent upon fishing, a measure has been developed to gauge overall fishing engagement.

An index of existing permit and landings data was created to provide a more empirical measure of fishing dependence (Jacob et al. 2013; Colburn and Jepson 2013; Jepson and Colburn 2013). Fishing engagement uses the absolute numbers of permits, dealers, landings and value of landings to provide a more robust look at a community's dependence upon fishing.

Using a principal component and single solution factor analysis each community receives a factor score for each index to compare to other communities. Factor scores are represented by colored bars and are standardized, therefore the mean is zero. Two thresholds of one and half a standard deviation above the mean are plotted onto the graphs to help determine thresholds for significance. Because the factor scores are standardized, a score above one is also above one standard deviation. The top 20 communities in **Figure 3.4.11** are all above the threshold of one standard deviation and therefore commercial fishing is likely to have a large impact on the local economy.

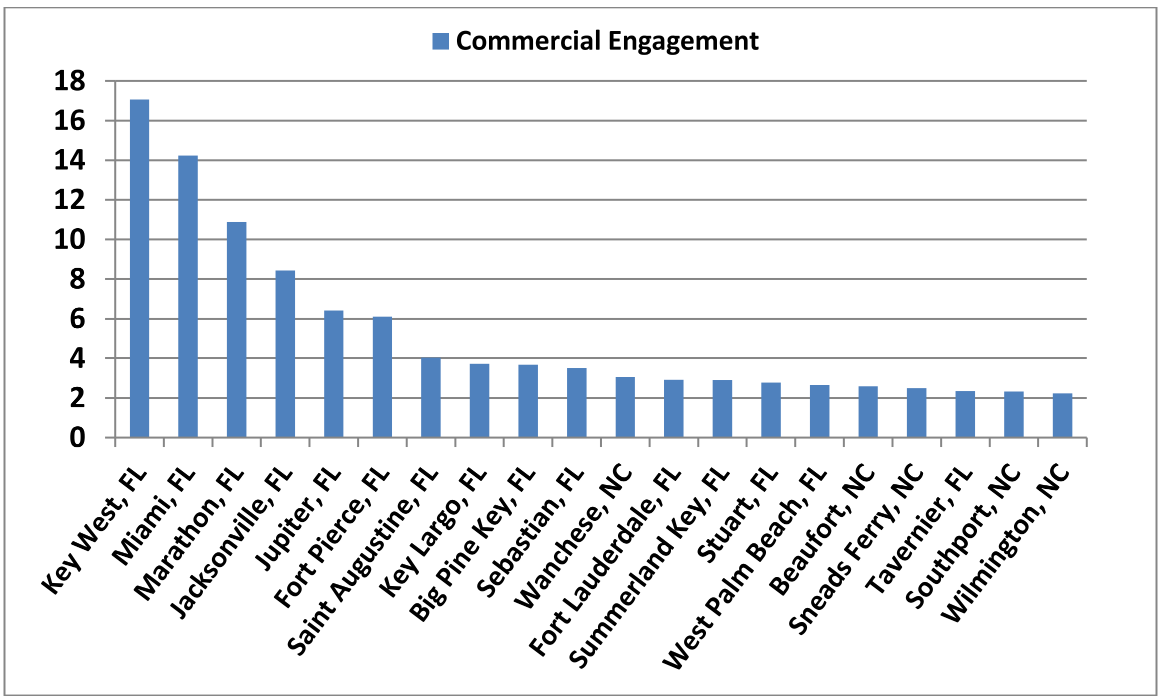

Figure 3.4.11. Top 20 commercial fishing communities as measured by overall commercial fishing engagement.
Source: NMFS SERO Community Social Vulnerability Indicators Database (2017).

Environmental Justice

Executive Order 12898 requires that 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. This executive order is generally referred to as environmental justice (EJ).

In order to assess whether a community may be experiencing EJ issues, a suite of indices created to examine the social vulnerability of coastal communities (Colburn and Jepson 2012; Jacob et al. 2013) is presented in **Figures 3.4.12 - 3.4.14** for those communities that appear in **Figures 3.4.3 - Figure 3.4.11**. The three indices are poverty, population composition, and personal disruptions. The variables included in each of these indices have been identified as important components that contribute to a community's vulnerability. Indicators such as increased poverty rates for different groups, more single female-headed households and children under the age of five, disruptions such as higher separation rates, higher crime rates, and unemployment all are signs of vulnerable populations. These indicators are closely aligned to previously used measures of EJ which used thresholds for the number of minorities and those in poverty. For those communities that exceed the threshold, it is expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

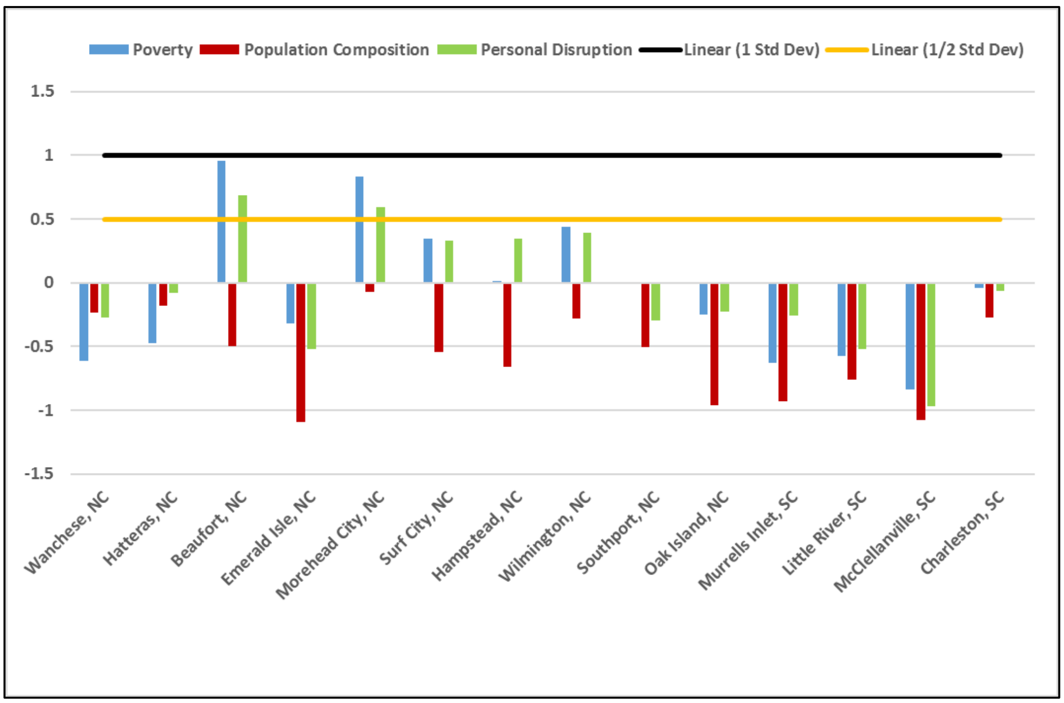

Figure 3.4.12. Social vulnerability indicators for selected NC/SC snapper grouper fishing communities. Source: NMFS SERO Community Social Vulnerability Indicators Database (2017).

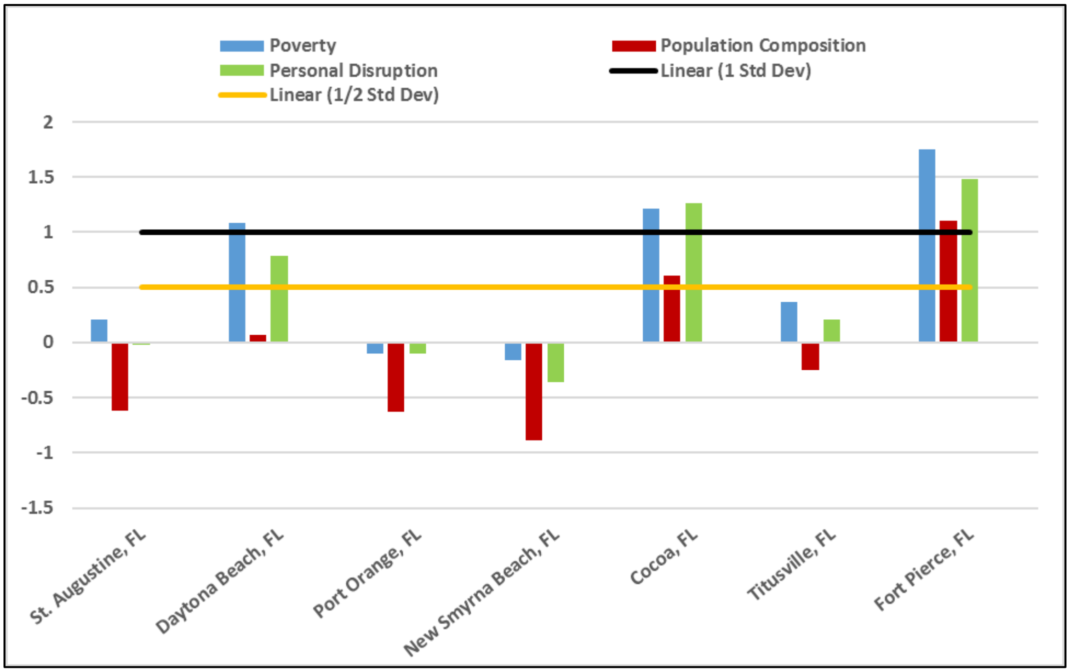

Figure 3.4.13. Social vulnerability indicators for selected Northern Florida snapper grouper fishing communities.
Source: NMFS SERO Community Social Vulnerability Indicators Database (2017).

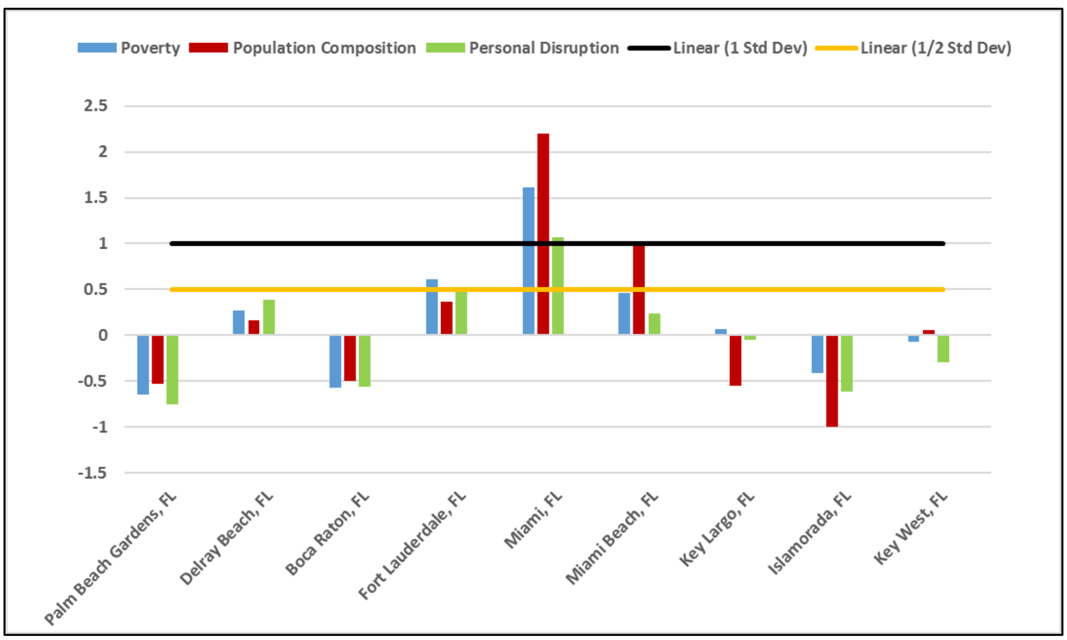

Figure 3.4.14. Social vulnerability indicators for selected Southern Florida snapper grouper fishing communities.
Source: NMFS SERO Community Social Vulnerability Indicators Database (2017).

3.5 Administrative Environment

3.5.1 The Fishery Management Process and Applicable Laws

3.5.1.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the Exclusive Economic Zone (EEZ), an area extending 200 nautical miles from the seaward boundary of each of the coastal states, and authority over U.S. anadromous species and continental shelf resources that occur beyond the 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 South Atlantic 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 South Atlantic 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 South Atlantic 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 South Atlantic Council has adopted procedures whereby the non-voting members serving on the South Atlantic Council Committees have full voting rights at the Committee level but not at the full South Atlantic Council level. The South Atlantic Council also established two voting seats for the Mid-Atlantic Council on the South Atlantic Mackerel Committee. South Atlantic 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 South Atlantic 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.

3.5.1.2 State Fishery Management

The state governments of North Carolina, South Carolina, Georgia, and Florida have the authority to manage fisheries that occur in waters extending three nautical miles from their respective shorelines. North Carolina's marine fisheries are managed by the Marine Fisheries Division of the North Carolina Department of Environmental Quality. The Marine Resources Division of the South Carolina Department of Natural Resources regulates South Carolina's marine fisheries. Georgia's marine fisheries are managed by the Coastal Resources Division of the Department of Natural Resources. The Marine Fisheries Division of the Florida Fish and Wildlife Conservation Commission is responsible for managing Florida's marine fisheries. Each state fishery management agency has a designated seat on the South Atlantic Council. The purpose of state representation at the South Atlantic 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 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 ASMFC is also represented at the South Atlantic Council level but does not have voting authority at the South Atlantic 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.

3.5.1.3 Enforcement

Both the NMFS Office for Law Enforcement (NOAA/OLE) and the United States Coast Guard (USCG) have the authority and the responsibility to enforce South Atlantic 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 at http://www.gc.noaa.gov/enforce-office3.html.

Chapter 4. Environmental Effects and Comparison of Alternatives

A Note on Analytical Methods

Two projection models were developed to predict the effects of proposed alternatives on future commercial landings: (1) based on the last three years of data (2014-2016; "Last 3"), and (2) a seasonal auto-regressive integrated moving average (SARIMA) model fit to landings data from 1997-2016. The Last 3 approach is a simple average and is highly sensitive to recent trends. The SARIMA model represents the best statistical fit to the time-series data, accounting for any seasonal and/or interannual trends. The SARIMA model approach is sensitive to recent trends, captures long-term trends, better expresses uncertainty, and has been shown to provide superior fits to catch trends as compared to recent years' data approaches (Farmer and Froeschke 2015).

When the Last 3 and SARIMA approaches provide very different mean estimates of catch rates and closure dates, this should be interpreted as an indication that historical data are not very informative of future trends. When different modeling approaches provide reasonably close estimates of catch rates and closure dates but confidence limits are wide, this should be interpreted as high variability within the historical data. Both modeling approaches were retained for projections in **Appendix J** to provide the South Atlantic Council information regarding the uncertainty in the projected closure dates. Most of the species under consideration are indirectly harvested during trips targeting other stocks; for this reason, uncertainty in the historical data is often high. Similarly, actions involving targeted species often require extrapolation of catch rates to periods that have been subject to recent closures or a complex management history, further contributing to uncertainty.

A more detailed explanation of these methods, caveats, assumptions, and results of projections can be found in **Appendix J**. Because both models were constructed with a terminal year of 2016, the recently available 2017 data are used, when possible, to inform decision-making with regards to the best predictive model using a retrospective comparison of model predictions to 2017 data.

4.1 Action 1. Establish a commercial split season and modify the commercial trip limit for blueline tilefish

4.1.1 Biological Effects

> ***Alternatives****
>
> 1. (No Action). The commercial fishing year for blueline tilefish is the calendar year. The trip limit is 300 pounds gutted weight (gw).
>
> 2. Specify two 6-month commercial fishing seasons: allocate 40% of the commercial ACL to the first season (Jan. – Jun.) and 60% to the second season (Jul. – Dec.). Allow quota roll-over from Season 1 to Season 2
>
> 2a. Season 1 trip limit = 100 pounds gw; Season 2 trip limit = 300 pounds gw.
> 2b. Season 1 trip limit = 150 pounds gw; Season 2 trip limit = 300 pounds gw.
>
> **3. Do not implement split seasons but modify the commercial trip limit:**
>
> **3a. 100 pounds gw from Jan. – Apr. and 300 pounds gw from May – Dec. .**
> 3b. 150 pounds gw from Jan. – Apr. and 300 pounds gw from May – Dec. .
> 3c. 100 pounds gw from Jan. – Jun. and 300 pounds gw from Jul. – Dec. .
>
> * Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

The South Atlantic Council's Scientific and Statistical Committee (SSC) recommended using predictions based on the "Last 3" model for blueline tilefish (see **Appendices I** and **J** for detailed methodology).

Expected Effects to the Blueline Tilefish Stock and Bycatch of Co-Occurring Species

Alternative 2 and its sub-alternatives and **Preferred Alternative 3** and its sub-alternatives would maintain commercial harvest of blueline tilefish at the annual catch limit (ACL); hence, biological effects of these alternatives would not differ from **Alternative 1 (No Action)** in terms of risk of overfishing. According to projected landings, the level of commercial harvest would be highest under **Sub-alternative 3b**, followed by **Sub-alternative 3c**, **Alternative 1 (No Action)**, **Sub-alternatives 2a** and **2b**, and lowest under **Preferred Sub-alternative 3a** (**Table 4.1.2.1**). In terms of landings seasonality, **Alternative 1 (No Action)** would result in highest landings of blueline tilefish in March, whereas, under **Alternative 2** and its sub-alternatives and **Preferred Alternative 3** and its sub-alternatives, landings are expected to be highest in July (**Table 4.1.2.1**). In the South Atlantic, blueline tilefish have a protracted spawning season, peaking from April through September (see **Section 3.2.1**); hence, **Alternative 2** and **Preferred Alternative 3**, and their respective sub-alternatives, would be expected to have greater negative biological effects than **Alternative 1 (No Action)**, since fishing mortality under the action alternatives would highest during peak spawning activity. All of the alternatives considered under this action, including **Alternative 1 (No Action)** would result in commercial harvest extending from January through July or August (**Table 4.1.1.1**). However, **Sub-alternative 2b** would result in commercial harvest pausing during the month of June, possibly imparting some biological benefit from a reduction in fishing mortality during a portion of the spawning season.

According to fishermen, blueline tilefish and snowy grouper are commonly caught together in some areas in the South Atlantic region. This is supported in trip co-occurrence analyses in **Appendix D** that show a high percentage of snowy grouper caught on trips where at least one pound of blueline tilefish was landed (**Table D-1**). Biological benefits may be realized if discards of snowy grouper diminish as a result of compatible blueline tilefish management. According to stakeholders in the northern portion of the South Atlantic Council's area of jurisdiction, because the commercial trip limit for blueline tilefish (300 pounds gutted weight [gw]) is higher than that for snowy grouper (200 lbs gw), fishermen tend to continue fishing for blueline tilefish after catching their limit of snowy grouper, thus resulting in discarding of snowy grouper. Due to the high release mortality associated with the capture depths of blueline tilefish and snowy grouper (95% and 100%, respectively), efforts should be made to align any seasonal or quota closures for commercial harvest of species that are often caught together to avoid regulatory discarding. Data obtained through the Commercial Discard Logbook, however, show low numbers of snowy grouper discards relative to snowy grouper landings (**Table D-2** in **Appendix D**). Available data on discards preclude any quantitative analyses of the effect of proposed alternatives under this action on the level of snowy grouper discards. It is expected that reduced trip limits for blueline tilefish in the earlier part of the year as proposed under **Alternatives 2** and **Preferred Alternative 3** (and their respective sub-alternatives) would help reduce snowy grouper discards, particularly in the northern range of the South Atlantic Council's area of jurisdiction, by allowing retention of blueline tilefish as incidental catch. As such, **Alternative 2** and **Preferred Alternative 3**, and their respective sub-alternatives, would impart biological benefits to the blueline tilefish stock relative to **Alternative 1 (No Action)**. However, as mentioned previously, **Sub-alternative 2b** would be beneficial over other sub-alternatives considered due to an expected reduction in fishing mortality during June, whereas, **Preferred Sub-alternative 3a** would result in the most conservative level of landings, thus also imparting biological benefits to the blueline tilefish stock.

Table 4.1.1.1. Projected mean and 95% lower and upper (L95, U95) confidence limits closure dates for blueline tilefish under different alternatives and sub-alternatives proposed for Action 1 using two analytical methodologies (refer to **Appendix J**). The recommended model is denoted by an asterisk (*). Preferred alternative indicated in bold.

		LAST 3*			SARIMA		
Alternative	**Season**	**L95**	**MEAN**	**U95**	**L95**	**MEAN**	**U95**
1: No Action	N/A	**No closure**	7-Jul	22-Apr	**No closure**	13-Jul	2-May
2a: 40% of ACL; 100 pounds	1		12-Jun	28-Mar		25-Jun	7-Apr
60% of ACL; 300 pounds	2		11-Aug	27-Jul		9-Aug	30-Jul
2b: 40% of ACL; 150 pounds	1		14-May	20-Mar		25-May	19-Mar
60% of ACL; 300 pounds	2		11-Aug	27-Jul		9-Aug	30-Jul
3a: 100 pounds Jan-Apr; 300 pounds May-Dec	N/A		**30-Jul**	16-Jun		**27-Jul**	14-Jun
3b: 150 pounds Jan-Apr; 300 pounds May-Dec	N/A		24-Jul	4-Jun		23-Jul	30-May
3c: 100 pounds Jan-Jun; 300 pounds July-Dec	N/A		8-Aug	6-Jul		8-Aug	8-Jul

Expected Effects to Protected Species

The alternatives under this action would not significantly modify the way in which the snapper grouper fishery is prosecuted in terms of gear types. Therefore, there are no additional impacts on Endangered Species Act (ESA)-listed species or designated critical habitats anticipated as a result of this action (see **Section 3.2.5** for a detailed description of ESA-listed species and critical habitat in the action area). Furthermore, no additional impacts on Essential

Fish Habitat (EFH) or EFH-Habitat Areas of Particular Concern (HAPC) are expected to result from any of the alternatives considered for this action (see **Section 3.1.3** and **Appendix H** for detailed descriptions of EFH in the South Atlantic region). This analysis is applicable to all actions in this amendment.

4.1.2 Economic Effects

The economic effects on individual harvesters from the alternatives under **Action 1** would depend on each vessel owner's profit maximization strategy, their dependence on blueline tilefish, their seasonal fishing behavior, and their ability to adapt to the changing regulations. Some vessel owners may benefit from a redistribution of blueline tilefish fishing days, while others may be hindered by a lower trip limit and less ACL being available during the first half of the year. Lower trip limits can reduce profits through a reduction in harvesting efficiency. Higher trip-level revenues later in the year as a result of a longer season could, however, offset the negative effects experienced earlier in the year. These types of individual vessel level effects cannot be determined with available models.

The expected direct economic effects of the alternatives for **Action 1** on commercial fishing vessels are provided in **Tables 4.1.2.1** and **4.1.2.2** and summarized in **Table 4.1.2.3**. Specifically, **Table 4.1.2.1** provides estimates of the projected monthly and annual landings of blueline tilefish by alternative (N. Farmer, pers. comm., 2/8/2018). **Table 4.1.2.2** provides estimates of the average monthly ex-vessel price of blueline tilefish from 2012 through 2016, which are then used in combination with the projected monthly and annual landings to estimate the expected monthly and average gross revenue for blueline tilefish by alternative and model. Although there are some differences in the projected annual landings across alternatives and models, the differences in expected annual gross revenue are primarily driven by differences in the projected monthly landings across alternatives and models in combination with differences in average ex-vessel prices across months. In general, alternatives that generate higher expected gross revenue are those that distribute relatively more landings to months with higher average ex-vessel prices. No changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected as a result of the alternatives considered under **Action 1**. Thus, the expected change in annual gross revenues approximates the change in net economic benefits for the alternatives under **Action 1**.

The summarized results in **Table 4.1.2.3** indicate that **Sub-alternative 2b** is expected to generate the greatest net economic benefits, while **Alternative 1 (No Action)** is expected to generate the least net economic benefits. However, net economic benefits expected from **Sub-alternative 2a** and **Preferred Sub-alternative 3c** are very similar to those for **Sub-alternative 2b**. Expected net economic benefits from **Sub-alternative 3b** and **Preferred Sub-alternative 3a** are less than **Sub-alternatives 2b**, **2a**, and **3c**, but greater than under **Alternative 1 (No Action)**. **Preferred Sub-alternative 3a** only ranks 5th of the six alternatives being considered.

Approximately 134 vessels harvested blueline tilefish on average each year from 2012 through 2016 (see **Section 3.3.1.2**). These vessels' average annual gross revenues were $82,411 per vessel during this time. According to Overstreet, Perruso, and Liese (pers. comm., 7/11/2018), annual net revenue from operations for vessels in the "deep-water fishery," which includes blueline tilefish, was approximately 4% of their average annual gross revenue from 2014 through 2016. Net revenue from operations is the best measure of economic profits available at this time. Thus, annual net revenue from operations (economic profit) for these blueline tilefish vessels is estimated to be about $3,300 per vessel. The alternatives considered are expected to result in a maximum increase in annual gross revenue per vessel of approximately $45. Thus, even under **Sub-alternative 2b**, the expected change in annual gross revenue per vessel would only be expected to increase the average vessel's economic profits by 1.4% per year. The expected increase would be less (0.7%) under **Preferred Sub-alternative 3a**.

With respect to indirect effects, **Table 4.1.2.4** provides the economic characteristics of snapper grouper dealers from 2012 through 2016. Based on this information, approximately 286 dealers purchase snapper grouper landings on average each year. Their average annual purchases of snapper grouper are about $61,000 per dealer while their average annual purchases of all seafood are almost $132,000 per dealer. Thus, snapper grouper purchases represent 46.2% of their total seafood purchases, with the remaining purchases coming from other South Atlantic species (6.3%) and Gulf of Mexico (Gulf) species (48.5%).

Table 4.1.2.1. Projected monthly and annual landings (pounds whole weight (lbs ww)) of blueline tilefish by alternative for **Action 1**.

Month	Alt 1 (No Action)	Sub-alt 2a	Sub-alt 2b	Pref. Sub-alt 3a	Sub-alt 3b	Sub-alt 3c
Jan	6,876	3,487	4,551	**3,487**	4,551	3,487
Feb	4,336	2,437	3,054	**2,437**	3,054	2,437
Mar	27,002	13,011	16,995	**13,011**	16,995	13,011
Apr	9,942	5,053	6,485	**5,053**	6,485	5,053
May	14,194	7,316	3,922	**14,194**	14,194	7,316
Jun	18,540	3,704	0	**18,540**	18,540	9,778
Jul	7,205	31,912	31,912	**30,882**	24,705	31,912
Aug	0	20,773	20,773	**0**	0	15,107
Sep	0	0	0	**0**	0	0
Oct	0	0	0	**0**	0	0
Nov	0	0	0	**0**	0	0
Dec	0	0	0	**0**	0	0
TOTAL	88,094	87,692	87,692	**87,603**	88,524	88,100

Source: N. Farmer, pers. comm., 2/8/2018.

Table 4.1.2.2. Average monthly ex-vessel price (2016$) projected monthly and annual gross revenue for blueline tilefish by alternative and model for **Action 1**.

Month	Price	Alt 1 (No Action)	Sub-alt 2a	Sub-alt 2b	Pref. Sub-alt 3a	Sub-alt 3b	Sub-alt 3c
Jan	$2.47	$16,974	$8,608	$11,235	**$8,608**	$11,235	$8,608
Feb	$2.14	$9,287	$5,219	$6,542	**$5,219**	$6,542	$5,219
Mar	$2.43	$65,485	$31,552	$41,216	**$31,552**	$41,216	$31,552
Apr	$2.34	$23,233	$11,809	$15,154	**$11,809**	$15,154	$11,809
May	$2.42	$34,356	$17,709	$9,494	**$34,356**	$34,356	$17,709
Jun	$2.36	$43,749	$8,741	$0	**$43,749**	$43,749	$23,073
Jul	$2.51	$18,108	$80,199	$80,199	**$77,611**	$62,089	$80,199
Aug	$2.57	$0	$53,413	$53,413	**$0**	$0	$38,845
Sep	$2.37	$0	$0	$0	**$0**	$0	$0
Oct	$2.46	$0	$0	$0	**$0**	$0	$0
Nov	$2.50	$0	$0	$0	**$0**	$0	$0
Dec	$2.25	$0	$0	$0	**$0**	$0	$0
TOTAL		$211,192	$217,251	$217,253	**$212,906**	$214,342	$217,016

Source: Price data are from https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/monthly-landings/index, accessed 7/5/2018.

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the indirect economic effect of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Thus, the ranking of net economic benefits to dealers would be the same as for commercial fishing vessels. More specifically, each dealer would be expected to see an increase in their purchases of blueline tilefish by about $24 per year at most under **Sub-alternative 2b** and only $6 under **Preferred Sub-alternative 3a**. Such changes would likely be imperceptible to most snapper grouper dealers.

Table 4.1.2.3. Expected Annual Gross Revenue for Blueline Tilefish, Expected Changes in Gross Revenue (Net Economic Benefits) and Economic Rank by Alternative for **Action 1**.

Alternative	Expected Annual Gross Revenue (2016$)	Expected Change in Annual Gross Revenue (2016$)	Expected Change in Gross Revenue per Vessel (2016$)	Economic Rank (Net Economic Benefit)
Alt. 1 (No Action)	$211,192	$0	$0	6
Sub-alt. 2a	$217,251	$6,059	$45	2
Sub-alt. 2b	$217,253	$6,061	$45	1
Pref. Sub-alt. 3a	**$212,906**	**$1,714**	**$13**	**5**
Sub-alt. 3b	$214,342	$3,150	$24	4
Sub-alt. 3c	$217,016	$5,824	$43	3

Table 4.1.2.4. Economic characteristics of snapper grouper dealers, 2012-2016. All monetary values are in 2016$.

Year	Number of Dealers	Average Annual Snapper-Grouper Purchases	Average Annual South Atlantic Purchases	Average Annual Gulf Purchases	Average Annual Seafood Purchases
2012	295	$56,798	$65,295	$67,083	$132,379
2013	317	$53,820	$60,777	$48,130	$108,907
2014	395	$46,000	$53,087	$47,730	$100,817
2015	209	$84,959	$94,885	$110,527	$205,412
2016	214	$81,601	$92,305	$57,926	$150,231
Average	286	$60,983	$69,288	$62,515	$131,803

Source: SEFSC Socioeconomic Panel (Version 7).

4.1.3 Social Effects

A description of the communities that would most likely be affected by changes in commercial management of blueline tilefish can be found in **Section 3.4**, and includes: Port Orange, Titusville, Palm Beach Gardens, Cocoa, Miami and Fort Pierce, Florida; Little River and McClellanville, South Carolina; and Wanchese and Hatteras, North Carolina (**Figure 3.4.2**). These communities would likely be affected by changes to the commercial split season and commercial trip limits for blueline tilefish.

Alternative 2 would establish a commercial split season for blueline tilefish and may help to extend commercial harvest longer than under **Alternative 1 (No Action)**. In general, a split season would be most beneficial for fishermen targeting other species in the beginning of the year, because it would ensure that a portion of the commercial ACL would be available later in the year. North Carolina has historically dominated blueline tilefish landings, but recently landings from Florida and South Carolina have been increasing early in the year (**Figure 3.2.2**). Split seasons under **Alternative 2** would improve access to the resource providing opportunity for fishermen in all states in the South Atlantic Council's jurisdiction to harvest blueline tilefish and experience associated positive social effects, which is particularly important for North Carolina where harvest has historically peaked in the fall.

The proposed split season under **Alternative 2** would better align harvest of blueline tilefish with harvest of snowy grouper (**Action 2**). Blueline tilefish and snowy grouper are commonly caught together in some portions of the South Atlantic Council's area of jurisdiction and establishing seasons and trip limits that would align harvest has the direct social benefit of aligning regulations with the way this portion of the snapper grouper fishery is conducted, improving stakeholder perceptions of management. Establishing a split season could result in fishermen shifting effort to or from a certain species (including targets on multi-species trips) based on economic, regulatory, biological, or environmental changes in the fishery resulting from changes in access to the blueline tilefish resource.

For changes in the trip limit under **Sub-alternatives 2a** and **2b**, the potential social effects would depend on how fishermen are affected by either higher trip limits and a shorter season, or lower trip limits and longer seasons. The higher trip limit in the first season under **Sub-alternative 2b**, when compared to **Sub-alternative 2a**, would be more likely to provide for the direct social benefit of increasing trip harvest, especially for businesses who target multiple species and do not need one species to be open year-round. Higher trip limits can also result in the ACL being reached faster, triggering an early closure of the first fishing season and causing negative social effects associated with decreased access to the resource. Alternatively, businesses focusing primarily on blueline tilefish would benefit from consistent access provided by a longer fishing season under **Sub-alternative 2a**. However, trip limits that are low, such as the Season 1 trip limits proposed in **Sub-alternative 2a** and **2b**, can decrease trip efficiency, particularly for fishermen that require longer travel time to fishing grounds.

Because the ACL for blueline tilefish is already relatively low compared to historical landings (**Table 3.2.2**), split seasons under **Alternative 2** could generate (or perpetuate) derby conditions. In addition to concerns about safety at sea that arise from the race to fish, a derby could result in a large amount of blueline tilefish on the market in a very short period. The bust-and-boom nature of the commercial blueline tilefish sector may cause negative indirect social effects by hindering business stability and steady job opportunities for captain and crew.

Preferred Alternative 3 would modify the commercial trip limit for blueline tilefish and is projected to help to extend commercial harvest longer than under **Alternative 1 (No Action)**. The potential social effects would depend on how fishermen are affected by either higher trip limits and a shorter season, or lower trip limits and longer seasons. **Preferred Sub-alternative 3a,** and **Sub-alternatives 3b** and **3c** would implement more restrictive trip limits early in the season. The majority of commercial harvest of blueline tilefish in Florida occurs at the beginning of the year (January – April), while harvest in North Carolina peaks in the fall months (July and August) (**Figure 3.2.2**). More restrictive trip limits early in the season would ensure that blueline tilefish is available later in the year when other grouper species are not available off the coast of North Carolina. **Sub-alternative 3c** would result in the longest season, while **Preferred Sub-alternative 3a** and **Sub-alternative 3b** result in shorter seasons (**Table 4.1.1.1**). In general, longer seasons provide consistent access to the resource and greater social benefits.

Overall, the positive and negative social effects on commercial fishermen of establishing a split season under **Alternative 2** or modifying commercial trip limits under **Preferred Alternative 3** would depend on the proportion of the ACL for each season and the length of each season under **Alternative 2**, and the likelihood of commercial harvest being open during times of the year when it is profitable to target blueline tilefish. Projected changes in gross revenue per vessel are expected to be minimal (<$100 per vessel) under all proposed alternatives (**Table 4.1.2.3**). **Alternative 1 (No Action)** would result in the shortest season with a projected closure date of July 7th. **Alternative 2** and its sub-alternatives would allow harvest to extend later into the year but would not substantially increase the number of months the commercial sector was open to harvest when compared to **Alternative 1 (No Action)**. Overall, **Sub-alternative 3c** would result in the longest season (number of months open), with a projected closure date of August 8th, followed by **Preferred Sub-alternative 3a**, and **Sub-alternative 3b** (**Table 4.1.1.1**). Generally, longer fishing seasons provide continued access for commercial fishermen, consistency for end users, and provide for long-term direct social benefits to commercial fishermen and indirect social benefits to communities such as consistent employment opportunities.

4.1.4 Administrative Effects

Alternative 1 (No Action) would not change the administrative environment from its current state. Currently, there is a commercial quota monitoring system in place for blueline tilefish that is utilized to monitor landings against the commercial ACL. Since 2012, with 2013 as an exception, commercial harvest has closed early due to landings reaching the ACL prior to the end of the fishing year. If total effort for blueline tilefish remains consistent, it is likely the ACL would be reached prior to the end of the fishing year. Therefore, fishery managers would have to continue to prepare and issue closure notices. Additionally, enforcement personnel would have to monitor the closures. With an in-season quota closure, there is potential that the landings would not reach 100% of the ACL. In that circumstance, guidance from the South Atlantic Council to National Marine Fisheries Service (NMFS) has recommended that harvest for a snapper grouper species should reopen if landings are less than 95% of the ACL, and the projected number of days to meet the ACL is two or more days. Therefore, NMFS would have to monitor the landings and prepare a reopening notice.

Since there is one fishing season for blueline tilefish under **Alternative 1 (No Action**) and **Preferred Alternative 3** (and its sub-alternatives), if the quota is projected to be met and harvest is closed, there is potential for a total of two in-season notices (i.e., closure notice and reopening notice if it is subsequently determined that a portion of the ACL was not harvested) that would need to be prepared by fishery managers. Since the yearly quota would be divided into two fishing seasons under **Alternative 2** (and its sub-alternatives), there is potential that fishery managers may have to prepare four in-season notices (i.e., closure notice and reopening notice for each of two seasons). Additionally, enforcement personnel would be burdened with an increase in potential harvest closures, which they would have to monitor. Outreach materials for each in-season action would take the form of fishery bulletins and updates to NMFS Southeast Regional Office’s web site.

4.2 Action 2. Establish a commercial split season for snowy grouper

4.2.1 Biological Effects

The "Last 3" model predictions were recommended by the SSC to inform management of snowy grouper (**Appendices I** and **J**). There is very little difference in predicted season length under **Alternative 1 (No Action)**, **Alternative 2**, and **Preferred Alternative 3** (**Table 4.2.1.1**).

Alternatives*

1 (No Action). The commercial fishing year for snowy grouper is from January 1 to December 31.

2. Specify two 6-month commercial fishing seasons: allocate 60% of the commercial ACL to the first season (Jan. – Jun.) and 40% to the second season (Jul. – Dec.). Allow quota roll-over from Season 1 to Season 2.

3. Specify two 6-month commercial fishing seasons: allocate 70% of the commercial ACL to the first season (Jan. – Jun.) and 30% to the second season (Jul. – Dec.). Allow quota roll-over from Season 1 to Season 2.

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

Expected Effects to the Snowy Grouper Stock and Bycatch of Co-Occurring Species

In terms of risk of overfishing, the effects of **Alternative 2** and **Preferred Alternative 3** would not differ relative to **Alternative 1 (No Action)** as commercial landings of snowy grouper would remain below the ACL and split-season quotas, and AMs would be triggered if the ACL or quotas were reached.

Peak spawning for snowy grouper is May through August (**Table 3.2.1**). In recent years, early closures of commercial harvest have reduced fishing pressure on snowy grouper during peak spawning months resulting in positive biological effects. However, if a split season were implemented as proposed under **Alternative 2** and **Preferred Alternative 3**, commercial harvest of snowy grouper might continue during peak spawning months resulting in negative biological effects relative to **Alternative 1 (No Action)**.

Since blueline tilefish and snowy grouper are commonly caught together in some areas of the South Atlantic Council's jurisdiction, biological benefits may be realized if discards of snowy grouper are reduced as a result of compatible management of blueline tilefish under **Action 1** of this amendment. Due to the high release mortality associated with the capture depths of blueline tilefish and snowy grouper (95% and 100%, respectively), efforts should be made to align any seasonal or quota closures for commercial harvest of species that are often caught together to avoid regulatory discarding.

Table 4.2.1.1. Projected mean and 95% lower and upper (L95, U95) confidence limits closure dates for snowy grouper under different alternatives and sub-alternatives proposed for Action 2 using two analytical methodologies (refer to **Appendix J**). The recommended model is denoted by an asterisk (*). Preferred alternative indicated in bold. Nc = no closure.

<table>
<tr><th></th><th></th><th colspan="3">LAST 3*</th><th colspan="3">SARIMA</th></tr>
<tr><th>Alternative</th><th>Season</th><th>L95</th><th>MEAN</th><th>U95</th><th>L95</th><th>MEAN</th><th>U95</th></tr>
<tr><td>1. (No Action)</td><td>N/A</td><td rowspan="5">No closure</td><td>21-Sep</td><td>1-Jul</td><td>7-Nov</td><td>19-Mar</td><td>14-Feb</td></tr>
<tr><td>2. 60% of ACL</td><td>1</td><td>21-Jun</td><td>8-May</td><td>Nc</td><td>18-Feb</td><td>27-Jan</td></tr>
<tr><td>40% of ACL</td><td>2</td><td>26-Sep</td><td>26-Sep</td><td>7-Nov</td><td>28-Jul</td><td>15-Jul</td></tr>
<tr><td>3. 70% of ACL</td><td>1</td><td>Nc</td><td>21-May</td><td>Nc</td><td>25-Feb</td><td>31-Jan</td></tr>
<tr><td>30% of ACL</td><td>2</td><td>21-Sep</td><td>14-Sep</td><td>7-Nov</td><td>21-Jul</td><td>11-Jul</td></tr>
</table>

Commercial discards of snowy grouper in 2014 through 2016 were low relative to landings and compared to other species in the snapper grouper complex (see **Table D-2** in **Appendix D**). As discussed in **Section 4.1.1**, fishermen have expressed concern over the amount of discards of snowy grouper in areas where blueline tilefish are targeted commercially and the two species co-occur. However, available data on discards preclude any quantitative analyses of the effect of proposed alternatives under this action on the level of snowy grouper discards.

4.2.2 Economic Effects

The economic effects on individual vessel owners from **Alternative 2** and **Preferred Alternative 3** would depend on each owner's profit maximization strategy, their dependence on snowy grouper, their seasonal fishing behavior, and their ability to adapt to the changing regulations. Some vessel owners may benefit from a temporal redistribution of snowy grouper landings, while others may not. These types of individual vessel level effects cannot be determined with available models.

The expected direct economic effects of the alternatives for **Action 2** on commercial fishing vessels are provided in **Table 4.2.2.1** and summarized in **Table 4.2.2.2**. Specifically, **Table 4.2.2.1** provides estimates of the projected monthly and annual landings of snowy grouper by alternative under the "Last 3" model (N. Farmer, pers. comm., 7/6/2018) and the average monthly ex-vessel price of snowy grouper from 2012 through 2016. These estimates are then used to estimate the expected monthly and average gross revenue for snowy grouper by alternative. The projected monthly and annual landings of snowy grouper are equivalent under **Alternative 1 (No Action)** and **Preferred Alternative 3**. Although there are differences in the projected annual landings between **Alternative 1 (No Action)** and **Preferred Alternative 3** compared to **Alternative 2**, the differences in expected annual gross revenue are primarily driven by differences in the projected monthly landings across alternatives in combination with differences in average ex-vessel prices across months. In general, alternatives that generate higher expected gross revenue are those that distribute relatively more landings to months with higher average ex-vessel prices.[10] In this specific case, the primary effect of **Alternative 2** is to

[10] No statistically significant relationship was found between average monthly landings and ex-vessel prices for blueline tilefish or other species considered in this Amendment. In fact, ex-vessel prices are sometimes higher in

redistribute landings from June to September compared to **Alternative 1 (No Action)** and **Preferred Alternative 3**. No changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected under **Alternative 2**. Rather, as with landings, effort and therefore harvesting costs are simply being shifted from June to September.[11] Thus, the expected change in annual gross revenue approximates the change in net economic benefits for the alternatives under **Action 2**. The summarized results in **Table 4.2.2.2** indicate that **Alternative 2** is expected to generate net economic benefits of about $1,038 relative to **Alternative 1 (No Action)** and **Preferred Alternative 3**. Because projected monthly and annual landings are the same under **Alternative 1 (No Action)** and **Preferred Alternative 3**, **Preferred Alternative 3** is not expected to generate additional gross revenue and thus net economic benefits relative to **Alternative 1 (No Action)**.

Approximately 149 vessels harvested snowy grouper on average each year from 2012 through 2016 (see **Section 3.3.1.2**). These vessels' average annual gross revenues were $85,475 per vessel during this time. According to Overstreet, Perruso, and Liese (pers. comm., 7/11/2018), annual net revenue from operations for vessels in the "deep-water fishery," which includes snowy grouper, was approximately 4% of their average annual gross revenue from 2014 through 2016. Net revenue from operations is the best measure of economic profits available at this time. Thus, annual net revenue from operations (economic profit) for these snowy grouper vessels, is estimated to be about $3,400 per vessel. **Alternative 2** is expected to result in an increase in annual gross revenue per vessel of approximately $7. Thus, under Alternative **2**, the expected change in annual gross revenue per vessel would only be expected to increase the average vessel's economic profits by 0.2% per year. As suggested above, **Preferred Alternative 3** is not expected to increase average annual gross revenue or economic profits per vessel.

With respect to indirect effects, **Table 4.1.2.4** provides the economic characteristics of snapper grouper dealers from 2012 through 2016. Based on this information, approximately 286 dealers purchase snapper grouper landings on average each year. Their average annual purchases of snapper grouper are about $61,000 per dealer while their average annual purchases of all seafood are almost $132,000 per dealer. Thus, snapper grouper purchases represent 46.2% of their total seafood purchases, with the remaining purchases coming from other South Atlantic species (6.3%) and Gulf species (48.5%).

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the effect of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial

months when South Atlantic landings are highest. This result is expected as South Atlantic production of snapper grouper only represents about 7% of the annual U.S. supply of snappers and groupers, while imports and production from the Gulf of Mexico represent 74% and 19%, respectively. Changes in seasonal demand due to holidays and tourist seasons also appear to play a role in price fluctuations. Thus, ex-vessel prices are determined by other sources than South Atlantic landings. In turn, ex-vessel prices are not expected to change as a result of relatively minor changes in the monthly distributions of South Atlantic snapper or grouper landings.

[11] This assumes cost per unit of effort does not differ between June and September. There is no available information suggesting that cost per unit of effort differs between these months.

fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Thus, the ranking of net economic benefits to dealers would be the same as for commercial fishing vessels. More specifically, each dealer would be expected to see an increase in their purchases of snowy grouper by about $4 per year under **Alternative 2** relative to **Alternative 1 (No Action)**. Such a change would likely be imperceptible to most snapper grouper dealers. **Preferred Alternative 3** is not expected to increase purchases of snapper grouper by snapper grouper dealers.

Table 4.2.2.1. Projected monthly and annual landings (lbs ww), monthly ex-vessel price, and expected gross revenue of Snowy Grouper by Alternative for **Action 2**.

Month	Alt 1 (No Action) Landings	Alt 2 Landings	Pref. Alt 3 Landings	Price	Alt 1 Gross Revenue	Alt 2 Gross Revenue	Pref. Alt 3 Gross Revenue
Jan	15,722	15,722	**15,722**	$4.27	$67,198	$67,198	**$67,198**
Feb	15,055	15,055	**15,055**	$4.32	$64,978	$64,978	**$64,978**
Mar	23,016	23,016	**23,016**	$4.41	$101,516	$101,516	**$101,516**
Apr	19,866	19,866	**19,866**	$4.35	$86,381	$86,381	**$86,381**
May	28,601	28,601	**28,601**	$4.16	$119,118	$119,118	**$119,118**
Jun	26,477	18,535	**26,477**	$4.06	$107,376	$75,165	**$107,376**
Jul	22,998	22,998	**22,998**	$3.90	$89,659	$89,659	**$89,659**
Aug	16,773	16,773	**16,773**	$3.94	$66,076	$66,076	**$66,076**
Sep	33,769	41,809	**33,769**	$4.14	$139,648	$172,897	**$139,648**
Oct	0	0	**0**	$3.68	$0	$0	**$0**
Nov	0	0	**0**	$4.14	$0	$0	**$0**
Dec	0	0	**0**	$3.91	$0	$0	**$0**
TOTAL	202,277	202,374	**202,277**		$841,950	$842,988	**$841,950**

Source: Landings estimates are from N. Farmer, pers. comm., 7/6/2018. Price data are from https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/monthly-landings/index, accessed 7/5/2018.

Table 4.2.2.2. Expected Annual Gross Revenue for Snowy Grouper, Expected Change in Gross Revenue (Net Economic Benefits), and Economic Rank by Alternative for **Action 2**.

Alternative	Expected Annual Gross Revenue (2016$)	Expected Change in Annual Gross Revenue (2016$)	Expected Change in Gross Revenue per Vessel (2016$)	Economic Rank
Alt 1 (No Action)	$841,950	0	0	2T
Alt 2	$842,988	$1,038	$7	1
Pref. Alt 3	**$841,950**	**0**	**0**	**2T**

4.2.3 Social Effects

A description of the communities that would most likely be affected by changes in commercial management of snowy grouper can be found in **Section 3.4**. and includes: Key West, Miami, Key Largo, Titusville, and Port Orange, Florida; Little River and Murrells Inlet, South Carolina; and Beaufort, Avon, and Oak Island, North Carolina. These communities would likely be affected by a commercial split season for snowy grouper.

A split season under **Alternative 2** and **Preferred Alternative 3** would ensure commercial harvest of snowy grouper can occur later in the year than under **Alternative 1 (No Action)**. In general, a split season would be most beneficial for fishermen targeting other species in the beginning of the year, because it would ensure that a portion of the commercial ACL would be available later in the year. Access to snowy grouper later in the year is especially important for communities in Florida which see higher landings of snowy grouper in the fall (**Figure 3.2.4**). Creating a split season under **Alternative 2** and **Preferred Alternative 3** would better align harvest of snowy grouper with harvest of blueline tilefish. Blueline tilefish and snowy grouper are commonly caught together in some portions of the South Atlantic Council's jurisdiction and compatible management would reduce discards of snowy grouper and have the direct social benefit of aligning regulations with the way this portion of the snapper grouper fishery is conducted, improving both management performance and stakeholder perceptions. Establishing a split season under **Alternative 2** and **Preferred Alternative 3** could result in fishermen shifting effort to or from a certain species (including targets on multi-species trips) because of economic, regulatory, biological, or environmental differences resulting from changes in access to snowy grouper.

Overall, the positive and negative social effects on commercial fishermen of establishing a split season under **Alternative 2** and **Preferred Alternative 3** would depend on the proportion of the ACL for each season, the length of each season, and the likelihood of commercial harvest being open during times of the year when it is profitable to target snowy grouper. **Alternative 2** is projected to result in an increase in the average annual gross revenue per vessels profits by less than 1% per year; this increase stems from projected landings extending into September when prices for snowy grouper, in the second half of the year, have historically been highest (**Table 4.2.2.1**). **Alternative 1 (No Action)** and **Preferred Alternative 3** are not anticipated to affect economic annual gross revenue for vessels when compared to **Alternative 1 (No Action)** (**Table 4.2.2.2**).

Under **Alternative 1 (No Action), Alternative 2,** and **Preferred Alternative 3**, the ACL is projected to be reached by mid-September. Under the split season proposed in **Alternative 2**, there would be a closure during the first season by the end of June (**Table 4.2.1.1)**. **Alternative 2**, which proposes allocating 40% of the ACL to the second season, would result in positive direct and indirect social effects for fishermen operating in Florida where snowy grouper is harvested throughout the fall. Under the split season proposed in **Preferred Alternative 3**, there would be no closure in Season 1 (January through June) and Season 2 would close on the same date as under **Alternative 1 (No Action)** (**Table 4.2.1.1)**. **Alternative 2** allocates 60% of the ACL to the first season, resulting in a shift in landings from June to September, which would be more beneficial, when compared to **Alternative 1 (No Action)** and **Preferred Alternative 3**, for fishermen operating in Florida where snowy grouper is harvested throughout the fall **(Figure 3.2.4** and **Table 4.2.2.1**).

4.2.4 Administrative Effects

Alternative 1 (No Action) would not change the administrative environment from its current condition. Currently, there is a commercial quota monitoring system in place for snowy grouper that is utilized to monitor landings against the commercial ACL. Since 2012, commercial harvest has closed early due to landings reaching the ACL prior to the end of the fishing year. If total effort for snowy grouper remains consistent, it is likely the ACL would be reached prior to the end of the fishing year. Therefore, NMFS would have to continue to prepare and issue closure notices. Additionally, enforcement personnel would have to continue to monitor the closures. With an in-season quota closure, there is potential for landings not to reach 100% of the ACL. In that circumstance, guidance from the South Atlantic Council to NMFS has recommended that harvest for snapper grouper species should reopen if landings are less than 95% of the ACL, and the projected number of days to meet the ACL is two or more days. Therefore, the fishery managers would have to monitor the landings and prepare a reopening notice.

Of the three alternatives considered for management of snowy grouper, **Alternative 2** and **Preferred Alternative 3** would impose the most direct administrative burden. Since there is one fishing season for snowy grouper under **Alternative 1 (No Action)**, if the quota is projected to be met and harvest is closed, there is potential for a total of two in-season notices (i.e., closure notice and reopening notice if it is subsequently determined that a portion of the ACL was not harvested) that would need to be prepared by fishery managers. Since the yearly quota would be divided into two fishing seasons under **Alternative 2** and **Preferred Alternative 3,** if the quota for each season is close to being met or exceeded, there is potential that fishery managers may have to prepare four in-season notices (i.e., closure notice and reopening notice for each of two seasons). Additionally, enforcement personnel would be burdened with an increase in potential harvest closures, which they would have to monitor. Outreach materials for each in-season action would take the form of fishery bulletins and updates to NMFS Southeast Regional Office's web site.

4.3 Action 3. Establish a commercial split season and modify the commercial trip limit for greater amberjack

4.3.1 Biological Effects

"Last 3" model predictions are recommended to guide decision-making on this action (refer to **Appendices I** and **J**). There is no difference in predicted closure dates for Seasons 1 and 2 between **Alternative 2** (and its sub-alternatives) and **Preferred Alternative 3** (and its sub-alternatives). **Alternative 4** would result in the longest period of harvest among all the alternatives considered, including **Alternative 1 (No Action)** (**Tables 4.3.1.1** and **4.3.1.2**). The greater amberjack trip limit may currently be harvested and possessed in either lbs ww or gw. The conversion factor between the two measurements is 1.04. Hence, the discrepancy in specifying the proposed trip limit in whole weight is statistically insignificant and does not change the outcome of analyses presented in this amendment.

Expected Effects to the Greater Amberjack Stock and Bycatch of Co-Occurring Species

The biological effects of **Alternative 2**, **Preferred Alternative 3**, and **Alternative 4**, and their respective sub-alternatives, would not differ from **Alternative 1 (No Action)** in terms of risk of overfishing as overall harvest would be limited to the ACL or split-season quotas, and AMs would be triggered if the ACL or quotas were reached. Under all alternatives considered,

Alternatives*

1 (No Action). The commercial fishing year is from March 1 to the end of February. Restriction on commercial sale and purchase applies during April each year. The commercial trip limit = 1,200 pounds.

2. Specify two 6-month commercial fishing seasons. Allocate 50% of the commercial ACL to the first season (Mar. – Aug.) and 50% to the second season (Sept. – Feb.). Allow quota roll-over from Season 1 to Season 2. Maintain commercial sale and purchase prohibition during April.
- 2a. Season 1 trip limit = 1,200 pounds ww; Season 2 trip limit = 1,000 pounds ww.
- 2b. Season 1 trip limit = 1,000 pounds ww; Season 2 trip limit = 800 pounds ww.
- 2c. Trip limit = 1,000 pounds ww in both seasons.
- 2d. Trip limit = 1,000 pounds ww in both seasons with reduction to 500 pounds ww in each season once 75% of the seasonal quota is met or projected to be met. A trip limit reduction would not occur in Season 2 unless 75% of the seasonal quota is met or is projected to be met by January 31.

3. Specify two 6-month commercial fishing seasons. Allocate 60% of the commercial ACL to the first season (Mar. – Aug.) and 40% to the second season (Sept. 1 – end of February). Allow quota roll-over from Season 1 to Season 2. Maintain commercial sale and purchase prohibition during April.
- **3a. Season 1 trip limit = 1,200 pounds ww; Season 2 trip limit = 1,000 pounds ww.**
- 3b. Season 1 trip limit = 1,000 pounds ww; Season 2 trip limit = 800 pounds ww.
- 3c. Trip limit equals 1,000 pounds ww in both seasons.

4. Retain the Mar. – Feb. fishing year. Maintain commercial sale and purchase prohibition during April and reduce the commercial trip limit to:
- 4a. 1,000 pounds ww.
- 4b. 800 pounds ww.

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

retention of the commercial sale and purchase prohibition during April each year would maintain protection during the peak spawning period (**Table 3.2.1**), thus, imparting biological benefit to the greater amberjack stock.

Commercial landings of greater amberjack are projected to be highest under **Alternative 1 (No Action)** and possibly exceed the current ACL of 769,388 lbs gw. The most conservative projected landings are under **Sub-alternative 2b** (**Table 4.3.2.1**). Therefore, biological benefits would be highest under **Sub-alternative 2b**, followed by **Sub-alternative 2c**, **Sub-alternative 2a**, **Sub-alternative 3b**, **Preferred Sub-alternative 3a**, **Sub-alternative 3c**, **Sub-alternative 4a**, **Sub-alternative 4b**, and **Alternative 1 (No Action)**.

Table 4.3.1.1. Projected mean and 95% lower and upper (L95, U95) confidence limits closure dates for greater amberjack for Alternative 1 (No Action) and Alternative 2 under Action 3 using two analytical methodologies (refer to **Appendix J**). The recommended model is denoted by an asterisk (*). Preferred alternative indicated in bold. Nc = no closure.

<table>
<tr><th></th><th></th><th colspan="3">Last 3*</th><th colspan="3">SARIMA</th></tr>
<tr><th>Alternative</th><th>Season</th><th>L95</th><th>MEAN</th><th>U95</th><th>L95</th><th>MEAN</th><th>U95</th></tr>
<tr><td>1: No Action</td><td>N/A</td><td>Nc</td><td>8-Nov</td><td>30-Sep</td><td></td><td>27-Jul</td><td>21-May</td></tr>
<tr><td colspan="8">Alt 2: Commercial ACL split 50% Season 1 and 50% Season 2</td></tr>
<tr><td>2a: 1,200 lbs</td><td>1</td><td>8-Jul</td><td>10-Jun</td><td>28-May</td><td rowspan="8">No closure</td><td>17-May</td><td>28-Mar</td></tr>
<tr><td>1,000 lbs</td><td>2</td><td>Nc</td><td>Nc</td><td>Nc</td><td>16-Dec</td><td>4-Oct</td></tr>
<tr><td>2b: 1,000 lbs</td><td>1</td><td>27-Jul</td><td>21-Jun</td><td>4-Jun</td><td>21-May</td><td>31-Mar</td></tr>
<tr><td>800 lbs</td><td>2</td><td>Nc</td><td>Nc</td><td>Nc</td><td>28-Dec</td><td>6-Oct</td></tr>
<tr><td>2c: 1,000 lbs</td><td>1</td><td>27-Jul</td><td>21-Jun</td><td>4-Jun</td><td>21-May</td><td>31-Mar</td></tr>
<tr><td>1,000 lbs</td><td>2</td><td>Nc</td><td>Nc</td><td>Nc</td><td>16-Dec</td><td>4-Oct</td></tr>
<tr><td>2d: 1,000 lbs to 500 lbs once 75% of quota met</td><td>1</td><td>10-Aug</td><td>5-Jul</td><td>16-Jun</td><td>27-May</td><td>3-May</td></tr>
<tr><td>1,000 lbs to 500 lbs unless 75% of quota met by 1/31</td><td>2</td><td>Nc</td><td>Nc</td><td>Nc</td><td>30-Dec</td><td>7-Oct</td></tr>
</table>

Table 4.3.1.2. Projected mean and 95% lower and upper (L95, U95) confidence limits closure dates for greater amberjack for **Preferred Alternative 3** and Alternative 4 under Action 3 using two analytical methodologies (refer to **Appendix J**). The recommended model is denoted by an asterisk (*). Nc = no closure. Preferred indicated in bold

		Last 3*			SARIMA		
Alternative	**Season**	**L95**	**MEAN**	**U95**	**L95**	**MEAN**	**U95**
Alt 3: Commercial ACL split 60% Season 1 and 40% Season 2							
3a: 1,200 lbs	**1**	**8-Jul**	**10-Jun**	**28-May**	No closure	17-May	28-Mar
1,000 lbs	**2**	**Nc**	**Nc**	**13-Jan**		22-Nov	27-Sep
3b: 1,000 lbs	1	27-Jul	21-Jun	4-Jun		21-May	31-Mar
800 lbs	2	Nc	Nc	Nc		16-Dec	3-Oct
3c: 1,000 lbs	1	27-Jul	21-Jun	4-Jun		21-May	31-Mar
1,000 lbs	2	Nc	Nc	12-Jan		21-Nov	27-Sep
Alt 4: No commercial split season							
4a: 1,000 lbs	N/A	Nc	26-Dec	14-Oct	Nc	12-Aug	26-May
4b: 800 lbs	N/A	Nc	27-Feb	5-Nov	Nc	2-Sep	1-Jun

Source: SERO

Commercial discards of greater amberjack from 2014 through 2016 were low relative to landings (**Appendix D**) and compared to discards of other snapper grouper species, indicating that fishers are likely able to selectively harvest greater amberjack.

4.3.2 Economic Effects

The economic effects of the proposed alternatives relative to **Alternative 1 (No Action)** and to each other would depend on aggregate annual harvest levels and seasonal shifts in landings. Splitting the fishing season may result in open fishing days later in the year that would not have been available under **Alternative 1 (No Action)**, but also potential closures earlier in the year (**Appendix J, Table 8**). In general, split seasons and lower trip limits may extend the fishing season and increase access later in the year. They may also reduce harvesting efficiency and negatively affect profits. The economic effects on individual vessel owners from **Alternative 2**, **Preferred Alternative 3**, **Alternative 4,** and the corresponding sub-alternatives would depend on each vessel owner's profit maximization strategy, their dependence on greater amberjack, their seasonal fishing behavior, and their ability to adapt to the changing regulations. These types of individual vessel level effects cannot be determined with available models.

The expected direct economic effects of the alternatives for **Action 3** on commercial fishing vessels are provided in **Tables 4.3.2.1** and **4.3.2.2** and summarized in **Table 4.3.2.3**. Specifically, **Table 4.3.2.1** provides estimates of the projected monthly and annual landings of greater amberjack by alternative under the "Last 3" model (N. Farmer, pers. comm., 2/8/2018). **Table 4.3.2.2** provides estimates of the average monthly ex-vessel price of greater amberjack from 2012 through 2016, which are then used in combination with the projected monthly and annual landings to estimate the expected monthly and average gross revenue for greater amberjack by alternative. There are relatively significant differences in the expected annual gross revenue across alternatives. Some of these differences are caused by differences in the projected monthly landings across alternatives in combination with differences in average ex-vessel prices across months. In general, alternatives that generate higher expected gross revenue are those that distribute relatively more landings to months with higher average ex-vessel prices. However, the differences in expected annual gross revenues are primarily driven by significant differences in the projected annual landings across alternatives. Projected annual landings are highest under **Alternative 1 (No Action)**, followed by **Sub-alternatives 4b, 4a, 3c,** and **Preferred Sub-alternative 3a**. Projected annual landings are significantly lower under **Sub-alternatives 3b**, **2a**, **2c**, and **2b**. More importantly, expected annual gross revenue is only expected to increase under **Sub-alternatives 4a** and **4b**, with **Sub-alternative 4a** generating the highest expected annual gross revenue. Expected annual gross revenue would be slightly less under **Preferred Sub-alternative 3a** and **Sub-alternative 3c** relative to **Alternative 1 (No Action)**. Expected annual gross revenue would be significantly less **Sub-alternatives 3b**, **2a**, **2d**, **Sub-alternative 2c**, and particularly **Sub-alternative 2b**.

Relative to **Alternative 1 (No Action)**, changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected under the other alternatives considered for **Action 3**. Models are not available to generate quantitative estimates of the expected change in costs, so these effects must be considered qualitatively.

In general, trip limits are expected to increase costs because commercial fishing vessels must take more trips to harvest and land the same amount of fish. The more restrictive the trip limit, the greater the expected increase in costs. Compared to **Alternative 1 (No Action)**, relatively small trip limit reductions are proposed under **Sub-alternatives 2a**, **Preferred 3a**, **4a**, **Sub-alternative 2c**, and **3c**. Larger trip limit reductions are proposed under **Sub-alternatives 2b**, **3b**, **4b**, and potentially **2d**. Further, changes in trip limits within a year and particularly within a season can introduce inefficiencies into the production process as commercial fishing vessels must adjust their operations in order to account for such changes. While these inefficiencies are likely not as great when the trip limit changes are known well in advance, they become particularly acute when the owners of commercial fishing vessels do not know if or when the trip limit change is going to occur, which is the case under **Sub-alternative 2d**. Because at least some owners of commercial fishing vessels would prefer to fish when the trip limit is higher, so-called "step downs" in the trip limit can result in mini-fishing derbies within a season. Splitting the commercial ACL between seasons would only partially mitigate this effect. Based on these considerations, relative to **Alternative 1 (No Action)**, **Sub-alternatives 2a** and **Preferred 3a** would be expected to generate the smallest increases in harvesting costs, followed by **Sub-alternative 4a**, **Sub-alternative 2c** and **Sub-alternative 3c**, **Sub-alternatives 3b** and **2b**, **Sub-alternative 4b**, with **Sub-alternative 2d** likely generating the greatest increase in harvesting costs. In addition, **Sub-alternative 2d** is expected to increase public costs (i.e., costs to the government and thus to the public/taxpayers) because of the costs associated with potentially implementing one and possibly two within-season trip limit reductions (e.g., staff time, cost of *Federal Register* Notices).

The summarized results in **Table 4.3.2.3** indicate that **Sub-alternative 4a** is expected to generate the greatest net economic benefits, followed by **Alternative 1 (No Action)**, **Sub-alternative 4b**, **Preferred Sub-alternative 3a**, **Sub-alternative 3c**, **Sub-alternative 2a**, **Sub-alternative 3b**, **Sub-alternative 2c**, **Sub-alternative 2d**, with **Sub-alternative 2b** expected to generate the least net economic benefits. Thus, **Preferred Sub-alternative 3a** ranks 4th of the 10 alternatives being considered.

Approximately 263 vessels harvested greater amberjack on average each year from 2012 to 2016 (see **Section 3.3.1.2**). These vessels' average annual gross revenues were $62,578 per vessel during this time. According to Overstreet, Perruso, and Liese (pers. comm., 7/11/2018), annual net revenue from operations for vessels in the "Jacks fishery," which includes greater amberjack, was approximately 4% of their average annual gross revenue from 2014 through 2016. Net revenue from operations is the best measure of economic profits available at this time. Thus, annual net revenue from operations (economic profit) for these greater amberjack vessels is estimated to be about $2,500 per vessel. **Sub-alternatives 4a** and **4b** are expected to result in the maximum increase in annual gross revenue per vessel, which would be approximately $37 and $12, respectively. Only under **Sub-alternatives 4a** and **4b** would net economic benefits be expected to potentially increase relative to **Alternative 1 (No Action)**, and that is somewhat unlikely under **Sub-alternative 4b** given the expected cost increases. Thus, even under **Sub-alternative 4a**, the expected change in annual gross revenue per vessel would only be expected to increase the average vessel's economic profits by 1.5% per year, and that would be prior to accounting for the expected cost increase. All other alternatives, including **Sub-alternative 2c**, would be expected to reduce net economic benefits to commercial fishing vessels.

With respect to indirect effects, **Table 4.1.2.4** provides the economic characteristics of snapper grouper dealers from 2012 through 2016. Based on this information, approximately 286 dealers purchase snapper grouper landings on average each year. Their average annual purchases of snapper grouper are about $61,000 per dealer while their average annual purchases of all seafood are almost $132,000 per dealer. Thus, snapper grouper purchases represent 46.2% of their total seafood purchases, with the remaining purchases coming from other South Atlantic species (6.3%) and Gulf species (48.5%).

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the effect of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Changes in harvesting costs would not be expected to indirectly affect dealers.

More specifically, each dealer would be expected to see, at most, an increase in their annual purchases of greater amberjack by about $34 and $11 per dealer under **Sub-alternatives 4a** and **4b**. Such changes would likely be imperceptible to most snapper grouper dealers. Conversely, dealers would be expected to be adversely affected under all of the other alternatives, including **Sub-alternative 2c**. Relative to **Alternative 1 (No Action)**, the average loss in purchases per dealer would be the least under **Preferred Sub-alternative 3a** and **Sub-alternative 3c**, but significantly greater under **Sub-alternatives 3b**, **2a**, **2d**, **Preferred Sub-alternative 2c**, and particularly **Sub-alternative 2b**. The greatest loss in purchases would be under **Sub-alternative 2b**, at about $544 per dealer or 0.4% of their average annual seafood purchases, while the loss under **Sub-alternative 2c** would be about $410 per dealer or 0.3% of their average annual seafood purchases. Such losses could adversely affect some snapper grouper dealers, particularly if they are operating under relatively small profit margins.

Table 4.3.2.1. Projected monthly and annual landings (lbs ww) of greater amberjack by alternative for **Action 3**.

Month	Alt 1 (No Action)	Sub-alt 2a	Sub-alt 2b	Sub-alt 2c	Sub-alt 2d	Pref Sub-alt 3a	Sub-alt 3b	Sub-alt 3c	Sub-alt 4a	Sub-alt 4b
Mar	142,576	142,576	130,220	130,220	130,220	**142,576**	130,220	130,220	130,220	115,154
Apr	0	0	0	0	0	**0**	0	0	0	0
May	211,499	211,499	191,618	191,618	181,373	**211,499**	191,618	191,618	191,618	171,032
Jun	95,334	31,778	62,863	62,863	66,289	**95,334**	89,804	89,804	89,804	82,940
Jul	66,808	0	0	0	7,870	**12,931**	12,327	51,363	63,690	59,526
Aug	80,227	0	0	0	0	**0**	0	0	76,269	69,744
Sep	75,463	70,860	65,401	70,860	70,860	**70,860**	65,401	70,860	70,860	65,401
Oct	89,238	84,181	77,042	84,181	84,181	**84,181**	77,042	84,181	84,181	77,042
Nov	8,977	30,006	26,932	30,006	30,006	**30,006**	26,932	30,006	30,006	26,932
Dec	0	39,218	34,958	39,218	39,218	**39,218**	34,958	39,218	32,892	34,958
Jan	0	38,463	36,004	38,463	38,463	**38,463**	36,004	38,463	0	36,004
Feb	0	34,809	32,220	34,809	34,809	**34,809**	32,220	34,809	0	31,069
TOTAL	770,121	683,389	657,258	682,237	683,287	**759,876**	696,526	760,541	769,540	769,802

Source: N. Farmer, pers. comm., 2/8/2018.

Table 4.3.2.2. Average monthly ex-vessel price, projected monthly and annual gross revenue of greater amberjack by alternative for **Action 3**.

Month	Price	Alt 1 (No Action)	Sub-alt 2a	Sub-alt 2b	Sub-alt 2c	Sub-alt 2d	Pref Sub-alt 3a	Sub-alt 3b	Sub-alt 3c	Sub-alt 4a	Sub-alt 4b
Mar	$1.51	$215,503	$215,503	$196,826	$196,826	$196,826	**$215,503**	$196,826	$196,826	$196,826	$174,055
Apr	$1.50	$0	$0	$0	$0	$0	**$0**	$0	$0	$0	$0
May	$1.44	$303,964	$303,964	$275,391	$275,391	$260,667	**$303,964**	$275,391	$275,391	$275,391	$245,805
Jun	$1.33	$126,854	$42,285	$83,648	$83,648	$88,206	**$126,854**	$119,497	$119,497	$119,497	$110,363
Jul	$1.39	$92,829	$0	$0	$0	$10,935	**$17,967**	$17,128	$71,369	$88,497	$82,711
Aug	$1.48	$118,611	$0	$0	$0	$0	**$0**	$0	$0	$112,760	$103,113
Sep	$1.59	$119,757	$112,452	$103,790	$112,452	$112,452	**$112,452**	$103,790	$112,452	$112,452	$103,790
Oct	$1.49	$133,365	$125,808	$115,139	$125,808	$125,808	**$125,808**	$115,139	$125,808	$125,808	$115,139
Nov	$1.58	$14,142	$47,270	$42,426	$47,270	$47,270	**$47,270**	$42,426	$47,270	$47,270	$42,426
Dec	$1.71	$0	$67,017	$59,738	$67,017	$67,017	**$67,017**	$59,738	$67,017	$56,208	$59,738
Jan	$1.38	$0	$53,138	$49,742	$53,138	$53,138	**$53,138**	$49,742	$53,138	$0	$49,742
Feb	$1.33	$0	$46,223	$42,785	$46,223	$46,223	**$46,223**	$42,785	$46,223	$0	$41,257
TOTAL		$1,125,026	$1,013,660	$969,484	$1,007,773	$1,008,542	**$1,116,196**	$1,022,462	$1,114,991	$1,134,709	$1,128,138

Source: Price data are from https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/monthly-landings/index, accessed 7/5/2018.

Table 4.3.2.3. Expected annual gross revenue for greater amberjack, expected changes in gross revenue, private costs, and net economic benefits, and economic rank by alternative for **Action 3**.

Alternative	Expected Annual Gross Revenue (2016$)	Expected Change in Annual Gross Revenue (2016$)	Expected Increase in Private Costs (Rank)	Economic Rank (net economic benefits)
Alt 1 (No Action)	$1,125,026	$0	1	2
Sub-alt 2a	$1,013,660	-$111,366	2T	6
Sub-alt 2b	$969,484	-$155,542	7T	10
Sub-alt 2c	$1,007,773	-$117,253	5T	8
Sub-alt 2d	$1,008,542	-$116,484	10*	9
Pref Sub-alt 3a	**$1,116,196**	**-$8,830**	**2T**	**4**
Sub-alt 3b	$1,022,462	-$102,564	7T	7
Sub-alt 3c	$1,114,991	-$10,035	5T	5
Sub-alt 4a	$1,134,709	$9,683	4	1
Sub-alt 4b	$1,128,138	$3,112	9	3

*Sub-alternative 2d is also expected to significantly increase public costs.

4.3.3 Social Effects

A description of the communities that would most likely be affected by changes in commercial management of greater amberjack is included in **Section 3.4** and includes: Key Largo, Mayport, Cocoa, New Smyrna Beach, Islamorada, Port Orange, Sugarloaf Key, Fort Lauderdale, and Saint Augustine, Florida; and Murrells Inlet, South Carolina. These communities would likely be affected by a commercial split season and trip limit modifications for greater amberjack.

A split season under **Alternative 2** and **Preferred Alternative 3** may help to extend commercial harvest of greater amberjack longer than under **Alternative 1 (No Action)**. In general, a split season would be most beneficial for fishermen targeting other species in the beginning of the year, because it would ensure that a portion of the commercial ACL would be available later in the year. Access to greater amberjack later in the year is important for commercial fishermen in North Carolina where harvest peaks in the fall months (**Figure 3.2.7**). **Preferred Alternative 3** would provide more of the ACL during the first season (60%) compared to **Alternative 2** (50%). Establishing a split season could result in fishermen shifting effort to or from a certain species (including targets on multi-species trips) because of economic, regulatory, biological, or environmental differences resulting from changes in access to greater amberjack.

Changes in potential social effects of the trip limit under **Sub-alternatives 2a, 2b, 2c** and **Preferred Sub-alternative 3a, 3b**, and **3c**, and **Sub-alternatives 4a** and **4b** would depend on how fishermen are affected by either higher trip limits and shorter seasons, or lower trip limits and longer seasons. None of the proposed alternatives include a trip limit greater than **Alternative 1 (No Action)**, but **Alternatives 2-4** and their sub-alternatives propose varying trip limits. Higher trip limits create the potential for higher profit per trip, which would provide direct social benefits to fishermen, especially for businesses who target multiple species and do not need one species to be open year-round. High trip limits can also result in the ACL being reached faster, triggering an early closure of Season 1 or Season 2 and associated negative social effects. Alternatively, businesses focusing primarily on greater amberjack would benefit from the consistent access provided by a longer fishing season. However, trip limits that are too low can make trips cost prohibitive, particularly for fishermen that require longer travel time to fishing grounds. The step-down in **Sub-alternative 2d** would likely help decrease the rate of harvest beyond that in **Sub-alternatives 2a, 2b** and **Sub-alternative 2c** and decrease the likelihood of negative social effects associated with an in-season closure. Alternatively, trip limit reductions result in added regulatory complexity which may cause confusion and frustration among fishermen. This confusion can result in lower compliance rates, preventing long-term social benefits from being realized by fishing communities.

Overall, the positive and negative social effects on commercial fishermen from establishing a split season and associated trip limits under **Alternative 2** and **Preferred Alternative 3** or reducing the commercial trip limit under **Alternative 4** would depend on the proportion of the ACL allocated to each season, the length of each season, and the likelihood of commercial harvest being open during times of the year when it is profitable to target greater amberjack. Considering both changes to annual gross revenue and increased cost to the private sector resulting from changes in trip limits, **Sub-alternative 4a** is projected to result in the greatest net economic benefit, while **Sub-alternative 2a** is projected to result in the least net economic benefit. **Preferred Sub-alternative 3a** is expected to substantially decrease overall annual gross revenue, driven primarily by a reduction in landings when compared to **Alternative 1 (No Action)** (**Tables 4.3.2.1** and **4.3.2.3**). The anticipated decrease in commercial fishing vessel revenue may have substantial negative social effects on fishermen and negative indirect effects on dealers and other commercial fishing businesses who operate under small profit margins, and combined, these have considerable social consequences for fishing communities (see **Section 4.3.2**).

Alternative 1 (No Action) would result in the shortest fishing season, with a projected closure in November. There is no substantial difference in the season length under the split seasons proposed in **Alternative 2** and **Preferred Alternative 3** and their respective sub-alternatives (**Table 4.3.1.1** and **4.3.1.2**) Season 1. **Sub-alternative 4b**, followed by **Sub-alternative 4a**, would result in the longest season overall (**Table 4.3.1.2**). Generally, longer fishing seasons provide continued access for commercial fishermen and consistency for end users, if trip limits are sufficient to support commercial fishing activity.

4.3.4 Administrative Effects

Alternative 1 (No Action) would not change the administrative environment from its current condition. Currently, there is a commercial quota monitoring system in place for greater amberjack that is utilized to monitor landings. Since the 2015-2016 fishing year, commercial harvest has closed early due to landings reaching the ACL prior to the end of the fishing year. If total effort for greater amberjack remains consistent, it is possible the ACL would be reached prior to the end of the fishing year. Therefore, NMFS would have to continue to prepare and issue closure notices. Additionally, enforcement personnel would have to monitor the closures. With an in-season quota closure, there is potential that the landings would not reach 100% of the ACL. In that circumstance, guidance from the South Atlantic Council to NMFS has recommended that harvest for a snapper grouper species should reopen if landings are less than 95% of the ACL, and the projected number of days to meet the ACL is two or more days. Therefore, NMFS would have to monitor the landings and prepare a reopen notice.

Since there is one fishing season for greater amberjack under **Alternative 1 (No Action**) and **Alternative 4** (and its sub-alternatives), if the quota is projected to be met and harvest is closed, there is potential for a total of two in-season notices (i.e., closure notice and reopening notice if it is subsequently determined that a portion of the ACL was not harvested) that would need to be prepared by fishery managers. Since the yearly quota would be divided into two fishing seasons under **Alternative 2** (and its sub-alternatives) and **Preferred Alternative 3** (and its sub-alternatives), there is potential that fishery managers may have to prepare four in-season notices (i.e., closure notice and reopening notice for each of two seasons). Under **Sub-alternative 2d**, there is potential for a trip limit reduction during Season 2, which would require fishery managers to prepare a trip limit reduction notice in addition to the four other potential notices under **Alternative 2**. Additionally, enforcement personnel would be burdened with an increase in potential harvest closures, which they would have to monitor. Outreach materials for each in-season action would take the form of fishery bulletins and updates to NMFS Southeast Regional Office's web site.

4.4 Action 4. Establish a commercial split season and modify commercial trip limit for red porgy

4.4.1 Biological Effects

Predictions based on the SARIMA model are recommended for this action (**Appendices I** and **J**). Under **Alternative 1 (No Action)**, neither model predicts an in-season closure. Similarly, in-season closures would not be expected during either season under **Preferred Alternative 2** (and its sub-alternatives), **Alternative 3** (and its sub-alternatives) or **Alternative 4** (**Table 4.4.1.1**).

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

The biological effects of **Preferred Alternative 2**, **Alternative 3**, and their respective sub-alternatives, and **Alternative 4**, would not differ from **Alternative 1 (No Action)** in terms of risk of overfishing as overall harvest would be limited to the ACL or split-season quotas, and AMs would be triggered if the ACL or quotas were reached.

Alternatives*

1 (No Action). The commercial fishing year is the calendar year. A sale and purchase prohibition is in place from Jan. – Apr. each year. From May – Dec. the trip limit is 120 fish.

2. Specify two commercial fishing seasons. Allocate 30% of the commercial ACL to the period Jan. – Apr. and 70% to the period May – Dec. Allow quota roll-over from Season 1 to Season 2. Remove the Jan. – Apr. sale and purchase prohibition. Retain 120 fish from May – Dec. and specify a commercial trip limit in Jan. – Apr. of:

- 2a. 30 fish
- 2b. 45 fish
- **2c. 60 fish**

3. Specify two commercial fishing seasons. Allocate 50% of the commercial ACL to the period Jan. – Apr. and 50% to the period May – Dec. Allow quota roll-over from Season 1 to Season 2. Remove the Jan. – Apr. sale and purchase prohibition. Retain 120 fish in May – Dec. and specify a commercial trip limit in Jan. – Apr. of:

- 3a. 30 fish
- 3b. 45 fish
- 3c. 60 fish

4. Remove the harvest and possession restrictions, and sale and purchase prohibition during Jan. – Apr. each year. Specify a commercial trip limit of 120 fish from Jan. – Dec.

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives.

Table 4.4.1.1. Projected mean and 95% lower and upper (L95, U95) confidence limits closure dates for red porgy for alternatives under Action 4 using two analytical methodologies (refer to **Appendix J**). The recommended model is denoted by an asterisk (*). Preferred alternative indicated in bold. Nc = no closure.

		Last 3			SARIMA*		
Alternative	**Season**	**L95**	**MEAN**	**U95**	**L95**	**MEAN**	**U95**
1 (No Action)	Jan-Dec	Nc	Nc	11-Nov	Nc	Nc	23-Jul
Alt 2: Commercial ACL split 30% Jan-Apr and 70% May-Dec							
2a: 30 fish/120 fish	Jan-Apr	No closure	Nc	29-Apr	**No closure**	**No closure**	8-Mar
	May-Dec		6-Nov	25-Aug			2-Jul
2b: 45 fish/120 fish	Jan-Apr		Nc	3-Apr			20-Feb
	May-Dec		2-Oct	25-Aug			2-Jul
2c: 60 fish/120 fish	Jan-Apr		22-Apr	**20-Mar**			**13-Feb**
	May-Dec		25-Sep	**25-Aug**			**2-Jul**
Alt 3: Commercial ACL split 50% Jan-Apr and 50% May-Dec							
3a: 30 fish/120 fish	Jan-Apr	No closure	Nc	Nc	No closure	No closure	24-Apr
	May-Dec		6-Nov	24-Aug			15-Jun
3b: 45 fish/120 fish	Jan-Apr		Nc	Nc			28-Mar
	May-Dec		2-Oct	9-Aug			15-Jun
3c: 60 fish/120 fish	Jan-Apr		Nc	Nc			13-Mar
	May-Dec		19-Sep	29-Jul			15-Jun
Alt 4: No split seasons							
4: 120 fish year-round	Jan-Dec	Nc	24-Aug	6-Jul	Nc	Nc	18-Apr

In the South Atlantic, red porgy spawn from January through May and spawning activity peaks from January through March (**Table 3.2.1**); hence, the current January through April prohibition on sale and purchase captures the majority of the spawning season for this species. Therefore, **Alternative 1 (No Action)** would impart the most direct benefits to the red porgy stock in terms of reducing fishing pressure on the spawning stock. However, during this time, fishermen target two co-occurring species, vermilion snapper and gray triggerfish, and fishermen report high numbers of red porgy discards. From 2014 through 2016, red porgy had among the highest number of discards reported on average (**Appendix D**). The discard mortality rate applied to the commercial fleet in the latest red porgy update assessment (SEDAR 1 2012 Update) was 35% for the commercial sector and 8% for the recreational sector. Thus, the benefits of a spawning season closure for red porgy are reduced by the amount of discards when fishermen target other co-occurring species. **Preferred Sub-alternative 2c** would allow for the smallest amount of harvest relative to the action alternatives considered. If the level of harvest under **Preferred Sub-alternative 2c** is similar to the amount of red porgy that would be discarded dead, then the biological effects would be similar to **Alternative 1 (No Action).**

Projected annual commercial landings of red porgy would be most conservative under **Alternative 1 (No Action)** followed by **Preferred Sub-alternative 2c** and **Sub-alternative 3c**, **Sub-alternatives 2b** and **3b**, **Sub-alternatives 2a** and **3a**, and highest under **Alternative 4** (**Table 4.4.2.1**). Biological benefits to the red porgy stock would be imparted in the same order.

4.4.2 Economic Effects

The economic effects of the proposed alternatives relative to **Alternative 1 (No Action)** and to each other would depend on aggregate annual harvest levels and seasonal shifts in landings. The economic effects on individual vessels from **Preferred Alternative 2**, **Alternative 3**, **Alternative 4**, and the corresponding sub-alternatives would depend on each vessel owner's profit maximization strategy, their dependence on red porgy, their seasonal fishing behavior, and their ability to adapt to the changing regulations. These types of individual vessel level effects cannot be determined with available models.

The expected direct economic effects of the alternatives for **Action 4** on commercial fishing vessels are provided in **Tables 4.4.2.1** and **4.4.2.2** and summarized in **Table 4.4.2.3**. Specifically, **Table 4.4.2.1** provides estimates of the projected monthly and annual landings of red porgy by alternative using the SARIMA model (N. Farmer, pers. comm., 2/8/2018). **Table 4.4.2.2** provides estimates of the average monthly ex-vessel price of red porgy from 2012 through 2016,[12] which are then used in combination with the projected monthly and annual landings to estimate the expected monthly and average gross revenue for red porgy by alternative. The differences in projected annual landings across alternatives are primarily driven by the allowance of landings during the currently closed months of January through April, and the amount of landings vessels can accrue under the various trip limits. In turn, these landings differences also drive the differences in expected annual gross revenue across alternatives. Expected landings and annual gross revenue are greatest under **Alternative 4**, followed by **Preferred Sub-alternative 2c** and **Sub-alternative 3c**, **Sub-alternatives 2b** and **3b**, and **Sub-alternatives 2a** and **3a**, with expected landings and gross revenue being considerably lower under **Alternative 1 (No Action)**.

No changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected as a result of the alternatives considered under **Action 4**, at least none that are not voluntarily assumed. The trip limit from May through December is the same under all the considered alternatives and thus costs are not affected relative to **Alternative 1 (No Action)** during those months. And although trip limits are being considered during the months of January to April, these are months during which landings are prohibited under **Alternative 1 (No Action)**. The decision to harvest red porgy during those months could lead to additional harvesting costs, but these would be self-imposed and, the additional gross revenues would be expected to exceed the additional costs (i.e., economic profits are expected to increase), assuming owners of commercial vessels are economically rational. Moreover, red porgy that would be expected to be landed during January through April are likely fish that would have previously been discarded due to the current landing prohibition. If these landings are fish that would have been previously discarded, then no additional costs would be incurred and the additional gross revenue would represent additional economic profit as well. Thus, although the expected change in annual gross revenue could be a slight overestimate of the expected change in economic profit, it is still a reasonable approximation of changes in economic profit and thus of changes in net economic benefits under the alternatives for **Action 4**. The summarized results

[12] Because no average monthly ex-vessel price data exists for January through April from 2012 through 2016, the average monthly price for January through April was assumed to be equal to the average across other months.

in **Table 4.4.2.3** indicate that **Sub-alternative 4a** is expected to generate the greatest net economic benefits, followed by **Preferred Sub-alternative 2c** and **Sub-alternative 3c**, **Sub-alternatives 2b** and **3b**, and **Sub-alternatives 2a** and **3a**, with expected net economic benefits being the least under **Alternative 1 (No Action)**.

Approximately 160 vessels harvested red porgy on average each year from 2012 to 2016 (see **Section 3.3.1.2**). These vessels' average annual gross revenues were $73,366 per vessel during this time. According to Overstreet, Perruso, and Liese (pers. comm., 7/11/2018), annual net revenue from operations for commercial vessels in the snapper grouper fishery was approximately 5% of their average annual gross revenue from 2014 through 2016.[13] Net revenue from operations is the best measure of economic profits available at this time. Thus, annual net revenue from operations (economic profit) for these red porgy vessels is estimated to be about $3,300 per vessel. **Alternative 4** is expected to result in a maximum increase in annual gross revenue per vessel of approximately $454. The expected change in annual gross revenue per vessel would represent an increase in the average vessel's economic profits of more than 14% per year. The expected increase in annual gross revenue under **Preferred Sub-alternative 2c** and **Sub-alternative 3c** would be somewhat less at about $335 per vessel, representing about 10% of current economic profits. The expected increases in economic profits would be less under the other alternatives.

With respect to indirect effects, **Table 4.1.2.4** provides the economic characteristics of snapper grouper dealers from 2012 through 2016. Based on this information, approximately 286 dealers purchase snapper grouper landings on average each year. Their average annual purchases of snapper grouper are about $61,000 per dealer while their average annual purchases of all seafood are almost $132,000 per dealer. Thus, snapper grouper purchases represent 46.2% of their total seafood purchases, with the remaining purchases coming from other South Atlantic species (6.3%) and Gulf species (48.5%).

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the effect of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Thus, the ranking of net economic benefits to dealers would be the same as for commercial fishing vessels. More specifically, each dealer would be expected to see an increase in their purchases of red porgy by about $252 per year under **Alternative 4**, or about 0.2% of their average annual seafood purchases, and approximately $187 under **Preferred Sub-alternative 2c** and **Sub-alternative 3c**, or about 0.1% of their average annual seafood purchases. Such changes could benefit dealers operating under relatively small profit margins. The other alternatives are expected to increase dealers' average annual seafood purchases by less than 0.1%, which would likely be imperceptible to most snapper grouper dealers.

[13] Overstreet, Perruso, and Liese do not consider red porgy to be part of a directed fishery, i.e., red porgy is an incidentally harvested species.

Table 4.4.2.1. Projected monthly and annual landings (lbs ww) of red porgy by alternative for **Action 4**.

Month	Alt 1 (No Action)	Sub-alt 2a	Sub-alt 2b	Pref. Sub-alt 2c	Sub-alt 3a	Sub-alt 3b	Sub-alt 3c	Alt 4
Jan	0	5,080	6,686	**7,925**	5,080	6,686	7,925	10,680
Feb	0	6,291	8,279	**9,814**	6,291	8,279	9,814	13,226
Mar	0	2,348	3,091	**3,663**	2,348	3,091	3,663	4,937
Apr	0	3,284	4,322	**5,122**	3,284	4,322	5,122	6,904
May	13,444	13,444	13,444	**13,444**	13,444	13,444	13,444	13,444
Jun	11,203	11,203	11,203	**11,203**	11,203	11,203	11,203	11,203
Jul	26,702	26,702	26,702	**26,702**	26,702	26,702	26,702	26,702
Aug	22,429	22,429	22,429	**22,429**	22,429	22,429	22,429	22,429
Sep	15,484	15,484	15,484	**15,484**	15,484	15,484	15,484	15,484
Oct	5,249	5,249	5,249	**5,249**	5,249	5,249	5,249	5,249
Nov	4,291	4,291	4,291	**4,291**	4,291	4,291	4,291	4,291
Dec	3,369	3,369	3,369	**3,369**	3,369	3,369	3,369	3,369
TOTAL	102,170	119,173	124,547	**128,693**	119,173	124,547	128,693	137,916

Source: N. Farmer, pers. comm., 2/8/2018.

Table 4.4.2.2. Average monthly ex-vessel price, projected monthly and annual gross revenue of red porgy by alternative for **Action 4**.

Month	Price	Alt 1 (No Action)	Sub-alt 2a	Sub-alt 2b	Pref. Sub-alt 2c	Sub-alt 3a	Sub-alt 3b	Sub-alt 3c	Alt 4
Jan	$2.02	$0	$10,262	$13,505	**$16,008**	$10,262	$13,505	$16,008	$21,574
Feb	$2.02	$0	$12,708	$16,724	**$19,824**	$12,708	$16,724	$19,824	$26,716
Mar	$2.02	$0	$4,744	$6,243	**$7,400**	$4,744	$6,243	$7,400	$9,973
Apr	$2.02	$0	$6,633	$8,730	**$10,347**	$6,633	$8,730	$10,347	$13,945
May	$1.98	$26,681	$26,681	$26,681	**$26,681**	$26,681	$26,681	$26,681	$26,681
Jun	$1.99	$22,347	$22,347	$22,347	**$22,347**	$22,347	$22,347	$22,347	$22,347
Jul	$2.02	$54,006	$54,006	$54,006	**$54,006**	$54,006	$54,006	$54,006	$54,006
Aug	$2.01	$45,035	$45,035	$45,035	**$45,035**	$45,035	$45,035	$45,035	$45,035
Sep	$2.02	$31,218	$31,218	$31,218	**$31,218**	$31,218	$31,218	$31,218	$31,218
Oct	$2.06	$10,811	$10,811	$10,811	**$10,811**	$10,811	$10,811	$10,811	$10,811
Nov	$2.12	$9,114	$9,114	$9,114	**$9,114**	$9,114	$9,114	$9,114	$9,114
Dec	$2.16	$7,277	$7,277	$7,277	**$7,277**	$7,277	$7,277	$7,277	$7,277
TOTAL		$206,490	$240,837	$251,692	**$260,068**	$240,837	$251,692	$260,068	$278,698

Source: Price data are from https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/monthly-landings/index, accessed 7/5/2018.

Table 4.4.2.3. Expected annual gross revenue for red porgy, expected changes in gross revenue and economic rank by alternative for Action 4.

Alternative	Expected Annual Gross Revenue (2016$)	Expected Change in Annual Gross Revenue (2016$)	Economic Rank (net economic benefits)
1 (No Action)	$206,490	$0	8
Sub-alt 2a	$240,837	$34,347	5T
Sub-alt 2b	$251,692	$45,202	4T
Pref. Sub-alt 2c	**$260,068**	**$53,578**	**2T**
Sub-alt 3a	$240,837	$34,347	5T
Sub-alt 3b	$251,692	$45,202	4T
Sub-alt 3c	$260,068	$53,578	2T
Alt 4	$278,698	$72,208	1

4.4.3 Social Effects

A description of the communities that would most likely be affected by changes in commercial management of red porgy can be found in **Section 3.4** and includes: Mayport, Saint Augustine, and Port Orange, Florida; Little River, Murrells Inlet, and Charleston, South Carolina; Supply, Beaufort, Morehead City, and Southport, North Carolina. These communities would likely be affected by changes to the commercial fishing year and trip limits for red porgy.

Red porgy is under restrictive catch limits and landings have been below the ACL in recent years (**Table 3.2.5**). Removing the sale and purchase prohibition from January through April would increase overall landings, though a closure due to reaching the ACL is not projected to occur (**Table 4.4.1.1**). Should harvest increase in the future, a split season under **Preferred Alternative 2** and **Alternative 3** may help to extend commercial harvest longer than under **Alternative 1 (No Action)**. In general, a split season would be most beneficial for fishermen targeting other species in the beginning of the year, because it would ensure that a portion of the commercial ACL would be available later in the year. Establishing a split season could result in fishermen shifting effort to or from a certain species (including targets on multi-species trips) because of economic, regulatory, biological, or environmental differences resulting from changes in access to red porgy.

For establishing a trip limit from January through April under **Sub-alternative 2a, 2b** and **Preferred Sub-alternative 2c** and **Sub-alternatives 3a, 3b** and **3c**, the potential social effects would depend on how fishermen are affected by either higher trip limits and a shorter season, or lower trip limits and longer seasons. However, in-season closures are not anticipated under **Preferred Alternative 2** or **Alternative 3** (**Table 4.4.1.1**). Establishing a higher trip limit from January through April would have the direct social benefit of increasing the amount of fish available for harvest per trip. If harvest of red porgy were to unexpectedly increase, a high trip limit could also result in the ACL being reached faster, triggering an early closure of the first fishing season and associated negative social effects.

Overall, the positive and negative social effects on commercial fishermen of establishing a split season under **Preferred Alternative 2** and **Alternative 3** would depend on the proportion of the ACL allocated to each season, the length of each season, and the likelihood of commercial harvest being open during times of the year when it is profitable to target red porgy. **Alternative 4** is expected to generate the greatest economic benefit followed by **Preferred Sub-alternative 2c**. **Alternative 1 (No Action)** is expected to result in the lowest economic benefit (**Table 4.4.2.3**). Under **Preferred Alternative 2** and its sub-alternatives, **Alternative 3** and its sub-alternatives, and **Alternative 4** there is no projected in-season closure (**Table 4.4.1.1)**. Generally, longer fishing seasons provide for positive direct and indirect social effects from continued access for commercial fishermen and consistency for end users, respectively, if trip limits are sufficient to support commercial fishing activity, as anticipated under all proposed alternatives.

Removing the restricted harvest limit for January 1 through April 30 under **Preferred Alternative 2, Alternative 3** and **4** may provide positive social effects to the commercial fleet by increasing access but would also increase overall harvest. Generally, higher catch limits are expected to be more beneficial to fishermen and communities by increasing access to red porgy, if harvest is not negatively affecting the long-term health of the stock, which may be a concern with peak spawning occurring from January through March. However, vermilion snapper and gray triggerfish are also harvested during this time resulting in high red porgy discards due to incidental catch, thus, reducing the long-term social benefit of the spawning closure. Removing the restricted harvest while keeping the available ACL low (30%), as proposed under **Preferred Alternative 2**, would have the direct social benefit of aligning regulations with the way this portion of the snapper grouper fishery is conducted, improving stakeholder perceptions of management, while keeping harvest low during the peak spawning period.

4.4.4 Administrative Effects

Alternative 1 (No Action) would not change the administrative environment from its current state. Currently, there is a commercial quota monitoring system in place for red porgy that is utilized to monitor landings against the commercial ACL. Since 2007, landings have reached at least 70% of the ACL, and the fishery closed in 2013 prior to the end of the fishing year when the ACL was met. If total effort for red porgy remains consistent, it is possible the ACL could be reached prior to the end of the fishing year. Therefore, NMFS would need to prepare and issue closure notices. Additionally, enforcement personnel would have to monitor the closures. With an in-season quota closure, there is potential that the landings do not reach 100% of the ACL. In that circumstance, guidance from the South Atlantic Council to NMFS has recommended that harvest for snapper grouper species should reopen if landings are less than 95% of the ACL, and the projected number of days to meet the ACL is two or more days. Therefore, NMFS would have to monitor the landings and prepare a reopening notice.

Since there is one fishing season for red porgy, under **Alternative 1 (No Action**) and **Alternative 4,** if the quota is projected to be met and harvest is closed, there is potential for a total of two in-season notices (i.e., closure notice and reopening notice if it is subsequently determined that a portion of the ACL was not harvested) that would need to be prepared by fishery managers. Since the yearly quota would be divided into two fishing seasons under **Preferred Alternative 2** and **Alternative 3** (and their sub-alternatives), there is potential that fishery managers may have to prepare four in-season notices (i.e., closure notice and reopening notice for each of two seasons). Additionally, enforcement personnel would be burdened with an increase in potential harvest closures, which they would have to monitor. Outreach materials for each in-season action would take the form of fishery bulletins and updates to NMFS Southeast Regional Office's web site. Therefore, **Preferred Alternative 2** and **Alternative 3** (and their sub-alternatives) would impose the most administrative burden, followed by **Alternative 1 (No Action**) and **Alternative 4**.

4.5 Action 5. Modify the commercial trip limit for vermilion snapper

Alternatives*

1 No Action. The commercial fishing year is the calendar year. The commercial ACL is allocated equally into two 6-month seasons (Jan. – Jun. and Jul. – Dec.). Roll-over of uncaught ACL from Season 1 to Season 2 is allowed. The commercial trip limit is 1,000 pounds gutted weight (lbs gw). For both seasons, when 75% of the seasonal quota is met or is projected to be met, the trip limit is reduced to 500 pounds lbs gw.

2. Retain the commercial trip limit and trip limit reduction in Season 1. For Season 2, reduce the commercial trip limit to 750 lbs gw and remove the trip limit reduction. Allow quota roll-over from Season 1 to Season 2.

3. Retain the commercial trip limit and trip limit reduction in Season 1. For Season 2, reduce the trip limit to 500 lbs gw and remove the trip limit reduction. Allow quota roll-over from Season 1 to Season 2.

4. Modify the commercial trip limit for both seasons and remove trip limit reductions. Allow quota roll-over between seasons.

- **4a. 1,000 pounds gw**
- 4b. 850 pounds gw
- 4c. 700 pounds gw

4.5.1 Biological Effects

Based on the retrospective analysis, the SARIMA model predictions are recommended to guide management decision-making for this action, but it is noted that both models overestimated the 2017 landings, thus, the predicted quota closure dates may be conservative (refer to **Appendices I** and **J**).

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

Differences in projected landings of vermilion snapper among the alternatives and sub-alternatives considered under this action are minor (**Table 4.5.2.1**), hence, there is no expected difference in biological effects in terms of overall harvest relative to **Alternative 1 (No Action)**. In general, trip limits do not result in biological effects, positive or negative, since overall harvest is limited by the ACL and AMs that are in place. Peak spawning activity for vermilion snapper is from June through August (**Table 3.2.1**). Analyses indicate an in-season closure would still occur under all proposed alternatives during Season 1, thus, possibly reducing fishing pressure on vermilion snapper at the onset of the spawning season. **Alternative 1 (No Action)** is predicted to result in a commercial closure before the end of August, meaning that alternative possibly has a small biological benefit over **Alternatives 2**, **3** and **Preferred Alternative 4**, all of which could result in fishing activity continuing past peak spawning.

Table 4.5.1.1. Projected mean and 95% lower and upper (L95, U95) confidence limits closure dates for vermilion snapper during ***Season 1*** for alternatives under Action 5 using two analytical methodologies (refer to **Appendix J**). The recommended model is denoted by an asterisk (*). Preferred alternative indicated in bold. Nc = no closure.

Trip Limit Reduced						
	Last 3			SARIMA*		
Alternative	L95	Mean	U95	L95	Mean	U95
1: 1,000 pounds with reduction	28-Mar	4-Mar	20-Feb	27-May	27-Feb	6-Feb
2: 1,000 pounds with reduction	28-Mar	4-Mar	20-Feb	27-May	27-Feb	6-Feb
3: 1,000 pounds with reduction	28-Mar	4-Mar	20-Feb	27-May	27-Feb	6-Feb
Fishery Closed						
1: 1,000 pounds with reduction	27-Apr	31-Mar	14-Mar	Nc	29-Apr	26-Feb
2: 1,000 pounds with reduction	27-Apr	31-Mar	14-Mar	Nc	29-Apr	26-Feb
3: 1,000 pounds with reduction	27-Apr	31-Mar	14-Mar	Nc	29-Apr	26-Feb
4a: 1,000 pounds, no reduction	**19-Apr**	**24-Mar**	**7-Mar**	**23-Jun**	**14-Apr**	**19-Feb**
4b: 850 pounds, no reduction	26-Apr	31-Mar	13-Mar	Nc	27-Apr	24-Feb
4c: 700 pounds, no reduction	5-May	7-Apr	21-Mar	Nc	6-May	7-Mar

Table 4.5.1.2. Projected mean and 95% lower and upper (L95, U95) confidence limits closure dates for vermilion snapper during ***Season 2*** for alternatives under Action 5 using two analytical methodologies (refer to **Appendix J**). The recommended model is denoted by an asterisk (*). Preferred alternative indicated in bold. Nc = no closure.

Trip Limit Reduced						
	Last 3			SARIMA*		
Alt	L95	Mean	U95	L95	Mean	U95
1: 1,000 pounds with reduction	18-Sep	25-Aug	13-Aug	4-Oct	22-Aug	4-Aug
Fishery Closed						
1: 1,000 pounds with reduction	25-Oct	17-Sep	31-Aug	Nc	16-Sep	23-Aug
2: 750 pounds, no reduction	1-Nov	20-Sep	1-Sep	Nc	19-Sep	25-Aug
3: 500 pounds, no reduction	18-Dec	14-Oct	19-Sep	Nc	12-Oct	11-Sep
4a: 1,000 pounds, no reduction	**13-Oct**	**9-Sep**	**24-Aug**	**14-Nov**	**7-Sep**	**16-Aug**
4b: 850 pounds, no reduction	23-Oct	14-Sep	28-Aug	28-Dec	13-Sep	20-Aug
4c: 700 pounds, no reduction	8-Nov	23-Sep	4-Sep	Nc	22-Sep	27-Aug

Analyses contained in **Appendix D** determined that vermilion snapper co-occur on a high percentage of trips with gray triggerfish, black sea bass, and red porgy. Vermilion snapper, red porgy, and gray triggerfish had the highest number of discards reported on average annually. The high number of discards for these species may be due to inability of fishers to selectively target one of the species during a seasonal or quota closure for a co-occurring species (e.g., targeting vermilion snapper when red porgy is closed). Additionally, SEDAR 17 Update (2012) estimated a commercial release mortality rate for vermilion snapper of 41% (sensitivity range: 24-53%).

4.5.2 Economic Effects

The economic effects on individual vessel owners from **Alternative 2** through **Preferred Alternative 4** would depend on each vessel owner's profit maximization strategy, dependence on vermilion snapper, seasonal fishing behavior, and ability to adapt to the changing regulations. Some vessel owners may benefit from a redistribution of vermilion snapper fishing days, while others may be hindered by a lower trip limit or change in availability of vermilion snapper during the year. These types of individual vessel level effects cannot be determined with available models.

The expected direct economic effects of the alternatives for **Action 5** on commercial fishing vessels are provided in **Tables 4.5.2.1** and **4.5.2.2** and summarized in **Table 4.5.2.3**. Specifically, **Table 4.5.2.1** provides estimates of the projected monthly and annual landings of vermilion snapper by alternative under the SARIMA model (N. Farmer, pers. comm., 2/8/2018). **Table 4.5.2.2** provides estimates of the average monthly ex-vessel price of vermilion snapper from 2012 through 2016, which are then used in combination with the projected monthly and annual landings to estimate the expected monthly and average gross revenue for vermilion snapper by alternative. There are differences in the projected annual landings across alternatives, though the differences are relatively minor. For example, the difference in projected annual landings between **Sub-alternative 4c** (highest landings) and **Sub-alternative 4b** (lowest landings) is about 7,300 lbs ww. The differences in expected annual gross revenue are driven more by differences in the projected monthly landings across alternatives in combination with differences in average ex-vessel prices across months. In general, alternatives that generate higher expected gross revenue are those that distribute relatively more landings to months with higher average ex-vessel prices.

Although **Sub-alternative 4c** has the highest projected annual landings, it is expected to result in the lowest expected annual gross revenue, about $52,000 less than under **Alternative 1 (No Action)** (**Table 4.5.2.3**). In fact, all of the alternatives are expected to result in lower annual gross revenue relative to **Alternative 1 (No Action)**, though the reductions are considerably less under the other alternatives than under **Sub-alternative 4c**.

Changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected as a result of the alternatives considered under **Action 5**. In general, trip limits are expected to increase costs because commercial fishing vessels must take more trips to harvest and land the same amount of fish. The more restrictive the trip limit (i.e., the lower it is and the longer it is in place), the greater the expected increase in costs. Further, changes in trip limits within a year (i.e., a “step-down”) and particularly within a season can introduce inefficiencies into the production process as commercial fishing vessels must adjust their operations to account for such changes. While these inefficiencies are likely not as great when the trip limit changes are known well in advance, they become particularly acute when the owners of commercial fishing vessels do not know if or when the trip limit change is going to occur. Further, because at least some owners of commercial fishing vessels would prefer to fish when the trip limit is higher, so-called trip limit “step downs” can result in mini-fishing derbies within a season. The split commercial ACL between seasons only partially mitigates this effect. In addition, “step-downs” are expected to increase public costs (i.e., costs to the government) because of the costs associated with potentially implementing one or more within-season trip limit reductions (e.g., staff time, cost of *Federal Register* Notices).

Based on these considerations, relative to **Alternative 1 (No Action)**, private costs would be reduced under **Preferred Sub-alternative 4a**, and the least under all of the alternatives, because the trip limit is not reduced but the step-down is eliminated. The effect on private costs is less clear under the other action alternatives because the elimination of the step-down is expected to decrease private costs but the decrease in the trip limit is expected to increase private costs. It is likely that the change in costs due to the decrease in the trip limit would outweigh the effect of removing the step-down, particularly as the decrease in the trip limit becomes larger and applies for a longer period of time. As such, private costs are expected to be the highest under **Sub-alternative 4c**. After **Preferred Sub-alternative 4a**, **Alternative 1 (No Action)** is expected to have the next lowest private costs, followed by **Alternative 2, Sub-alternative 4b**, and **Alternative 3**.

Public costs would be reduced the most, and likely by the same amount, under **Preferred Sub-alternative 4a**, **Sub-alternative 4b**, and **Sub-alternative 4c**. Some but lower reductions in public costs would be expected under **Alternative 2** and **Alternative 3**.

Consistent with the discussion above, the summarized results in **Table 4.5.2.3** indicate that **Preferred Sub-alternative 4a** is expected to generate the greatest net economic benefits, followed by **Sub-alternative 4b, Alternative 1 (No Action), Alternative 2,** and **Sub-alternative 4c**, while **Alternative 3** is expected to generate the least net economic benefits. Some subjectivity is involved in these rankings because the expected changes in private and public costs can only be evaluated qualitatively across alternatives (i.e., ranked), unlike the expected reductions in annual gross revenue.

Approximately 206 vessels harvested vermilion snapper on average each year from 2012 to 2016 (see **Section 3.3.1.2**). These vessels' average annual gross revenues were $66,330 per vessel during this time. According to Overstreet, Perruso, and Liese (pers. comm., 7/11/2018), annual net revenue from operations for vessels in the "vermilion snapper fishery" was approximately -1% of their average annual gross revenue from 2014 through 2016 (i.e., these vessels have been earning economic losses). Net revenue from operations is the best measure of economic profits available at this time. Thus, annual net revenue from operations (economic profit) for these vermilion snapper vessels is estimated to be about -$6,600 per vessel. Relative to **Alternative 1 (No Action)**, the other alternatives considered are expected to result in lower annual gross revenue per vessel, from as much as $253 under **Sub-alternative 4c** to as little as $8 under **Alternative 2**. The expected reduction under **Preferred Sub-alternative 4a** is about $42. However, as previously noted, the other alternatives considered are also expected to reduce private costs. With the potential exception of **Sub-alternative 4c**, the decreases in harvesting costs per vessel could easily be greater than the reductions in annual gross revenue per vessels, in which case economic losses would be reduced from their current level. It is unknown whether those reductions would be sufficient to eliminate the economic losses these vessels are currently earning.

With respect to indirect effects, **Table 4.1.2.4** provides the economic characteristics of snapper grouper dealers from 2012 through 2016. Based on this information, approximately 286 dealers purchase snapper grouper landings on average each year. Their average annual purchases of snapper grouper are about $61,000 per dealer while their average annual purchases of all seafood are almost $132,000 per dealer. Thus, snapper grouper purchases represent 46.2% of their total seafood purchases, with the remaining purchases coming from other South Atlantic species (6.3%) and Gulf species (48.5%).

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the effect of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Thus, dealers would be the most adversely affected under **Sub-alternative 4c** and the least under **Alternative 1 (No Action)**. At most, each dealer would be expected to see a decrease in their purchases of vermilion snapper by about $182 per year (or about 0.1%) under **Sub-alternative 4c**, $30 under **Preferred Sub-alternative 4a**, and only $6 under **Alternative 2**. With the potential exception of the effects under **Sub-alternative 4c**, such changes would likely be imperceptible to most snapper grouper dealers.

Table 4.5.2.1. Projected monthly and annual landings (lbs ww) of vermilion snapper by alternative for **Action 5**.

Month	Alt 1 (No Action)	Alt 2	Alt 3	Pref Sub-alt 4a	Sub-alt 4b	Sub-alt 4c
Jan	184,550	184,550	184,550	**184,550**	166,525	144,625
Feb	145,668	145,668	145,668	**147,664**	134,670	118,476
Mar	41,407	41,407	41,407	**58,020**	54,152	49,395
Apr	61,733	61,733	61,733	**42,312**	76,189	77,189
May	0	0	0	**0**	0	49,725
Jun	0	0	0	**0**	0	0
Jul	192,949	165,164	124,323	**192,949**	178,092	157,832
Aug	170,162	159,571	119,345	**190,951**	173,256	152,315
Sep	70,139	109,820	131,511	**47,599**	81,092	121,774
Oct	0	0	56,321	**0**	0	0
Nov	0	0	0	**0**	0	0
Dec	0	0	0	**0**	0	0
TOTAL	866,608	867,913	864,858	**864,045**	863,976	871,331

Source: N. Farmer, pers. comm., 2/8/2018.

Table 4.5.2.2. Average monthly ex-vessel price, projected monthly and annual gross revenue of vermilion snapper by Alternative for **Action 5**.

Month	Price	Alt 1 (No Action)	Alt 2	Alt 3	Pref Sub-alt 4a	Sub-alt 4b	Sub-alt 4c
Jan	$3.46	$638,984	$638,984	$638,984	**$638,984**	$576,575	$500,748
Feb	$3.42	$498,812	$498,812	$498,812	**$505,647**	$461,152	$405,698
Mar	$3.53	$146,265	$146,265	$146,265	**$204,949**	$191,286	$174,482
Apr	$3.63	$223,791	$223,791	$223,791	**$153,387**	$276,196	$279,821
May	$2.16	$0	$0	$0	**$0**	$0	$107,416
Jun	$3.70	$0	$0	$0	**$0**	$0	$0
Jul	$3.48	$670,574	$574,010	$432,072	**$670,574**	$618,940	$548,529
Aug	$3.39	$576,548	$540,663	$404,368	**$646,986**	$587,031	$516,078
Sep	$3.29	$231,027	$361,730	$433,176	**$156,783**	$267,104	$401,104
Oct	$3.37	$0	$0	$189,631	**$0**	$0	$0
Nov	$3.49	$0	$0	$0	**$0**	$0	$0
Dec	$6.69	$0	$0	$0	**$0**	$0	$0
TOTAL		$2,986,002	$2,984,256	$2,967,100	**$2,977,311**	$2,978,283	$2,933,877

Source: Price data are from https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/monthly-landings/index, accessed 7/5/2018.

Table 4.5.2.3. Expected annual gross revenue for vermilion snapper, expected changes in gross revenue, private costs, and public costs, and economic rank by alternative for Action 5.

Alternative	Expected Annual Gross Revenue (2016$)	Expected Change in Annual Gross Revenue (2016$)	Expected Change Private Costs (Rank)	Expected Change in Public Costs (Rank)	Economic Rank (net economic benefits)
Alt 1 (No Action)	$2,986,002	$0	2	6	3
Alt 2	$2,984,256	-$1,746	3	4T	4
Alt 3	$2,967,100	-$18,902	5	4T	6
Pref Sub-alt 4a	**$2,977,311**	**-$8,691**	**1**	**1T**	**1**
Sub-alt 4b	$2,978,283	-$7,719	4	1T	2
Sub-alt 4c	$2,933,877	-$52,125	6	1T	5

4.5.3 Social Effects

A description of the communities that would most likely be affected by changes in commercial management of vermilion snapper can be found in **Section 3.4** and includes: Mayport, Saint Augustine, and Port Orange, Florida; Murrells Inlet and Little River, South Carolina; and Southport, Morehead City, Oak Island, Beaufort, and Supply, North Carolina.

In general, a commercial trip limit may help slow the rate of harvest and lengthen a season, but trip limits that are too low may make fishing trips inefficient and costly if fishing grounds are too far away. A longer open season would have direct social benefits to the commercial fleet and indirect social effects to end users of vermilion snapper (restaurant owners, fish houses, and consumers) by improving consistency of availability, so long as it doesn't result in a decrease in harvest and/or revenue.

The vermilion snapper ACL is currently evenly split between two seasons of equal length. The trip limit changes proposed under **Alternatives 2** through **4 (Preferred)** would result in potential social effects that depend on how fishermen are affected by either higher trip limits and a shorter season, or lower trip limits and longer seasons and when those seasons occur. **Alternative 3** is projected to result in the longest season, followed by **Sub-alternative 4c** and **Alternative 2**. **Preferred Sub-alternative 4a** would result in the shortest season (**Tables 4.5.1.1** and **4.5.1.2**). Conversely, landings are projected to be highest under **Sub-alternative 4c** and lowest under **Preferred Sub-alternative 4a** (**Table 4.5.2.1**). **Alternative 1 (No Action)**, **Alternative 2**, and **Preferred Sub-alternatives 4a** and **4b** propose higher trip limits in the second season compared to **Alternative 3** and **Sub-alternative 4b**. A higher trip limit in the second season would have the direct social benefit of increasing trip efficiency, especially for businesses who target multiple species and do not need one species to be open year-round. High trip limits can also result in the ACL being reached faster, triggering an early closure of the first fishing season and associated negative social effects. Alternatively, businesses focusing primarily on vermilion snapper would benefit from a longer fishing season under **Alternative 3**. Though, trip limits that are too low can decrease trip efficiency, particularly for fishermen that require longer travel time to fishing grounds.

Generally, longer fishing seasons provide positive direct and indirect social effects through continued access for commercial fishermen and consistency for end users, if trip limits are sufficient to support commercial fishing activity and allow for harvest during periods when it is profitable to land vermilion snapper. Considering both private costs associated with trip limits, mid-season trip limit reductions, and overall anticipated annual gross revenue, **Preferred Sub-alternative 4a** is expected to generate the greatest net economic benefits, followed by **Sub-alternative 4b**, and **Alternative 2**, and **Alternative 1 (No Action)** (**Table 4.5.2.3**).

Alternative 2 and **Alternative 3** would remove the trip limit reduction once 75% of the Season 2 quota is met. **Preferred Alternative 4** and its sub-alternatives would remove the trip limit reduction for Season 1 and Season 2. Removal of trip limit reductions could increase the rate of harvest beyond that in **Alternative 1 (No Action)** and increase the likelihood of an in-season closure, shortening the season and reducing access to the vermilion snapper portion of the snapper grouper fishery. Alternatively, removing trip limit reductions can have the social benefit of reducing regulatory complexity and increasing compliance, ensuring long-term social benefits are realized by fishing communities.

4.5.4 Administrative Effects

Alternative 1 (No Action) would not change the administrative environment from its current state. Currently, there is a commercial quota monitoring system in place for vermilion snapper that is utilized to monitor landings against the commercial ACL and seasonal quotas. Since 2014, there has been a commercial harvest trip limit reduction for each 6-month fishing season. Additionally, since the 2009 July through December fishing season, commercial harvest has closed early for both fishing seasons due to landings reaching the seasonal quotas prior to the end of the fishing season. If total effort for vermilion snapper remains consistent, it is likely that trip limit reductions would be needed during each fishing season, and closures would occur prior to the end of the fishing season. Therefore, fishery managers would have to continue to prepare and issue trip limit reductions and closure notices for each six-month season. Additionally, enforcement personnel would have to monitor the closures. With an in-season quota closure, there is potential that the landings do not reach 100% of the ACL. In that circumstance, guidance from the South Atlantic Council to NMFS has recommended that harvest for snapper grouper species should reopen if landings are less than 95% of the ACL, and the projected number of days t to meet the ACL is two or more days. Therefore, the fishery managers would have to monitor the landings and prepare a reopening notice.

Alternative 2 and **Alternative 3** would modify the commercial trip limit for Season 2 (July through December). The Season 2 trip limit under **Alternative 2** would be lower than under **Alternative 1 (No Action)**, and the trip limit reduction requirement in Season 2 would be removed. A lower trip limit may slow the rate of harvest and lengthen the season, and potentially reduce the need for fishery managers to prepare a trip limit reduction notice and/or a closure notice that is required under **Alternative 1 (No Action)**. **Alternative 3** would lower the Season 2 trip limit even further than **Alternative 1 (No Action)** and **Alternative 2**, and also remove the Season 2 trip limit reduction. Since **Preferred Alternative 4** would remove the trip limit reduction requirement for both seasons, trip limit reduction notices would not need to be prepared, and the ACL may be met sooner in the season and would have the potential to close the season early. Out of the reduced trip limit sub-alternatives under **Preferred Alternative 4**, **Sub-Alternative 4c** and **4b** have the lowest seasonal trip limits, followed by **Preferred Sub-Alternative 4a**.

Alternative 1 (No Action), **Alternative 2**, and **Preferred Sub-alternatives 4a** and **4b** propose higher trip limits in Season 2 compared to **Alternative 3** and **Sub-alternative 4b**. A higher trip limit in Season 2 would have the direct social benefit of increasing trip efficiency, especially for businesses who target multiple species and do not need one species to be open year-round. Removal of trip limit reductions could increase the rate of harvest beyond that in **Alternative 1 (No Action)** and increase the likelihood of an in-season closure, shortening the season and reducing access to vermilion snapper. Alternatively, removing trip limit reductions can have the social benefit of reducing regulatory complexity and increasing compliance, ensuring long-term social benefits are realized by fishing communities. Of the four alternatives (plus sub-alternatives) considered, **Alternative 1 (No Action)** would impose the most administrative burden. Since the yearly quota is divided into two fishing seasons under **Alternative 1 (No Action**), if the quota for each season is projected to be met and harvest is closed, there is potential for a total of six in-season notices (i.e., trip limit reduction notice, closure notice, and reopening notice if it is subsequently determined that a portion of the ACL was not harvested, for each of two seasons) that would need to be prepared by fishery managers. Under **Alternative 2** and **Alternative 3**, there is potential that fishery managers may have to prepare five in-season notices since the trip limit reduction would be removed from Season 2. Fishery managers would only have to prepare a maximum of four in-season notices under **Preferred Alternative 4** and its sub-alternatives since the trip limit reduction would be removed from both seasons. Because there is already a trip limit in place combined with a trip limit reduction for each 6-month season for vermilion snapper, **Alternative 1 (No Action)** would impose the most administrative burden, followed by **Alternatives 2** and **3,** and **Preferred Alternative 4** (and its sub-alternatives). Outreach materials would take the form of fishery bulletins and updates to NMFS Southeast Regional Office's web site.

4.6 Action 6. Establish a minimum size limit for almaco jack for the commercial sector

4.6.1 Biological Effects

Under current conditions, using data from 2014 through 2016, 88.5% of almaco jack landed commercially (by weight) in the South Atlantic are above 20 inches fork length (FL) and 66% of the catch is above 26 inches FL (**Table 4.6.1.1**).

Table 4.6.1.1. Percent of almaco jackcommercial catch (in pounds) comprised of fish below and above each of the proposed minimum sizes limits (fork length), 2014-2016. Preferred indicated in bold.

Min Size	Pounds of Fish	
	% > min size	% < min size
20 inches	**88.5%**	**11.5%**
22 inches	82.6%	17.4%
24 inches	74.6%	25.4%
26 inches	65.8%	34.2%

Source: SAFMC

Alternatives*

1 (No Action). There is no commercial minimum size limit specified for almaco jack.

2. Specify a minimum size limit for almaco jack for the commercial sector:
- **2a. 20 inches fork length**
- 2b. 22 inches fork length
- 2c. 24 inches fork length
- 2d. 26 inches fork length

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives.

Expected Effects to the Almaco Jack Stock and Bycatch of Co-Occurring Species

Appendix K contains detailed methodology for the analyses presented below. Almaco jack are part of the Other Jacks Complex, and the data show that as the minimum size of almaco jack increases under **Preferred Alternative 2** and its sub-alternatives, the estimated annual landings of the Other Jacks Complex decrease. None of the proposed minimum size limit alternatives keep the annual landings of Other Jacks Complex below the commercial ACL (**Figure 4.6.1.1**).

Under **Alternative 1 (No Action)**, the commercial ACL for the Other Jacks Complex is expected to be met in early July; whereas, the proposed minimum size limits under **Sub-alternatives 2a (Preferred)-2d** might allow harvest to continue increasingly longer; from 12 additional days under a 20-inch FL minimum size limit (**Preferred Sub-alternative 2a**) to 82 additional days under a 26-inch FL minimum size limit (**Sub-alternative 2d**) (**Table 4.6.1.2**).

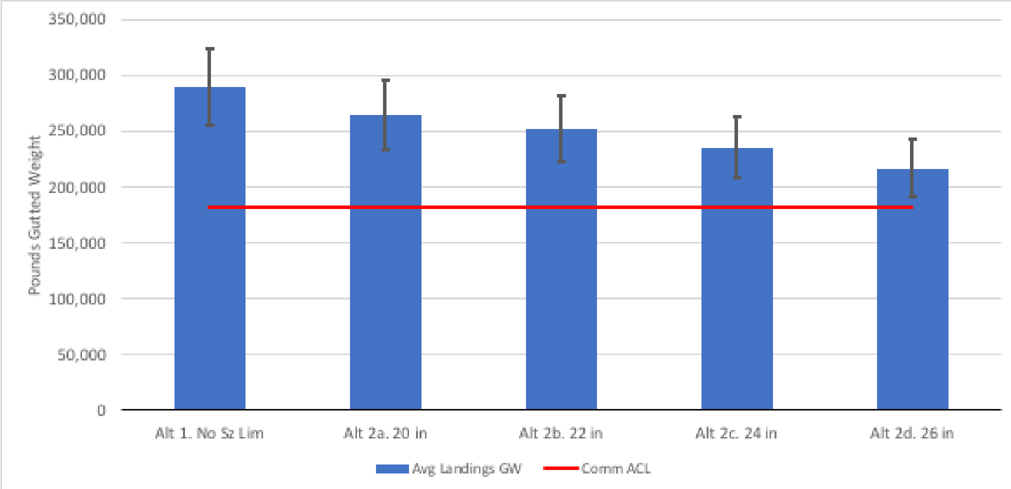

Figure 4.6.1.1. Estimated annual commercial landings of the Other Jacks Complex for each of the alternative almaco jack minimum size limits under Action 6 with 95% confidence intervals and the commercial ACL for reference.
Source: SAFMC

Table 4.6.1.2. Estimated closure dates for the Other Jacks Complex and estimated total landings with 95% confidence interval (CI) based on proposed almaco jack minimum sizes limit (TL) alternatives. Preferred indicated in bold.

Alt Num	Alternatives	Lower 95%	Closure Date	Upper 95%
1	No Size Limit	No Closure	7/2	6/2
2a	**20 in**	**No Closure**	**7/14**	**6/9**
2b	22 in	No Closure	7/26	6/13
2c	24 in	No Closure	8/18	6/19
2d	26 in	No Closure	9/23	6/27

Source: SAFMC

Establishing a minimum size limit for almaco jack is not expected to affect overall harvest, which is limited by the ACL and AMs that are in place. Biological benefits to the almaco jack stock would be realized if the minimum size limit allowed for an increase in the reproductive potential of the population. However, size at maturity information for almaco jack is limited (see **Section 3.2.1.6**). Without additional information on the reproductive biology of almaco jack, it is not possible to predict how imposition of a minimum size limit for the commercial harvest of this species would affect its reproductive potential. However, it is reasonable to assume that the larger an individual is upon harvest, the higher the likelihood that it would able to reproduce at least once. Hence, biological benefits would be higher under **Sub-alternatives 2d**, **2c**, **2b**, and **Preferred Sub-alternative 2a**, in that order.

Since the majority of the commercial catch of almaco jack is above the proposed 20-inch FL minimum size limit, discards are expected to be minimal. While a discard mortality rate for almaco jack is not available, greater amberjack, a related species, has an estimated discard mortality rate of 20% (SEDAR 15 2008). Therefore, the negative biological effects of **Preferred Alternative 2** are expected to be minimal relative to **Alternative 1 (No Action)** if almaco jack experience a similarly low release mortality.

Analyses contained in **Appendix D** determined that almaco jack co-occurred on a high percentage of trips with vermilion snapper, gray triggerfish, and greater amberjack. For species with a low estimated release mortality rate, such as and almaco jack, a high percentage of released fish likely survive resulting in minimal long-term population effects from a minimum size limit.

4.6.2 Economic Effects

Each incremental increase in the minimum size limit would be expected to successively increase the season length for the Other Jacks Complex by further reducing daily harvest rates of almaco jack (**Table 4.6.1.2**). Because landings per trip are reduced in exchange for a longer season, **Preferred Alternative 2** may benefit some vessels in terms of increased access and negatively affect others in terms of lower trip-level landings or increased harvesting costs. The magnitude of such effects would depend on the harvesting characteristics and profit maximization strategies of each vessel. These types of individual vessel level effects cannot be determined with available models.

The expected direct economic effects of the alternatives for **Action 6** on commercial fishing vessels are provided in **Tables 4.6.2.1** and **4.6.2.2** and summarized in **Table 4.6.2.3**. Specifically, **Table 4.6.2.1** provides estimates of the projected monthly and annual landings of the Other Jacks Complex by alternative (M. Errigo, pers. comm., 7/13/2018). **Table 4.6.2.2** provides estimates of the average monthly ex-vessel price of Other Jacks Complex from 2012 through 2016,[14] which are then used in combination with the projected monthly and annual landings to estimate the expected monthly and average gross revenue for almaco jack by alternative. There are minor differences in annual landings across alternatives (less than 1,400 lbs gw at most). There are also relatively minor differences in the projected monthly landings across alternatives. In general, alternatives that generate higher expected gross revenue are those that distribute relatively more landings to months with higher average ex-vessel prices. Even with differences in average ex-vessel prices across months, there are relatively small differences in the expected annual gross revenue across alternatives (less than $2,200), with expected annual gross revenue being the greatest under **Alternative 1 (No Action)** and the least under **Sub-alternative 2d**. Expected annual gross revenue is only slightly more than $700 less under **Preferred Sub-alternative 2a** than under **Alternative 1 (No Action)**.

However, relative to **Alternative 1 (No Action)**, changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected under the other alternatives considered for **Action 6**. Models are not available to generate quantitative estimates of the expected change in costs, so these effects must be considered qualitatively.

In general, minimum size limits are expected to increase costs in a manner similar to trip limits. Specifically, minimum size limits lead to discarded fish. Thus, commercial fishing vessels must exert more effort per trip or take more trips to land the same amount of fish, which leads to higher costs. The more restrictive the minimum size limit, the greater the amount of discarded fish and thus the greater the expected increase in costs. Thus, compared to

[14] The average ex-vessel price for almaco jack was used as a proxy for the price of the Other Jacks Complex in Actions 6 and 7 because almaco jack is the predominant species in the Other Jacks Complex.

Alternative 1 (No Action), harvesting costs to commercial fishing vessels are expected to be higher under all of the other alternatives and, specifically, the highest under **Sub-alternative 2d**.

The summarized results in **Table 4.6.2.3** indicate that **Alternative 1 (No Action)** is expected to generate the greatest net economic benefits, followed by **Preferred Sub-alternative 2a**, **Sub-alternative 2c**, **Sub-alternative 2b**, with **Sub-alternative 2d** expected to generate the least net economic benefits. Moreover, because all of the other alternatives are expected to result in lower annual gross revenue and higher private costs relative to **Alternative 1 (No Action)**, the changes in net economic benefits are expected to be negative under these other alternatives.

Approximately 165 vessels harvested almaco jack on average each year from 2012 to 2016 (see **Section 3.3.1.2**). These vessels' average annual gross revenues were $77,267 per vessel during this time. According to Overstreet, Perruso, and Liese (pers. comm., 7/11/2018), annual net revenue from operations for vessels in the "Jacks fishery" was approximately 4% of their average annual gross revenue from 2014-2016. Net revenue from operations is the best measure of economic profits available at this time. Thus, annual net revenue from operations (economic profit) for these almaco jack vessels is estimated to be about $3,100 per vessel. The largest average reduction in annual gross revenue per vessel is under **Sub-alternative 2d**, which is about $13 (or 0.4% of economic profits) and even less at $4 per vessel (or 0.1%) under **Preferred Sub-alternative 2a**. These reductions would be imperceptible for most vessels. However, the increases in costs could be considerably more significant depending on the amount of fish vessels are forced to discard and how much additional effort they exert to maintain their landings and revenue. These increases in cost may somewhat be offset through a higher price received for larger fish, but the extent to which this would occur is unknown. As such, economic profits are assumed to be reduced under any of the other alternatives relative to **Alternative 1 (No Action)**.

With respect to indirect effects, **Table 4.1.2.4** provides the economic characteristics of snapper grouper dealers from 2012 through 2016. Based on this information, approximately 286 dealers purchase snapper grouper landings on average each year. Their average annual purchases of snapper grouper are about $61,000 per dealer while their average annual purchases of all seafood are almost $132,000 per dealer. Thus, snapper grouper purchases represent 46.2% of their total seafood purchases, with the remaining purchases coming from other South Atlantic species (6.3%) and Gulf species (48.5%).

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the effect of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Changes in harvesting costs would not be expected to indirectly affect dealers.

More specifically, the largest reduction in annual seafood purchases relative to **Alternative 1 (No Action)** is expected under **Sub-alternative 2d**, and that would only be $8 per dealer. The reductions would be even less under the other alternatives. Thus, all of these reductions would be imperceptible to snapper grouper dealers.

Table 4.6.2.1. Projected monthly and annual landings (lbs gw) of Other Jacks Complex by alternative for **Action 6**. Preferred indicated in bold.

Month	Alt 1 (No Action)	Pref. Sub-alt 2a	Sub-alt 2b	Sub-alt 2c	Sub-alt 2d
Jan	11,500	**12,100**	11,458	10,587	9,636
Feb	13,304	**13,544**	12,842	11,890	10,851
Mar	16,341	**15,489**	14,652	13,516	12,276
Apr	45,257	**41,623**	41,105	40,403	39,637
May	51,528	**47,943**	45,570	42,349	38,835
Jun	42,981	**36,781**	34,607	31,655	28,434
Jul	2,992	**16,162**	22,052	22,411	20,066
Aug	0	**0**	0	9,789	12,883
Sep	0	**0**	0	0	9,650
Oct	0	**0**	0	0	0
Nov	0	**0**	0	0	0
Dec	0	**0**	0	0	0
TOTAL	183,902	**183,640**	182,287	182,599	182,268

Source: M. Errigo, pers. comm., 7/13/2018.

Table 4.6.2.2. Average monthly ex-vessel price (gw), projected monthly and annual gross revenue of Other Jacks Complex by alternative for **Action 6**.

Month	Price	Alt 1 (No Action)	Pref. Sub-alt 2a	Sub-alt 2b	Sub-alt 2c	Sub-alt 2d
Jan	$1.01	$11,574	**$12,177**	$11,531	$10,654	$9,698
Feb	$1.00	$13,299	**$13,539**	$12,837	$11,885	$10,847
Mar	$1.23	$20,091	**$19,043**	$18,015	$16,617	$15,093
Apr	$1.38	$62,306	**$57,302**	$56,591	$55,624	$54,569
May	$1.06	$54,756	**$50,946**	$48,426	$45,002	$41,268
Jun	$0.99	$42,630	**$36,480**	$34,324	$31,396	$28,202
Jul	$1.10	$3,278	**$17,707**	$24,160	$24,554	$21,985
Aug	$1.08	$0	**$0**	$0	$10,526	$13,853
Sep	$1.06	$0	**$0**	$0	$0	$10,229
Oct	$1.06	$0	**$0**	$0	$0	$0
Nov	$1.06	$0	**$0**	$0	$0	$0
Dec	$1.06	$0	**$0**	$0	$0	$0
TOTAL		$207,932	**$207,195**	$205,884	$206,259	$205,743

Source: Price data are from https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/monthly-landings/index, accessed 7/5/2018.

Table 4.6.2.3. Expected annual gross revenue for Other Jacks Complex, expected changes in gross revenue and private costs, and economic rank by alternative for Action 6. Preferred indicated in bold.

Alternative	Expected Annual Gross Revenue (2016$)	Expected Change in Annual Gross Revenue (2016$)	Expected Increase in Private Costs (Rank)	Economic Rank (net economic benefits)
1 (No Action)	$207,932	$0	1	1
Pref. Sub-alt 2a	**$207,195**	**-$737**	**2**	**2**
Sub-alt 2b	$205,884	-$2,049	3	4
Sub-alt 2c	$206,259	-$1,674	4	3
Sub-alt 2d	$205,743	-$2,189	5	5

4.6.3 Social Effects

A description of the communities that would most likely be affected by changes in commercial management of the Other Jacks Complex can be found in **Section 3.4** and include: Islamorada, Palm Beach Gardens, Boca Raton, Daytona Beach, Miami, Delray Beach, and Marathon Shores, Florida; and Hampstead, Wilmington, and Morehead City, North Carolina. These communities would likely be affected by changes to the minimum size limit for almaco jack.

Specifying a minimum size limit under **Preferred Alternative 2** does not reduce harvest below the ACL and would not result in a substantially longer fishing season (**Table 4.6.1.2**). The social effects of specifying a minimum size limit for almaco jack would be associated with the positive and negative biological effects on the species (see **Section 4.6.1**). Negative effects of specifying a minimum size limit could result from increased discards. However, only about 12% (by weight) of the almaco jack being harvested commercially are below the proposed 20-inch FL minimum size limit and discard mortality of jacks is estimated to be low (see **Section 4.6.1**). Alternatively, specifying a minimum size limit may protect reproductive potential. This would be expected to contribute to the sustainability of harvest and the health of these stocks and provide for long-term social benefits.

All of the proposed alternatives are anticipated to result in a minor reduction in gross economic revenue and slightly higher costs when compared to **Alternative 1 (No Action)**. The smallest reduction in net economic benefits, when compared to **Alternative 1 (No Action)**, would be seen under **Preferred Sub-alternative 2a**, followed by **Sub-alternative 2c**, **Sub-alternative 2b**, with the largest reduction under **Sub-alternative 2d** (**Table 4.6.2.3**). However, the reduction in net economic benefits is not substantial under any alternative and would not be anticipated to result in negative direct or indirect social effects on fishing communities.

4.6.4 Administrative Effects

There is no minimum size limit currently in place for almaco jack in the South Atlantic Region; however, establishing a minimum size limit under **Preferred Alternative 2** would not be unusually burdensome. Administrative impacts on the agency associated with **Preferred Alternative 2** (including **Sub-Alternatives 2a-2d**) would be incurred by rulemaking, outreach, education, and enforcement.

4.7 Action 7. Establish a commercial trip limit for the Other Jacks Complex

4.7.1 Biological Effects

> ***Alternatives****
>
> 1 No Action. There is no commercial trip limit for the Other Jacks Complex (lesser amberjack, almaco jack, and banded rudderfish).
>
> **2. Establish a commercial trip limit of:**
> - **2a. 500 lbs gw**
> - 2b. 400 lbs gw
> - 2c. 300lbs gw
>
> * Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

The analyses presented here account for the specification of a minimum size limit under **Action 6**. Refer to **Appendix K** for detailed methodology and assumptions.

The proposed trip limits have the expected effect of reducing the estimated landings of species in the Other Jacks Complex as the trip limit decreases from **Preferred Sub-alternative 2a** (500 lbs gw) to **Sub-alternative 2c** (300 lbs gw). Within each trip limit sub-alternative, imposition of a minimum size for almaco jack shows a decreasing pattern in the landings level as minimum size limits increase (**Figure 4.7.1.1**). Under a 26-inch FL minimum size limit, trip limits of 400 or 300 lbs gw (**Sub-alternatives 2b** and **2c**, respectively) would result in the commercial ACL not being fully harvested. Similarly, the combination of a 24-inch FL minimum size and a 300-lbs gw trip limit (**Sub-alternative 2c**) would leave a portion of the ACL unharvested. Predicted closure dates under **Preferred Alternative 2** and its sub-alternatives range from mid-August to no closure (**Table 4.7.1.1**).

Monthly landings of species in the Other Jacks Complex from 2014 through 2016 show a clear pattern, or "season," for the Other Jacks Complex that starts in April and is over by August under **Alternative 1 (No Action)** (see **Figure 3.2.13** in **Section 3.2.1**). Landings occur over the rest of the year but at a much lower level. It is noted that the 95% confidence intervals around these monthly estimates are very wide.

Expected Effects to the Other Jacks Complex and Bycatch of Co-Occurring Species

There is no expected difference in the biological effects of implementing a trip limit for the Other Jacks Complex relative to **Alternative 1 (No Action)** since overall harvest would continue to be limited to the ACL and AMs. As discussed previously, since most of the commercial catch of almaco jack is above the proposed 20-inch FL minimum size limit and release mortality is expected to be low, any negative biological effects of **Preferred Alternative 2** and its sub-alternatives would be minimal relative to **Alternative 1 (No Action)**. It is not possible to evaluate the effects of proposed trip limit alternatives in relation to spawning activity for this group of species, as little is known about their reproductive biology (see **Section 3.2.1**)

Analyses contained in **Appendix D** determined that species in the Other Jacks Complex also co-occurred on a high percentage of trips with vermilion snapper, gray triggerfish, greater amberjack, and black sea bass. In addition, almaco jack, banded rudderfish, and lesser amberjack had low reported discards.

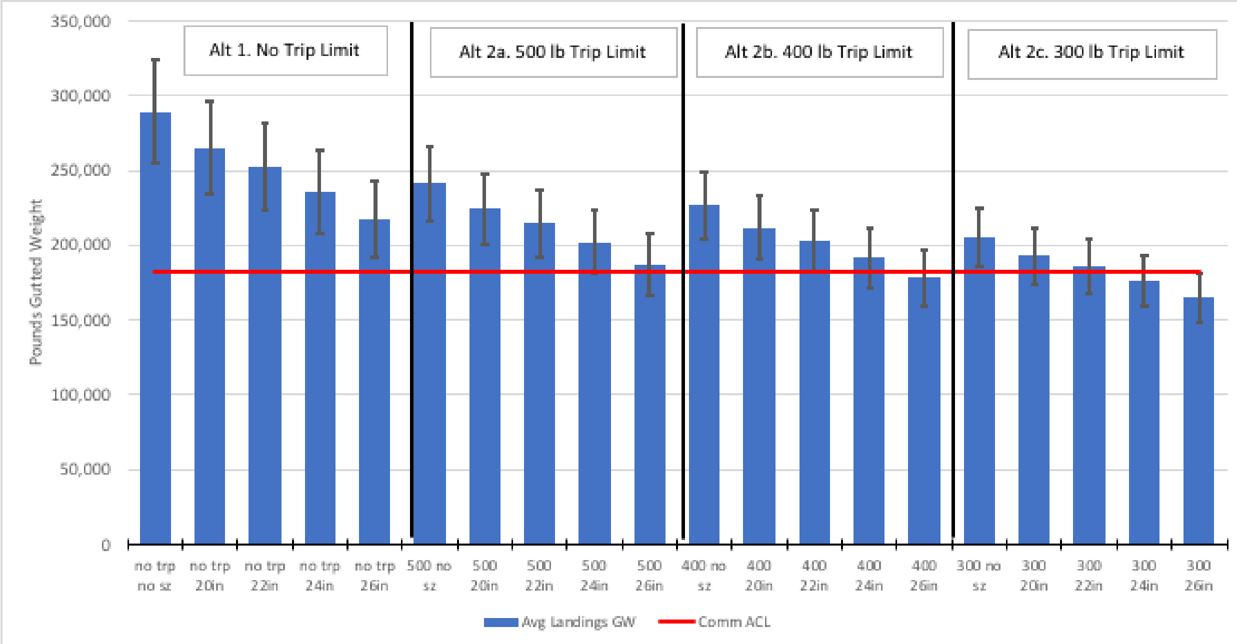

Figure 4.7.1.1. Estimated annual commercial landings of the Other Jacks Complex for **Sub-alternatives 2a (Preferred)-2c**. Each sub-alternative was analyzed for each of the almaco jack minimum size limit alternatives under Action 6. The commercial ACL for the Other Jacks Complex is depicted by the red line.

Table 4.7.1.2. Estimated closure dates for each trip limit sub-alternative under **Preferred Alternative 2** analyzed in combination with minimum size limits proposed under Action 6. Preferred alternatives indicated in bold.

Trip Limit Alt (Action 7)	Size Limit Alt (Action 6)	Lower 95%	Closure Dates	Upper 95%	Est. Landings (gw)
2a (500 lbs)	1 (No size limit)	No Closure	16-Aug	9-Jun	182,138
	2a (20 inches)	**No Closure**	**14-Sep**	**10-Jun**	**182,138**
	2b (22 inches)	No Closure	3-Oct	11-Jun	182,138
	2c (24 inches)	No Closure	4-Nov	15-Jun	182,138
	2d (26 inches)	No Closure	17-Dec	27-Jun	182,138
2b (400 lbs)	1 (No size limit)	No Closure	9-Sep	16-Jun	182,138
	2a (20 inches)	No Closure	11-Oct	17-Jun	182,138
	2b (22 inches)	No Closure	1-Nov	17-Jun	182,138
	2c (24 inches)	No Closure	6-Dec	22-Jun	182,138
	2d (26 inches)	No Closure	No Closure	29-Jun	178,291
2c (300 lbs)	1 (No size limit)	No Closure	28-Oct	27-Jun	182,138
	2a (20 inches)	No Closure	2-Dec	28-Jun	182,138
	2b (22 inches)	No Closure	20-Dec	29-Jun	182,138
	2c (24 inches)	No Closure	No Closure	4-Jul	176,195
	2d (26 inches)	No Closure	No Closure	12-Jul	164,759

Source: SAFMC

4.7.2 Economic Effects

Because landings per trip are reduced in exchange for a longer season, **Preferred Alternative 2** may benefit some vessels in terms of increased access and negatively affect others in terms of lower trip-level landings. The magnitude of such effects would depend on the harvesting characteristics and profit maximization strategies of each vessel. These types of individual vessel level effects cannot be determined with available models.

The expected direct economic effects of the alternatives for **Action 7** on commercial fishing vessels are provided in **Tables 4.7.2.1** through **4.7.2.6** and summarized in **Table 4.7.2.7**. Specifically, **Tables 4.7.2.1** through **4.7.2.3** provide estimates of the projected monthly and annual landings of the Other Jacks Complex by alternative in combination with the alternatives under **Action 6** (M. Errigo, pers. comm., 7/13/2018). **Tables 4.7.2.4** through **4.7.2.6** provide estimates of the average monthly ex-vessel price of species in the Other Jacks Complex from 2012 through 2016, which are then used in combination with the projected monthly and annual landings to estimate the expected monthly and average gross revenue for species in the Other Jacks Complex by alternative (**Table 4.7.2.7**).

The differences in annual landings across alternatives are trivial in most cases, with the exceptions of **Sub-alternative 2b** in combination with **Sub-alternative 2d** under Action 6, **Sub-alternative 2c** in combination with **Sub-alternative 2c** under Action 6, and particularly **Sub-alternative 2c** in combination with **Sub-alternative 2d** under Action 6. These particular combinations of alternatives lead to landings reductions of about 5,600 lbs gw, 7,700 lbs gw, and more than 19,000 lbs gw, respectively. These differences in projected annual landings partly explain some of the differences in expected annual gross revenue. However, differences in the projected monthly distributions of landings in conjunction with differences in average ex-vessel prices across months also contribute to the differences in expected annual gross revenue across alternatives. In general, alternatives that generate higher expected gross revenue are those that distribute relatively more landings to months with higher average ex-vessel prices. Relative to **Alternative 1 (No Action)** for **Action 7**, most of the combinations of alternatives under **Action 7** and Action 6 result in an additional decrease in expected annual gross revenue of about $5,000 to $7,600, with the exceptions of **Sub-alternative 2b** in combination with **Sub-alternative 2d** under Action 6, **Sub-alternative 2c** in combination with **Sub-alternative 2c** under Action 6, and particularly **Sub-alternative 2c** in combination with **Sub-alternative 2d** under Action 6. For these three combinations of alternatives, the additional expected reductions in annual gross revenue are nearly $10,000, about $13,500, and more than $25,000, respectively. The additional reduction in expected annual gross revenue under **Preferred Sub-alternative 2a** under **Action 7**, assuming **Preferred Sub-alternative 2a** under Action 6, is about $5,100.

In addition, relative to **Alternative 1 (No Action)**, changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected under the other alternatives considered for **Action 7**. Models are not available to generate quantitative estimates of the expected change in costs, so these effects must be considered qualitatively.

In general, trip limits are expected to increase costs because commercial fishing vessels must take more trips to land the same amount of fish. The more restrictive the trip limit, the greater the expected increase in costs. Relative to **Alternative 1 (No Action)**, **Sub-alternative 2c** would be expected to increase harvesting costs the most, followed by **Sub-alternative 2b**, and **Preferred Sub-alternative 2a.**

The summarized results in **Table 4.7.2.7** indicate that **Alternative 1 (No Action)** is expected to generate the greatest net economic benefits, followed by **Preferred Sub-alternative 2a**, **Sub-alternative 2b**, with **Sub-alternative 2c** expected to generate the least net economic benefits. Moreover, because all of the other alternatives are expected to result in lower annual gross revenue and higher private costs relative to **Alternative 1 (No Action)**, the changes in net economic benefits are expected to be negative under these other alternatives.

Approximately 210 vessels harvested species in the Other Jacks Complex on average each year from 2012 to 2016 (see **Section 3.3.1.2**). These vessels' average annual gross revenues were $69,363 per vessel during this time. According to Overstreet, Perruso, and Liese (pers. comm., 7/11/2018), annual net revenue from operations for vessels in the "Jacks fishery" was approximately 4% of their average annual gross revenue from 2014-2016. Net revenue from operations is the best measure of economic profits available at this time. Thus, annual net revenue from operations (economic profit) for these "Other Jacks" vessels is estimated to be about $2,800 per vessel. In general, the largest average reduction in annual gross revenue per vessel is under **Sub-alternative 2c**. Depending on which alternative is selected under Action 6, the additional reduction in annual gross revenue is expected to range from between $28 and $120 per vessel, or between 1% and 4% of their economic profits, under **Sub-alternative 2c**. Under **Preferred Sub-alternative 2a**, these reductions would be lower and range between $18 and $38, or between 0.6% and 1%. However, the expected increases in costs would decrease economic profits even further, the magnitude of which depends on how much additional effort vessels must exert to maintain their landings and revenues. As such, economic profits are expected to be reduced under any of the other alternatives relative to **Alternative 1 (No Action)**.

With respect to indirect effects, **Table 4.1.2.4** provides the economic characteristics of snapper grouper dealers from 2012 through 2016. Based on this information, approximately 286 dealers purchase snapper grouper landings on average each year. Their average annual purchases of snapper grouper are about $61,000 per dealer while their average annual purchases of all seafood are almost $132,000 per dealer. Thus, snapper grouper purchases represent 46.2% of their total seafood purchases, with the remaining purchases coming from other South Atlantic species (6.3%) and Gulf species (48.5%).

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the effect of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). In this circumstance, changes in harvesting costs would not be expected to indirectly affect dealers.

More specifically, the largest reduction in annual seafood purchases relative to **Alternative 1 (No Action)** is expected under **Sub-alternative 2c**. Those reductions would be expected to range from about $20 to $87 per dealer or less than 0.1%. The reductions would be even less under **Sub-alternative 2b** and **Preferred Sub-alternative 2a**. Thus, all of these reductions would be imperceptible to snapper grouper dealers.

Table 4.7.2.1. Projected monthly and annual landings (lbs gw) of Other Jacks Complex for **Action 7**, **Preferred Sub-alternative 2a** in combination with Action 6 sub-alternatives for minimum size limit. Combination of preferred alternatives indicated in bold.

Month	Action 6 Alt 1 (No Action)	Action 6 Pref. Sub-alt 2a	Action 6 Sub-alt 2b	Action 6 Sub-alt 2c	Action 6 Sub-alt 2d
Jan	13,223	**12,033**	11,419	10,577	9,636
Feb	14,369	**13,156**	12,524	11,638	10,643
Mar	16,284	**14,879**	14,116	13,056	11,893
Apr	26,345	**25,655**	25,279	24,751	24,151
May	46,457	**43,109**	41,299	38,755	35,788
Jun	32,127	**29,684**	28,367	26,514	24,434
Jul	25,093	**23,052**	21,909	20,338	18,564
Aug	8,830	**14,899**	14,246	13,336	12,303
Sep	0	**6,311**	12,646	11,948	11,145
Oct	0	**0**	739	9,597	8,885
Nov	0	**0**	0	1,638	9,526
Dec	0	**0**	0	0	5,351
TOTAL	182,727	**182,776**	182,543	182,149	182,318

Source: M. Errigo, pers. comm., 7/13/2018.

Table 4.7.2.2. Projected monthly and annual landings (lbs gw) of Other Jacks Complex for Action 7, Sub-alternative 2b in combination with Action 6 sub-alternatives for minimum size limit.

Month	Action 6 Alt 1 (No Action)	Action 6 Pref. Sub-alt 2a	Action 6 Sub-alt 2b	Action 6 Sub-alt 2c	Action 6 Sub-alt 2d
Jan	13,091	11,937	11,328	10,494	9,586
Feb	13,968	12,824	12,205	11,363	10,440
Mar	15,753	14,449	13,742	12,771	11,666
Apr	23,517	22,928	22,603	22,132	21,583
May	43,363	40,650	39,123	36,857	34,245
Jun	30,034	27,953	26,768	25,108	23,179
Jul	23,630	21,868	20,910	19,555	17,896
Aug	15,190	14,144	13,585	12,756	11,800
Sep	3,633	12,328	11,874	11,248	10,527
Oct	0	3,228	9,543	9,006	8,384
Nov	0	0	605	9,783	9,134
Dec	0	0	0	1,436	9,851
TOTAL	182,179	**182,309**	182,285	182,511	178,291

Source: M. Errigo, pers. comm., 7/13/2018.

Table 4.7.2.3. Projected monthly and annual landings (lbs gw) of Other Jacks Complex for Action 7, Sub-alternative 2c in combination with Action 6 sub-alternatives for minimum size limit.

Month	Action 6 Alt 1 (No Action)	Action 6 Pref. Sub-alt 2a	Action 6 Sub-alt 2b	Action 6 Sub-alt 2c	Action 6 Sub-alt 2d
Jan	12,724	11,653	11,083	10,291	9,418
Feb	13,304	12,273	11,718	10,940	10,068
Mar	14,891	13,727	13,109	12,228	11,234
Apr	20,039	19,486	19,201	18,810	18,365
May	38,476	36,432	35,289	33,639	31,571
Jun	26,674	25,151	24,296	23,038	21,450
Jul	21,587	20,085	19,257	18,100	16,763
Aug	13,913	13,006	12,505	11,809	11,009
Sep	12,107	11,365	10,947	10,362	9,697
Oct	8,792	8,992	8,656	8,190	7,649
Nov	0	9,861	9,517	9,008	8,415
Dec	0	213	7,259	9,779	9,119
TOTAL	182,506	182,244	182,837	176,195	164,759

Source: M. Errigo, pers. comm., 7/13/2018.

Table 4.7.2.4. Average monthly ex-vessel price (gw), projected monthly and annual gross revenue of Other Jacks Complex for Action 7, **Preferred Sub-alternative 2a** in combination with Action 6 sub-alternatives for minimum size limit. Combination of preferred alternatives indicated in bold.

Month	Price	Action 6 Alt 1 (No Action)	Action 6 Pref. Sub-alt 2a	Action 6 Sub-alt 2b	Action 6 Sub-alt 2c	Action 6 Sub-alt 2d
Jan	$1.01	$13,307	**$12,109**	$11,492	$10,644	$9,698
Feb	$1.00	$14,364	**$13,151**	$12,519	$11,634	$10,639
Mar	$1.23	$20,021	**$18,293**	$17,356	$16,052	$14,622
Apr	$1.38	$36,269	**$35,320**	$34,802	$34,074	$33,249
May	$1.06	$49,367	**$45,810**	$43,886	$41,184	$38,030
Jun	$0.99	$31,864	**$29,441**	$28,135	$26,298	$24,235
Jul	$1.10	$27,493	**$25,256**	$24,003	$22,283	$20,339
Aug	$1.08	$9,495	**$16,020**	$15,318	$14,340	$13,229
Sep	$1.06	$0	**$6,689**	$13,404	$12,664	$11,814
Oct	$1.06	$0	**$0**	$783	$10,173	$9,418
Nov	$1.06	$0	**$0**	$0	$1,737	$10,098
Dec	$1.06	$0	**$0**	$0	$0	$5,672
TOTAL		$202,180	**$202,090**	$201,700	$201,083	$201,041

Source: Price data are from https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/monthly-landings/index, accessed 7/5/2018.

Table 4.7.2.5. Average monthly ex-vessel price (gw), projected monthly and annual gross revenue of Other Jacks Complex for Action 7, Sub-alternative 2b in combination with Action 6 sub-alternatives for minimum size limit.

Month	Price	Action 6 Alt 1 (No Action)	Action 6 Pref. Sub-alt 2a	Action 6 Sub-alt 2b	Action 6 Sub-alt 2c	Action 6 Sub-alt 2d
Jan	$1.01	$13,175	$12,013	$11,400	$10,561	$9,647
Feb	$1.00	$13,963	$12,819	$12,200	$11,359	$10,436
Mar	$1.23	$19,368	$17,765	$16,895	$15,702	$14,343
Apr	$1.38	$32,376	$31,565	$31,118	$30,470	$29,714
May	$1.06	$46,080	$43,197	$41,574	$39,166	$36,391
Jun	$0.99	$29,788	$27,724	$26,549	$24,903	$22,990
Jul	$1.10	$25,889	$23,959	$22,910	$21,425	$19,607
Aug	$1.08	$16,333	$15,209	$14,608	$13,716	$12,688
Sep	$1.06	$3,850	$13,068	$12,587	$11,923	$11,159
Oct	$1.06	$0	$3,421	$10,115	$9,547	$8,887
Nov	$1.06	$0	$0	$641	$10,369	$9,682
Dec	$1.06	$0	$0	$0	$1,523	$10,442
TOTAL		$200,823	$200,741	$200,597	$200,665	$195,985

Source: Price data are from https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/monthly-landings/index, accessed 7/5/2016.

Table 4.7.2.6. Average monthly ex-vessel price (gw), projected monthly and annual gross revenue of Other Jacks Complex for Action 7, Sub-alternative 2c in combination with Action 6 sub-alternatives for minimum size limit.

Month	Price	Action 6 Alt 1 (No Action)	Action 6 Pref. Sub-alt 2a	Action 6 Sub-alt 2b	Action 6 Sub-alt 2c	Action 6 Sub-alt 2d
Jan	$1.01	$12,805	$11,727	$11,154	$10,357	$9,478
Feb	$1.00	$13,299	$12,268	$11,713	$10,936	$10,064
Mar	$1.23	$18,308	$16,877	$16,117	$15,034	$13,812
Apr	$1.38	$27,588	$26,827	$26,434	$25,895	$25,283
May	$1.06	$40,887	$38,715	$37,500	$35,747	$33,549
Jun	$0.99	$26,456	$24,946	$24,097	$22,850	$21,274
Jul	$1.10	$23,651	$22,006	$21,098	$19,831	$18,366
Aug	$1.08	$14,960	$13,985	$13,446	$12,698	$11,838
Sep	$1.06	$12,834	$12,047	$11,604	$10,984	$10,279
Oct	$1.06	$9,319	$9,531	$9,176	$8,682	$8,108
Nov	$1.06	$0	$10,453	$10,088	$9,549	$8,920
Dec	$1.06	$0	$226	$7,695	$10,366	$9,666
TOTAL		$200,107	$199,607	$200,123	$192,928	$180,639

Source: Price data are from https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/monthly-landings/index, accessed 7/5/2016.

Table 4.7.2.7. Expected annual gross revenue for Other Jacks Complex, expected changes in gross revenue, and private costs, and economic rank by alternative for **Action 7**.

Action 6 Alternative	Action 7 Alternative	Expected Annual Gross Revenue (2016$)	Expected Change in Annual Gross Revenue (2016$)	Expected Increase in Private Costs (Rank)	Economic Rank (net economic benefits)
Alt 1 (No action)	Alt 1 (No action)	$207,932	$0	1	1
Sub-alt 2a	Alt 1 (No action)	$207,195	-$737	2	2
Sub-alt 2b	Alt 1 (No action)	$205,884	-$2,049	3	4
Sub-alt 2c	Alt 1 (No action)	$206,259	-$1,674	4	3
Sub-alt 2d	Alt 1 (No action)	$205,743	-$2,189	5	5
Alt 1 (No action)	Sub-alt 2a	$202,180	-$5,752	6T	6
Sub-alt 2a	**Sub-alt 2a**	**$202,090**	**-$5,843**	**6T**	**7**
Sub-alt 2b	Sub-alt 2a	$201,700	-$6,233	6T	8
Sub-alt 2c	Sub-alt 2a	$201,083	-$6,849	6T	9
Sub-alt 2d	Sub-alt 2a	$201,041	-$6,892	6T	10
Alt 1 (No action)	Sub-alt 2b	$200,823	-$7,109	11T	11
Sub-alt 2a	Sub-alt 2b	$200,741	-$7,191	11T	12
Sub-alt 2b	Sub-alt 2b	$200,597	-$7,335	11T	14
Sub-alt 2c	Sub-alt 2b	$200,665	-$7,268	11T	13
Sub-alt 2d	Sub-alt 2b	$195,985	-$11,947	11T	17
Alt 1 (No action)	Sub-alt 2c	$200,107	-$7,825	15T	16
Sub-alt 2a	Sub-alt 2c	$199,607	-$8,326	15T	18
Sub-alt 2b	Sub-alt 2c	$200,123	-$7,810	15T	15
Sub-alt 2c	Sub-alt 2c	$192,928	-$15,004	15T	19
Sub-alt 2d	Sub-alt 2c	$180,639	-$27,293	15T	20

4.7.3 Social Effects

A description of the communities that would most likely be affected by changes in commercial management of the Other Jacks Complex can be found in **Section 3.4** and include: Islamorada, Palm Beach Gardens, Boca Raton, Daytona Beach, Miami, Delray Beach, and Marathon Shores, Florida; and Wilmington, Morehead City and Hampstead, North Carolina. These communities would likely be affected by changes to the commercial trip limit for the Other Jacks Complex.

In general, a commercial trip limit under **Preferred Alternative 2** may help slow the rate of harvest and lengthen the season, but trip limits that are too low may make fishing trips inefficient and too costly if fishing grounds are too far away, which would be of most concern under **Sub-alternative 2c**, followed by **Sub-alternative 2b** and **Preferred Sub-alternative 2a**. A longer open season would be beneficial to the commercial fleet and to end users of jacks (restaurant owners, fish houses, and consumers) by improving consistency of availability.

Peak harvest of Other Jacks Complex species begins in April and concludes in August (see **Figure 3.2.13**). When combined with the minimum size limit for almaco jack proposed in Action 6, **Preferred Sub-alternative 2a** and **Sub-alternative 2c** would keep the Other Jacks Complex open until the beginning of December; whereas, **Preferred Sub-alternative 2a** and

Sub-alternative 2b would result in a shorter season with estimated closures in mid-September and Mid-October, respectively, after harvest of Other Jacks Complex species has peaked (**Table 4.7.1.2**). **Alternative 1 (No Action)** would result in the shortest fishing season, with a predicted closure date of July 2nd when harvest of Other Jacks Complex species still occurs at moderate levels under current management. This would result in negative social effects associated with a decrease in fishing opportunities (**Table 4.6.1.2**). Generally, longer fishing seasons provide continued access for commercial fishermen and consistency for end users, if trip limits are sufficient to support commercial fishing activity. Reductions in annual gross revenue under **Preferred Sub-alternative 2a** for Action 6 and **Preferred Alternative 2a** for Action 7 are expected to be minimal and are not anticipated to have a negative direct or indirect social effect on fishing communities (**Table 4.7.2.7**).

4.7.4 Administrative Effects

Alternative 1 (No Action) would not change the administrative environment from its current condition. Currently, there is a commercial quota monitoring system in place for the Other Jacks Complex. From 2014 through 2016, the ACL for the Other Jacks Complex has been met from late June to early August (**Table 3.2.6**), which is prior to the end of the fishing year. In 2018, the commercial ACL for the Other Jacks Complex was met and harvest closed on August 22. If total effort for the Other Jacks Complex remains consistent, it is likely that the ACL would be reached and closures would continue to occur prior to the end of the fishing year. Therefore, fishery managers would have to continue to prepare and issue closure notices. Additionally, enforcement personnel would have to monitor the closures. With an in-season quota closure, there is potential that the landings do not reach 100% of the ACL. In that circumstance, guidance from the South Atlantic Council to NMFS has recommended that harvest for snapper grouper species should reopen if landings are less than 95% of the ACL, and the projected number of days to meet the ACL is two or more days. Therefore, fishery managers would have to monitor the landings and prepare a reopening notice.

Preferred Alternative 2 would establish a commercial trip limit for the Other Jacks Complex, which may slow the rate that landings would reach the ACL and lengthen the season. When in combination with the minimum size limits proposed under Action 6 and a trip limit implemented under **Preferred Sub-alternative 2a**, it is expected that the ACL would be met prior to the end of the fishing year, similarly to **Alternative 1 (No Action)**, and fishery managers would still need to prepare a closure notice. The minimum size limits proposed under Action 6, and a lower trip limit implemented under **Sub-alternatives 2b** or **2c** would slow the rate of landings even further and lengthen the season, which could delay or potentially end the need for fishery managers to prepare a closure notice, as the ACL would be met later in the fishing year or not at all.

Of the alternatives considered for modifying the trip limit for the Other Jacks Complex, **Alternative 1 (No Action),** and **Preferred Sub-alternative 2a** would impose the most administrative burden, compared to **Sub-alternatives 2b** and **2c**. Ongoing monitoring of the commercial quota would be required, and enforcement personnel would have to monitor trip limits. Over the course of a given fishing year, there is potential under **Preferred Sub-alternative 2a** for a total of two in-season notices (i.e., closure notice and reopening notice if it is subsequently determined that a portion of the ACL was not harvested) that would need to be prepared by fishery managers. Outreach materials would take the form of fishery bulletins and updates to NMFS Southeast Regional Office's web site.

4.8 Action 8. Remove the commercial minimum size limit for certain deep-water species

4.8.1 Biological Effects

*Alternatives**

1. No Action. The commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper is 12 inches total length (TL).

2. Remove the 12-inch TL commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper in South Atlantic federal waters.

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

Expected Effects to the Deep-waters species and Bycatch of Co-Occurring Species

It is difficult to determine the effects of **Preferred Alternative 2** due to the lack of commercial discard data. The only discard data available for the years 2014 through 2016 were from the SEFSC Supplemental Discard Logbook Program. The discard logbook database (accessed May 2017) contains self-reported discard data from a 20% sub-sample (by region and gear fished) of all commercial vessels with federal fishing permits (see **Appendix J** for detailed methodology). From 2014 through 2016, only two trips reported discards for silk snapper and no discards were reported for queen snapper or blackfin snapper (**Table 4.8.1.1**). None of the species were reported as being kept for bait. Among trips with reported discards for any of the three species, there were four silk snapper discarded alive due to being undersized. Even though the discard condition was reported as alive, silk snapper are caught in deep water and it is likely that discard mortality is high because of depth-related trauma. A literature search did not reveal any discard mortality studies for the species considered in this action, but other studies of commercially discarded red snapper have estimated discard mortality rates >50% beyond 60 meters (Campbell et al. 2014, Pulver 2017).

Expanding the observed discard rates to the snapper grouper fishery as a whole is non-informative due to low reported encounters in recent years (see **Table S-2** in **Appendix J**). Available data suggest minimal changes in discard or harvest rates would be expected under **Preferred Alternative 2**. Thus, biological effects of **Preferred Alternative 2** would be neutral compared to **Alternative 1 (No Action)** as removing the minimum size limit would have no effect on overall harvest, which is limited by the ACL and AMs that are in place. Analyses contained in **Appendix D** determined that queen snapper, blackfin snapper, and silk snapper also co-occurred on a high percentage of trips with dolphin, scamp, red porgy, snowy grouper, greater amberjack, blueline tilefish, vermilion snapper, and gray triggerfish. Besides silk snapper, queen snapper and blackfin snapper had no reported discards.

Table 4.8.1.1. Number of discards of queen, silk, and blackfin snapper reported to the coastal logbook program from 2014 through 2016 for the South Atlantic.

Species	Number Discarded	Discard Condition	Discard Reason
Queen Snapper	0	———	———
Silk Snapper	4	All Alive	Size Limit
Blackfin Snapper	0	———	———

Source: SERO

4.8.2 Economic Effects

Alternative 1 (No Action) would maintain the current commercial minimum size limit of 12 inches TL for queen snapper, silk snapper, and blackfin snapper. **Preferred Alternative 2** would remove this minimum size limit; however, based on available data, only minimal changes in discards or landings would be expected to occur (**Section 4.8.1**). Therefore, any potential changes in ex-vessel revenue relative to **Alternative 1 (No Action)** would also be expected to be minimal. If harvest rates increase noticeably as a result of **Preferred Alternative 2**, it could result in an overall increase in aggregate annual ex-vessel revenue relative to the status quo. Such an increase would be constrained, however, by the ACL for the Deep-water Complex.

Logbook discard data are not always reliable (i.e., tend to underestimate actual discards relative to other data sources such as observer data), and thus the increase in landings could be greater than these data suggest. As commercial fishing vessels have only harvested about 43% of the commercial Deep-water Complex ACL in 2015/2016 (after blueline tilefish was removed from the Deep-water Complex), landings could increase significantly without any concern of exceeding the commercial ACL. Further, with the elimination of the minimum size limit, vessels would be able to increase their landings of these species per unit of effort. Thus, the costs of harvesting these species would also be expected to decrease on a per pound basis. So, net economic benefits under **Preferred Alternative 2** would be expected to be higher than under **Alternative 1 (No Action).**

Approximately 94 vessels harvested these species on average each year from 2012 to 2016 (**Section 3.3.1.2**). These vessels' average annual gross revenues were $93,154 per vessel during this time. According to Overstreet, Perruso, and Liese (pers. comm., 7/11/2018), annual net revenue from operations for vessels in the "deep-water fishery" was approximately 4% of their average annual gross revenue from 2014-2016. Net revenue from operations is the best measure of economic profits available at this time. Thus, annual net revenue from operations (economic profit) for these deep-water snapper vessels is estimated to be about $3,700 per vessel. **Preferred Alternative 2** would be expected to increase their economic profits to a limited extent.

4.8.3 Social Effects

A description of the communities that would most likely be affected by changes in commercial management of queen, silk, and blackfin snapper can be found in **Section 3.4** and includes: Key West, Miami, Miami Beach, Key Largo, and Mayport, Florida; Murrells Inlet, South Carolina; and Southport, Beaufort, and Emerald Isle, North Carolina. These communities would likely be affected by changes to commercial size limits for silk snapper, queen snapper, and blackfin snapper.

Some social effects of removing the minimum size limits for these three species would be associated with the positive and negative biological effects on the species (see **Section 4.8.1**). Positive effects of removing the minimum size limit would result from reduced discards. This would be expected to reduce waste for this portion of the snapper grouper fishery, improving the perception of management success.

However, as discussed in **Section 4.8.1**, discards of queen, silk, and blackfin snapper are generally at low levels. Removing the minimum size limit (**Preferred Alternative 2**) would likely have minimal or no effects on current commercial trips and the effects are similar to the expected effects of **Alternative 1 (No Action)**, because these species are not caught in large numbers.

4.8.4 Administrative Effects

Because there is a minimum size limit already in place for queen snapper, silk snapper, and blackfin snapper in the South Atlantic Region under **Alternative 1 (No Action)**, beneficial administrative effects would be expected from **Preferred Alternative 2**, when compared with **Alternative 1 (No Action)**. Removing the minimum size limit for silk snapper, queen snapper, and blackfin snapper under **Preferred Alternative 2** would create consistent regulations with other managed deep-water species, which would help the public avoid confusion with regulations and aid law enforcement. Administrative impacts on the agency associated with the action alternatives would be incurred by rulemaking, outreach, education and enforcement.

4.9 Action 9. Reduce the commercial minimum size limit for gray triggerfish in the Exclusive Economic Zone off east Florida

4.9.1 Biological Effects

> ***Alternatives****
>
> 1. No Action. The commercial minimum size limit for gray triggerfish in federal waters off east Florida is 14 inches fork length (FL). The commercial minimum size limit for gray triggerfish in federal waters off Georgia, South Carolina, and North Carolina is 12 inches FL.
>
> **2. Reduce the commercial minimum size limit for gray triggerfish off east Florida to 12 inches FL.**
>
> * Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

For detailed methodology of the analysis to evaluate the effects of lowering the current minimum size limit of gray triggerfish refer to **Appendix J**.

The majority of the gray triggerfish harvested from January 2014 through June 2015 were above the current minimum size limit of 14 inches FL (**Figure 4.9.1.1**). Lowering the current size limit to 12 inches FL (**Preferred Alternative 2**) would result in approximately 18% additional gray triggerfish available for harvest (**Table 4.9.1.1**). This is consistent with analyses from Amendment 29 (SAFMC 2014b) that reported between 11% and 26% of the mean monthly landings in federal waters off the east coast of Florida were less than 14 inches FL in the South Atlantic from 2007 through 2012. **Preferred Alternative 2** would also likely reduce discards during the open months; however, harvest rates could also increase, possibly shortening the commercial fishing seasons.

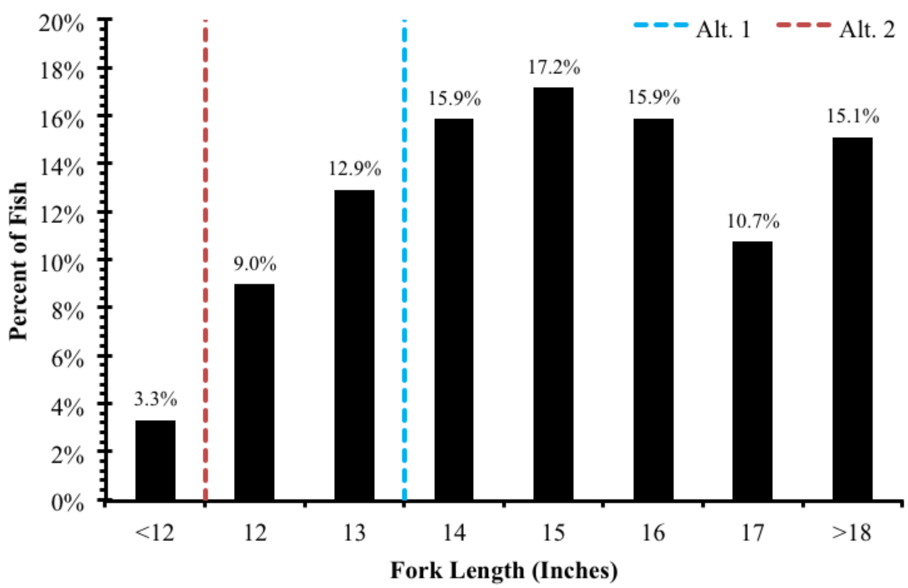

Figure 4.9.1.1. Length distribution of gray triggerfish (inches fork length) caught in federal waters off east Florida generated from commercial Trip Intercept Program data (n=2,616; **Appendix J**) from January 2014 to June 2015. Dashed lines denote the commercial minimum size limit proposed in each alternative.
Source: SERO

Table 4.9.1.1. Estimated percent increase in landings (lbs ww) of commercial gray triggerfish in federal waters off east Florida at 1-inch intervals between 12-14 inches fork length (FL). The increases were generated with Trip Intercept Program data from January 2014 to June 2015 from a sample of 2,616 fish (**Appendix J**).

Minimum Size Limit (inches FL)	Percent Increase
12	17.9
13	11.4
14	0.0

Gray triggerfish are managed under two 6-month seasons where equal portions of the commercial ACL are allocated to each. For Season 1 (Jan. – Jun.), **Preferred Alternative 2** is projected to shorten the fishing season by seven days relative to **Alternative 1 (No Action)**. For Season 2 (Jul. – Dec.), **Preferred Alternative 2** is only projected to shorten the fishing season by four days relative to **Alternative 1 (No Action)** (**Table 4.9.1.2**). The broad confidence intervals for these predictions suggest some uncertainty and they should be interpreted with caution, but the projected reduction in days between alternatives is consistent with analyses from Amendment 29 (SAFMC 2014b), which predicted a change of three to seven days.

Table 4.9.1.2. Projected mean and 95% lower and upper (L95, U95) confidence limits for the quota closure dates projected for gray triggerfish under each alternative proposed in Action 9 by season.

Alternative	Season	ACL (lbs ww)	L95	Mean	U95
1	Jan-Jun	156,162	24-Jun	**16-Apr**	26-Mar
1	Jul-Dec	156,162	No Closure	**6-Nov**	4-Oct
2	Jan-Jun	156,162	7-Jun	**9-Apr**	20-Mar
2	Jul-Dec	156,162	No Closure	**2-Nov**	30-Sep

Expected Effects to the Gray Triggerfish Stock and Bycatch of Co-Occurring Species

When compared to **Alternative 1 (No Action)**, the biological effects of **Preferred Alternative 2** could be negative even with AMs that would limit overall harvest to the ACL. The reduction in the number of discarded fish associated with the decreased minimum size limit during the fishing season may have minimal biological impact due to the low discard mortality of 12.5% estimated in SEDAR 41 (2016). However, a decrease in the minimum size limit, as proposed under **Preferred Alternative 2**, could have negative biological effects relative to **Alternative 1 (No Action)** since larger females produce more eggs. The length at 50% maturity (L50) in SEDAR 41 (2016) was estimated at 177 mm FL (7 inches) for female gray triggerfish. Based on equations in SEDAR 41 for length-age relationship (Von Bertalanffy equation) and egg production at age, a 12-inch FL gray triggerfish female produces about half the number of eggs as a 14-inch fish FL.

Analyses contained in **Appendix D** determined that gray triggerfish co-occurred on a high percentage of trips with vermilion snapper, black sea bass, and almaco jack. Gray triggerfish (along with vermilion snapper and red porgy) had the highest number of discards reported on average annually. The high number of discards for these species may be due to inability of fishers to selectively target one of the species during a seasonal or quota closure for a co-occurring species (e.g., targeting gray triggerfish when red porgy is closed).

4.9.2 Economic Effects

Preferred Alternative 2 would be expected to increase landings rates on average by about 20% and would likely result in a shorter gray triggerfish season than under the status quo (**Table 4.9.1.2**). Increasing catch rates but shortening the season may benefit some vessels and fishing businesses in terms of greater harvesting efficiency earlier in the year but may also negatively affect others due to decreased access later in the year. These effects would depend on a variety of factors, including vessel harvesting characteristics and profit maximization strategies.

The expected direct economic effects of the alternatives for **Action 9** on commercial fishing vessels are provided in **Tables 4.9.2.1** and summarized in **Table 4.9.2.2**. Specifically, **Table 4.9.2.1** provides estimates of the projected monthly and annual landings of gray triggerfish by alternative (J. Pulver, pers. comm., 7/13/2018) and the average monthly ex-vessel price of gray triggerfish from 2012 through 2016. These estimates are then used to estimate the expected monthly and average gross revenue for gray triggerfish by alternative. The difference in the projected annual landings between **Alternative 1 (No Action)** and **Preferred Alternative 2** is relatively small (less than 750 lbs ww). The differences in expected annual gross revenue are also relatively small, with **Preferred Alternative 2** expected to generate about $2,200 in additional gross revenue per year. A relatively small part of that increase is because **Preferred Alternative 2** distributes relatively more landings to months with higher average ex-vessel prices.

Reducing the minimum size limit would also allow commercial fishing vessels to harvest these species with less effort. As such, **Preferred Alternative 2** would also be expected to decrease costs to the private sector (e.g., harvesting costs of commercial fishing vessels) by decreasing the cost per pound of harvest. Thus, in combination with the expected increase in annual gross revenue, the summarized results in **Table 4.9.2.2** indicate that **Preferred Alternative 2** is expected to generate greater net economic benefits relative to **Alternative 1 (No Action)**.

Approximately 213 vessels harvested gray triggerfish on average each year from 2012 to 2016 (**Section 3.3.1.2**). These vessels' average annual gross revenues were $65,661 per vessel during this time. According to Overstreet, Perruso, and Liese (pers. comm., 7/11/2018), annual net revenue from operations for vessels in the "triggerfish fishery" was approximately 2% of their average annual gross revenue from 2014 through 2016. Net revenue from operations is the best measure of economic profits available at this time. Thus, annual net revenue from operations (economic profit) for these gray triggerfish vessels is estimated to be about $1,300 per vessel. **Preferred Alternative 2** is expected to result in an increase in annual gross revenue per vessel of approximately $10. Thus, under **Preferred Alternative 2**, the expected change in annual gross revenue per vessel would only be expected to increase the average vessel's economic profits by 0.8% per year. The expected decrease in costs would also be expected to increase these vessels' economic profits, though by how much is unknown.

With respect to indirect effects, **Table 4.1.2.4** provides the economic characteristics of snapper grouper dealers from 2012 through 2016. Based on this information, approximately 286 dealers purchase snapper grouper landings on average each year. Their average annual purchases of snapper grouper are about $61,000 per dealer while their average annual purchases of all seafood are almost $132,000 per dealer. Thus, snapper grouper purchases represent 46.2% of their total seafood purchases, with the remaining purchases coming from other South Atlantic species (6.3%) and Gulf species (48.5%).

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the effect of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). More specifically, each dealer would be expected to see an increase in their purchases of gray triggerfish by about $5 per year under **Preferred Alternative 2**. Such a change would likely be imperceptible to most snapper grouper dealers.

Table 4.9.2.1. Projected monthly and annual landings (lbs ww), monthly ex-vessel price, and expected gross revenue of gray triggerfish by alternative for **Action 9**. Preferred indicated in bold.

Month	Alt 1 (No Action) Landings	Pref Alt 2 Landings	Price	Alt 1 (No Action) Gross Revenue	Pref Alt 2 Gross Revenue
Jan	54,076	**57,320**	$2.37	$127,974	**$135,651**
Feb	39,369	**42,015**	$2.36	$93,004	**$99,254**
Mar	41,349	**44,138**	$2.36	$97,500	**$104,076**
Apr	21,829	**12,959**	$2.32	$50,745	**$30,125**
May	0	**0**	$2.21	$0	**$0**
Jun	0	**0**	$2.33	$0	**$0**
Jul	26,180	**27,642**	$2.48	$64,953	**$68,580**
Aug	30,187	**31,502**	$2.54	$76,736	**$80,078**
Sep	50,171	**53,302**	$2.54	$127,313	**$135,260**
Oct	40,524	**41,616**	$2.54	$102,945	**$105,720**
Nov	9,216	**3,155**	$2.54	$23,418	**$8,018**
Dec	0	**0**	$2.60	$0	**$0**
TOTAL	312,900	**313,648**		$764,589	**$766,761**

Source: Projected landings are from J. Pulver, Pers. comm., 7/13/2018. Price data are from https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/monthly-landings/index, accessed 7/5/2016.

Table 4.9.2.2. Expected annual gross revenue for gray triggerfish, expected changes in gross revenue (net economic benefits) and economic rank by alternative for **Action 9**. Preferred indicated in bold.

Alternative	Expected Annual Gross Revenue (2016$)	Expected Change in Annual Gross Revenue (2016$)	Expected Change in Gross Revenue per Vessel (2016$)	Expected Change in Private Costs (Rank)	Economic Rank
Alt 1 (No Action)	$764,589	0	0	2	2
Pref Alt 2	**$766,761**	**$2,172**	**$10**	**1**	**1**

4.9.3 Social Effects

A description of the communities that would most likely be affected by changes in commercial management of gray triggerfish can be found in **Section 3.4**. and includes: Mayport, and Saint Augustine, Florida; Murrells Inlet, Little River, Charleston, and McClellanville, South Carolina; and Oak Island, Beaufort, Morehead City, and Southport, North Carolina.

Some social effects of minimum size limits would be associated with the biological effects on gray triggerfish (see **Section 4.9.1**). Additionally, there is a trade-off with reducing the minimum size limit in that an increase in the number of fish that can be kept may improve commercial trip profitability but may also increase the harvest rate and trigger AMs if landings reach the ACL sooner in the fishing year.

The rate of harvest is anticipated to slightly increase under the proposed minimum size limit in **Preferred Alternative 2** when compared to the minimum size limit in **Alternative 1 (No Action)** (**Table 4.9.1.1**). The AM for gray triggerfish is an in-season closure for the entire South Atlantic, which contributes to the potential negative social effects of **Preferred Alternative 2** to all commercial fishermen targeting gray triggerfish if there were in-season closures. The benefits and costs to commercial fishermen would depend on the balance of increasing the number of fish that can be kept while ensuring that an increased harvest rate would not result in a shortened commercial season. When compared to **Alternative 1 (No Action)**, **Preferred Alternative 2** is anticipated to reduce the season length by seven days and four days for Season 1 and Season 2, respectively (**Table 4.9.1.2**). This reduction is minor and is not anticipated to result in substantial negative social effects.

Reducing the minimum size limit (**Preferred Alternative 2**) may result in positive social effects for Florida commercial fishermen by increasing the number of fish that can be retained, which may increase trip profitability. Considering the decrease in cost of harvest from lower the size limit and expected increase in gross economic revenue per year, **Preferred Alternative 2** would result in an estimated $10 increase in gross revenue per vessel (**Table 4.9.2.2**). This minimal increase would likely go unnoticed by fishing communities.

Preferred Alternative 2 would also make the minimum size limit consistent for all South Atlantic states and be expected to reduce the number of discards during the open season, which could produce long-term positive social effects by contributing to the health of the stock.

4.9.4 Administrative Effects

Beneficial administrative effects would be expected from **Preferred Alternative 2**, when compared with **Alternative 1** (**No Action**). Alternatives that specify a consistent minimum size limits in federal waters throughout the South Atlantic Council's jurisdiction would help the public avoid confusion with regulations and aid law enforcement. Additionally, the minimum size limit would be consistent between state waters and federal waters off the east coast of Florida, also contributing to a more favorable administrative environment. Administrative impacts on the agency associated with the action alternatives would be incurred by rulemaking, outreach, education and enforcement.

Chapter 5. South Atlantic Council's Choice for the Preferred Alternatives

5.1 Action 1. Establish a commercial split season and modify the commercial trip limit for blueline tilefish

Alternatives*

1. (No Action). The commercial fishing year for blueline tilefish is the calendar year. The trip limit is 300 pounds gutted weight (gw).

2. Specify two 6-month commercial fishing seasons: allocate 40% of the commercial ACL to the first season (Jan. – Jun.) and 60% to the second season (Jul. – Dec.). Allow quota roll-over from Season 1 to Season 2

- 2a. Season 1 trip limit = 100 pounds gw; Season 2 trip limit = 300 pounds gw.
- 2b. Season 1 trip limit = 150 pounds gw; Season 2 trip limit = 300 pounds gw.

3. Do not implement split seasons but modify the commercial trip limit:

- **3a. 100 pounds gw from Jan. – Apr. and 300 pounds gw from May – Dec. .**
- 3b. 150 pounds gw from Jan. – Apr. and 300 pounds gw from May – Dec. .
- 3c. 100 pounds gw from Jan. – Jun. and 300 pounds gw from Jul. – Dec. .

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

5.1.1 Snapper Grouper Advisory Panel (AP) Comments and Recommendations

At their April 17-19, 2017, meeting, the Snapper Grouper AP offered the following:

- Commercial harvest of blueline tilefish and snowy grouper needs to be kept in line, especially important off the Carolinas after vermilion snapper and gray triggerfish close.
  However, fishermen are also targeting blueline tilefish and snowy grouper early in the year.
- Concern about ongoing blueline tilefish assessment. The South Atlantic Council could possibly wait to take action until after the assessment results are available.

The AP approved the following motion:
MOTION: AP RECOMMENDS ALTERNATIVE 1, NO ACTION, ON SPLITTING THE COMMERCIAL SEASON FOR BLUELINE TILEFISH
APPROVED BY AP (UNANIMOUSLY)

At their November 8-9, 2017, meeting Snapper Grouper AP members suggested that recent regulatory changes should be evaluated before considering additional modifications. Also, because blueline tilefish and snowy grouper are caught together, fishermen suggested that the management approach aim at extending the season for both species as long as possible. AP members were in agreement with the range of alternatives being considered for both blueline tilefish and snowy grouper. AP members reiterated that South of Cape Lookout, North Carolina, blueline tilefish are an incidental catch.

The AP provided no additional recommendations during their April 11-13, 2018, meeting.

5.1.2 Law Enforcement AP Comments and Recommendations

The Law Enforcement AP received an overview of actions proposed in the amendment during their April 18-19, 2018, meeting. The AP had no comments or recommendations on this action.

5.1.3 Scientific and Statistical Committee (SSC) Comments and Recommendations

At their October 24-26, 2017, meeting the SSC was asked to comment on the two methods used to predict season length for Actions 1 through 5 in this amendment. Specifically, comments were requested on the use and uncertainties of the two methods. The methodology is explained in detail in **Appendix J**. Asked whether one methodology is more appropriate than the other, whether one approach provided clearer management advice to the South Atlantic Council, and whether there are differences in relative risk or uncertainty between the two methods, the SSC offered the following:

- The complexity of the Seasonal Auto-Regressive Integrated Moving Average (SARIMA) model makes it less favorable as a management tool.
- The last 3 years of data are likely more representative of the current fishery than using the entire data series.
- The number of data points in the time series is sufficiently large enough to split the time series into two parts, using the first part to predict behavior of the second part, then using the actual values in the second part to determine how well the SARIMA model works.
- Explore sensitivity to smoothing kernel/range.
- Important to try and understand the changes in behavior of the fishing effort to different management perturbations.

In February 2018, the Socio-Economic Panel (SEP) of the SSC met and also reviewed the use of the SARIMA model for forecasting fisheries landings and for management advice. The SEP had a diverging opinion on the use of the SARIMA model in Regulatory Amendment 27. The conclusions of the SEP are below:

Regarding the appropriateness of the two models and methodologies used to predict landings under various scenarios, the SEP agreed that, in principle, the SARIMA method was superior to the "Last 3 Years" averaging method; however, the SEP recommends that the council be presented with results from both models, as both models have pros and cons. The "Last 3 Years" model is less complicated and easier to understand, but it puts perhaps too much weight on data from recent years at the expense of neglecting longer-run effects due to changes in year class abundance or environmental or policy shocks or cycles. The SARIMA model is more complicated but probably gives a better picture of the uncertainty involved in predicting landings through better modeling of the error term that incorporates the effects of factors left out of the model. Over time, as data availability and quality improve, the performance of the SARIMA model should improve relative to the "Last 3 Years" model.

After this meeting, a retrospective analysis was conducted, using 2017 data, to determine which method more accurately predicted the catch rates of snapper grouper species in the following year. The results indicated that each method performed better under different circumstances. The SSC stated the following:

In a new analysis presented during the webinar, the analyst generated predictions of closure dates in 2017 with both models and compared them with the actual timing of quota closures under current regulations. For Regulatory Amendment 27, he recommended using the model for each species that most closely predicted actual closure dates in 2017. Based on the justifications given by the analyst, the SSC agrees with the recommended use of both the SARIMA and the Last 3 Years, depending on the retrospective performance analysis done for each Action in Reg Amendment 27."

For Action 1, the SSC recommended using the "Last 3" model to inform management decisions (see **Appendix I**).

5.1.4 Public Comments and Recommendations

Public hearings for Vision Blueprint Regulatory Amendment 27 were held on May 8-10, 2018, via webinar and listening stations in North Carolina, South Carolina, and Florida. The public comment period was from April 24 through May 11. Comments were also accepted on the South Atlantic Council's online public comment form through June 8, 2018. Below is a summary of comments on Action 1:

- One commenter from Key West expressed opposition to commercial split season for deep-water species. He maintains the proposed changes do not work for fisheries in south Florida.
- One commenter from Jupiter, Florida, expressed support for all the proposed commercial split seasons. He stated it would be beneficial to have some snowy grouper available for local markets and restaurants in the summer.
- Commenters suggested allowing a 50 to 100-pound bycatch limit of blueline tilefish year-round. It is important for blueline tilefish to be open during the snowy grouper season as the two species are caught together.
- Commenters from Florida and North Carolina reiterated that harvest of blueline tilefish needs to be aligned with snowy grouper to address discards and make trips more profitable.
- One commenter maintained that the fishery for blueline tilefish is different north and south of Cape Lookout and the data do not necessarily reflect this. He stated his support for the preferred alternative but cautioned that actions may be premature in light of pending assessment results for this species. He suggested a more thorough analysis of discard data by area.
- A comment was submitted in support of the South Atlantic Council's preferred alternative.

5.1.5 South Atlantic Council's Conclusion

The South Atlantic Council acknowledged that management approaches for blueline tilefish should be made in concert with those for snowy grouper since the two species co-occur in a portion of the South Atlantic Council's jurisdiction. Blueline tilefish and snowy grouper are target species for fishermen north of Cape Hatteras, North Carolina, but access to these species in that area is limited early in the year (January through May) due to weather conditions. On the other hand, blueline tilefish are, for the most part, an incidental catch during commercial harvest of snowy grouper for commercial fishermen operating south of Cape Hatteras, North Carolina, through about Cape Canaveral, Florida. Fishermen targeting snowy grouper tend to continue fishing for blueline tilefish after they have reached their snowy grouper trip limit. Fishermen claim this practice is causing increased discards of snowy grouper. Hence, the South Atlantic Council reasoned that a 100-lbs gutted weight (gw) trip limit of blueline tilefish from January through April would help reduce snowy grouper discards while an increase to a 300-lbs gw trip limit at the beginning of May would allow fishermen in the northern portion of the South Atlantic Council's area of jurisdiction to have greater access to the resource and optimize their harvest.

The South Atlantic Council acknowledged that the proposed changes to management of blueline tilefish (Action 1) and snowy grouper (Action 2) accomplish objectives in the Snapper Grouper Vision Blueprint to address regional differences in access to the resource and to minimize discards. The South Atlantic Council initially considered a split season for blueline tilefish but decided not to proceed with such a proposal because of the administrative burden of managing a number of split seasons. The South Atlantic Council reasoned that specifying different trip limits for blueline tilefish during certain months of the year would be enough to alleviate the issue of snowy grouper discards along with considering a split season for snowy grouper in Action 2. In addition, the selected preferred alternative would allow greater access to blueline tilefish to fishermen in northern North Carolina during a time of the year when few other snapper grouper species are available, while still ensuring that fishermen in Florida continue to have access to the resource.

The South Atlantic Council concluded that **Preferred Alternative 3/Preferred Sub-alternative 3a** best meets the purpose to address commercial stakeholder input to enable equitable access for fishermen participating in the snapper grouper fishery, and to minimize discards. The preferred alternative also best meets the objectives of the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP), as amended, while complying with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and other applicable law.

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

The use of split seasons for the commercial sector is addressed under the Vision Blueprint's Strategy 2.3 - *Support development of management approaches that account for the seasonality of the snapper grouper fishery*. One of the priority actions under that strategy states *Expand the use of split seasons for the commercial fishery.* The intent is to "line up" harvest for species that are often caught together to level out accessibility in different areas and to reduce regulatory discards. Factors such as distance to fishing grounds and weather/temperature affect availability of some species to the commercial fleets in different parts of the South Atlantic Council's jurisdiction.

The use of trip limits for the commercial sector is addressed under the Vision Blueprint's Strategy 2.1 - *Support development of management approaches that address retention of snapper grouper species*. The first priority action under this strategy is to consider trip limit adjustments for the commercial sector to lengthen seasons and better utilize annual catch limits (ACL).

5.2 Action 2. Establish a commercial split season for snowy grouper

5.2.1 Snapper Grouper AP Comments and Recommendations

At their April 17-19, 2017, meeting the Snapper Grouper AP reiterated that snowy and blueline seasons, if implemented, should be in line. The AP approved the following motion:

MOTION: CONSIDER A TRIP LIMIT STEP-DOWN/REDUCTION IN THE SNOWY AND BLUELINE TRIP LIMITS TO COINCIDE WITH OPENING OF SHALLOWWATER GROUPER ON MAY 1. CONSIDER OTHER OPTIONS TO LENGTHEN SEASON (INCLUDING STEP-DOWN WHEN A CERTAIN PERCENTAGE OF THE ACL IS MET). APPROVED BY AP (UNANIMOUSLY)

> ***Alternatives****
>
> 1 (No Action). The commercial fishing year for snowy grouper is from January 1 to December 31.
>
> 2. Specify two 6-month commercial fishing seasons: allocate 60% of the commercial ACL to the first season (Jan. – Jun.) and 40% to the second season (Jul. – Dec.). Allow quota roll-over from Season 1 to Season 2.
>
> **3. Specify two 6-month commercial fishing seasons: allocate 70% of the commercial ACL to the first season (Jan. – Jun.) and 30% to the second season (Jul. – Dec.). Allow quota roll-over from Season 1 to Season 2.**
>
> * Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

At their November 8-9, 2017, meeting Snapper Grouper AP members suggested that recent regulatory changes should be evaluated before considering additional modifications. Also, because blueline tilefish and snowy grouper are caught together, fishermen asked that the management approach aim at extending the season for both species as long as possible. AP members were in agreement with the range of alternatives being considered for both blueline tilefish and snowy grouper. AP members reiterated that South of Cape Lookout, North Carolina, blueline tilefish are an incidental catch.

The AP provided no additional recommendations during their April 11-13, 2018, meeting.

5.2.2 Law Enforcement AP Comments and Recommendations

The Law Enforcement AP received an overview of actions proposed in the amendment during their April 18-19, 2018, meeting. The AP had no comments or recommendations on this action.

5.2.3 SSC Comments and Recommendations

At their October 24-26, 2017, meeting the SSC was asked to comment on the two methods used to predict season length for Actions 1 through 5 in this amendment. Specifically, comments were requested on the use and uncertainties of the two methods. The methodology is explained in detail in **Appendix J**. Asked whether one methodology is more appropriate than the other, whether one approach provided clearer management advice to the South Atlantic Council, and whether there are differences in relative risk or uncertainty between the two methods, the SSC offered the following:

- The complexity of the SARIMA model makes it less favorable as a management tool.
- The last 3 years of data are likely more representative of the current snapper grouper fishery than using the entire data series.
- The number of data points in the time series is sufficiently large enough to split the time series into two parts, using the first part to predict behavior of the second part, then using the actual values in the second part to determine how well the SARIMA model works.
- Explore sensitivity to smoothing kernel/range.
- Important to try and understand the changes in behavior of the fishing effort to different management perturbations.

In February 2018, the SEP of the SSC met and also reviewed the use of the SARIMA model for forecasting snapper grouper landings and for management advice. The SEP had a diverging opinion on the use of the SARIMA model in Regulatory Amendment 27. The conclusions of the SEP are below:

Regarding the appropriateness of the two models and methodologies used to predict landings under various scenarios, the SEP agreed that, in principle, the SARIMA method was superior to the "Last 3 Years" averaging method; however, the SEP recommends that the council be presented with results from both models, as both models have pros and cons. The "Last 3 Years" model is less complicated and easier to understand, but it puts perhaps too much weight on data from recent years at the expense of neglecting longer-run effects due to changes in year class abundance or environmental or policy shocks or cycles. The SARIMA model is more complicated but probably gives a better picture of the uncertainty involved in predicting landings through better modeling of the error term that incorporates the effects of factors left out of the model. Over time, as data availability and quality improve, the performance of the SARIMA model should improve relative to the "Last 3 Years" model.

After this meeting, a retrospective analysis was conducted, using 2017 data, to determine which method more accurately predicted the catch rates of snapper grouper species in the following year. The results indicated that each method performed better under different circumstances. The SSC convened via webinar on May 7, 2018, to review the methodology and stated the following:

In a new analysis presented during the webinar, the analyst generated predictions of closure dates in 2017 with both models and compared them with the actual timing of quota closures under current regulations. For Regulatory Amendment 27, he recommended using the model for each species that most closely predicted actual closure dates in 2017. Based on the justifications given by the analyst, the SSC agrees with the recommended use of both the SARIMA and the Last 3 Years, depending on the retrospective performance analysis done for each Action in Reg Amendment 27."

For Action 2, the SSC recommended using the "Last 3" model to inform management decisions (see **Appendix I**).

5.2.4 Public Comments and Recommendations

Public hearings for Vision Blueprint Regulatory Amendment 27 were held on May 8-10, 2018, via webinar and listening stations in North Carolina, South Carolina, and Florida. The public comment period was from April 24 through May 11. Comments were also accepted on the South Atlantic Council's online public comment form through June 8, 2018. Below is a summary of comments on Action 2:

- One commenter from North Carolina supported no action on a split season for snowy grouper. He stated that as wholesaler/retailer, he relies on snowy grouper during the winter months while the shallow water species are closed. He suggested increasing the trip limit to 250-300 lbs gw.
- One commenter from North Carolina supported the South Atlantic Council's preferred.
- One commenter from North Carolina was of the opinion that a 70/30 allocation is not appropriate. He suggested a 60/40 allocation would be better based on where harvest of snowy grouper is now taking place and the size of the fish. He suggested that the South Atlantic Council look into the size of the fish being landed in certain areas.
- A comment was submitted in support of the South Atlantic Council's preferred alternative.

5.2.5 South Atlantic Council's Conclusion

A commercial split season for snowy grouper was considered in Regulatory Amendment 20 to the Snapper Grouper FMP (SAFMC 2014a). The snowy grouper ACL was also increased through the same amendment, and analyses indicated that a commercial harvest closure during Season 1 was not likely. Without an in-season closure during Season 1 for most of the scenarios examined, the South Atlantic Council reasoned that a split season would have little to no effect on extending the fishing season and opted to take no action at that time. In addition, the South Atlantic Council opted to retain the commercial fishing year as the calendar year because snowy grouper are an important species in the early part of the year, when shallow-water groupers are closed to commercial harvest. The South Atlantic Council acknowledged that fishermen in North Carolina have historically had limited access to snowy grouper at the beginning of the fishing year due to weather conditions. However, recent years have brought milder winters and fishermen have benefitted from having access to snowy grouper. South Atlantic Council members also mentioned that snowy grouper commands a higher price on the market during the early months of the year and cited that as another reason to retain the calendar year for the commercial sector.

Stakeholders participating in the Visioning Project for the Snapper Grouper Fishery in 2014-2015 requested that the South Atlantic Council address regional differences in access to the snapper grouper resource, including snowy grouper, and implement management approaches that would minimize discards. Fishermen and other stakeholders alerted the South Atlantic Council to a recent increase in snowy grouper discards when fishermen attempt to harvest their blueline tilefish trip limit when targeting snowy grouper. The management approach proposed under Action 1 would address this concern. In addition, stakeholders also reiterated the importance of snowy grouper in the market during the early months of the year (January through April) while harvest of shallow-water groupers is closed. The South Atlantic Council reasoned that allocating the majority (70%) of the commercial ACL to the first half of the year (January through July) would ensure availability of snowy grouper when it is most valuable and optimize access to this species for the majority of commercial fishermen in the South Atlantic region. On the other hand, allocating 30% of the commercial ACL of snowy grouper to the second half of the year allows incidental harvest of snowy grouper when North Carolina fishermen are targeting blueline tilefish. **Preferred Alternative 3** is a "meet-in-the middle" compromise to allow Florida fishermen access to snowy grouper during the time of year when North Carolina fishermen cannot access them, while also benefitting the market. As such, the South Atlantic Council acknowledged that the longer grouper species are available in the marketplace, the more this benefits fishermen and communities in the region.

The South Atlantic Council concluded that **Preferred Alternative 3** best meets the purpose to address commercial stakeholder input to enable equitable access for fishermen participating in the snapper grouper fishery. The preferred alternative also best meets the objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

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

The use of split seasons for the commercial sector is addressed under the Vision Blueprint's Strategy 2.3 - *Support development of management approaches that account for the seasonality of the snapper grouper fishery*. One of the priority actions under that strategy states *Expand the use of split seasons for the commercial fishery.* The intent is to "line up" harvest for species that are often caught together to level out accessibility in different areas and to reduce regulatory discards. Factors such as distance to fishing grounds and weather/temperature affect availability of some species to the commercial fleets in different parts of the South Atlantic Council's jurisdiction. In addition, consideration of market availability in management decisions is listed under "Hot Topic" items for the Management Goal.

5.3 Action 3. Establish a commercial split season and modify the commercial trip limit for greater amberjack

5.3.1 Snapper Grouper AP Comments and Recommendations

During their April 17-19, 2017, meeting the Snapper Grouper AP offered the following:

- AP supports exploring use of commercial split season to lengthen amberjack harvest.
- Consider trip limit reduction or step-down to achieve objective of lengthening season and improving access.
- Consider reduction in trip limit and/or step-down to allow season to last all year.

At their November 8-9, 2017, meeting AP members stated that greater amberjack is an important resource for commercial fishermen throughout the South Atlantic. However, greater amberjack are not available to fishermen off North Carolina until August and this results in inequitable access. AP members maintain that the stock is healthy, and they are seeing large numbers of small fish indicating strong recruitment. The AP approved the following motion:

MOTION: SUPPORT FOR SUB-ALTERNATIVE 2C WITH SUGGESTED MODIFICATIONS BELOW:

> **Sub-alternative 2c.** Trip limit = 1,000 pounds whole weight in both seasons. A trip limit step-down to 500 pounds whole weight would occur in each season once

Alternatives*

1 (No Action). The commercial fishing year is from March 1 to the end of February. Restriction on commercial sale and purchase applies during April each year. The commercial trip limit = 1,200 pounds.

2. Specify two 6-month commercial fishing seasons. Allocate 50% of the commercial ACL to the first season (Mar. – Aug.) and 50% to the second season (Sept. – Feb.). Allow quota roll-over from Season 1 to Season 2. Maintain commercial sale and purchase prohibition during April.
   - 2a. Season 1 trip limit = 1,200 pounds ww; Season 2 trip limit = 1,000 pounds ww.
   - 2b. Season 1 trip limit = 1,000 pounds ww; Season 2 trip limit = 800 pounds ww.
   - 2c. Trip limit = 1,000 pounds ww in both seasons.
   - 2d. Trip limit = 1,000 pounds ww in both seasons with reduction to 500 pounds ww in each season once 75% of the seasonal quota is met or projected to be met. A trip limit reduction would not occur in Season 2 unless 75% of the seasonal quota is met or is projected to be met by January 31.

3. Specify two 6-month commercial fishing seasons. Allocate 60% of the commercial ACL to the first season (Mar. – Aug.) and 40% to the second season (Sept. 1 – end of February). Allow quota roll-over from Season 1 to Season 2. Maintain commercial sale and purchase prohibition during April.
   - **3a. Season 1 trip limit = 1,200 pounds ww; Season 2 trip limit = 1,000 pounds ww.**
   - 3b. Season 1 trip limit = 1,000 pounds ww; Season 2 trip limit = 800 pounds ww.
   - 3c. Trip limit equals 1,000 pounds ww in both seasons.

4. Retain the Mar. – Feb. fishing year. Maintain commercial sale and purchase prohibition during April and reduce the commercial trip limit to:
   - 4a. 1,000 pounds ww.
   - 4b. 800 pounds ww.

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

75% of the seasonal quota is met or projected to be met. ~~A trip limit step-down would not occur in Season 1 unless 75% of the season's quota is met or is projected to be met on ______.~~ A trip step down would not occur in Season 2 unless75% of the season's quota is met or is projected to be met on JANUARY 31.

APPROVED (4 OPPOSED)

The AP provided no additional recommendations during their April 11-13, 2018, meeting.

5.3.2 Law Enforcement AP Comments and Recommendations

The Law Enforcement AP received an overview of actions proposed in the amendment during their April 18-19, 2018, meeting. The AP had no comments or recommendations on this action.

5.3.3 Scientific and Statistical Committee (SSC) Comments and Recommendations

At their October 24-26, 2017, meeting the SSC was asked to comment on the two methods used to predict season length for Actions 1 through 5 in this amendment. Specifically, comments were requested on the use and uncertainties of the two methods. The methodology is explained in detail in **Appendix J**. Asked whether one methodology is more appropriate than the other, whether one approach provided clearer management advice to the South Atlantic Council, and whether there are differences in relative risk or uncertainty between the two methods, the SSC offered the following:

- The complexity of the SARIMA model makes it less favorable as a management tool.
- The last 3 years of data are likely more representative of the current fishery than using the entire data series.
- The number of data points in the time series is sufficiently large enough to split the time series into two parts, using the first part to predict behavior of the second part, then using the actual values in the second part to determine how well the SARIMA model works.
- Explore sensitivity to smoothing kernel/range.
- Important to try and understand the changes in behavior of the fishing effort to different management perturbations.

In February 2018, the SEP of the SSC met and also reviewed the use of the SARIMA model for forecasting snapper grouper landings and for management advice. The SEP had a diverging opinion on the use of the SARIMA model in Regulatory Amendment 27. The conclusions of the SEP are below:

Regarding the appropriateness of the two models and methodologies used to predict landings under various scenarios, the SEP agreed that, in principle, the SARIMA method was superior to the "Last 3 Years" averaging method; however, the SEP recommends that the council be presented with results from both models, as both models have pros and cons. The "Last 3 Years" model is less complicated and easier to understand, but it puts perhaps too much weight on data from recent years at the expense of neglecting longer-run effects due to changes in year class abundance or environmental or policy shocks or cycles. The SARIMA model is more complicated but probably gives a better picture of the uncertainty involved in predicting landings through better modeling of the error term that incorporates the effects of factors left out *of the model. Over time, as data availability and quality improve, the performance of the SARIMA model should improve relative to the "Last 3 Years" model.*

After this meeting, a retrospective analysis was conducted, using 2017 data, to determine which method more accurately predicted the catch rates of snapper grouper species in the following year. The results indicated that each method performed better under different circumstances. The SSC convened via webinar on May 7, 2018 to review the methodology and stated the following:

In a new analysis presented during the webinar, the analyst generated predictions of closure dates in 2017 with both models and compared them with the actual timing of quota closures under current regulations. For Regulatory Amendment 27, he recommended using the model for each species that most closely predicted actual closure dates in 2017. Based on the justifications given by the analyst, the SSC agrees with the recommended use of both the SARIMA and the Last 3 Years, depending on the retrospective performance analysis done for each Action in Reg Amendment 27."

For Action 3, the SSC recommended using the "Last 3" model to inform management decisions (see **Appendix I**).

5.3.4 Public Comments and Recommendations

Public hearings for Vision Blueprint Regulatory Amendment 27 were held on May 8-10, 2018, via webinar and listening stations in North Carolina, South Carolina, and Florida. The public comment period was from April 24 through May 11, 2018. Comments were also accepted on the South Atlantic Council's online public comment form through June 8, 2018. Below is a summary of comments on Action 3:

- Two commenters from North Carolina expressed support for the South Atlantic Council's preferred. They stated the need for access to greater amberjack in the fall as that is when most of the large fish are close to shore.
- One commenter from Florida suggested a trip limit of 1,200 lbs ww with a step-down to 500 lbs ww (or even 300 lbs ww) when 75% of ACL is met. However, among the alternatives under consideration, he supports Sub-alternative 2a: Season 1 trip limit equals 1,200 lbs ww, Season 2 trip limit equals 1,000 lbs ww.
- A comment was submitted in support of the South Atlantic Council's preferred alternative.

5.3.5 South Atlantic Council's Conclusion

When discussing possible changes to the management of greater amberjack, the South Atlantic Council acknowledged that regulations for yellowtail snapper need to be kept in mind. Commercial harvest of yellowtail snapper has closed in early June in the past two years, two months ahead of the end of that species' fishing year. This results in commercial fishermen in Florida targeting greater amberjack more heavily leading to early closures and price fluctuations that affect resource users throughout the region. Dividing the greater amberjack commercial ACL into two seasons and modifying the trip limit is expected to lengthen the season and allow for a more equitable distribution and price stability of the greater amberjack resource throughout the South Atlantic Council's area of jurisdiction. **Preferred Alternative 3/Preferred Sub-alternative 3a** would strike a balance between improved access to the greater amberjack resource for fishermen throughout the region and economic profitability. Fishermen in Florida target greater amberjack early in the fishing year, when they can also fish for other jacks species; whereas, in the fall, greater amberjack schools are found off North Carolina. Hence, allocating a smaller portion of the ACL at a higher trip limit early in the year and a larger portion of the ACL at a lower trip limit during the latter part of the year ensures access and profitability to fishermen throughout the region and allows for the entire ACL to be harvested. Other alternatives considered could have allowed harvest throughout the year but at the risk of leaving a portion of the ACL unharvested.

The South Atlantic Council concluded that **Preferred Alternative 3/Preferred Sub-alternative 3a** best meets the purpose to address commercial stakeholder input to enable equitable access for fishermen participating in the snapper grouper fishery. The preferred alternative also best meets the objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

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

The use of split seasons for the commercial sector is addressed under the Vision Blueprint's Strategy 2.3 - *Support development of management approaches that account for the seasonality of the snapper grouper fishery*. One of the priority actions under that strategy states *Expand the use of split seasons for the commercial fishery.* The intent is to "line up" harvest for species that are often caught together to level out accessibility in different areas and to reduce regulatory discards. Factors such as distance to fishing grounds and weather/temperature affect availability of some species to the commercial fleets in different parts of the South Atlantic Council's jurisdiction.

The use of trip limits for the commercial sector is addressed under the Vision Blueprint's Strategy 2.1 - *Support development of management approaches that address retention of snapper grouper species*. The first priority action under this strategy is to consider trip limit adjustments for the commercial sector to lengthen seasons and better utilize ACLs.

5.4 Action 4. Establish a commercial split season and modify the commercial trip limit for red porgy

5.4.1 Snapper Grouper AP Comments and Recommendations

At their April 17-19, 2017, meeting the Snapper Grouper AP offered the following:

- Discard issue exists but there is also a market issue. Red porgy is important for the market when vermilion snapper and gray triggerfish close.
- Concern about moving forward with management changes ahead of the stock assessment.
- Concern that the fishery-independent survey (MARMAP) only samples in warm months of the year and fishermen report seeing large schools of red porgy off North Carolina during cold months.
- Consider trip limit modification to address discards and still consider split season. Consider a low trip limit (bycatch allowance) when vermilion snapper and gray triggerfish are still open.

Alternatives*

1 (No Action). The commercial fishing year is the calendar year. A sale and purchase prohibition is in place from Jan. – Apr. each year. From May – Dec. the trip limit is 120 fish.

2. Specify two commercial fishing seasons. Allocate 30% of the commercial ACL to the period Jan. – Apr. and 70% to the period May – Dec. Allow quota roll-over from Season 1 to Season 2. Remove the Jan. – Apr. sale and purchase prohibition. Retain 120 fish from May – Dec. and specify a commercial trip limit in Jan. – Apr. of:

2a. 30 fish
2b. 45 fish
2c. 60 fish

3. Specify two commercial fishing seasons. Allocate 50% of the commercial ACL to the period Jan. – Apr. and 50% to the period May – Dec. Allow quota roll-over from Season 1 to Season 2. Remove the Jan. – Apr. sale and purchase prohibition. Retain 120 fish in May – Dec. and specify a commercial trip limit in Jan. – Apr. of:

3a. 30 fish
3b. 45 fish
3c. 60 fish

4. Remove the harvest and possession restrictions, and sale and purchase prohibition during Jan. – Apr. each year. Specify a commercial trip limit of 120 fish from Jan. – Dec.

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives.

The AP approved the following motion:
MOTION: CONSIDER TRIP LIMIT MODIFICATION TO ADDRESS DISCARDS AND STILL CONSIDER SPLIT SEASON. ANALYZE A RANGE OF TRIP LIMIT OPTIONS: 30 FISH TO 60 FISH IN SEASON 1 (DURING THE MONTHS OF THE SPAWNING CLOSURE).
APPROVED BY AP (UNANIMOUSLY)

At their November 8-9, 2017, meeting the AP made the following motion:
MOTION #3: SUPPORT FOR ALTERNATIVE 2, SUB-ALTERNATIVE 2C:

> **Alternative 2.** Specify two commercial fishing seasons for red porgy. Allocate the commercial red porgy annual catch limit into two quotas: 30% to the period January 1 through April 30 and 70% to the period May 1 through December 31. Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward. Remove the sale and purchase prohibition during January

1 to April 30 each year. Retain the commercial trip limit of 120 fish from May 1 through December 31 and specify a commercial trip limit from January 1 through April 30 of:

Sub-alternative 2b. 45 fish

APPROVED BY AP

At their April 11-13, 2018, meeting the Snapper Grouper AP reiterated support for proposed measures to reduce discards of red porgy.

5.4.2 Law Enforcement AP Comments and Recommendations

The Law Enforcement AP received an overview of actions proposed in the amendment during their April 18-19, 2018, meeting. The AP had no comments or recommendations on this action.

5.4.3 SSC Comments and Recommendations

At their October 24-26, 2017, meeting the SSC was asked to comment on the two methods used to predict season length for Actions 1 through 5 in this amendment. Specifically, comments were requested on the use and uncertainties of the two methods. The methodology is explained in detail in **Appendix J**. Asked whether one methodology is more appropriate than the other, whether one approach provided clearer management advice to the South Atlantic Council, and whether there are differences in relative risk or uncertainty between the two methods, the SSC offered the following:

- The complexity of the SARIMA model makes it less favorable as a management tool.
- The last 3 years of data are likely more representative of the current fishery than using the entire data series.
- The number of data points in the time series is sufficiently large enough to split the time series into two parts, using the first part to predict behavior of the second part, then using the actual values in the second part to determine how well the SARIMA model works.
- Explore sensitivity to smoothing kernel/range.
- Important to try and understand the changes in behavior of the fishing effort to different management perturbations.

In February 2018, the SEP of the SSC met and also reviewed the use of the SARIMA model for forecasting snapper grouper landings and for management advice. The SEP had a diverging opinion on the use of the SARIMA model in Regulatory Amendment 27. The conclusions of the SEP are below:

Regarding the appropriateness of the two models and methodologies used to predict landings under various scenarios, the SEP agreed that, in principle, the SARIMA method was superior to the "Last 3 Years" averaging method; however, the SEP recommends that the council be presented with results from both models, as both models have pros and cons. The "Last 3 Years" model is less complicated and easier to understand, but it puts perhaps too much weight on data from recent years at the expense of neglecting longer-run effects due to changes in year class abundance or environmental or policy shocks or cycles. The SARIMA model is more complicated but probably gives a better picture of the uncertainty involved in predicting landings through better modeling of the error term that incorporates the effects of factors left out of the model. Over time, as data availability and quality improve, the performance of the SARIMA model should improve relative to the "Last 3 Years" model.

After this meeting, a retrospective analysis was conducted, using 2017 data, to determine which method more accurately predicted the catch rates of snapper grouper species in the following year. The results indicated that each method performed better under different circumstances. The SSC convened via webinar on May 7, 2018, to review the methodology and stated the following:

In a new analysis presented during the webinar, the analyst generated predictions of closure dates in 2017 with both models and compared them with the actual timing of quota closures under current regulations. For Regulatory Amendment 27, he recommended using the model for each species that most closely predicted actual closure dates in 2017. Based on the justifications given by the analyst, the SSC agrees with the recommended use of both the SARIMA and the Last 3 Years, depending on the retrospective performance analysis done for each Action in Reg Amendment 27."

For Action 4, the SSC recommended using the SARIMA model to inform management decisions (see **Appendix I**).

5.4.4 Public Comments and Recommendations

Public hearings for Vision Blueprint Regulatory Amendment 27 were held on May 8-10, 2018, via webinar and listening stations in North Carolina, South Carolina, and Florida. The public comment period was from April 24 through May 11, 2018. Comments were also accepted on the South Atlantic Council's online public comment form through June 8, 2018. Below is a summary of comments on Action 4:

- One commenter supported a reduced red porgy trip limit during the spawning season instead of a total closure.
- One commenter from North Carolina suggested 50 or100-lbs bycatch trip limit of red porgy during the Jan. – Apr. period, but no changes otherwise.
- Two comments supported the South Atlantic Council's preferred alternative.

5.4.5 South Atlantic Council's Conclusion

Restrictions on possession of red porgy (prohibition on sale and purchase during March and April each year and possession limited to the bag limit) were implemented on September 22, 2000 (Amendment 12; SAFMC 1999), to protect and rebuild the South Atlantic red porgy stock. The restriction was extended to apply during January through April each year through implementation of Amendment 13C to the Snapper Grouper FMP (SAFMC 2006). In recent years, fishermen have approached the South Atlantic Council with concerns over the level of red porgy discards during the January through April commercial closure when co-occurring species such as vermilion snapper and gray triggerfish are being targeted. Indeed, discard data from 2014 through 2016 (see **Appendix D**) showed high numbers of red porgy discards (24,754 fish) relative to landings, compared to other species. Allocating the commercial ACL into two seasons, as proposed under **Preferred Alternative 2**, would also ensure enough fish are available from May through December and, according to analyses, get closer to "lining up" the red porgy and vermilion snapper seasons so discards would be minimized. Additionally, allocating a smaller portion of the red porgy ACL to the early part of the year, when red porgy are spawning, would provide some biological benefit over the other alternatives considered while also reducing the level of discards and improving trip profitability for fishermen. To reduce discarding **Preferred Sub-alternative 2c** would act as a "bycatch allowance" to allow commercial fishermen to retain small numbers of red porgy during January through April.

The South Atlantic Council concluded that **Preferred Alternative 2/Preferred Sub-alternative 2c** best meets the purpose to address commercial stakeholder input to minimize discards for fishermen participating in the snapper grouper fishery. The preferred alternative also best meets the objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

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

The use of split seasons for the commercial sector is addressed under the Vision Blueprint's Strategy 2.3 - *Support development of management approaches that account for the seasonality of the snapper grouper fishery*. One of the priority actions under that strategy states *Expand the use of split seasons for the commercial fishery*. The intent is to "line up" harvest for species that are often caught together to level out accessibility in different areas and to reduce regulatory discards. Factors such as distance to fishing grounds and weather/temperature affect availability of some species to the commercial fleets in different parts of the South Atlantic Council's jurisdiction.

The use of trip limits for the commercial sector is addressed under the Vision Blueprint's Strategy 2.1 - *Support development of management approaches that address retention of snapper grouper species*. The first priority action under this strategy is to consider trip limit adjustments for the commercial sector to lengthen seasons and better utilize ACLs.

5.5 Action 5. Modify the commercial trip limit for vermilion snapper

5.5.1 Snapper Grouper AP Comments and Recommendations

At their April 17-19, 2017, meeting the Snapper Grouper AP offered the following:

- AP supports exploring alternatives as presented.
- Perhaps also consider trip limit reduction in first season as well (although some AP members stated concern about weather being a factor in some areas that would disadvantage some fishermen at a lower trip limit than the current one and not that many species available for market during first season).

The AP approved the following motion:
MOTION: AP RECOMMENDS ALTERNATIVE 2
Alternative 2. Implement a 750 lbs gw vermilion snapper commercial trip limit for the second season (July 1 through December 31). The commercial trip limit is reduced to 500 lbs gw when 75% of the second season quota is met or is projected to be met.
APPROVED BY AP (2 ABSTENTIONS)

Alternatives*

1 No Action. The commercial fishing year is the calendar year. The commercial ACL is allocated equally into two 6-month seasons (Jan. – Jun. and Jul. – Dec.). Roll-over of uncaught ACL from Season 1 to Season 2 is allowed. The commercial trip limit is 1,000 pounds gutted weight (lbs gw). For both seasons, when 75% of the seasonal quota is met or is projected to be met, the trip limit is reduced to 500 pounds lbs gw.

2. Retain the commercial trip limit and trip limit reduction in Season 1. For Season 2, reduce the commercial trip limit to 750 lbs gw and remove the trip limit reduction. Allow quota roll-over from Season 1 to Season 2.

3. Retain the commercial trip limit and trip limit reduction in Season 1. For Season 2, reduce the trip limit to 500 lbs gw and remove the trip limit reduction. Allow quota roll-over from Season 1 to Season 2.

4. Modify the commercial trip limit for both seasons and remove trip limit reductions. Allow quota roll-over between seasons.

4a. 1,000 pounds gw
4b. 850 pounds gw
4c. 700 pounds gw

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives.

At their November 8-9, 2017, meeting the Snapper Grouper AP reiterated how important vermilion snapper is to the commercial snapper grouper fishery and especially to "traditional bandit boats." However, AP members indicated that certain components of the vermilion snapper portion of the snapper grouper fishery would be severely impacted by a reduction in the trip limit. In particular, AP members stated fishermen in north Florida (Mayport, St. Augustine) would be negatively impacted. AP members stated that the trip limit reduction is not having much of an effect at extending the season. Asked whether trip limit increases, or "step-ups" should be considered, AP members indicated they may not be desirable from a market stand point because of the potential for market flooding.

The AP approved the following motions:
MOTION: CONSIDER ADDING ANALYSIS FOR A 500-POUND TRIP LIMIT YEAR-ROUND
APPROVED BY AP (UNANIMOUSLY)

MOTION: CONSIDER ADDING ALTERNATIVE FOR 500-POUND TRIP LIMIT IN BOTH SEASONS WITH NO STEP-DOWNS
Intent is to look at analysis first and then consider adding the alternative
APPROVED BY AP (2 OPPOSED)

MOTION: CONSIDER ADDING ALTERNATIVE FOR 650-POUND TRIP LIMIT IN BOTH SEASONS WITH NO STEP-DOWNS.
APPROVED BY AP (1 OPPOSED)

MOTION: CONSIDER ADDING ALTERNATIVE FOR A 750-POUND TRIP LIMIT IN SEASON 1 AND 500 POUNDS IN SEASON 2 WITH NO STEP-DOWNS.
APPROVED BY AP (UNANIMOUSLY)

MOTION: AP RECOMMENDS ALTERNATIVE 2

> **Alternative 2.** Retain the commercial trip limit and trip limit reduction in Season 1. Implement a 750 lbs gw vermilion snapper commercial trip limit for the second season (July 1 through December 31). The commercial trip limit is reduced to 500 lbs gw when 75% of the second season quota is met or is projected to be met.

APPROVED BY AP (2 ABSTENTIONS)

The AP provided no additional recommendations during their April 11-13, 2018, meeting.

5.5.2 Law Enforcement AP Comments and Recommendations

The Law Enforcement AP received an overview of actions proposed in the amendment during their April 18-19, 2018, meeting. The AP had no comments or recommendations on this action.

5.5.3 SSC Comments and Recommendations

At their October 24-26, 2017, meeting, the SSC was asked to comment on the two methods used to predict season length for Actions 1 through 5 in this amendment. Specifically, comments were requested on the use and uncertainties of the two methods. The methodology is explained in detail in **Appendix J**. Asked whether one methodology is more appropriate than the other, whether one approach provided clearer management advice to the South Atlantic Council, and whether there are differences in relative risk or uncertainty between the two methods, the SSC offered the following:

- The complexity of the SARIMA model makes it less favorable as a management tool.
- The last 3 years of data are likely more representative of the current fishery than using the entire data series.

- The number of data points in the time series is sufficiently large enough to split the time series into two parts, using the first part to predict behavior of the second part, then using the actual values in the second part to determine how well the SARIMA model works.
- Explore sensitivity to smoothing kernel/range.
- Important to try and understand the changes in behavior of the fishing effort to different management perturbations.

In February 2018, the SEP of the SSC met and also reviewed the use of the SARIMA model for forecasting snapper grouper landings and for management advice. The SEP had a diverging opinion on the use of the SARIMA model in Regulatory Amendment 27. The conclusions of the SEP are below:

Regarding the appropriateness of the two models and methodologies used to predict landings under various scenarios, the SEP agreed that, in principle, the SARIMA method was superior to the "Last 3 Years" averaging method; however, the SEP recommends that the council be presented with results from both models, as both models have pros and cons. The "Last 3 Years" model is less complicated and easier to understand, but it puts perhaps too much weight on data from recent years at the expense of neglecting longer-run effects due to changes in year class abundance or environmental or policy shocks or cycles. The SARIMA model is more complicated but probably gives a better picture of the uncertainty involved in predicting landings through better modeling of the error term that incorporates the effects of factors left out of the model. Over time, as data availability and quality improve, the performance of the SARIMA model should improve relative to the "Last 3 Years" model.

After this meeting, a retrospective analysis was conducted, using 2017 data, to determine which method more accurately predicted the catch rates of snapper grouper in the following year. The results indicated that each method performed better under different circumstances. The SSC convened via webinar on May 7, 2018 to review the methodology and stated the following:

In a new analysis presented during the webinar, the analyst generated predictions of closure dates in 2017 with both models and compared them with the actual timing of quota closures under current regulations. For Regulatory Amendment 27, he recommended using the model for each species that most closely predicted actual closure dates in 2017. Based on the justifications given by the analyst, the SSC agrees with the recommended use of both the SARIMA and the Last 3 Years, depending on the retrospective performance analysis done for each Action in Reg Amendment 27."

For Action 5, the SSC recommended using the SARIMA model to inform management decisions (see **Appendix I**).

5.5.4 Public Comments and Recommendations

In October 2017, one commenter suggested the following:

One option for vermilion snapper that would benefit everyone and the resource is to start the season without a trip limit and go to a 500-lbs gw limit when 50% of the quota has been landed with a final step down to a 100-lbs gw bycatch allowance at 75%. Another option is to keep the 1,000-lbs gw trip limit for the first 70% and step down to a 200 lbs gw bycatch allowance for the final 30% of each seasonal quota. The commenter maintained that properly managing vermilion snapper quotas to avoid extended closures should result in consumers being able to enjoy the

35,000 lbs gw of this seafood that is currently allocated to projected post-closure discard mortality every year. The commenter stated that the South Atlantic Council's goal should be to make regulatory discards rare while promoting proven release practices that maximize survival rates. The commenter stated that a multi-species fishery should be managed with appropriate possession limits and bycatch allowances so fishermen can target fish with higher limits while still keeping most of what is caught with lower possession limits.

Public hearings for Vision Blueprint Regulatory Amendment 27 were held on May 8-10, 2018, via webinar and listening stations in North Carolina, South Carolina, and Florida. The public comment period was from April 24 through May 11, 2018. Comments were also accepted on the South Atlantic Council's online public comment form through June 8, 2018. Below is a summary of comments on Action 5:

- One commenter suggested that the South Atlantic Council consider adjusting the vermilion snapper trip limits so it is no longer necessary to allocate 35,000 lbs gw of quota each year to projected post-closure dead discards.
- One commenter from North Carolina expressed support for Sub-alternative 4c (700-lbs gw trip limit for both seasons and remove trip limit reductions) since it would increase the likelihood of year-round harvest for vermilion snapper.
- Three comments (2 from North Carolina and 1 from Florida) offered that 700-lbs gw in both seasons with no trip limit reductions (Sub-alternative 4c) would work for commercial fishermen.
- One commenter from Florida stated that traditional bandit boats would need the largest trip limit available. He indicated a reduction at a certain percentage of the ACL to a bycatch fishery would be good to consider.

5.5.5 South Atlantic Council's Conclusion

Vermilion snapper have been managed under a commercial split season with trip limit reductions in each season since 2009 (Amendment 16; SAFMC 2009). However, early closures have occurred each year since then and the trip limit reduction when 75% of the seasonal quota is met, typically allows for about another two weeks of fishing (**Table 3.2.6**). Fishermen have requested that the South Atlantic Council consider reducing the commercial trip limit in the second season (July through December) as many more species are available for harvest during that time and a lower trip limit would likely extend the season. **Preferred Alternative 4/Sub-alternative 4a** would remove the existing trip limit reductions in both seasons and maintain the 1,000-lbs gw trip limit. Trip limit reductions are administratively burdensome, not very effective at attaining that goal (to lengthen the season), and they may be confusing to fishermen. In addition, the South Atlantic Council recently approved an amendment (Abbreviated Framework 2) for submission to the National Marine Fisheries Service that would increase the total ACL for vermilion snapper based on the results of the latest stock assessment (SEDAR 55 2018). Hence, there is no longer a strong need to have a trip limit reduction. Also, analyses indicate that maintaining the current trip limit would ensure economic profitability and efficient use of the resource.

The South Atlantic Council concluded that **Preferred Alternative 4/Sub-alternative 4a** best meets the purpose to address commercial stakeholder input to minimize discards for fishermen participating in the snapper grouper fishery. The preferred alternative also best meets the objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

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

The use of trip limits for the commercial sector is addressed under the Vision Blueprint's Strategy 2.1 - *Support development of management approaches that address retention of snapper grouper species*. The first priority action under this strategy is to consider trip limit adjustments for the commercial sector to lengthen seasons and better utilize ACLs.

5.6 Action 6. Establish a minimum size limit for almaco jack for the commercial sector

5.6.1 Snapper Grouper AP Comments and Recommendations

At their November 8-9, 2017, meeting the snapper grouper AP was in agreement with the range of alternatives being considered. In addition, the AP discussed whether a minimum size limit for almaco jack should also be considered for the recreational sector. The AP agreed that a minimum size limit is not necessary for that sector as recreational anglers generally fish shallower waters where large almaco jacks are uncommon. AP members also stated that species identification issues should be kept in mind when considering management changes.

The AP provided no additional recommendations during their April 11-13, 2018, meeting.

Alternatives*

1 (No Action). There is no commercial minimum size limit specified for almaco jack.

2. Specify a minimum size limit for almaco jack for the commercial sector:

- **2a. 20 inches fork length**
- 2b. 22 inches fork length
- 2c. 24 inches fork length
- 2d. 26 inches fork length

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives.

5.6.2 Law Enforcement AP Comments and Recommendations

The Law Enforcement AP received an overview of actions proposed in the amendment during their April 18-19, 2018, meeting. The AP had no comments or recommendations on this action.

5.6.3 SSC Comments and Recommendations

The SSC offered no comments or recommendations on this action.

5.6.4 Public Comments and Recommendations

Public hearings for Vision Blueprint Regulatory Amendment 27 were held on May 8-10, 2018 via webinar and listening stations in North Carolina, South Carolina, and Florida. The public comment period was from April 24 through May 11, 2018. Comments were also accepted on the South Atlantic Council's online public comment form through June 8, 2018. Below is a summary of comments on Action 6:

- One commenter offered that a minimum size limit for almaco jack would do nothing more than increase regulatory discards while reducing stock assessment data.
- Two commenters from North Carolina expressed support for the South Atlantic Council for preferred alternative. A 20-inch fork length almaco jack is approximately 5 lbs gw, which is optimal for restaurants or the retail market. Another comment from Florida also expressed support for the preferred alternative.

- A commenter from Florida did not think a minimum size limit for almaco jack was necessary.
- One commenter from North Carolina did not support the proposed minimum size limit as larger fish, in his experience, are not as good to eat as the smaller individuals.

5.6.5 South Atlantic Council's Conclusion

The South Atlantic Council is considering a commercial minimum size limit for almaco jack based on concern from snapper grouper commercial permit holders about the small size and resulting poor commercial value of some of the fish being landed. It is expected that establishing a minimum size limit of 20 inches FL, equivalent to about 5 lbs gw, would command a higher price per pound for almaco jack in the market and keep smaller fish, which fishermen have indicated are hard to sell and may lead to discarding. Although minimum size limits, in general, have the potential to increase discards, almaco jack would presumably exhibit similar release mortality to that of greater amberjack (20%, SEDAR 15 2008), thus, many discarded fish would likely survive. Indeed, fishermen maintain almaco jack are a "hearty" fish and have high release survival. Hence, **Preferred Alternative 2/Sub-alternative 2a** is expected to reduce discards to the extent practicable. Data are not available to assess the marketability aspect of the proposed minimum size limit, however. The available market categories cannot be applied to specific minimum-size alternatives so management decisions have to be based on qualitative information.

The South Atlantic Council concluded that **Preferred Alternative 2/Preferred Sub-alternative 2a** best meets the purpose to minimize discards in the snapper grouper fishery to the extent practicable while improving marketability. The preferred alternative also best meets the objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

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

Establishing minimum size limits would address the Vision Blueprint's Strategy 3.1 under Objective 3 - *Consider development of management approaches that assist fishery-dependent businesses to operate efficiently and profitably*. Specifically, the proposed action meets Action A to "consider market availability when making management decisions". This action was not among the South Atlantic Council's priorities in the 2016-2020 Vision Blueprint but is included in Appendix B of the Vision Blueprint.

5.7 Action 7. Establish a commercial trip limit for the Other Jacks Complex

5.7.1 Snapper Grouper AP Comments and Recommendations

During their April 17-19, 2017, meeting the Snapper Grouper AP offered the following:

- AP reiterates concern over almaco jack. AP had previously recommended removing almaco from the complex and implementing a trip limit on that species.
- Analysis should include season length under no trip limit and under proposed trip limits.
- If possible, break down landings by species to determine whether a single species is driving the harvest.

Alternatives*

1 No Action. There is no commercial trip limit for the Other Jacks Complex (lesser amberjack, almaco jack, and banded rudderfish).

2. Establish a commercial trip limit of:
2a. 500 pounds gutted weight (gw)
2b. 400 pounds gw
2c. 300 pounds gw

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

At their November 8-9, 2017, meeting the snapper grouper AP stated that trip limit reductions (step-downs) for the Other Jacks Complex may not be necessary.

At their April 11-13, 2018, meeting the Snapper Grouper AP recommended revisiting the sector allocation for banded rudderfish. In addition, it was stated that almaco jack should have its own ACL but the proposed trip limit for the Other Jacks Complex should help slow down the harvest.

5.7.2 Law Enforcement AP Comments and Recommendations

The Law Enforcement AP received an overview of actions proposed in the amendment during their April 18-19, 2018, meeting. The AP had no comments or recommendations on this action.

5.7.3 SSC Comments and Recommendations

The SSC had no comments or recommendations on this action.

5.7.4 Public Comments and Recommendations

In October 2017 one commenter suggested the following:
The Other Jacks Complex should be managed with the same split seasons as vermilion snapper and a 200 lbs gw trip limit. These solutions would greatly reduce regulatory discards while providing a dependable supply of local seafood to consumers in an environmentally friendly way.

Public hearings for Vision Blueprint Regulatory Amendment 27 were held on May 8-10, 2018, via webinar and listening stations in North Carolina, South Carolina, and Florida. The public comment period was from April 24 through May 11, 2018. Comments were also accepted on the South Atlantic Council's online public comment form through June 8, 2018. Below is a summary of comments on Action 7:

- Two comments from Florida expressed support for the South Atlantic Council's preferred.
- Two commenters from North Carolina support the preferred alternative. In North Carolina, fishermen catch large almaco jacks inshore in the fall inshore and have to throw back 300-500 lbs gw a day.
- A commenter from North Carolina supports either the 500 or 300-lbs gw trip limit.

5.7.5 South Atlantic Council's Conclusion

While discussing this action, South Atlantic Council members acknowledged that almaco jack are an incidental catch on trips targeting vermilion snapper and it would benefit commercial fishermen to be able to profit from those fish if they were to command a higher price. It was stated that the market value of almaco jack (and other species in the Other Jacks Complex) is increasing. Fishermen have reported that a 500-pound gw trip limit would still allow them to make a profit on a trip and would have the added benefit of extending the season. In addition, South Atlantic Council members mentioned that banded rudderfish are important in the springtime, particularly in April when commercial harvest of greater amberjack is closed. Although some trips can land over 1,000 lbs gw of banded rudderfish during some times of the year, the South Atlantic Council reasoned it would be more equitable for fishermen, and better for the long-term sustainability of the resource, to establish a 500-lbs gw trip limit for this group of species, a proposed under **Preferred Sub-alternative 2a**.

The South Atlantic Council concluded that **Preferred Alternative 2/Sub-alternative 2a** best meets the purpose to enable equitable access for fishermen participating in the commercial snapper grouper fishery. The preferred alternative also best meets the objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

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

The use of trip limits for the commercial sector is addressed under the Vision Blueprint's Strategy 2.1 - *Support development of management approaches that address retention of snapper* *grouper species*. The first priority action under this strategy is to consider trip limit adjustments for the commercial sector to lengthen seasons and better utilize ACLs.

5.8 Action 8. Remove the commercial minimum size limit for certain deep-water species

5.8.1 Snapper Grouper AP Comments and Recommendations

At their April 17-19, 2017, meeting the Snapper Grouper AP approved the following motion:
MOTION: RECOMMEND REMOVAL OF MINIMUM SIZE LIMIT FOR DEEPWATER SPECIES
APPROVED BY AP (UNANIMOUSLY)

The AP provided no additional recommendations during their April 11-13, 2018, meeting.

*Alternatives**

1. No Action. The commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper is 12 inches total length (TL).

2. Remove the 12-inch TL commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper in South Atlantic federal waters.

* Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

5.8.2 Law Enforcement AP Comments and Recommendations

The Law Enforcement AP received an overview of actions proposed in the amendment during their April 18-19, 2018, meeting. The AP had no comments or recommendations on this action.

5.8.3 SSC Comments and Recommendations

The SSC had no comments or recommendations on this action.

5.8.4 Public Comments and Recommendations

Public hearings for Vision Blueprint Regulatory Amendment 27 were held on May 8-10, 2018, via webinar and listening stations in North Carolina, South Carolina, and Florida. The public comment period was from April 24 through May 11, 2018. Comments were also accepted on the South Atlantic Council's online public comment form through June 8, 2018. Members of the public who offered comment expressed support for this action.

5.8.5 South Atlantic Council's Conclusion

Silk snapper, blackfish snapper, and queen snapper are included in the Deep-water Complex, along with misty grouper, yellowedge grouper, and sand tilefish due to their habitat preference and life history characteristics. A 12-inch total length (TL) minimum size limit was established for these species in 1992 with implementation of Amendment 4 (SAFMC 1991). The amendment stated that silk snapper, blackfin snapper, and queen snapper were among 14 species in the Snapper Grouper Complex thought to be overfished. A 12-inch TL minimum size limit was determined to be adequate to control growth overfishing and prevent recruitment overfishing of similar species (i.e., gray snapper, vermilion snapper) and was intended to protect the species and complement existing regulations in Florida. However, silk snapper, blackfin snapper, and queen snapper are currently the only deep-water species for which a minimum size limit is still in effect. Since 1992, our knowledge of barotrauma and subsequent mortality among species that are caught in deep water has grown; hence, fish that are discarded because they are undersized are almost certain to die. Therefore, to curb potential discard losses, the South Atlantic Council proposes removing minimum size limits for species that are likely to die if they are caught and released.

The South Atlantic Council concluded that **Preferred Alternative 2** best meets the purpose to minimize discards in the commercial snapper grouper fishery. The preferred alternative also best meets the objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

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

Removal of size limits for deep-water species is addressed in the Vision Blueprint Strategy 4.2 (in Appendix B) - *Consider management approaches that address the impact of depth on bycatch of snapper grouper species.* Three deep-water snappers—silk snapper, queen snapper, and blackfin snapper—are managed under a 12-inch TL minimum size limit in federal waters. These minimum size limits were put in place long ago, before estimates of discard mortality were available, and before the creation of the various species Complexes. Species in the Deep-water Complex are typically associated with high discard mortality. To curb discard losses, the South Atlantic Council is taking action thought this amendment to eliminate minimum size limit requirements for these deep-water species in Action 8.

5.9 Action 9. Reduce the commercial minimum size limit for gray triggerfish in the exclusive economic zone off east Florida

5.9.1 Snapper Grouper AP Comments and Recommendations

At their April 17-19, 2017, meeting the Snapper Grouper AP approved the following motion:
MOTION: AP RECOMMENDS ALTERNATIVE 2, REDUCING THE MSL FOR GRAY TRIGGERFISH OFF EAST FLORIDA TO 12 INCHES
APPROVED BY AP (1 ABSTENTION)

> ***Alternatives****
>
> 1. No Action. The commercial minimum size limit for gray triggerfish in federal waters off east Florida is 14 inches fork length (FL). The commercial minimum size limit for gray triggerfish in federal waters off Georgia, South Carolina, and North Carolina is 12 inches FL.
>
> **2. Reduce the commercial minimum size limit for gray triggerfish off east Florida to 12 inches FL.**
>
> * Preferred indicated in bold. Refer to Chapter 2 for detailed language of alternatives

The AP provided no additional recommendations during their April 11-13, 2018, meeting.

5.9.2 Law Enforcement AP Comments and Recommendations

The Law Enforcement AP received an overview of actions proposed in the amendment during their April 18-19, 2018, meeting. The AP had no comments or recommendations on this action.

5.9.3 SSC Comments and Recommendations

The SSC had no comments or recommendations on this action.

5.9.4 Public Comments and Recommendations

Public hearings for Vision Blueprint Regulatory Amendment 27 were held on May 8-10, 2018, via webinar and listening stations in North Carolina, South Carolina, and Florida. The public comment period was from April 24 through May 11, 2018. Comments were also accepted on the South Atlantic Council's online public comment form through June 8, 2018. Below is a summary of comments on Action 9:

- One commenter from North Carolina supported no action.
- One comment from Florida was in support of the South Atlantic Council's preferred alternative.

5.9.5 South Atlantic Council's Conclusion

The commercial minimum size limit for gray triggerfish was modified in 2015 through implementation of Amendment 29 to the Snapper Grouper FMP (SAFMC 2014b). A commercial minimum size limit of 12 inches FL was implemented in federal waters off North Carolina, South Carolina, and Georgia, and a commercial minimum size limit of 14 inches FL was put in place in federal waters off the east coast of Florida. This was precautionary action in response to concerns about the status of the gray triggerfish stock in the South Atlantic and to align regulations with those in the Gulf of Mexico. However, after the new minimum size limit went into effect (on July 1, 2015), stakeholders in Florida voiced concern to the Florida Fish and Wildlife Conservation Commission (FWC) regarding increasing discards of gray triggerfish in south Florida where the average size of gray triggerfish is smaller than that in northeast Florida. In response, the FWC reduced the recreational minimum size limit of gray triggerfish to 12 inches FL in November 2015 and requested that the South Atlantic Council follow suit in issuing consistent regulations.

As discussed in **Section 4.9.1**, lowering the minimum size limit to 12 inches FL would increase the rate of harvest, thus increasing landings and possibly shortening the current commercial seasons. However, due to the recent regulatory changes detailed above, there is uncertainty in predictions of season length and the South Atlantic Council opted to align the regulations to minimize discards and thus promote a consistent regulatory environment to benefit stakeholders and law enforcement.

The South Atlantic Council concluded that **Preferred Alternative 2** best meets the purpose to minimize discards in the commercial snapper grouper fishery. The preferred alternative also best meets the objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

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

While consistent regulations between state and federal waters is not specifically listed as an objective in the Vision Blueprint, it is the South Atlantic Council's intent to, whenever possible, ensure a consistent regulatory environment to minimize confusion among resource users and to aid in enforcing of fishery regulations.

Chapter 6. Cumulative Effects

6.1 Affected Area

The immediate impact area would be the federal 200-mile limit of the Atlantic off the coasts of North Carolina, South Carolina, Georgia, and east Florida to Key West, which is also the South Atlantic Fishery Management Council's (South Atlantic 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 the actions found in Vision Blueprint Regulatory Amendment 27 (Regulatory Amendment 27) to the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP), the cumulative effects analysis includes an analysis of data from 2014 through 2018.

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

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

Past Actions

The Blueline Tilefish Emergency Rule implemented temporary measures to reduce overfishing of blueline tilefish while permanent measures were being developed in Amendment 32 to the Snapper Grouper FMP. The temporary rule removed the blueline tilefish portion from the Deep-water Complex annual catch limit (ACL), and established separate commercial and recreational ACLs and accountability measures (AMs). The emergency rule published on April 17, 2014 (79 FR 21636). Those measures were extended through a temporary rule on October 14, 2014 (79 FR 61262, October 10, 2014), and were effective through April 18, 2015, while Amendment 32 and the associated rulemaking were being developed.

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

Regulatory Amendment 14 to the Snapper Grouper FMP, which became effective on December 8, 2014, in part, modified the commercial and recreational fishing year for greater amberjack, and modified the recreational AM for vermilion snapper.

Regulatory Amendment 21 to the Snapper Grouper FMP, which became effective on November 6, 2014, modified the definition of the overfished threshold for red snapper, blueline tilefish, gag, black grouper, yellowtail snapper, vermilion snapper, red porgy, and greater amberjack.

Amendment 32 to the Snapper Grouper FMP, which became effective on March 30, 2015, implemented measures to end overfishing of blueline tilefish. The amendment removed blueline tilefish from the Deep-water Complex, specified AMs, recreational ACLs, and a commercial trip limit, and adjusted the recreational bag limit. The amendment also specified ACLs and revised the AMs for the recreational section of the Deep-water Complex (yellowedge grouper, silk snapper, misty grouper, queen snapper, sand tilefish, and blackfin snapper).

Amendment 29 to the Snapper Grouper FMP, which became effective on July 1, 2015, updated the South Atlantic Council's acceptable biological catch (ABC) control rule to incorporate methodology for determining the ABC of "Only Reliable Catch Stocks," adjusted ABCs for the affected unassessed species, specified ACLs for seven species based on the updated ABCs, and modified management measures for gray triggerfish.

Regulatory Amendment 20 to the Snapper Grouper FMP, which became effective on August 20, 2015, adjusted the recreational and commercial ACLs for snowy grouper, as well as adjusted the rebuilding strategy, modified the commercial trip limit and the recreational bag limit, and modified the recreational fishing season.

Amendment 33 to the Snapper Grouper FMP (also included with Amendment 7 to the FMP for the Dolphin and Wahoo Fishery of the Atlantic), which became effective on December 28, 2015, in part, was implemented to allow recreational fishermen to bring dolphin and wahoo fillets from The Commonwealth of The Bahamas (The Bahamas) into the U.S. exclusive economic zone (EEZ), and update regulations allowing recreational fishermen to bring snapper grouper fillets from the Bahamas into the U.S. EEZ.

Amendment 34 to the Snapper Grouper FMP (included in the Generic AM and Dolphin Allocation Amendment), in part, modified AMs for snapper grouper species to make them more consistent with AMs already implemented for other species and other FMPs. The regulations became effective on February 22, 2016.

Amendment 35 to the Snapper Grouper FMP, which became effective on June 22, 2016, was implemented to remove four species from the FMP (black snapper, dog snapper, mahogany snapper, and schoolmaster), and clarified regulations implementing the golden tilefish longline endorsement.

Regulatory Amendment 25 to the Snapper Grouper FMP, in part, revised the commercial and recreational ACLs for blueline tilefish and implemented a recreational season. The regulations for blueline tilefish became effective on July 13, 2016.

Amendment 36 to the Snapper Grouper FMP, which became effective on July 31, 2017, was implemented to establish new Spawning Special Management Zones to protect spawning areas for snapper grouper species.

Present Actions

The Vision Blueprint Recreational Regulatory Amendment 26 (Regulatory Amendment 26) for the Snapper Grouper FMP considers actions to establish a recreational deep-water species aggregate and specify the recreational season and bag limit for species in the deep-water aggregate. The amendment would also remove the recreational minimum size limit for three 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. Final approval for Secretarial review is scheduled to be held at the December 2018 South Atlantic Council meeting.

At the June 2018, meeting, the South Atlantic Council directed staff to begin development of an abbreviated framework (Abbreviated Framework Amendment 2) to the Snapper Grouper FMP to adjust the ACLs for vermilion snapper and black sea bass based on the results of the most recent Southeast Data Assessment and Review (SEDAR) stock assessment for those species and the subsequent ABC recommendations from the South Atlantic Council's Scientific and Statistical Committee. Public hearings and final approval for Secretarial review took place at the September 2018 South Atlantic Council meeting.

Reasonably Foreseeable Future Actions

At the March 2018 meeting, the South Atlantic Council directed staff to continue to develop Regulatory Amendment 29 to the Snapper Grouper FMP to address the use of best fishing practices and powerhead regulations in a framework amendment to expedite development (these actions were previously included in Amendment 46 to the Snapper Grouper FMP). The amendment was approved for scoping at the June 2018 meeting and work on the amendment will continue into 2019.

At the March 2018 meeting, the South Atlantic Council directed staff to conduct scoping webinars for Amendment 42 to the Snapper Grouper FMP for proposed modifications to regulations for vessels with South Atlantic snapper grouper commercial or for-hire permits to allow the use of three additional sea turtle release gear types. The amendment also proposes changes to the snapper grouper framework procedure to facilitate modifying protected resources' release gear and handling requirements in the future. Scoping hearings were conducted in April 2018. South Atlantic Council staff delivered a summary of scoping comments and an overview of the decision document at the June 2018 meeting. Work will continue on the amendment into 2019.

At the June 2018 meeting, the South Atlantic Council reviewed Amendment 45 to the Snapper Grouper FMP (included in the Comprehensive ABC Control Rule Amendment) Options Paper and comments, and approved the document for scoping in late 2018. The amendment 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.

Expected Impacts from Past, Present, and Future Actions

In recent years, participants in the snapper grouper commercial fishery and associated businesses have experienced some negative economic and social impacts due to changes in ACLs and early closures during the fishing years. Factors such as distance to fishing grounds, weather, and water temperature affect availability of species to the commercial fleets in different parts of the South Atlantic Council's jurisdiction.

The proposed actions are to establish commercial split seasons for snowy grouper, greater amberjack, and red porgy. The intent is to align regulations for species that are often caught together, promote access to snapper grouper fishery, and reduce regulatory discards. Additionally, modifying or specifying trip limits for blueline tilefish, greater amberjack, red porgy, vermilion snapper, and the Other Jacks Complex may help slow the rate of harvest and lengthen fishing seasons. However, trip limits that are too low may make fishing trips inefficient and too costly if fishing grounds are too far away. Yet, a longer open season could be beneficial to the commercial fleet and to end users (restaurant owners, fish houses, and consumers) by improving consistency of availability. For blueline tilefish and red porgy, trip limits may maximize efficiency on trips targeting multiple species and increase fishing opportunities, thus providing some economic relief for commercial fishermen who harvest these snapper grouper species. Additionally, for red porgy, fish that were previously discarded due to the purchase and sale prohibition during January through April would be able to be landed and sold. Therefore, the combined split season and modified trip limit would have biological benefits due to reducing discards, and socio-economic benefits from additional economic profit if these landings are fish that were previously discarded.

Actions that remove size limits for deep-water species are expected to reduce discard mortality. The actions that addresses establishing a minimum size limit for almaco jack responds to stakeholder's concerns over the small size and resulting poor commercial value of the fish being landed. The reduction in the minimum size limit for gray triggerfish responds to stakeholders concerns regarding increasing discards of gray triggerfish in south Florida where the average size of gray triggerfish is smaller than that in northeast Florida and is also intended to bring regulatory consistency.

When combined with the impacts of past, present, and future actions affecting the snapper grouper fishery, specifically for the species in Regulatory Amendment 27, minor cumulative impacts are likely to accrue. For example, there could be beneficial cumulative effects from the actions in this regulatory amendment, in addition to future proposed actions to require the use of descending devices. Also, there may be cumulative socio-economic effects by promoting access to the fishery which would improve commercial fishing opportunities and benefits to associated businesses and communities; however the actions in this regulatory amendment are not expected to result in significant cumulative adverse biological or socio-economic effects to the snapper grouper fishery when combined with the impacts of past, present, and future actions (see **Chapter 4**).

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 27 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 actions are intended to address commercial stakeholder input to enable equitable access for fishermen participating in the snapper grouper fishery, and to minimize discards. The actions are expected to improve management of the commercial sector of the snapper grouper fishery in to order to achieve optimum yield, while minimizing, to the extent practicable, adverse socio-economic effects for commercial fishermen in the South Atlantic Region. 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 all the four states in the South Atlantic Region (Florida, Georgia, South Carolina, and North Carolina). The National Marine Fisheries Service would continue to monitor and collect information on 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 on non-indigenous species.

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

Name	Agency/Division	Title
Brian Cheuvront	SAFMC	Deputy Executive Director for Management
Myra Brouwer	SAFMC	IPT Lead/Fishery Biologist
Kari McLauchlin	SAFMC	Social Scientist
John Hadley	SAFMC	Fishery Economist
Christina Wiegand	SAFMC	Social Scientist
Roger Pugliese	SAFMC	Senior Fishery Biologist
Mike Errigo	SAFMC	Data analyst
Mary Vara	SERO/SF	IPT Lead/Fishery Biologist
Rick DeVictor	SERO/SF	South Atlantic Branch Chief
Adam Bailey	SERO/SF	Technical Writer and Editor
Jessica Stephen	SERO/SF	LAPPs Branch Chief
Nick Farmer	SERO/SF	Data Analyst
Jeff Pulver	SERO/SF	Data Analyst
Mike Travis	SERO/SF	Economist
Nikhil Mehta	SERO/SF	Fishery Biologist/NEPA
Frank Helies	SERO/SF	Fishery Biologist
Mike Jepson	SERO/SF	Social Scientist
Mary Wunderlich	SERO/PR	Fishery Biologist
Jennifer Lee	SERO/PR	Fishery Biologist
David Dale	SERO/HC	EFH Specialist
Noah Silverman	NMFS/SER	Regional NEPA Coordinator
Monica Smit-Brunello	NOAA GC	General Counsel
Tracy Dunn	SERO/OLE	Criminal Investigator
Larry Perruso	SEFSC	Economist
Erik Williams	SEFSC	Biologist

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

Chapter 8. Agencies and Persons Consulted

Responsible Agency

South Atlantic
South Atlantic Fishery Management Council
4055 Faber Place Drive, Suite 201
Charleston, South Carolina 29405
(843) 571-4366 (TEL)
Toll Free: 866-SAFMC-10
(843) 769-4520 (FAX)
safmc@safmc.net

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

Environmental Assessment:

List of Agencies, Organizations, and Persons Consulted

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

Chapter 9. References

Adams, W.F. and C. Wilson. 1995. The status of the smalltooth sawfish, *Pristis pectinata* Latham 1794 (Pristiformes: Pristidae) in the United States. Chondros 6(4):1-5.

Aguilar-Perera, A. 1994. Preliminary observations of the spawning aggregation of Nassau grouper, Epinephelus striatus, at Majahual, Quintana Roo, Mexico. Proceedings of the Gulf and Caribbean Fisheries Institute 43:112-122.

Allen, G.R., 1985. Snappers of the world. An annotated and illustrated catalogue of lutjanid species known to date. FAO Species Catalogue, Vol. 6. FAO Fish. Synop. 125, pp. 1–208.

Anderes Alvarez, B.A. and I. Uchida. 1994. Study of the Hawksbill turtle (*Eretmochelys imbricata)* stomach content in Cuban waters. *In*: Study of the Hawksbill turtle in Cuba (I), Ministry of Fishing Industry, Cuba.

Armstrong, A. O., A. J. Armstrong, F. R. A. Jaine, L. I.E. Couturier, K. Fiora, J. Uribe-Palomino, S. J. Weeks, K. A. Townsend, M. B. Bennett, and A. J. Richardson. 2016. Prey density threshold and tidal influence on reef manta ray foraging at an aggregation site on the Great Barrier Reef. PLoS One 11(5):e0153393.

Backus, R. H., S. Springer, and E. L. Arnold Jr. 1956. A contribution to the natural history of the white-tip shark, *Pterolamiops longimanus* (Poey). Deep-sea Research 3:178-188.

Bardach, J.E., C.L. Smith, and D.W. Menzel. 1958. Bermuda fisheries research program final report. Bermuda Trade Development Board. Hamilton 59 p.

Baum, J., E. Medina, J. A. Musick, and M. Smale. 2006. *Carcharhinus longimanus.* The IUCN red list of threatened species. www.iucnredlist.org (accessed June 2015).

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

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

Bjorndal, K.A. 1997. Foraging ecology and nutrition of sea turtles. *In*: Lutz, P.L. and J.A. Musick (eds.), The Biology of Sea Turtles. CRC Press, Boca Raton, Florida.

Bolten, A.B. and G.H. Balazs. 1995. Biology of the early pelagic stage – the "lost year." *In*: Bjorndal, K.A. (ed.), Biology and Conservation of Sea Turtles, Revised edition. Smithsonian Institute Press, Washington, D.C., 579.

Bonfil, R., S. Clarke, and H. Nakano. 2008. The biology and ecology of the oceanic whitetip shark, *Carcharhinus longimanus. In* M. D. Camhi, E. K. Pikitch, E. A. Babcock, editors. Sharks of the open ocean: Biology, fisheries and conservation. Blackwell Science Publishing.
Brainard, R. E., C. Birkeland, C. M. Eakin, P. McElhany, M. W. Miller, M. Patterson, and G. A. Piniak. 2011. Status review report of 82 candidate coral species petitioned under the U.S. Endangered Species Act. NOAA Technical Memo. U.S. Department of Commerce, NOAA-MNMFS-PIFSC-27.

Brongersma, L.D. 1972. European Atlantic Turtles. Zool. Verhand. Leiden, 121:318

Burke, V.J., E.A. Standora, and S.J. Morreale. 1993. Diet of juvenile Kemp's ridley and loggerhead sea turtles from Long Island, New York. Copeia, 1993, 1176.

Byles, R.A. 1988. Behavior and Ecology of Sea Turtles from Chesapeake Bay, Virginia. Ph.D. dissertation, College of William and Mary, Williamsburg, VA.

Camargo, S. M., R. Coelho, D. Chapman, L. Howey-Jordan, E. J. Brooks, D. Fernando, N. J. Mendes, F. H. Hazin, C. Oliveira, M. N. Santos, F. Foresti, and F. F. Mendonca. 2016. Structure and genetic variability of the oceanic whitetip shark, *Carcharhinus longimanus,* determined using mitochondrial DNA. PLoS One 11(5):e0155623.

Campbell, M.D., W.B. Driggers, B. Sauls, and J.F. Walter. 2014. Release mortality in the red snapper fishery: a meta-analysis of three decades of research. Fishery Bulletin. 112:283-296.

Carpenter, K.E. (ed.). 2002. The living marine resources of the Western Central Atlantic. Volume 3: Bony fishes part 2 (Opistognathidae to Molidae), sea turtles and marine mammals. FAO Species Identification Guide for Fishery Purposes and American Society of Ichthyologists and Herpetologists Special Publication No. 5. FAO, Rome, pp. 601-1374.

Carr, A. 1986. Rips, FADS, and little loggerheads. BioScience 36:92.

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

Carter, J., G.J. Marrow, and V. Pryor. 1994. Aspects of the ecology and reproduction of Nassau grouper, Epinephelus striatus, off the coast of Belize, Central America. Proceedings of the Gulf and Caribbean Fisheries Institute 43:65–111.

Cervigón, F. 1966. Los Peces Marinas de Venezuela. Vols. I and II. Fund. La Salle. Ciencia Naturales.

Chin, A., P. M. Kyne, T. I. Walker, and R. B. McAuley. 2010. An integrated risk assessment for climate change: analyzing the vulnerability of sharks and rays on Australia's Great Barrier Reef. Global Change Biology 16:1936-1953.

CITES. 2013. Consideration of proposals for amendment of Appendices I and II: Manta Rays. Sixteenth meeting of the Conference of the Parties. Bangkok, Thailand, March 3-14.

Clark, T. B. 2010. Abundance, home range, and movement patterns of manta rays (*Manta alfredi, M. birostris*) in Hawai'i. PhD dissertation. University of Hawaii, Manoa, Hawaii, 149 pp.

Cole, T. V. N., P. Hamilton, A. G. Henry, P. Duley, R. M. Pace, B. N. White, and T. Frasier. 2013. Evidence of a North Atlantic right whale *Eubalaena glacialis* mating ground. Endangered Species Research 21(1):55-64.

Colin P.L. 1992. Reproduction of the Nassau grouper, *Epinephelus striatus* (Pisces: Serranidae) and its relationship to environmental conditions. Environmental Biology of Fishes 34:357-377.

Colin, P.L., W.A. Laroche, and E.B. Brothers. 1997. Ingress and settlement in the Nassau grouper, *Epinephelus striatus* (Pisces: Serranidae), with relationship to spawning occurrence. Bulletin of Marine Science 60(3):656-667.

Compagno, L. J. V. 1984. FAO Species Catalogue. Vol 4: *In:* Sharks of the World, Part 1- Hexanchiformes to Lamniformes. FAO Fisheries Synopsis 125. 250 pp.

Couturier, L. I., A. D. Marshall, F. R. Jaine, T. Kashiwagi, S. J. Pierce, K. A. Townsend, S. J. Weeks, M. B. Bennett, and A. J. Richardson. 2012. Biology, ecology and conservation of the Mobulidae. Journal of Fish Biology 80:1075-1119.

Cuellar, N., G.R. Sedberry, and D.M. Wyanski. 1996. Reproductive seasonality, maturation, fecundity, and spawning frequency of the vermilion snapper, *Rhomboplites aurorubens*, off the southeastern United States. Fish. Bull. 94: 635-653.

De Boer, M. N., J. T. Saulino, T. P. Lewis, and G. Notarbartolo-Di-Sciara. 2015. New records of whale shark (*Rhincodon typus*), giant manta ray (*Manta birostris*) and Chilean devil ray (*Mobula tarapacana*) for Suriname. Marine Biodiversity Records 8:e10.

DeVries, D. A. 2006. The Life History, Reproductive Ecology, and Demography of the Red Porgy, *Pagrus Pagrus,* in the Northeastern Gulf of Mexico. Ph.D. Dissertation. Florida State University.

Dooley, J.K. 1978. Malacanthidae. In W. Fischer (ed.). FAO species identification sheets for fishery purposes. Western Central Atlantic (Fishing Area 31). Volume 3. FAO, Rome.

Duffy, C. A. J., and D. Abbott. 2003. Sightings of mobulid rays from northern New Zealand, with confirmation of the occurrence of *Manta birostris* in New Zealand waters. New Zealand Journal of Marine and Freshwater Research 37:715-721.

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

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

Eggleston D.B. 1995. Recruitment in Nassau grouper *Epinephelus striatus*: post-settlement abundance, microhabitat features and ontogenetic habitat shifts. Marine Ecology Progress Series 124:9-22.

Essumang, D. 2010. First determination of the levels of platinum group metals in *Manta birostris* (Manta Ray) caught along the Ghanaian coastline. Bulletin of Environmental Contamination and Toxicology 84:720-725.

Farmer N.A. and J.T. Froeschke. 2015. Forecasting for recreational fisheries management: What's the catch? NAJFM, 35(4):720-735.

Farmer, N. 2016. South Atlantic Nassau Grouper Landings and Discards. SERO-LAPP-2016-09.

Farmer, N.A., Heyman, W.D., Karnauskas, M., Kobara, S., Smart, T.I., Ballenger, J.C., et al. 2017. Timing and locations of reef fish spawning off the southeastern United States. PLoS ONE12(3): e0172968. https://doi.org/10.1371/journal.pone.0172968

Freedman, R., and S. S. Roy. 2012. Spatial patterning of *Manta birostris* in United States east coast offshore habitat. Applied Geography 32:652-659.

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

Good, C. P. 2008. Spatial ecology of the North Atlantic right whale (*Eubalaena glacialis*). Duke University, Durham, North Carolina.

Graham, R. T., M. J. Witt, D. W. Castellanos, F. Remolina, S. Maxwell, B. J. Godley, and L.A. Hawkes. 2012. Satellite tracking of manta rays highlights challenges to their conservation. PLoS One 7(5):e36834.

Grimes, C. B., C. S. Manooch, and G. R. Huntsman. 1982. Reef and rock outcropping fishes in the outer continental shelf of North Carolina and South Carolina and ecological notes on the red porgy and vermilion snapper. Bulletin of Marine Science 32:277-289.

Gudger, E. W. 1922. The most northerly record of the capture in Atlantic waters of the United States of the giant ray, *Manta birostris.* The Science Press 338 pp.

Guinder, V., and J. Molinero. 2013. Climate change effects on marine phytoplankton. Pages 68-90 *in* Marine Ecology in a Changing World. CRC Press: Boca Raton, London, New York.

Harris, P.J., D.M. Wyanski, and P.T.P. Mikell. 2004. Age, growth, and reproductive biology of blueline tilefish along the southeastern coast of the United States, 1982-1999. Transactions of the American Fisheries Society 133:1190-1204.

Harris, P.J., D.M. Wyanski, D.B. White, P.P. Mikell and P.B. Eyo. 2007. Age, Growth, and Reproduction of Greater Amberjack off the Southeastern U.S. Atlantic Coast. Transactions of the American Fisheries Society 136(6): 1534-1545.

Hayes, S., E. Josephson, K. Maze-Foley, and P.E. Rosel. 2017. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2016. NOAA Technical Memorandum NMFS – NE-241. U.S. Department of Commerce – Woods Hole, MA

Heemstra, P.C., and J.E. Randall. 1993. FAO species catalogue. Groupers of the world (Family Serranidae, Subfamily Epinephelinae). An annotated and illustrated catalogue of the grouper, rockcod, hind, coral grouper and lyretail species known to date. FAO Fisheries Synopsis. No. 125, Vol. 16. Rome, FAO.

Heyman, W.D. 2001. Spawning aggregations in Belize a report generated for the workshop, "Towards a sustainable management of Nassau groupers in Belize. The Nature Conservancy.

Hill, R.L., and Y. Sadovy de Mitcheson. 2013. Nassau Grouper, *Epinephelus striatus* (Bloch 1792), Status Review Document. Report to National Marine Fisheries Service, Southeast Regional Office. June 12, 2013. 117 p.

Hinojosa-Alvarez, S., R. P. Walter, P. Diaz-Jaimes, F. Galvan-Magafia, and E. M. Paig-Tran. 2016. A potential third manta ray species near the Yucatan Peninsula? Evidence for a recently diverged and novel genetic Manta group from the Gulf of Mexico. PeerJ 4:e2586.

Hood, P.B. and A.K. Johnson. 1999. Age, growth, mortality, and reproduction of vermilion snapper, *Rhomboplites aurorubens,* from the eastern Gulf of Mexico. Fish. Bull. 97: 828-841.

Hughes, G.R. 1974. The sea turtles of southeast Africa. II. The biology of the Tongaland loggerhead turtle *Caretta caretta* L. with comments on the leatherback turtle *Dermochelys coriacea* L. and green turtle *Chelonia mydas* L. in the study region. Oceanographic Research Institute (Durban) Investigative Report. No. 36.

IOTC. 2015. Status of the Indian Ocean oceanic whitetip shark (OCS: *Carcharhinus longimanus*). *IOTC-2015-SCI 8-ESI 8[E]*.

IPCC (Intergovernmental Panel on Climate Change). 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the

Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

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.

Kashiwagi, T., T. Ito, and F. Sato. 2010. Occurrences of reef manta ray, *Manta alfredi,* and giant manta ray, *M. birostris.* Japan, examined by photographic records Report of Japanese Society for Elasmobranch Studies 46:20-27.

Kashiwagi, T., A. D. Marshall, M. B. Bennett, and J. R. Ovenden. 2011. Habitat segregation and mosaic sympatry of the two species of manta ray in the Indian and Pacific Oceans: *Manta alfredi* and *M. birostris*-CORRIGENDUM. Marine Biodiversity Records 4:e86.

Keinath, J.A., and J.A. Musick. 1993. Movements and diving behavior of a leatherback sea turtle, *Dermochelys coriacea*. Copeia 1993:1010.

Keller, C., L. Garrison, R. Baumstark, L. I. Ward-Geiger, and E. Hines. 2012. Application of a habitat model to define calving habitat of the North Atlantic right whale in the southeastern United States. Endangered Species Research 18(1):73-87.turtle, Dermochelys coriacea. Copeia 1993:1010.

Kennedy, V.S., R.R. Twilley, J.A. Kleypas, J.H. Cowan, Jr., and S.R. Hare. 2002. Coastal and Marine Ecosystems & Global Climate Change: Potential Effects on U.S. Resources. Pew Center on Global Climate Change. 52 p.

Kitchen-Wheeler, A.M. 2013. The behaviour and ecology of Alfred mantas *(Manta alfredi)* in the Maldives. PhD dissertation. Newcastle University, United Kingdom, 379 pp.

Knowlton, A.R., J.B. Ring, and B. Russell. 2002. Right whale sightings and survey effort in the mid Atlantic region: Migratory corridor, time frame, and proximity to port entrances. National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Kohler, N. E., J. G. Casey, and P.A. Turner. 1998. NMFS cooperative shark tagging program, 1962-1993: an atlas of shark tag and recapture data. Marine Fisheries Review 60:1-87.

Kolmos, K.J., T. Smart, D. Wyanski, A. Kelly, and M. Reichert. 2014. Report on Life History of South Atlantic Gray Triggerfish, *Balistes capriscus*, from Fishery-Independent Sources. SEDAR41-DW16. SEDAR, North Charleston, SC. 34 pp.

Kraus, S. D., and R. Rolland, editors. The Urban Whale: North Atlantic Right Whales at the Crossroads. Harvard University Press, Cambridge, Massachusetts.

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

Lee, T.N., V. Kourafalou, J.D. Wang, W.J. Ho, J.O. Blanton, L.P. Atkinson, and L.J. Pietrafesa. 1985. Shelf circulation from Cape Canaveral to Cape Fear during winter. In L.P. Atkinson, D.W. Menzel, and K.A. Bush (eds.), Oceanography of the southeastern U.S. continental shelf, p. 33-62. American Geophysical Union, Washington, D.C.

Lessa, R., F. M. Santana, and R. Paglerani. 1999. Age, growth and stock structure of the oceanic whitetip shark, *Carcharhinus longimanus,* from the southwestern equatorial Atlantic. Fisheries Research 42:21-30.

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

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

Lindeman, K.C, R. Pugliese, G.T. Waugh, and J.S. Ault. 2000. Developmental patterns within a multispecies reef fishery: management applications for essential fish habitats and protected areas. Bulletin of Marine Science 66: 929-956

Low, R. A. and G. F. Ulrich. 1983. Deep-water demersal finfish resources and fisheries off South Carolina. South Carolina Mar. Resour. Center Tech. Rep. 57, 24 p.

Lutz, P.L., and J.A. Musick (eds.). 1997. The Biology of Sea Turtles. CRC Press, Boca Raton, Florida.

Lutz, P.L., J.A. Musick, and J. Wyneken. 2002. The Biology of Sea Turtles, Volume II. CRC Press, Boca Raton, Florida.

MacIntyre, I.G. and J.D. Milliman. 1970. Physiographic features on the outer shelf and upper slope, Atlantic Continental Margin, southeastern United States. Geological Society of America Bulletin 81:2577-2598.

Manooch, C. S., III. 1976. Reproductive cycle, fecundity, and sex ratios of the red porgy, *Pagrus pagrus* (pisces: Sparidae) in North Carolina. Fishery Bulletin 74: 775–781.

Manooch, C. S., and W. W. Hassler. 1978. Synopsis of biological data on the red porgy, *Pagrus pagrus* (Linnaeus). FAO Fisheries Synopsis 116, 19 p.

Manooch, C.S., III, and J.C. Potts. 1997a. Age, growth and mortality of greater amberjack from the southeastern United States. Fisheries Research 30: 229-240.

Manooch, C.M., III and J.C. Potts. 1997b. Age, growth, and mortality of greater amberjack, Seriola dumerili, from the Gulf of Mexico headboat fishery. Bulletin of Marine Science 61:671-683.

Márquez-M, R.1994. Synopsis of biological data on the Kemp's ridley turtles, *Lepidochelys kempii* (Garman, 1880). NOAA Technical Memo, NMFS-SEFSC-343. Miami, FL.

Marshall, A. D., L. J. Compagno, and M. B. Bennett. 2009. Redescription of the genus Manta with resurrection of *Manta alfredi* (Krefft, 1868) (Chondrichthyes; Myliobatoidei; Mobulidae). Zootaxa 2301:1-28.

Marshall, A. D., and M. B. Bennett. 2010. Reproductive ecology of the reef manta ray *Manta alfredi* in southern Mozambique. Journal of Fish Biology 77:169-190.

Marshall, A., M. B. Bennett, G. Kodja, S. Hinojosa-Alvarez, F. Galvan-Magana, M. Harding, G. Stevens, and T. Kashiwagi. 201la. *Manta birostris* The IUCN Red List of Threatened Species. www.iucnredlist.org

Marshall A., T. Kashiwagi, M. B. Bennett, M. H. Deakos, G. Stevens, F. McGregor, T. Clark, H. Ishihara, and K. Sato. 2011b. *Manta alfredi* The IUCN Red List of Threatened Species. www.iucnredlist.org

Mate, B. R., S. L. Nieukirk, R. Mesecar, and T. Martin. 1992. Application of remote sensing for tracking large cetaceans: North Atlantic right whales (*Eubalaena glacialis*). U.S. Department of the Interior, Minerals Management Service, Reston, Virginia.

McLellan, W., E. Meagher, L. Torres, G. Lovewell, C. Harper, K. Irish, B. Pike, and D. A. Pabst. 2003. Winter right whale sightings from aerial surveys of the coastal waters of the US Mid-Atlantic. Pages 109 in Fifteenth Biennial Conference on the Biology of Marine Mammals, Greensboro, North Carolina.

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

Meylan, A. 1984. Feeding Ecology of the Hawksbill turtle (*Eretmochelys imbricata)*: Spongivory as a Feeding Niche in the Coral Reef Community. Dissertation, University of Florida, Gainesville, FL.

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

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

Miller, G.C. and W.J. Richards. 1979. Reef fish habitat, faunal assemblages and factors determining distributions in the South Atlantic Bight. Proceedings of the Gulf and Caribbean Fisheries Institute 32:114-130.

Miller, M. H. and C. Klimovich. 2016. Endangered Species Act status review report: Giant manta ray *(Manta birostris)* and reef manta ray *(Manta alfredi).* Draft Report to National Marine Fisheries Service, Office of Protected Resources, Silver Spring, Maryland. 127 pp.

Moore, A. B. M. 2012. Records of poorly known batoid fishes from the north-western Indian Ocean (Chondrichthyes: Rhynchobatidae, Rhinobatidae, Dasyatidae, Mobulidae). African Journal of Marine Science 34:297-301.

Moore, C.M. and R.F. Labisky. 1984. Population parameters of a relatively unexploited stock of snowy grouper in the lower Florida Keys. Trans. Am. Fish. Soc. 113:322-329.

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

Mortimer, J.A. 1982. Feeding ecology of sea turtles. *In*: Bjorndal, K.A. (ed.), Biology and Conservation of Sea Turtles. Smithsonian Institute Press, Washington, D.C.

Newton J.G., O.H. Pilkey, and J.O. Blanton. 1971. An Oceanographic Atlas of the Carolina and continental margin. North Carolina Dept. of Conservation and Development. 57 p.

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.

NMFS. 2006. Endangered Species Act Section 7 Consultation - Biological Opinion on the Continued Authorization of Snapper-Grouper Fishing in the U.S. South Atlantic Exclusive Economic Zone as Managed under the Snapper-Grouper Fishery Management Plan of the South Atlantic Region (SGFMP), including Amendment 13C to the SGFMP.

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 (National Marine Fisheries Service). 2017. Fisheries Economics of the United States, 2015. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-170, 245p.

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

Ogren, L.H. 1989. Distribution of juvenile and subadult Kemp's ridley turtles: Preliminary results from the 1984-1987 surveys. *In*: C.W. Caillouet Jr. and A.M. Landry Jr. (eds.) Proceedings from the 1st Symposium on Kemp's ridley Sea Turtle Biology, Conservation, and Management. Sea Grant College Program, Galveston, TX. 116.

Ooi, M. S., K. A. Townsend, M. B. Bennett, A. J. Richardson, D. Fernando, C. A. Villa, and C. Gaus. 2015. Levels of arsenic, cadmium, lead and mercury in the branchial plate and muscle tissue of mobulid rays. Marine Pollution Bulletin 94:251-259.

Pabst, D. A., C. Taylor, M. Zani, A. Glass, A. Knowlton, C. Khan, R. J. McAlarney, and W. A. McLellan. 2009. North Atlantic right whale (*Eubalaena glacialis*) sightings in the US mid-Atlantic and southeast Atlantic Bight (Virginia through South Carolina) from 2001-2008. 18th Biennial Conference on the Biology of Marine Mammals, Quebec City, Canada.

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

Parker, R.O., D.R. Colby, and T.D. Willis. 1983. Estimated amount of reef habitat on a portion of the U.S. South Atlantic and Gulf of Mexico Continental Shelf. Bulletin of Marine Science 33:935-940.

Parker, R.O., Jr. and S.W. Ross. 1986. Observing reef fishes from submersibles off North Carolina. Northeast Gulf Sci. 8:31-49.

Parker, R.O., Jr. and R.W. Mays. 1998. Southeastern U.S. deepwater reef fish assemblages, habitat characteristics, catches, and life history summaries. NOAA Tech. Report, National Marine Fisheries Service 138.

Parks, S. E., M. W. Brown, L. A. Conger, P. K. Hamilton, A. R. Knowlton, S. D. Kraus, C. K. Slay, and P. L. Tyack. 2007. Occurrence, composition, and potential functions of North Atlantic right whale (*Eubalaena glacialis*) surface active groups. Marine Mammal Science 23(4):868-887.

Paxton, J.R., D.F. Hoese, G.R. Allen, and J.E. Hanley. 1989. Pisces. Petromyzontidae to Carangidae. Zoological Catalogue of Australia, Vol. 7. Australian Government Publishing Service, Canberra, 665 p.

Pulver, J. R., H. Liu, and E. Scott-Denton. 2016. Modelling community structure and species co-occurrence using fishery observer data. ICES Journal of Marine Science 73(7):1750-1763.

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.

Radakov, D. V., A.D. Motchek, Y.N. Sbikin, R. Claro Madruga, and A. Silva Lee. 1975. Acerca de la longitud de los peces comerciales en capturas de la zona noroccidental de Cuba. Serie Oceanologica. No. 28. Academia de Ciencias de Cuba. Instituto de Oceanologia. Habana. Cuba, 9 p.

Rodrigues, J., D. Freitas, I. Fernandes, and R. Lessa. 2015. Estrutura populacional do tubarao estrangeiro *(Carcharhinus longimanus)* no Atlantico Sul. 3.

Robins, C.R. and G.C. Ray. 1986. A field guide to Atlantic coast fishes of North America. Houghton Mifflin Company, Boston, U.S.A. 354 p.

Rohner, C. A., S. J. Pierce, A. D. Marshall, S. J. Weeks, M. B. Bennett, and A. J. Richardson. 2013. Trends in sightings and environmental influences on a coastal aggregation of manta rays and whale sharks. Marine Ecological Progress Series 482:153-168.

Rosenbaum, H. C., and coauthors. 2000. World-wide genetic differentiation of Eubalaena: Questioning the number of right whale species. Molecular Ecology 9(11):1793-1802.

Ross, S.W. 1978. Life history aspects of the gray tilefish *Caulolatilus microps* (Goode and Bean, 1878). M.S. Thesis, College of William and Mary, Williamsburg, VA. 125 p.

Ross, J.L. and G.R. Huntsman. 1982. Age, growth and mortality of blueline tilefish from North Carolina and South Carolina. Transactions of the American Fisheries Society 111:585-592.

Roumillat, W, A., and C. W. Waltz. 1993. Biology of the red porgy *Pagrus pagrus* from the southeastern United States. Data Report 1993 MARMAP, South Carolina Wildlife and Marine Resources Department, P.O. Box 12559, Charleston, SC 29422.

Rubin R., K. Kumli, and G. Chilcott. 2008. Dive characteristics and movement patterns of acoustic and satellite-tagged manta rays *(Manta birostris)* in the Revillagigedos Islands of Mexico. Joint Meeting of Ichthyologists and Herpetologists Montreal, Canada.

Ruck, C. 2016. Global genetic connectivity and diversity in a shark of high conservation concern, the oceanic whitetip, *Carcharhinus longimanus.* Master's thesis, Nova Southeastern University, Fort Lauderdale, Florida, 64 pp.

Sadovy de Mitchesen, Y. and P.L. Colin. 2011. Reef Fish Spawning Aggregations: Biology, Research and Management. Springer Science and Business Media.

SAFMC (South Atlantic Fishery Management Council). 1991. 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., Ste 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1998. Amendment 9 to 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). 1999. Amendment 12 to 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). 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). 2008. 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). 2009. Amendment 16 to 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). 2009. Fishery Ecosystem Plan for 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). 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). 2010c. Regulatory Amendment 9 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). 2011. Comprehensive Annual Catch Limit Amendment for the South Atlantic Region with Final Environmental Impact Statement, 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). 2013. 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, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2014a. Regulatory Amendment 20, 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). 2014b. Amendment 29 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Assessment, 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). 2015a. Regulatory Amendment 25 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Assessment, 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). 2015b. 2016-2020 Vision Blueprint for the Snapper Gruper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

Schmidtke, M. A. 2017. Life History and Management Methods for Blueline Tilefish (*Caulolatilus microps*) from the United States Mid-Atlantic Region. Doctor of Philosophy (PhD) dissertation. Ocean/Earth/Atmos Sciences, Old Dominion University, https://digitalcommons.odu.edu/oeas_etds/11

Scott, W.B. and M.G. Scott. 1988. Atlantic fishes of Canada. Can. Bull. Fish. Aquat. Sci. 219, 731 p.

SEDAR (Southeast Data, Assessment and Review) 1. 2002. Stock Assessment Report: South Atlantic Red Porgy. SEDAR, 4055 Faber Place Drive, Suite 201, NorthCharleston, SC 29405. http://sedarweb.org

SEDAR (Southeast Data, Assessment and Review) 1 Update. 2006. Stock Assessment Report: South Atlantic Red Porgy. SEDAR, 4055 Faber Place Drive, Suite 201, NorthCharleston, SC 29405. http://sedarweb.org

SEDAR (Southeast Data, Assessment and Review) 15. 2008. Stock Assessment Report: South Atlantic Greater Amberjack. SEDAR, 4055 Faber Place Drive, Suite 201, NorthCharleston, SC 29405. http://sedarweb.org

SEDAR (Southeast Data, Assessment and Review) 17. 2008. Stock Assessment Report: South Atlantic Vermilion Snapper. SEDAR, 4055 Faber Place Drive, Suite 201, NorthCharleston, SC 29405. http://sedarweb.org

SEDAR (Southeast Data, Assessment and Review) 17 Update. 2012. Stock Assessment Report: South Atlantic Red Porgy. SEDAR, 4055 Faber Place Drive, Suite 201, NorthCharleston, SC 29405. http://sedarweb.org

SEDAR (Southeast Data, Assessment and Review) 1 Update. 2012. Stock Assessment Report: South Atlantic Red Porgy. SEDAR, 4055 Faber Place Drive, Suite 201, NorthCharleston, SC 29405. http://sedarweb.org

SEDAR (Southeast Data, Assessment and Review) 32. 2013. Stock Assessment Report: South Atlantic Blueline Tilefish. SEDAR, 4055 Faber Place Drive, Suite 201, NorthCharleston, SC 29405. http://sedarweb.org

SEDAR (Southeast Data, Assessment and Review) 36. 2013. Stock Assessment Report: South Atlantic Snowy Grouper. SEDAR, 4055 Faber Place Drive, Suite 201, NorthCharleston, SC 29405. http://sedarweb.org

SEDAR (Southeast Data, Assessment and Review) 41. 2016. Stock Assessment Report: South Atlantic Gray Triggerfish. SEDAR, 4055 Faber Place Drive, Suite 201, NorthCharleston, SC 29405. http://sedarweb.org

SEDAR (Southeast Data, Assessment and Review) 50. 2017. Stock Assessment Report: South Atlantic Blueline Tilefish. SEDAR, 4055 Faber Place Drive, Suite 201, NorthCharleston, SC 29405. http://sedarweb.org

SEDAR (Southeast Data, Assessment and Review) 55. 2018. Stock Assessment Report: South Atlantic Vermilion Snapper. SEDAR, 4055 Faber Place Drive, Suite 201, NorthCharleston, SC 29405. http://sedarweb.org

Sedberry G.R., Pashuk O., Wyanski D.M., Stephen J.A., and P. Weinbach. 2006. Spawning locations for Atlantic reef fishes off the southeastern US; 2006. GCFI 57:463-514.

Seki, T., T. Taniuchi, H. Nakano, and M. Shimizu. 1998. Age, growth and reproduction of the oceanic whitetip shark from the Pacific Ocean. Fisheries Science 64:14-20.

Shaver, D.J. 1991. Feeding ecology of wild and head-started Kemp's ridley sea turtles in south Texas waters. Journal of Herpetology 25:327.

Silva Lee, A.F. 1974. Hábitos alimentarios de la cherna criolla *Epinephelus striatus* Bloch y algunos datos sobre su biologia. Serie Oceanologica Academia de Ciencias de Cuba 25:3-14.

Simon, T., R.M. Macieira and J.C. Joyeux. 2013. The shore fishes of the Trindade–Martin Vaz insular complex: an update. Journal of Fish Biology 82(6): 2113-2127.

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

Simpfendorfer, C.A. and T.R. Wiley. 2004. Determination of the distribution of Florida's remnant sawfish population, and identification of areas critical to their conservation. Mote Marine Laboratory, Technical Report July 2, 2004, 37 pp.

Smith, C.L. 1971. A revision of the American groupers: Epinephelus and allied genera. Bulletin of the American Museum of Natural History 146:69-241.

Soma, M. 1985. Radio biotelemetry system applied to migratory study of turtle. Journal of the Faculty of Marine Science and Technology, Tokai University, Japan, 21:47.

Standora, E.A., J.R. Spotila, J.A. Keinath, and C.R. Shoop. 1984. Body temperatures, diving cycles, and movements of a subadult leatherback turtle, *Dermochelys coriacea*. Herpetologica 40:169.

Starr, R.M., E. Sala, E. Ballesteros, and M. Zabala. 2007. Spatial dynamics of the Nassau grouper *Epinephelus striatus* in a Caribbean atoll. Marine Ecology Progress Series 343:239-249.

Stewart, J. D., C. S. Beale, D. Fernando, A. B. Sianipar, R. S. Burton, B. X. Semmens, and O. Aburto-Oropeza. 2016a. Spatial ecology and conservation of *Manta birostris* in the Indo-Pacific. Biological Conservation 200:178-183.

Stewart, J. D., E. M. Hoyos-Padilla, K. R. Kumli, and R. D. Rubin. 2016b. Deep-water feeding and behavioral plasticity in *Manta birostris* revealed by archival tags and submersible observations. Zoology 119(5):406-413.

Strasburg, D. 1958. Distribution, abundance, and habits of pelagic sharks in the central Pacific ocean. Fishery Bulletin 58:35-361.

Taylor, J. K. D., M. A. Zani, A. R. Knowlton, B. Wikgren, P. Hamilton, and S. D. Kraus. 2010. Aerial surveys to reduce ship/whale collisions in the calving ground of the North Atlantic right whale (*Eubalaena glacialis*). National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Fernandina Beach, Florida.

Thayer, G.W., K.A. Bjorndal, J.C. Ogden, S.L. Williams, and J.C. Zieman. 1984. Role of large herbivores in seagrass communities. Estuaries 7:351.

Thompson, R. and J.L. Munro. 1974. Chapter 8: The biology, ecology and bionomics of the jacks, Carangidae, pages 82–93 In Munro, J.L. (ed), Caribbean Coral Reef Fishery Resources.

Thompson, R. and J.L. Munro. 1978. Aspects of the biology and ecology of Caribbean reef fishes: Serranidae (hinds and groupers). Journal of Fish Biology 12:115-146.

Thompson, B.A., J.H. Power, M.L. Brown and A. Whitehurst. 1996. Life history, population dynamics, and identification of three species of amberjacks (genus Seriola). Technical Report. Final Report to MARFIN: LSU-CFI-96-04.

Tucker, J.W., P.G. Bush, and S.T. Slaybaugh. 1993. Reproductive patterns of Cayman Islands Nassau grouper (*Epinephelus striatus*) populations. Bulletin of Marine Science, 52:961–969.

Tucker, J.W., Jr., and P.N. Woodward. 1994. Growth and development of domestic juvenile Nassau groupers. Proceedings of the Gulf and Caribbean Fisheries Institute, 43:389-391.

Van Dam, R. and C. Diéz. 1998. Home range of immature hawksbill turtles (*Eretmochelys imbricata*) at two Caribbean islands. Journal of Experimental Marine Biology and Ecology 220(1):15-24.

Walker, T.A. 1994. Post-hatchling dispersal of sea turtles. p. 79. *In*: Proceedings of the Australian Marine Turtle Conservation Workshop, Queensland Australia.

Waring, G.T., E. Josephson, K. Maze-Foley, and P.E. Rosel (eds). 2013. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2012. U.S. Department of Commerce, Woods Hole, MA.

Witzell, W.N. 2002. Immature Atlantic loggerhead turtles (*Caretta caretta*): suggested changes to the life history model. Herpetological Review 33(4):266-269.

Wyanski, D.M., D.B.White, and C.A. Barans. 2000. Growth, population age structure, maturity, spawning of snowy grouper, *Epinephelus niveatus*, off the Atlantic coast of the southeastern United States. Fish. Bull. 98:199-218.

Wyanski, D.M., D.B. White, K.J. Kolmos, and P.P. Mikell. 2013. Marine Resources Monitoring, Assessment and Prediction Program: Report on the Status of the Life History of Snowy Grouper, *Hyporthodus niveatus*, for the SEDAR36 Standard Stock Assessment. SEDAR36-WP08. SEDAR, North Charleston, SC. 46 pp.

Wynne, K. and M. Schwartz. 1999. Guide to marine mammals and turtles of the U.S. Atlantic and Gulf of Mexico. Rhode Island Sea Grant, Narragansett. 115pp.

Young, C. N., J. Carlson, M. Hutchinson, C. Hutt, D. Kobayashi, C. T. McCandless, and J. Wraith. 2016. Status review report: oceanic whitetip shark *(Carcharhinius longimanus).* Final Report to the National Marine Fisheries Service, Office of Protected Resources. November 2016. 162 pp.

Zhao, B., J.C. McGovern, and P.J. Harris. 1997. Age, growth, and temporal change in size-at-age of the vermilion snapper from the South Atlantic Bight. Trans. Am. Fish. Soc. 126:181-193.

Zhao, B. and J.C. McGovern. 1997. Temporal variation in sexual maturity and gear specific sex ratio of the vermilion snapper, *Rhomboplites aurorubens*, in the South Atlantic Bight. Fish. Bull. 95: 837-848.

Appendix A. Considered But Rejected Alternatives

Action 1. Establish a commercial split season and modify the commercial trip limit for blueline tilefish

Alternative 3. Specify two commercial fishing seasons for blueline tilefish. Allocate the blueline tilefish commercial ACL into two quotas: XX% to the period January 1 through ______ and YY% to the period ____ through December 31. Any remaining quota from Season One would transfer to Season Two. Any remaining quota from Season Two would not be carried forward.

Discussion: The South Atlantic Fishery Management Council (South Atlantic Council) removed this alternative from consideration early on in the development of this amendment because it was redundant. However, alternatives that the South Atlantic Council subsequently considered were structured similarly.

Action 4. Establish a commercial split season and modify commercial trip limit for red porgy

Alternative 2. Maintain the annual January 1 to April 30 seasonal harvest limit for red porgy.

> **Sub-Alternative 2a.** Allocate the directed commercial red porgy ACL into two quotas: 50% to the period January 1 through June 30 and 50% to the period July 1 through December 31. Any remaining quota from Season One would transfer to Season Two. Any remaining quota from Season Two would not be carried forward.
>
> **Sub-alternative 2b.** Allocate the directed commercial red porgy ACL into two quotas: XX% to the period January 1 through ______ and YY% to the period ____ through December 31. Any remaining quota from Season One would transfer to Season Two. Any remaining quota from Season Two would not be carried forward.

Discussion: The South Atlantic Council removed this alternative from consideration because it would have retained the annual January through April sale and purchase prohibition on red porgy. To meet the purpose and need to minimize discards, the South Atlantic Council determined it would be necessary to impose a small trip limit during those four months of the year, when species that co-occur with red porgy (i.e., vermilion snapper and gray triggerfish) are being targeted.

Action 6. Implement a commercial trip limit for the Other Jacks Complex

Alternative 3. Establish a commercial trip limit for almaco jack only.

> **Sub-alternative 3a.** 500 pounds gutted weight
> **Sub-alternative 3b.** 400 pounds gutted weight
> **Sub-alternative 3c.** 300 pounds gutted weight

Discussion:
Almaco jack is included in the Other Jacks Complex with lesser amberjack and banded rudderfish. Species identification issues have been identified within this group of species, making it difficult to establish regulations that affect only one species in the Complex. In addition, data show that the majority (75%) of commercial landings for this complex is composed of almaco jack. Hence, the South Atlantic Council determined it was neither productive nor necessary to focus management measures on almaco jack only.

Alternative 2. Establish a commercial trip limit for the Other Jacks Complex.

> **Sub-alternative 2a.** 500 pounds gutted weight with a trip limit reduction to 250 pounds gutted weight once 75% of the annual catch limit is met or projected to be met.
> **Sub-alternative 2b.** 400 pounds gutted weight with a trip limit reduction to 200 pounds gutted weight once 75% of the annual catch limit is met or projected to be met.
> **Sub-alternative 2c.** 300 pounds gutted weight with a trip limit reduction to 150 pounds gutted weight once 75% of the annual catch limit is met or projected to be met.

Discussion: Trip limit reductions can result in heavy administrative burden for the managing agency and, due to the time lag in obtaining data, the timing of implementing such a reduction can be imprecise. Commercial landings of species in the Other Jacks Complex are too low compared to those of other snapper grouper species to justify the administrative burden of a trip limit reduction that, according to the analysis conducted, would not result in appreciative lengthening of the season.

Action 8. Modify the seasonal prohibition on commercial harvest and possession and sale and purchase of red grouper in the Exclusive Economic Zone off South Carolina and North Carolina

Discussion: The South Atlantic Council intends to continue developing this action in a separate amendment addressing red grouper management in order to promote consistency and facilitate timely implementation of actions pertaining to that species.

Appendix B. Glossary

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

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

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

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

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

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

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

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

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

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

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

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

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

Discards: Fish captured but released at sea.

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

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

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

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

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

F: Fishing mortality.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Gulf of Mexico Fishery Management Council (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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix C. History of Management

South Atlantic Snapper Grouper History of Management
Last Updated: 8/21/18

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

*Shaded rows indicate FMP Amendments

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

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

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
			-20” TL limit – red snapper, gag, and red, black, scamp, yellowfin, and yellowmouth groupers; -28” fork length (FL) limit – greater amberjack (recreational only); -36” FL or 28” core length – greater amberjack (commercial only); -Bag limits – 10 vermilion snapper, 3 greater amberjack -Aggregate snapper bag limit – 10/person/day, excluding vermilion snapper and allowing no more than 2 red snappers; -Aggregate grouper bag limit – 5/person/day, excluding Nassau and goliath grouper, for which no retention (recreational & commercial) is allowed; -Spawning season closure – commercial harvest greater amberjack > 3 fish bag prohibited in April; -Spawning season closure – commercial harvest mutton snapper >snapper aggregate prohibited during May and June; -Charter/headboats and excursion boat possession limits extended.
Amendment #5 (1992a)	04/06/92	PR: 56 FR 57302 FR: 57 FR 7886	For wreckfish: -Established limited entry system with individual transferable quotas (ITQs); -Required dealer to have permit; -Rescinded 10,000 lb. trip limit; -Required off-loading between 8 am and 5 pm; -Reduced occasions when 24-hour advance notice of offloading required for off-loading; -Established procedure for initial distribution of percentage shares of total allowable catch (TAC).
Emergency Rule	8/31/92	57 FR 39365	For Black Sea Bass (bsb): -Modified definition of bsb pot; -Allowed multi-gear trips for bsb; -Allowed retention of incidentally-caught fish on bsb trips.
Emergency Rule Extension	11/30/92	57 FR 56522	For Black Sea Bass: -Modified definition of bsb pot; -Allowed multi-gear trips for bsb; -Allowed retention of incidentally-caught fish on bsb trips.
Regulatory Amendment #4 (1992b)	07/06/93	FR: 58 FR 36155	-For Black Sea Bass: -Modified definition of bsb pot; -Allowed multi-gear trips for bsb; -Allowed retention of incidentally-caught fish on bsb trips.
Regulatory Amendment #5 (1992c)	07/31/93	PR: 58 FR 13732 FR: 58 FR 35895	-Established 8 SMZs off South Carolina, where only hand-held, hook-and-line gear and spearfishing (excluding powerheads) was allowed.

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
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.
Action Suspended	5/14/98		-NMFS informed the Council that action on the interim rule request was suspended.
Emergency Rule Request	9/24/98		-Council requested Amendment 9 be implemented via emergency rule.
Amendment #8 (1997)	12/14/98	PR: 63 FR 1813 FR: 63 FR 38298	-Established program to limit initial eligibility for snapper grouper fishery: -Must have demonstrated landings of any species in the snapper grouper FMU in 1993, 1994, 1995 or 1996; and have held valid snapper grouper permit between 02/11/96 and 02/11/97; -Granted transferable permit with unlimited landings if vessel landed ≥ 1,000 pounds (lbs) of snapper grouper species in any of the years;

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
			-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.
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 lbs; 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.

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Emergency Interim Rule	09/08/99, expired 08/28/00	64 FR 48324 and 65 FR 10040	-Prohibited harvest or possession of red porgy.
Amendment #10 Comprehensive Essential Fish Habitat Amendment (1998c)	07/14/00	PR: 64 FR 37082 and 64 FR 59152 FR: 65 FR 37292	-Identified essential fish habitat (EFH) and established habitat areas of particular concern (HAPC) for species in the snapper grouper FMU.
Amendment #11 Comprehensive Sustainable Fisheries Act Amendment (1998d)	12/02/99	PR: 64 FR 27952 FR: 64 FR 59126	-Maximum sustainable yield (MSY) proxy: goliath and Nassau grouper = 40% static spawning potential ratio (SPR); all other species = 30% static SPR; -OY: hermaphroditic groupers = 45% static SPR; goliath and Nassau grouper = 50% static SPR; all other species = 40% static SPR -Overfished/overfishing evaluations: BSB: overfished (minimum stock size threshold (MSST)=3.72 mp, 1995 biomass=1.33 mp); undergoing overfishing (maximum fishing mortality threshold (MFMT)=0.72, F1991-1995=0.95) Vermilion snapper: overfished (static SPR = 21-27%) Red porgy: overfished (static SPR = 14-19%). Red snapper: overfished (static SPR = 24-32%) Gag: overfished (static SPR = 27%) Scamp: no longer overfished (static SPR = 35%) Speckled hind: overfished (static SPR = 8-13%) Warsaw grouper: overfished (static SPR = 6-14%) Snowy grouper: overfished (static SPR = 5-15%) White grunt: no longer overfished (static SPR = 29-39%) Golden tilefish: overfished (couldn't estimate static SPR) Nassau grouper: overfished (couldn't estimate static SPR) Goliath grouper: overfished (couldn't estimate static SPR) -overfishing level: goliath and Nassau grouper = F>F40% static SPR; all other species: = F>F30% static SPR Approved definitions for overfished and overfishing. MSST = [(1-M) or 0.5 whichever is greater]* B_{MSY}. MFMT = F_{MSY}.

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #12 (2000a)	09/22/00	PR: 65 FR 35877 FR: 65 FR 51248	For Red porgy: -MSY=4.38 mp; OY=45% static SPR; MFMT=0.43; MSST =7.34 mp; rebuilding timeframe=18 years (1999=year 1); -no sale of red porgy during Jan-April; -1 fish bag limit; -50 lb. bycatch commercial trip limit May-December; -Modified management options and list of possible framework actions.
Regulatory Amendment #8 (2000b)	11/15/00	PR: 65 FR 41041 FR: 65 FR 61114	-Established 12 SMZs at artificial reefs off Georgia; revised boundaries of 7 existing SMZs off Georgia to meet CG permit specs; restricted fishing in new and revised SMZs.
Amendment #9 (1998b) resubmitted	10/13/00	PR: 63 FR 63276 FR: 65 FR 55203	-Commercial trip limit for greater amberjack.
Amendment #13A (2003)	04/26/04	PR: 68 FR 66069 FR: 69 FR 15731	-Extended for an indefinite period the regulation prohibiting fishing for and possessing snapper grouper species within the *Oculina* Experimental Closed Area.
Notice of Control Date	10/14/05	70 FR 60058	-Considered management measures to further limit participation or effort in the commercial fishery for snapper grouper species (excluding wreckfish).
Amendment #13C (2006)	10/23/06	PR: 71 FR 28841 FR: 71 FR 55096	-End overfishing of snowy grouper, vermilion snapper, black sea bass, and golden tilefish. Increase allowable catch of red porgy. Year 1 = 2006; 1. Snowy Grouper Commercial: -Quota = 151,000 lbs gutted weight (gw) in year 1, 118,000 lbs gw in year 2, and 84,000 lbs gw in year 3 onwards. -Trip limit = 275 lbs gw in year 1, 175 lbs gw in year 2, and 100 lbs gw in year 3 onwards; Recreational: -Limit possession to one snowy grouper in 5 grouper per person/day aggregate bag limit; 2. Golden Tilefish Commercial: Quota of 295,000 lbs gw, 4,000-lbs gw trip limit until 75% of the quota is taken when the trip limit is reduced to 300 lbs gw. Do not adjust the trip limit downwards unless 75% is captured on or before September 1; Recreational: Limited possession to 1 golden tilefish in 5 grouper per person/day aggregate bag limit; 3. Vermilion Snapper Commercial: Quota of 1,100,000 lbs gw; Recreational: 12" TL size limit. 4. Black Sea Bass

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
			Commercial: Quota of 477,000 lbs gw in year 1, 423,000 lbs gw in year 2, and 309,000 lbs gw in year 3 onwards; -Required use of at least 2” mesh for the entire back panel of black sea bass pots effective 6 months after publication of the final rule; -Required black sea bass pots be removed from the water when the quota is met; -Changed fishing year from calendar year to June 1 – May 31; Recreational: Recreational allocation of 633,000 lbs gw in year 1, 560,000 lbs gw in year 2, and 409,000 lbs gw in year 3 onwards. Increased the minimum size limit from 10” to 11” in year 1 and to 12” in year 2; -Reduced recreational bag limit from 20 to 15 per person per day; -Changed fishing year from the calendar year to June 1 through May 31. 5. Red Porgy Commercial and recreational: -Retained 14” TL size limit and seasonal closure (retention limited to the bag limit); -Specified a commercial quota of 127,000 lbs gw and prohibit sale/purchase and prohibit harvest and/or possession beyond the bag limit when quota is taken and/or during January through April; -Increased commercial trip limit from 50 lbs ww to 120 red porgy (210 lbs 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 deep-water Type II marine protected areas (MPAs) to protect a portion of the population and habitat of long-lived deep-water snapper grouper species.
Amendment #15A (2008a)	3/14/08	73 FR 14942	- Established rebuilding plans and status determination criteria for snowy grouper, black sea bass, and red porgy.
Notice of Control Date	12/4/08	74 FR 7849	-Established a control date for the golden tilefish portion of the snapper grouper fishery in the South Atlantic.
Notice of Control Date	12/4/08	74 FR 7849	-Established control date for black sea bass pot sector in the South Atlantic.
Amendment #15B (2008b)	12/16/09, except for the amendments to § 622.18(c) was effective 11/16/2009; the	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;

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
	amendment to § 622.10(c) was effective 2/16/2010; and §§ 622.5, 622.8, and 622.18(b)(1)(ii) required OMB approval.		-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).
Amendment #16 (2009a)	7/29/09	PR: 74 FR 6297 FR: 74 FR 30964	-Specified status determination criteria for gag and vermilion snapper; For gag: -Specified interim allocations 51% commercial & 49% recreational; -Recreational and commercial shallow water grouper spawning closure January through April; -Directed commercial quota= 352,940 lbs gw; -Reduced 5-fish aggregate grouper bag limit, including tilefish species, to a 3-fish aggregate; -Captain and crew on for-hire trips cannot retain the bag limit of vermilion snapper and species within the 3-fish grouper aggregate; For vermilion snapper: -Specified interim allocations 68% commercial & 32% recreational; -Directed commercial quota split Jan-June=315,523 lbs gw and 302,523 lbs gw July-Dec; -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 Comprehensive Ecosystem-Based Amendment 1 (CE-BA1) (2009b)	7/22/10	PR: 75 FR 14548 FR: 75 FR 35330	-Amended coral, coral reefs, and live/hardbottom habitat FMP to establish deep-water 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.
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;

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
			-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 deep-water 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.
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 deep-water species (snowy grouper, blueline tilefish, yellowedge grouper, queen snapper, silk snapper, misty grouper);

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment # 25 Comprehensive Annual Catch Limit Amendment (2011d)	4/16/12	PR: 76 FR 74757 Amended PR: 76 FR 82264 FR: 77 FR 15916	-Reorganize FMUs to 6 complexes (deep-water, 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.
Amendment #23 Comprehensive Ecosystem-based Amendment 2 (CE-BA2) (2011f)	1/30/12	PR: 76 FR 69230 FR: 76 FR 82183	-Designated the Deepwater MPAs as EFH-HAPCs; -Modify management measures for Octocoral; -Limit harvest of snapper grouper species in SC SMZs to the bag limit; -Modify sea turtle release gear; -Designated new EFP for pelagic Sargassum habitat.
Amendment #18A (2012a)	7/1/12	PR: 77 FR 16991 FR: 77FR3 2408	-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: -Defined and reverted inactive shares; -Redistributed reverted shares; -Established a share cap; -Established an appeals process.

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
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;
Yellowtail snapper Emergency Rule	11/7/2012, through 5/6/2013	77 FR 66744	-Increased the commercial ACL for yellowtail snapper from 1,142,589 lbs to 1,596,510 lbs.
Amendment #18B (2013a)	5/23/13	PR: 77 FR 75093 FR: 77 FR 23858	For Golden Tilefish: -Limited participation and effort in the commercial sector through establishment of a longline endorsement; -Established eligibility requirements and allowed transferability of longline endorsement; -Established an appeals process; -Modified trip limits; -Specified allocations 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.
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.

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
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 Joint South Atlantic and Gulf of Mexico Generic Headboat Reporting Amendment (2013h)	1/27/2014	PR: 78 FR 59641 FR: 78 FR 78779	-Required electronic reporting for headboat vessels at weekly intervals.
Blueline Tilefish Emergency Rule	4/17/2014 through 10/10/2014 or 4/18/2015	PR: 79 FR 21636 FR:79 FR 61262	-Removed the blueline tilefish portion from the deep-water complex ACL; -Established separate commercial and recreational ACLs and AMs for blueline tilefish.
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.
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.

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #29 (2014c)	7/1/2015	NOA: 79 FR 69819 PR: 79 FR 72567 FR: 80 FR 30947	-Updated the ABC control rule to incorporate methodology for determining the ABC of unassessed species; -Adjusted the ABCs for fourteen unassessed snapper-grouper species (see final rule); -Adjusted the ACLs and ACTs for three species complexes and four snapper-grouper species based on revised ABCs; -Established ACLs for unassessed species; -Modified gray triggerfish minimum size limits; -Established a commercial split season and commercial trip limits for gray triggerfish.
Regulatory Amendment #20 (2014d)	8/20/2015	PR: 80 FR 18797 FR: 80 FR 43033	-Adjusted the recreational and commercial ACLs for snowy grouper; -Adjusted the rebuilding strategy; -Modified the commercial trip limit; -Modified recreational bag limit; -Modified the recreational fishing season.
Amendment #32 (2014e)	3/30/2015	PR: 80 FR 3207 FR: 80 FR 16583	-End overfishing of blueline tilefish; -Removed blueline tilefish from the deep-water 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 deep-water complex (yellowedge grouper, silk snapper, misty grouper, queen snapper, sand tilefish, black snapper, and blackfin snapper);
Regulatory Amendment #22 (2015a)	9/11/2015, except for the amendments to §§ 622.190(b) and 622.193(r)(1) which were effective 8/12/2015	PR: 80 FR 31880 FR: 80 FR 48277	-Adjusted ACLs and OY for gag and wreckfish
Amendment # 33 Dolphin Wahoo Amendment 7 and Snapper Grouper Amendment 33 (2015b)	12/28/2015	NOA:80 FR 55819 PR:80 FR 60601 FR:80 FR 80686	-Allowed dolphin and wahoo fillets to enter the U.S. EEZ after lawful harvest in The Bahamas; -Specified the condition of any dolphin, wahoo, and snapper-grouper fillets; -Described how the recreational bag limit is determined for any fillets; -Prohibited the sale or purchase of any dolphin, wahoo, or snapper-grouper recreationally harvested in The Bahamas; -Specified the required documentation to be onboard any vessels that have these fillets; -Specified transit and stowage provisions for any vessels with fillets.

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #34 Generic Accountability Measures and Dolphin Allocation Amendment (2015c)	2/22/2016	NOA:80 FR 41472 PR:80 FR 58448 FR:81 FR 3731	-Modified AMs for snapper-grouper species (golden tilefish, snowy grouper, gag, red grouper, black grouper, scamp, the shallow-water grouper complex (SASWG: red hind, rock hind, yellowmouth grouper, yellowfin grouper, coney, and graysby), greater amberjack, the jacks complex (lesser amberjack, almaco jack, and banded rudderfish), bar jack, 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	NOA:81 FR 6222 PR:81 FR 11502 FR:81 FR 32249	-Removed black snapper, dog snapper, mahogany snapper, and schoolmaster from the Snapper-Grouper FMP; -Clarified regulations governing the use of Golden Tilefish Longline Endorsements.
Regulatory Amendment #16 (2016a)	12/29/2016 (closure) 1/30/2017 (gear markings)	NOI: 78 FR 72868 PR: 81 FR 53109 FR: 81 FR 95893	-Revise the area where fishing with black sea bass pots is prohibited from Nov.1-April 30. -Add additional gear marking requirements for black sea bass pot gear.
Regulatory Amendment #25 (2016b)	8/12/2016 except changes to blueline tilefish, effective 7/13/2016.	PR: 81 FR 34944 FR: 81 FR 45245	-Revised commercial and recreational ACL for blueline tilefish; -Revised the recreational bag limit for black sea bass; -Revised the commercial and recreational fishing year for yellowtail snapper.
Amendment #36 (2016d)	7/31/17	NOI: 82 FR 810 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	NOI: 80 FR 45641 NOA: 81 FR 69774 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

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
			size limits, recreational bag limits, and commercial trip limits.
Red Snapper 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
Golden Tilefish 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	NOA:82 FR 44756 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).

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #43 (2017d)	7/26/2018	NOI:82 FR 1720 NOA: 83 FR 16282 PR:83 FR 22939 FR:83 FR35428	-Actions addressed overfishing of red snapper by specifying recreational and commercial ACLs beginning in 2018;
Amendment #39 (Generic For-Hire Reporting Amendment) (2017e)	TBD	NOA:83 FR 11164 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: Red Grouper (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.
Amendment #26 (Bycatch Reporting Amendment)	TBD	TBD	-Modify bycatch and discard reporting for commercial and for-hire vessels.
Regulatory Amendment 26 (Vision Blueprint Recreational)	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 (Vision Blueprint Commercial)	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 28(2018)	TBD	PR: 83 FR 48788	-End overfishing of golden tilefish by reducing the ACL based on the most recent stock assessment
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 Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Regulatory Amendment 32	TBD	TBD	-Revise accountability measures for yellowtail snapper to reduce the possibility of in-season closures.
Amendment 42	TBD	TBD	-Modification to sea turtle release gear and SG framework

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.

Appendix D. Bycatch Practicability Analysis

Revised July 10, 2018

Background

The Magnuson-Stevens Fishery Conservation and Management Act at §3(2) defines bycatch as "fish which are not harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch-and-release fishery management program." Economic discards are fish that are discarded because they are undesirable to the harvester. Economic discards generally includes certain species, sizes, and/or sexes with low or no market value.

Regulatory discards are fish that are required by regulation to be discarded, but also include fish that may be retained but not sold. National Marine Fisheries Service (NMFS) outlines at 50 CFR §600.350(d) (3) (i) ten factors that should be considered in determining whether a management measure minimizes bycatch or bycatch mortality to the extent practicable.

1. Population effects for the bycatch species.
2. Ecological effects due to changes in the bycatch of that species (effects on other species in the ecosystem).
3. Changes in the bycatch of other species of fish and the resulting population and ecosystem effects.
4. Effects on marine mammals and birds.
5. Changes in fishing, processing, disposal, and marketing costs.
6. Changes in fishing practices and behavior of fishermen.
7. Changes in research, administration, and enforcement costs and management effectiveness.
8. Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources.
9. Changes in the distribution of benefits and costs.
10. Social effects.

The Fishery Management Councils are encouraged to adhere to the precautionary approach outlined in Article 6.5 of the Food and Agriculture Organization of the United Nations Code of Conduct for Responsible Fisheries when uncertain about these factors.

The South Atlantic Fishery Management Council (South Atlantic Council) manages snapper grouper stocks in federal waters from the Florida Keys to the Virginia/North Carolina border. In Vision Blueprint Commercial Regulatory Amendment 27 (Regulatory Amendment 27) to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP), the South Atlantic Council has proposed modifications of commercial regulations such as fishing seasons, trip limits, and size limits for species in the Snapper Grouper FMP. These proposed management measures are intended to address commercial stakeholder input to enable equitable access for fishermen participating in the Snapper Grouper FMP, and to minimize discards. In the South Atlantic, most snapper grouper species are harvested with hook-and-line gear. Many of the species under consideration in Regulatory Amendment 27 are indirectly harvested during trips targeting other stocks; for this reason, uncertainty in the historical data is often high.

1.1 Population Effects for the Bycatch Species

A total of 12 species could be directly impacted by actions included in Regulatory Amendment 27. **Table D-1** lists the species most often landed on the same trip in the South Atlantic using Southeast Fisheries Science Center (SEFSC) commercial logbook data. The analysis was done by isolating all commercial logbook trips that reported at least one pound landed for the species of interest using data from 2014 through 2016 in the South Atlantic. Next, on the same trips, the numbers of trips in which other species were also landed were used to provide a percentage of trip co-occurrence. Some species had other species landed on greater than 60% of the trips; most notably vermilion snapper on trips landing gray triggerfish and snowy grouper on trips landing blueline tilefish. Additionally, due to the high release mortality associated with the capture depths of blueline tilefish and snowy grouper (95 and 100%, respectively), efforts should be made to align any seasonal or quota closures to avoid regulatory discarding. The most common species being landed with greater amberjack was gag on 29.5% of the trips. Species of interest with no dominant co-occurring species may be due to the ability of fishers to selectively target the species of interest using specific gear, locations, seasonal patterns, or a combination of these thus avoiding unnecessary bycatch. It is not possible to do a meaningful analysis of any long-term population effects due to changes in effort based on the high connectivity between many of the species being landed in the fishery together; however, efforts to align any seasonal or quota closures between species with high co-occurrence should be beneficial. These analyses are limited to co-occurrence of landings and do not contain any information on species that were discarded at-sea. Other studies have incorporated data from the Reef Fish Observer Program in the Gulf of Mexico and an independent sampling program that may provide more comprehensive analyses, but these are focused on the Gulf of Mexico and not the South Atlantic (Farmer et al. 2016; Pulver et al. 2016).

Table D-1. The species of interest, the number of trips where at least one pound was landed for the species of interest, and the top three species caught on the same trips in the South Atlantic for all gear types from 2014 through 2016, including the percentage of trip co-occurrence for species one through three.

Species of Interest	Number of Trips	Species One	Species Two	Species Three
Almaco Jack	3,397	Vermilion Snapper (54.1%)	Gray Triggerfish (47.8%)	Greater Amberjack (42.1%)
Banded Rudderfish	1,201	Almaco Jack (49.5%)	Greater Amberjack (38.4%)	Vermilion Snapper (31.6%)
Blackfin Snapper	151	Dolphin (34.4%)	Scamp (34.4%)	Red Porgy (33.8%)
Blueline Tilefish	1,778	Snowy Grouper (62.5%)	Golden Tilefish (23.5%)	Vermilion Snapper (23.5%)
Gray Triggerfish	4,168	Vermilion Snapper (72.5%)	Black Sea Bass (42.9%)	Almaco Jack (38.9%)
Greater Amberjack	6,778	Gag (29.5%)	Red Porgy (26.5%)	Vermilion Snapper (25.9%)
Lesser Amberjack	308	Vermilion Snapper (32.1%)	Gray Triggerfish (29.2%)	Black Sea Bass (26.9%)
Queen Snapper	60	Snowy Grouper (43.3%)	Greater Amberjack (38.3%)	Blueline Tilefish (26.7%)
Red Porgy	4,109	Scamp (57.2%)	Black Sea Bass (56.5%)	Gag (51%)
Silk Snapper	729	Vermilion Snapper (54.9%)	Red Porgy (49.1%)	Gray Triggerfish (46.8%)
Snowy Grouper	3,582	Blueline Tilefish (31.0%)	Golden Tilefish (28.2%)	Almaco Jack (24.7%)
Vermilion Snapper	5,252	Gray Triggerfish (57.5%)	Black Sea Bass (43.3%)	Red Porgy (39.3%)

Source: Southeast Fisheries Science Center Commercial Logbook (November 2017).

Current Discards

Currently, commercial discard data are collected using a supplemental form that is sent to a 20% stratified random sample of the active permit holders in the snapper grouper fishery. However, in the absence of any observer data, there are concerns about the accuracy of logbook data in collecting bycatch information. Biases associated with logbooks primarily result from inaccuracy in reporting of species that are caught in large numbers or are of little economic interest (particularly of bycatch species), and from low compliance rates. Commercial discards were estimated by month using the SEFSC Commercial Logbook and Supplemental Discard Logbook (accessed May 2017) to develop a discard rate in numbers of fish per unit of effort, by species, gear, and region, and expand that rate to the total effort in the fishery by gear and region. Note that a randomly selected comprehensive observer program is not available in the South Atlantic, thus estimation of commercial discards is reliant upon self-reported data.

From 2014 through 2016, the commercial sector of the South Atlantic snapper grouper fishery had a wide range of mean annual discards (0 – 27,222 individuals) reported for the species potentially affected in Regulatory Amendment 27 (**Table D-2**). It is difficult to compare the ratio of commercial landings to discards because commercial landings are reported in pounds whole weight (lbs ww) and discards are reported in numbers of fish (N). However, based on the information available, red porgy had high numbers of discards (24,754) relative to landings, compared to other species. On the contrary, greater amberjack had on average only 3,630 fish being reported discarded annually with the second highest average annual landings (857,415 lbs ww). Greater amberjack discard data in conjunction with the trip co-occurrence analyses indicates fishers are likely able to selectively harvest greater amberjack. Vermilion snapper, red porgy, and gray triggerfish had the highest number of discards reported on average annually. Vermilion snapper, red porgy, and gray triggerfish also co-occurred on a high percentage of trips, and the high number of discards for these species may be due to inability of fishers to selectively target one of the species during a seasonal or quota closure for a co-occurring species, e.g., targeting vermilion snapper when red porgy is closed.

In addition to the number of self-reported discards per trip and gear, the SEFSC Supplemental Discard Logbook attempts to quantify the reason why discarding occurs using four codes.

1) Regulation – Not legal size: Animals that would have been sold, however local or federal size limits forbid it.
2) Regulation – Out of season: Animals that would have been sold, however the local or federal fishing season is closed.
3) Regulation – Other: Animals that would have been sold, however a local or federal regulation other than size or season, forbids it (Other than size or season; i.e., protected species, not properly permitted).
4) Market conditions: Animals that have no market value (rotten, damaged).

Fishers can specify multiple reasons for a species discarded on the same trip and gear. More information on the discard logbook is available here https://www.sefsc.noaa.gov/fisheries/logbook.htm.

The discard logbook only contains self-reported discards from a 20% sub-sample by region and gear fished; thus, it may not be representative of the entire fishery. Of the four codes described above, regulations (i.e., not legal size or out of season) were the most common reason selected, depending on the species, based on the number of self-reported discards (**Table D-3**). For the three species that had the highest number of discards reported on average annually (vermilion snapper, red porgy, and gray triggerfish), 'out of season' was the most common reason selected. Efforts to align any seasonal or quota closures among these three species would likely be beneficial in reducing discards. The regulation 'not legal size' was the most common reason selected for greater amberjack. For species with a low estimated release mortality rate, such as greater amberjack and almaco jack, a high percentage of released fish likely survive resulting in minimal long-term population effects from a minimum size limit. Even for other species with higher release mortality rates, a minimum size limit could potentially benefit the stock by increasing spawning potential (larger fish are more fecund) and therefore remains an effective management measure to achieve reductions in harvest to keep landings below the annual catch limit (ACL).

Table D-2. Mean annual South Atlantic commercial landings and estimates of discards for species from 2014 through 2016. Mean commercial landings are in pounds (lbs) whole weight (ww). Discards represent numbers of fish (N).

Species	Mean Landings (lbs ww)	Mean Discards (N)
Almaco Jack	147,370	3,091
Banded Rudderfish	55,502	400
Blackfin Snapper	456	0
Blueline Tilefish	110,824	5,106
Gray Triggerfish	285,310	17,516
Greater Amberjack	857,415	3,630
Lesser Amberjack	6,026	86
Queen Snapper	1,639	0
Red Porgy	140,569	24,754
Silk Snapper	11,444	4
Snowy Grouper	148,504	351
Vermilion Snapper	865,546	27,222

Sources: Commercial landings data from SEFSC Commercial ACL Dataset (October 2017) with discard estimates expanded from the SEFSC Supplemental Commercial Discard Logbook (May 2017). The number of trips from 2014 through 2016 is available in Table D-1.

Table D-3. The number of trips with discards reported to the Supplemental Discard Logbook in the South Atlantic from 2014 through 2016 and percentage of unexpanded discards for each discard reason out of the total number of self-reported discards.

Species	Number of Trips	Not Legal Size	Out of Season	Other Regulations	Market Conditions
Almaco Jack	378	3.0%	80.4%	3.7%	13.0%
Blueline Tilefish	116	0.4%	84.9%	14.7%	0.0%
Gray Triggerfish	445	28.6%	64.7%	6.3%	0.3%
Greater Amberjack	469	84.5%	10.4%	3.7%	1.4%
Red Porgy	1,197	19.7%	77.1%	3.2%	0.1%
Vermilion Snapper	1,292	32.2%	60.7%	6.7%	0.4%

Sources: SEFSC Supplemental Commercial Discard Logbook (November 2017). Note the logbook only contains self-reported discards from a 20% sub-sample by region and gear fished thus may not be representative of the entire fishery. The analysis was limited to species with greater than 1,000 expanded discards reported on average annually from table D-2.

Release Mortality Rates

A wide range of release mortality rates are expected to occur based on the diversity of species potentially affected in Regulatory Amendment 27. Generally, release mortality is highly correlated with depth for snapper grouper species, with highest mortality among fish captured in deep water (Campbell et al. 2014; Pulver 2017; Rudershausen et al. 2014; Stephen and Harris 2010; Wilson and Burns 1996). Many species can be captured over a broad depth range or transition to different depth zones throughout their life history, so release mortality rates can be highly variable. Recent Southeast Data, Assessment, and Review (SEDAR) assessments include estimates of release mortality rates based on published study and industry input. Stock assessment reports can be found at http://sedarweb.org/.

SEDAR 50 (2017) estimated a point release mortality rate of 95% (sensitivity range: 90-100%) for blueline tilefish captured in the South Atlantic hook-and-line commercial fishery. Snowy grouper also had a high release mortality rate of 100% estimated in SEDAR 36 (2014). A lower release mortality rate of 20% (sensitivity range: 10-30%) was estimated for greater amberjack in the South Atlantic (SEDAR 15 2008). SEDAR 59 is currently underway for South Atlantic greater amberjack and could potentially update the greater amberjack release mortality estimate. SEDAR 01 Update (2012) recommended a base release mortality rate for red porgy of 35% based on the previous SEDAR, but also discussed a higher rate of 82% that was reported by Stephen and Harris (2010) may be more appropriate. The SEDAR 01 Update assessment (2012) determined if the higher release mortality rate of 82% is correct, overfishing may have occurred during multiple years in the previous decade. SEDAR 17 Update (2012) estimated a release mortality rate of 41% (sensitivity range: 24-53%) for vermilion snapper captured by the commercial sector in the South Atlantic. SEDAR 55 is currently underway for vermilion snapper and could potentially update the vermilion snapper mortality rate estimate.

A very low discard mortality rate (sensitivity range: 0-10%) was recommended in SEDAR 49 (2016) for almaco jack. Fishers cited the shallower depth of capture and the general hardiness of almaco jacks compare to greater amberjack as support for the very low release mortality rate. In the same assessment, a low release mortality estimate between 20 and 40% was recommended for lesser amberjack. No SEDAR estimate of banded rudderfish release mortality is currently available but based on similar physiology to other species within the same genus (almaco jack, greater amberjack, and banded rudderfish) a release mortality estimate between 0 and 40% could be expected. No SEDAR estimate of release mortality were available for queen snapper, silk snapper, or blackfin snapper, but due to the relatively deep depth of capture for these species release mortality is likely very high (near 100%). SEDAR 41 (2016) estimated a low release mortality rate of 12.5% (sensitivity range: 5-20%) for gray triggerfish in the South Atlantic.

Expected Impacts on Bycatch for the Proposed Actions

Action 1 would establish a commercial split season and modify the commercial trip limit for blueline tilefish. On average, 5,106 blueline tilefish were discarded annually according to the SEFSC discard logbook from 2014 through 2016, with 'out of season' selected as the primary reason for discarding. Reducing the trip limit could extend the fishing season longer and reduce regulatory discarding when fishers are targeting other species, but still catching blueline tilefish after the commercial blueline tilefish fishery has closed. However, the commercial trip limit could also increase discarding if the amount is overly restrictive and fishers catch more blueline tilefish than the trip limit. Bycatch and discards could increase, decrease, or remain the same by establishing a commercial split season. If the commercial split season is better aligned with the fishing seasons of other deep-water species, primarily snowy grouper, discards would remain similar or decrease, but if the fishing seasons are not aligned regulatory discarding could increase.

Action 2 would establish a commercial split season for snowy grouper. Currently, very few discards relative to the landings are being reported. Similar to blueline tilefish, if the commercial split season coincides with other deep-water species, discards would remain similar or decrease, but if the fishing seasons are not aligned regulatory discarding could potentially increase.

Action 3 would establish a commercial split season and modify the commercial trip limit for greater amberjack. The commercial split season and trip limit should lengthen the fishing season which has closed early when the ACL has been met the past few years. Currently, relatively few discards are reported for greater amberjack and any changes in discards would likely have minimal population effects because greater amberjack have a low discard mortality rate.

Action 4 would establish a commercial split season and modify the commercial trip limit for red porgy. The commercial split season and trip limit should lengthen the fishing season, reducing discards when other species are targeted, primarily gray triggerfish and vermilion snapper. Reducing the trip limit could also increase discards if the amount is overly restrictive and fishers catch more red porgy than the trip limit. Red porgy have a moderate estimated release mortality rate so some negative population effects would be expected from an increase in discards.

Action 5 would modify the commercial trip limit for vermilion snapper and could lengthen the fishing season, reducing discards when other species are targeted, primarily gray triggerfish and red porgy. Reducing the trip limit could also increase discards if the amount is overly restrictive and fishers catch more vermilion snapper than the trip limit. Vermilion snapper have a moderate estimated release mortality rate so some negative population effects would be expected from an increase in discards.

Action 6 would implement a minimum size limit for almaco jack for the commercial sector. Almaco jack have a very low estimated release mortality rate (0-10%). A high percentage of released fish likely survive resulting in minimal long-term population effects. The minimum size limit may benefit the stock by increasing spawning potential and remains an effective management measure to achieve reductions in harvest to extend the length of the fishing season.

Action 7 would implement a commercial trip limit for the Other Jacks Complex. Similar to other actions, reducing the trip limit could extend the fishing season longer and reduce any regulatory discarding when targeting other species during periods when the fishery has typically been closed. However, the commercial trip limit could also increase discards if the amount is overly restrictive and fishers catch more jacks than the trip limit. The species in the Other Jacks Complex (almaco jack, lesser amberjack, and banded rudderfish) have low estimated release mortality rates, so any increases in discards are expected to have minimal population effects.

Action 8 would remove the commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper. Eliminating the minimum size limit should reduce discards, but very few self-reported commercial discards have been reported recently. No change in population effects is expected because any fish that were previously released were likely discarded dead due to the depth of capture typically associated with these three species.

Action 9 would reduce the commercial minimum size limit for gray triggerfish in the Exclusive Economic Zone off east Florida. Reducing the minimum size limit should reduce discards when the fishery is open, but the increase in harvest could shorten the fishing season and increase discards due to an earlier closure. Any benefit from reduced discarding when the fishery is open may be minimal because of the low (12.5%) estimated release mortality rate (e.g., most of the undersized gray triggerfish likely survived). Further the stock may be negatively affected by harvesting gray triggerfish at an earlier age, potentially reducing spawning potential.

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

The Comprehensive Ecosystem-Based Amendment 2 (CE-BA 2; SAFMC 2011b) included actions that removed harvest of octocorals off Florida from the Coral, Coral Reefs, and Live/Hard Bottom Habitat Fishery Management Plan (Coral FMP); set the octocoral ACL for Georgia, South Carolina, and North Carolina equal to 0; modified management of special management zones (SMZs) off South Carolina; revised sea turtle release gear requirements for the snapper grouper fishery that were established in Amendment 15B to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP; SAFMC 2008); and designated new essential fish habitat (EFH) and EFH-Habitat Areas of Particular Concern in the South Atlantic. There is no bycatch associated with octocoral harvest within the management area of the Coral FMP since harvest is prohibited. CE-BA 2 also included an action that limited harvest and possession of snapper grouper and coastal migratory pelagics (CMP) species to the bag limit in SMZs off South Carolina. This action likely reduced bycatch around SMZs by restricting commercial harvest in the area, but has probably had limited effect on the magnitude of overall bycatch of snapper grouper species in the South Atlantic.

Other actions have been taken in recently implemented amendments that have reduced bycatch of and bycatch mortality of federally managed species in the South Atlantic. Amendment 13C to Snapper Grouper FMP (SAFMC 2006) required the use of 2-inch mesh in the back panel of black sea bass pots, which has likely reduced the magnitude of regulatory discards. Amendment 16 to the Snapper Grouper FMP (SAFMC 2009) required the use of dehooking devices, which could help reduce bycatch mortality of vermilion snapper, black sea bass, gag, red grouper, black grouper, and red snapper. Dehooking devices can allow fishermen to remove hooks with greater ease and more quickly from snapper grouper species without removing the fish from the water. If a fish does need to be removed from the water, dehookers reduce handling time thus increasing survival (Cooke et al. 2001). Furthermore, Amendment 17A to the Snapper Grouper FMP (SAFMC 2010a) required circle hooks for snapper grouper species north of 28 degrees latitude, which has likely reduced bycatch mortality of some snapper grouper species. Amendment 17B to the Snapper Grouper FMP (SAFMC 2010b) established ACLs and AMs and address overfishing for eight species in the snapper grouper management complex: golden tilefish, snowy grouper, speckled hind, Warsaw grouper, black sea bass, gag, red grouper, black grouper, and vermilion snapper. Overfishing is no longer occurring for black sea bass, snowy grouper, red grouper, black grouper, and vermilion snapper.

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

Amendment 18A to the Snapper Grouper FMP (SAFMC 2011c), included actions that could reduce bycatch of black sea bass and the potential for interactions with protected species. Actions in Amendment 18A limited the number of participants in the black sea bass pot sector, required fishermen bring pots back to port at the completion of a trip, and limited the number of pots a fisherman can deploy. Amendment 24 to the Snapper Grouper FMP (SAFMC 2011d) established a rebuilding plan for red grouper, which was overfished and undergoing overfishing. Amendment 24 (SAFMC 2011d) also established ACLs and AMs for red grouper, to help to reduce bycatch of red grouper and co-occurring species.

The final rule (78 FR 23858; April 23, 2013) for Amendment 18B to the Snapper Grouper FMP (SAFMC 2012), established an endorsement program for the commercial golden tilefish longline sector, which could have positive effects for habitat and protected species. Regulatory

Amendment 14 to the Snapper Grouper FMP (SAFMC, 2014) adjusted management measures for a number of snapper grouper species, some of which likely reduced the magnitude of discards. Regulatory Amendment 15 to the Snapper Grouper FMP included actions for yellowtail snapper and gag that are expected to reduce bycatch of snapper grouper species (SAFMC, 2013a). Amendment 36 to the Snapper Grouper FMP established Spawning Special Management Zones (SMZs) and is expected to reduce bycatch of many snapper grouper species, especially speckled hind and Warsaw grouper.

The Joint Dealer Reporting Amendment (SAFMC 2013b), which went into effect on January 27, 2014, has changed the reporting frequency for landings by headboats from monthly to weekly, and requires that reports be submitted electronically. The action is expected to provide more timely information on landings and discards. Improved information on landings would help ensure ACLs are not exceeded. Furthermore, more timely and accurate information would be expected to provide a better understanding of the composition and magnitude of catch and bycatch, enhance the quality of data provided for stock assessments, increase the quality of assessment output, and lead to better decisions regarding additional measures to reduce bycatch. Management measures that affect gear and effort for a target species can influence fishing mortality in other species. Therefore, enhanced catch and bycatch monitoring would provide better data that could be used in multi-species assessments.

The South Atlantic Council developed Amendment 39 to the Snapper Grouper FMP, Amendment 9 to the Dolphin Wahoo FMP and Amendment 27 to the Coastal Migratory Pelagics FMP of the Gulf of Mexico and Atlantic Regions that proposes mandatory weekly electronic reporting for charter vessel operators with a federal for-hire permit in the snapper grouper, dolphin wahoo, or coastal migratory pelagic fisheries; reduces the time allowed for headboat operators to complete their electronic reports; and proposes requiring location reporting by charter vessels with the same detail now required for headboat vessels. The notice of availability published on March 14, 2018 (83 FR 11164), and the comment period ended on May 13, 2018. The proposed rule published on April 4, 2018 (83 FR 14400), and the comment period ended on May 4, 2018.

Other amendments under development to the Snapper Grouper FMP include Amendment 42, which will include actions to include sea turtle release gear in the regulations for the commercial snapper grouper fishery and consider modifications to the snapper grouper framework so the South Atlantic Council may more quickly modify sea turtle and other protected resources release gear and handling requirements in the future. The South Atlantic Council approved the amendment for scoping at their March 2018 meeting.

Amendment 46 to the Snapper Grouper FMP is being developed to focus on private recreational permit and reporting (e.g., MyFishCount App).

Amendment 47 to the Snapper Grouper FMP may be developed to explore a moratorium on the for-hire component of the snapper grouper fishery. In March 2018, the South Atlantic Council provided detailed input and directed staff to develop a draft scoping document based on their direction to consider at the June 2018 meeting. In October 2018, however, the South Atlantic Council voted to stop work on this amendment.

Vison Blueprint Recreational Regulatory Amendment 26 to the Snapper Grouper FMP proposes to modify recreational regulations for species in the snapper grouper complex, including aggregate bag limits, seasonal closures, minimum size limits, and gear requirements for certain species. The purpose of this amendment is to address recreational stakeholder input to increase access and predictability for the recreational component of the snapper grouper fishery, minimize regulatory discards, and improve regulatory compliance and consistency.

The South Atlantic Council reviewed options at their June 2018 for Regulatory Amendment 29 to the Snapper Grouper FMP, which contains actions pertaining to best fishing practices (e.g., descending devices) and powerhead regulations.

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.

These future actions will help to improve estimates on the composition and magnitude of catch and bycatch of snapper grouper species, as well as all other federally managed species in the southeast region. Additional information on fishery related actions from the past, present, and future considerations can be found in **Chapter 6** (Cumulative effects) of the environmental assessment.

1.2 Ecological Effects Due to Changes in Bycatch of that Species (effects on other species in the ecosystem).

The ecological effects of bycatch mortality are the same as fishing mortality from directed fishing efforts. If not properly managed and accounted for, either form of mortality could potentially reduce stock biomass to an unsustainable level. Relationships among species in marine ecosystems are complex and poorly understood, making the nature and magnitude of ecological effects difficult to predict. As mentioned in the above section, actions have been taken, and are underway to reduce bycatch and enhance data reporting for snapper grouper species. Better bycatch and discard data would provide a better understanding of the composition and magnitude of catch and bycatch, enhance the quality of data provided for stock assessments, increase the quality of assessment output, and lead to better decisions regarding additional measures to reduce bycatch.

As summarized in **Section 1.1** of this BPA, most actions in Regulatory Amendment 27 are not expected to result in significant changes in bycatch for most of the actions. Additionally, as stated in **Chapter 3,** and analyzed in detail in **Chapter 4**, the biological (and consequently ecological) effects due to changes in the bycatch would likely be negligible for the species with low release mortality rates, but potentially much greater for species with higher mortality rates.

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

Regulatory Amendment 27 is not expected to affect major changes in bycatch of other fish species. Bycatch of other species is incidental in the hook-and-line fishery for most of the species. Furthermore, improved data monitoring and reporting measures have been implemented, which is expected to reduce bycatch and discards. Additionally, data collection improvements using electronic reporting and monitoring should allow more accurate and timely tracking of catch as well as other capture information. Improved information should benefit stocks by improving accuracy and reducing uncertainty in catch estimates leading to better decisions.

1.4 Effects on Marine Mammals and Birds

Under Section 118 of the Marine Mammal Protection Act (MMPA), NMFS must publish, at least annually, a List of Fisheries (LOF) that places all U.S. commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishery. Of the gear utilized within the snapper grouper fishery, only the black sea bass pot is considered to pose an entanglement risk to marine mammals. The southeast U.S. Atlantic black sea bass pot sector is included in the grouping of the Atlantic mixed species trap/pot fisheries, which the 2016, 2017, and 2018 LOF classifies as a Category II (81 FR 20550, April 8, 2016, 81 FR 54019, August 15, 2016; and February 7, 2018, 83 FR 5349, respectively). Gear types used in these fisheries are determined to have occasional incidental mortality and serious injury of marine mammals. For the South Atlantic snapper grouper fishery, the best available data on protected species interactions are from the SEFSC Supplementary Discard Data Program (SDDP) initiated in July of 2000. The SDDP sub-samples 20% of the vessels with an active permit. Since August 2001, only three interactions with marine mammals have been documented; each was taken by handline gear and each released alive (McCarthy SEFSC database). The longline and hook-and-line gear components of the snapper grouper in the South Atlantic are classified in the 2016, 2017, and 2018 LOF as Category III fisheries.

Commercial and recreational fishers in the South Atlantic snapper grouper fishery use hook-and-line gear, spear/powerheads, and pot/traps to target black sea bass, but only pots may adversely affect North Atlantic Right whales (NARWs) (NMFS 2016). Although the black sea bass pot sector can pose an entanglement risk to large whales due to their distribution and occurrence, sperm, fin, sei, and blue whales are unlikely to overlap with the black sea bass pot sector operated within the snapper grouper fishery since it is executed primarily off North Carolina and South Carolina in waters ranging from 70-120 feet deep (21.3- 36.6 meters). NMFS estimated that the number of annual lethal takes for NARWs from black sea bass trap/pot gear ranged from an estimated minimum of 0.005 to a maximum of 0.08. This equates to 1 estimated lethal entanglement approximately every 25 to 42 years.

On December 1, 2016, NMFS completed its most recent biological opinion (2016 Opinion) on the snapper grouper FMP (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 distinct population segments (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. Summary information on the species that may be adversely affected by the snapper grouper fishery and how they are affected is presented **Section 3.2.5**.

The Bermuda petrel and roseate tern occur within the action area. Bermuda petrels are occasionally seen in the waters of the Gulf Stream off the coasts of North Carolina and South Carolina during the summer. Sightings are considered rare and only occurring in low numbers (Alsop 2001). Roseate terns occur widely along the Atlantic coast during the summer but in the southeast region, they are found mainly off the Florida Keys (unpublished US Fish and Wildlife Service data). Interaction with fisheries has not been reported as a concern for either of these species. Fishing effort reductions have the potential to reduce the amount of interactions between the fishery and marine mammals and birds. Although, the Bermuda petrel and roseate tern occur within the action area, these species are not commonly found and neither has been described as associating with vessels or having had interactions with the snapper grouper fishery. Thus, it is believed that the snapper grouper fishery is not likely to negatively affect the Bermuda petrel and the roseate tern.

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

Research and monitoring is ongoing to understand the effectiveness of proposed management measures and their effect on bycatch. In 1990, the SEFSC initiated a logbook program for vessels with federal permits in the snapper grouper fishery from the Gulf of Mexico and South Atlantic. Approximately 20% of commercial fishermen are asked to fill out discard information in logbooks; however, a greater percentage of fishermen could be selected with emphasis on individuals that dominate landings. The SEFSC is developing electronic logbooks, which could be used to enable fishery managers to obtain information on species composition, size distribution, geographic range, disposition, and depth of fishes that are released. Further, the Joint Commercial Logbook Reporting Amendment is being developed by the South Atlantic Council and the Gulf of Mexico Council, which would require electronic reporting of landings information by federally permitted commercial vessels to increase the timeliness and accuracy of landings and discard data.

Recreational discards are obtained from Marine Recreational Information Program and logbooks from the NMFS headboat program. Additional data collection activities for the recreational sector are being considered by the South Atlantic Council that could allow for a better monitoring of snapper grouper bycatch in the future. Some observer information has been provided by Marine Fisheries Initiative and Cooperative Research Programs (CRP), but more is desired for the snapper grouper fishery. In December 2012, the Southeast Region Headboat Survey underwent a transition from paper logbooks to electronic logbooks, which is expected to improve the quality of data in that sector. As of January 1, 2013, a new electronic logbook replaced the paper logbook form. The form is available through a password protected Web site on the Internet, which can be accessed by personal computer, computer tablet, or “smart phone”. The South Atlantic Council approved the For-Hire Amendment at their March 2013 meeting, which was approved and implemented in January 2014. This amendment requires weekly electronic reporting by the headboat sector.

Cooperative research projects between science and industry are being used to a limited extent to collect bycatch information on the snapper grouper fishery in the South Atlantic. For example, Harris and Stephen (2005) characterized the entire (retained and discarded) catch of reef fishes from a selected commercial fisherman in the South Atlantic including total catch composition and disposition of fishes that were released. The Gulf and South Atlantic Fisheries Foundation, Inc. conducted a fishery observer program within the snapper grouper vertical hook-and-line (bandit rig) fishery of the South Atlantic United States. Through contractors they randomly placed observers on cooperating vessels to collect a variety of data quantifying the participation, gear, effort, catch, and discards within the fishery.

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

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

NMFS established the South East Fishery-Independent Survey in 2010 to strengthen fishery-independent sampling efforts in southeast U.S. waters, addressing both immediate and long-term fishery-independent data needs, with an overarching goal of improving fishery independent data utility for stock assessments. Meeting these data needs is critical to improving scientific advice to the management process, ensuring overfishing does not occur, and successfully rebuilding overfished stocks on schedule.

1.6 Changes in Fishing Practices and Behavior of Fishermen

Changes in trip limits and split commercial seasons through Regulatory Amendment 27 could result in a modification of fishing practices by commercial fishers, thereby, affecting the magnitude of discards during the designated timeframe. Whereas it is likely bycatch of species in the Snapper Grouper FMP will be reduced for many of the actions, there is a potential for the discards to increase in other fisheries if fishing seasons are not aligned between species with high co-occurrence or trip limits are overly restrictive. However, as discussed in **Section 1.1** of this bycatch practicability analysis (BPA), the magnitude of discards is not expected to be significantly affected for most of the proposed actions. It is difficult to quantify any of the measures in terms of reducing discards until bycatch has been monitored over several years. Commercial bycatch information is collected by NMFS, and that information will continue to be analyzed to determine what changes, if any, have taken place in terms of fishing practices and fishing behavior as a result of the actions implemented through Regulatory Amendment 27.

Social effects of actions proposed in Regulatory Amendment 27 are addressed in **Chapter 4** of this document. **Section 3.4** includes information on environmental justice.

Fishermen can be educated about methods to reduce bycatch and enhance survival of regulatory discards. Whereas improving survival may be advantageous for mid-shelf species, it is more of a challenge for deep-water species that can experience nearly 100% mortality from depth related trauma. Furthermore, it is not clear that changes in behavior could substantially affect the amount of bycatch incurred. Gear changes such as hook type or hook size could have some effect on reducing bycatch mortality. Furthermore, spawning seasons with stricter regulations, new or reduced quotas, reduced bag and trip limits, and increased size limits could cause some commercial fishers to reduce or shift effort.

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

The proposed actions are not expected to significantly impact administrative costs. Trip limits, size limits, and catch monitoring are currently used to regulate the commercial fishery. All these measures will require additional research to determine the magnitude and extent of changes in bycatch and bycatch mortality. Additional administrative and enforcement efforts would help to implement and enforce fishery regulations. NMFS established the South East Fishery-Independent Survey in 2010 to strengthen fishery-independent sampling efforts in southeast U.S. waters, addressing both immediate and long-term fishery-independent data needs, with an overarching goal of improving fishery independent data utility for stock assessments. Meeting these data needs is critical to improving scientific advice to the management process, ensuring overfishing does not occur, and successfully rebuilding overfished stocks on schedule.

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

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

1.9 Changes in the Distribution of Benefits and Costs

The distribution of benefits and costs expected from proposed actions in the environmental assessment are discussed in **Chapter 3**. Economic and social effects of the proposed actions are addressed in **Chapter 4** of this document.

1.10 Social Effects

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

Conclusion

The bycatch practicability analysis evaluates taking additional action to minimize bycatch and bycatch mortality using the ten factors provided at 50 CFR section 600.350(d)(3)(i). In summary, measures proposed in Regulatory Amendment 27 are intended to modify commercial regulations such as fishing seasons, trip limits, and size limits for species in the commercial sector of the snapper grouper fishery. These actions are necessary to enable equitable access for fishers participating in the fishery and minimize discards while minimizing, to the extent practicable, adverse social and economic effects. As summarized in **Section 1.1** of this BPA, the actions in Regulatory Amendment 27 are not expected to result in significant changes in bycatch for most of the actions. In addition, the South Atlantic Council, NMFS, and the SEFSC have implemented and plan to implement numerous management measures and reporting requirements that have improved or are likely to improve monitoring efforts of discards and discard mortality. For example, Regulatory Amendment 29 to the Snapper Grouper FMP considers implementing descending devices to help reduce discard mortality. The Commercial Landings Monitoring System and actions in the Joint Generic Dealer (requiring electronic reporting from dealers) and Generic For-Hire Reporting (requiring electronic reporting from charter fishermen) amendments are expected to provide more timely and accurate data reporting which reduces uncertainty with the data, and would thus reduce the incidence of quota overages, and generate better management decisions, overall. Therefore, no additional action is needed to minimize bycatch or bycatch mortality within the snapper grouper fishery.

References

Campbell, M. D., W. B. Driggers, B. Sauls, and J. F. Walter. 2014. Release mortality in the red snapper fishery (*Lutjanus campechanus*) fishery: a meta-analysis of 3 decades of research. Fishery Bulletin 112:283-296.

Farmer, N. A., R. P. Malinowski, M. F. McGovern, and P. J. Rubec. 2016. Stock complexes for fisheries management in the Gulf of Mexico. Marine and Coastal Fisheries 8(1):177-201.

NMFS (National Marine Fisheries Service). 2006. Endangered Species Act section 7 consultation on the Continued Authorization of Snapper-Grouper Fishing under the South Atlantic Snapper-Grouper Fishery Management Plan (RFFMP) and Proposed Amendment 13C. Biological Opinion. June 7.

Pulver, J. R., H. Liu, and E. Scott-Denton. 2016. Modelling community structure and species co-occurrence using fishery observer data. ICES Journal of Marine Science 73(7):1750-1763.

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.

Rudershausen, P. J., J. A. Buckel, and J. E. Hightower. 2014. Estimating reef fish discard mortality using surface and bottom tagging: effects of hook injury and barotrauma. Canadian Journal of Fisheries and Aquatic Sciences 71:514-520.

NMFS (National Marine Fisheries Service). 2006. Endangered Species Act section 7 consultation on the Continued Authorization of Snapper-Grouper Fishing under the South Atlantic Snapper-Grouper Fishery Management Plan (RFFMP) and Proposed Amendment 13C. Biological Opinion. June 7

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). 2008. Amendment 15B to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Impact Statement, Biological Assessment, 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. 324 pp. plus appendices.

SAFMC (South Atlantic Fishery Management Council). 2009. Amendment 16 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. 608 pp. plus appendices.

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. Comprehensive Annual Catch Limit Amendment for the South Atlantic Region with Final Environmental Impact Statement, 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. 755 pp. plus appendices.

SAFMC (South Atlantic Fishery Management Council). 2011b. 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). 2011c. Amendment 18A to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Impact Statement with Regulatory Flexibility Act Analysis, Regulatory Impact Review, and Fishery Impact Statement. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2011d. 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 Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2012. Amendment 18B to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Assessment, 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). 2013a. 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). 2013b. Amendment 31 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Assessment, 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). 2014. Regulatory Amendment 14 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Assessment, 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.

SEDAR 01 Update. 2012. Stock assessment of red porgy off the Southeastern United States. Southeast Data, Assessment, and Review. North Charleston, South Carolina.

SEDAR 15. 2008. Stock assessment report 2 South Atlantic greater amberjack. Southeast Data, Assessment, and Review. North Charleston, South Carolina.

SEDAR 17 Update. 2012. Stock assessment of vermilion snapper off the Southeastern United States. Southeast Data, Assessment, and Review. North Charleston, South Carolina.

SEDAR 36. 2014. Stock assessment report South Atlantic snowy grouper. Southeast Data, Assessment, and Review. North Charleston, South Carolina.

SEDAR 41. 2016. Stock assessment report South Atlantic gray triggerfish. Southeast Data, Assessment, and Review. North Charleston, South Carolina.

SEDAR 49. 2016. Stock assessment report Gulf of Mexico data-limited species. Southeast Data, Assessment, and Review. North Charleston, South Carolina.

SEDAR 50. 2017. Stock assessment report Atlantic blueline tilefish. Southeast Data, Assessment, and Review. North Charleston, South Carolina.

SERO-LAPP-2017-05. 2017. Impacts of proposed alternatives in South Atlantic Regulatory Amendment 27: Commercial Visioning Blueprint. NOAA Fisheries Service, Southeast Regional Office, St. Petersburg, FL. 80 pp.

Stephen, J. A., and P. J. Harris. 2010. Commercial catch composition with discard and immediate release mortality proportions off the southeastern coast of the United States. Fisheries Research 103:18-24.

Wilson Jr., R. R., and K. M. Burns. 1996. Potential survival of released groupers caught deeper than 40 m based on shipboard and in-situ observations, and tag-recapture data. Bulletin of Marine Science 58(1):234-247.

Appendix E. Regulatory Impact Review

Introduction

The National Marine Fisheries Service (NMFS) requires a Regulatory Impact Review (RIR) for all regulatory actions that are of public interest to satisfy our obligations under Executive Order (E.O.) 12866, as amended. In conjunction with the analysis of direct and indirect effects in the "Environmental Consequences" section of this Amendment (see **Chapter 4**), the RIR: 1) provides a comprehensive review of the level and incidence of impacts associated with a regulatory action; 2) provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problem; and 3) ensures that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost effective way. The RIR also serves as the basis for determining whether any proposed regulations are a "significant regulatory action" under certain criteria provided in Executive Order (E.O.) 12866. In addition, the RIR provides some information that may be used in conducting an analysis of the effects on small entities pursuant to the Regulatory Flexibility Act (RFA). This RIR analyzes the effects this regulatory action would be expected to have on the commercial sector of the South Atlantic snapper grouper fishery.

Problems and Objectives

The problems and objectives for the proposed actions are presented in **Section 1.4** of this amendment and are incorporated herein by reference.

Description of Fisheries

A description of the commercial sector in the snapper grouper fishery of the South Atlantic region is provided in **Section 3.3** of this amendment and is incorporated herein by reference.

Effects of Management Measures

Action 1. Establish a commercial split season and modify the commercial trip limit for blueline tilefish

A detailed analysis and discussion of the expected economic effects of the proposed action is included in **Section 4.1.2**. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo) for each action.

Preferred Sub-alternative 3a for **Action 1** would set a set trip limit of 100 pounds gutted weight (lbs gw) from January 1 through April 30, after which the trip limit would revert back to the current trip limit of 300 lbs gw for the remainder of the year. The economic effects on individual harvesters would depend on each vessel owner's profit maximization strategy, their dependence on blueline tilefish, their seasonal fishing behavior, and their ability to adapt to the changing regulations. Some vessel owners may benefit from a redistribution of blueline tilefish fishing days, while others may be hindered by a lower trip limit and less annual catch limit (ACL) being available during the first half of the year. Lower trip limits can reduce profits through a reduction in harvesting efficiency. Higher trip-level revenues later in the year as a result of a longer season could, however, offset the negative effects experienced earlier in the year. These types of individual vessel level effects cannot be determined with available models.

No changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected as a result of **Preferred Sub-alternative 3a**. Thus, the expected change in annual gross revenues approximates the change in net economic benefits. **Preferred Sub-alternative 3a** is expected to increase annual gross revenue. The difference in expected annual gross revenue is primarily driven by the projected monthly landings in combination with a difference in average ex-vessel prices across months. **Preferred Sub-alternative 3a** is anticipated to result in an estimated annual increase of $1,714 (2016 dollars) in gross revenue in aggregate and an estimated annual increase of $13 (2016 dollars) in gross revenue per vessel. Overall, the alternative is expected to directly increase net economic benefits for the private sector.

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the net indirect economic effect (i.e., net costs or net benefits) of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Seafood dealers are expected to be positively affected through an annual increase in their purchases of blueline tilefish by approximately $6 (2016 dollars) per dealer under **Preferred Sub-alternative 3a**. Such changes would likely be imperceptible to most snapper grouper dealers.

Action 2. Establish a commercial split season for snowy grouper

A detailed analysis and discussion of the expected economic effects of the proposed action is included in **Section 4.2.2**. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo) for each action.

Preferred Alternative 3 for **Action 2** would specify a split commercial season for snowy grouper. The economic effects on individual vessel owners would depend on each owner's profit maximization strategy, their dependence on snowy grouper, their seasonal fishing behavior, and their ability to adapt to the changing regulations. Some vessel owners may benefit from a temporal redistribution of snowy grouper landings, while others may not. These types of individual vessel level effects cannot be determined with available models.

No changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected as a result of **Preferred Alternative 3**. Thus, the expected change in annual gross revenues approximates the change in direct net economic benefits. However, because projected monthly and annual landings are the same under **Preferred Alternative 3** as the status quo,

Preferred Alternative 3 is not expected to generate a change in gross revenue and thus no change in net economic benefits. Additionally, seafood dealers are not expected to be indirectly affected since there is not a projected change in their purchases of snowy grouper under **Preferred Alternative 3**.

Action 3. Establish a commercial split season and modify commercial trip limit for greater amberjack

A detailed analysis and discussion of the expected economic effects of the proposed action is included in **Section 4.3.2**. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo) for each action.

Preferred Sub-alternative 3a for **Action 3** would specify a split commercial season with a trip limit of 1,200 pounds whole weight (lbs ww) in Season 1 (March through August) and 1,000 lbs ww in Season 2 (September through February) for greater amberjack. The economic effects would depend on aggregate annual harvest levels and seasonal shifts in landings. Splitting the fishing season may result in open fishing days later in the year that would not have been available otherwise, but also potential closures earlier in the year. In general, split seasons and lower trip limits may extend the fishing season and increase access later in the year. They may also reduce harvesting efficiency and negatively affect profits. The economic effects on individual vessel owners would depend on each vessel owner's profit maximization strategy, their dependence on greater amberjack, their seasonal fishing behavior, and their ability to adapt to the changing regulations. These types of individual vessel level effects cannot be determined with available models.

Changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected under **Preferred Sub-alternative 3a**. Models are not available to generate quantitative estimates of the expected change in costs, so these effects must be considered qualitatively. In general, trip limits are expected to increase costs because commercial fishing vessels must take more trips to harvest and land the same amount of fish. The more restrictive the trip limit, the greater the expected increase in costs. **Preferred Sub-alternative 3a** would implement a more restrictive trip limit than the status quo in Season 2, and thus would also increase estimated private sector costs during this season. This alternative is also estimated to lower gross revenue largely due to a projected decrease in commercial greater amberjack landings. **Preferred Sub-alternative 3a** is anticipated to result in an annual decrease of $8,830 (2016 dollars) in gross revenue in aggregate and an estimated annual decrease of $34 (2016 dollars) in gross revenue per vessel. Overall, the alternative is expected to directly decrease net economic benefits.

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the net indirect economic effect (i.e., net costs or net benefits) of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Seafood dealers are expected to be indirectly affected through an annual decrease in their purchases of greater amberjack by approximately $31 (2016 dollars) per dealer under **Preferred Sub-alternative 3a**. Such changes would likely be imperceptible to most snapper grouper dealers.

Action 4. Establish a commercial split season and modify the commercial trip limit for red porgy

A detailed analysis and discussion of the expected economic effects of the proposed action is included in **Section 4.4.2**. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo) for each action.

Preferred Sub-alternative 2c for **Action 3** would remove the prohibition on sale and purchase of red porgy during January through April and specify a split commercial season with a trip limit of 60 fish from January through April and 120 fish from May through December for red porgy. Removing the prohibition on sale and purchase of red porgy during January through April is expected to result in the commercial ACL being more fully harvested, which would increase annual gross revenue. No changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected as a result of **Preferred Sub-alternative 2c**. And although a trip limit is being considered during the months of January through April, these are months during which landings are currently prohibited. The decision to harvest red porgy during those months could lead to additional harvesting costs, but these will be self-imposed and, assuming owners of commercial vessels are rational, the additional gross revenues will exceed the additional costs (i.e., economic profits are expected to increase). Moreover, the red porgy that would be expected to be landed during January through April are likely fish that were previously discarded due to the current landing prohibition. If these landings are fish that were previously discarded, then no additional costs would be incurred and the additional gross revenue would represent additional economic profit as well. Thus, the expected change in annual gross revenue could be a slight overestimate of the expected change in economic profit, but it is still a reasonable approximation of changes in economic profit and thus of changes in net economic benefits. **Preferred Sub-alternative 2c** is anticipated to result in an estimated annual increase of $53,578 (2016 dollars) in gross revenue in aggregate and an estimated annual increase of $335 (2016 dollars) in gross revenue per vessel. Overall, the alternative is expected to directly increase net economic benefits.

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the net indirect economic effect (i.e., net costs or net benefits) of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Seafood dealers are expected to be positively affected through an annual increase in their purchases of red porgy by approximately $187 (2016 dollars) per dealer under **Preferred Sub-alternative 2c**. Such changes could benefit dealers operating under relatively small profit margins.

Action 5. Modify the commercial trip limit for vermilion snapper

A detailed analysis and discussion of the expected economic effects of the proposed action is included in **Section 4.5.2**. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo) for each action.

Preferred Sub-alternative 4a for **Action 5** maintains the trip limit of 1,000 pounds gutted weight and removes the trip limit reduction currently in place under the status quo. The economic effects on individual harvesters from **Preferred Sub-alternative 4a** would depend on each vessel owner's profit maximization strategy, their dependence on vermilion snapper, their seasonal fishing behavior, and their ability to adapt to the changing regulations. Some vessel owners may benefit from a redistribution of vermilion snapper fishing days, while others may be hindered by a change in availability of vermilion snapper during the year. These types of individual vessel level effects cannot be determined with available models.

Changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected under **Preferred Sub-alternative 4a**. In general, trip limits are expected to increase costs because commercial fishing vessels must take more trips to harvest and land the same amount of fish. The more restrictive the trip limit, the greater the expected increase in costs. Further, changes in trip limits within a year and particularly within a season can introduce inefficiencies into the production process as commercial fishing vessels must adjust their operations in order to account for such changes. While these inefficiencies are likely not as great when the trip limit changes are known well in advance, they become particularly acute when the owners of commercial fishing vessels do not know if or when the trip limit change is going to occur. Further, because at least some owners of commercial fishing vessels would prefer to fish when the trip limit is higher, so-called "step downs" can result in mini-fishing derbies within a season. Splitting the commercial ACL between seasons would only partially mitigate this effect. In addition, "step-downs" are expected to increase public costs (i.e., costs to the government) because of the costs associated with potentially implementing one within-season trip limit reductions (e.g., staff time, cost of *Federal Register* Notices). Based on these considerations, private and public costs would be reduced under **Preferred Sub-alternative 4a**.

Preferred Sub-alternative 4a is also estimated to lower gross revenue largely due to differences in the projected monthly landings of vermilion snapper in combination with differences in average ex-vessel prices across months. **Preferred Sub-alternative 4a** is anticipated to result in an estimated annual decrease of $8,691 (2016 dollars) in gross revenue in aggregate and an estimated annual decrease of $42 (2016 dollars) in gross revenue per vessel. However, as previously noted, the alternative is also expected to reduce private and public costs. Such cost reductions may exceed the reduction in annual gross revenue. Thus, **Preferred Sub-alternative 4a** may directly increase net economic benefits.

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the net indirect economic effect (i.e., net costs or net benefits) of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Seafood dealers are expected to be negatively affected through an annual decrease in their purchases of vermilion snapper by approximately $30 (2016 dollars) per dealer under **Preferred Sub-alternative 4a**. Such changes would likely be imperceptible to most snapper grouper dealers.

Action 6. Establish a minimum size limit for almaco jack for the commercial sector

A detailed analysis and discussion of the expected economic effects of the proposed action is included in **Section 4.6.2**. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo) for each action.

Preferred Sub-alternative 2a for **Action 6** would specify a 20-inch fork length minimum size limit for almaco jack for the commercial sector. The increase in the minimum size limit (MSL) would be expected to increase the season length for the Other Jacks Complex by further reducing daily harvest rates of almaco jack. Because landings per trip are reduced in exchange for a longer season, **Preferred Sub-alternative 2a** may benefit some vessels in terms of increased access and negatively affect others in terms of lower trip-level landings or increased harvesting costs. The magnitude of such effects would depend on the harvesting characteristics and profit maximization strategies of each vessel. These types of individual vessel level effects cannot be determined with available models.

Changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected under **Preferred Sub-alternative 2a**. Models are not available to generate quantitative estimates of the expected change in costs, so these effects must be considered qualitatively. In general, minimum size limits are expected to increase costs in a manner similar to trip limits. Specifically, minimum size limits can lead to discarded fish. Thus, commercial fishing vessels may exert more effort per trip or take more trips to land the same amount of fish, which leads to higher costs. The more restrictive the size limit, the greater the amount of discarded fish and the greater the expected increase in costs. **Preferred Sub-alternative 2a** would implement a restrictive size limit compared to the status quo and thus would also increase estimated private sector costs. This alternative is also estimated to lower gross revenue largely due to a projected change in monthly landings of almaco jack in combination with differences in average ex-vessel prices across months. **Preferred Sub-alternative 2a** is anticipated to result in an estimated annual decrease of $737 (2016 dollars) in gross revenue in aggregate and an estimated annual decrease of $4 (2016 dollars) in gross revenue per vessel. Overall, the alternative is expected to directly decrease net economic benefits.

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the net indirect economic effect (i.e., net costs or net benefits) of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Seafood dealers are expected to be negatively affected through an annual decrease in their purchases of almaco jack by approximately $3 (2016 dollars) per dealer under **Preferred Sub-alternative 2a**. Such changes would likely be imperceptible to most snapper grouper dealers.

Action 7. Establish a commercial trip limit for the Other Jacks Complex

A detailed analysis and discussion of the expected economic effects of the proposed action is included in **Section 4.7.2**. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo) for each action.

Preferred Sub-alternative 2a for **Action 7** would specify a 500-lbs gw commercial trip limit for the Other Jacks Complex. Because landings per trip are reduced in exchange for a longer season, **Preferred Sub-alternative 2a** may benefit some vessels in terms of increased access and negatively affect others in terms of lower trip-level landings. The magnitude of such effects would depend on the harvesting characteristics and profit maximization strategies of each vessel. These types of individual vessel level effects cannot be determined with available models.

Changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected under **Preferred Sub-alternative 2a**. Models are not available to generate quantitative estimates of the expected change in costs, so these effects must be considered qualitatively. In general, trip limits are expected to increase costs because commercial fishing vessels must take more trips to land the same amount of fish. The more restrictive the trip limit, the greater the expected increase in costs. **Preferred Sub-alternative 2a** would implement a more restrictive trip limit than the status quo and thus would increase estimated private sector costs. This alternative is also estimated to lower gross revenue largely due to a projected change in monthly landings the Other Jacks Complex in combination with differences in average ex-vessel prices across months. **Preferred Sub-alternative 2a** is anticipated to result in an estimated annual decrease of $5,843 (2016 dollars) in gross revenue in aggregate and an estimated annual decrease of $28 (2016 dollars) in gross revenue per vessel. Overall, the alternative is expected to directly decrease net economic benefits.

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the net indirect economic effect (i.e., net costs or net benefits) of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Seafood dealers are expected to be negatively affected through an annual decrease in their purchases of species from the Other Jacks Complex by approximately $20 (2016 dollars) per dealer under **Preferred Sub-alternative 2a**. Such changes would likely be imperceptible to most snapper grouper dealers.

Action 8. Remove the commercial minimum size limits for certain deep-water species

A detailed analysis and discussion of the expected economic effects of the proposed action is included in **Section 4.8.2**. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo) for each action.

Preferred Alternative 2 of **Action 8** would remove the commercial minimum size limitof 12 inches total length for queen, silk, or blackfin snapper; however, based on available data, only minimal changes in discards or landings would be expected to occur. Therefore, any potential changes in ex-vessel revenue would also be expected to be minimal. If in fact harvest rates increase noticeably as a result of **Preferred Alternative 2**, it could result in an overall increase in aggregate annual ex-vessel revenue relative to the status quo. Such an increase would be constrained, however, by the ACL for the Deep-water Complex. As commercial fishing vessels have only harvested about 43% of the commercial Deep-water Complex ACL the last two years (after blueline tilefish was removed from the Deep-water Complex), landings could increase significantly without any concern of exceeding the commercial ACL. Further, with the elimination of the minimum size limit, vessels would be able to increase their landings of these species per unit of effort. Thus, the costs of harvesting these species would also be expected to decrease on a per pound basis. Due to the relatively low projected change in landings, **Preferred Alternative 2** would be expected to increase economic profits to a limited extent for vessels that land queen, silk, or blackfin snapper, which would result in directly increasing net economic benefits.

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the net indirect economic effect (i.e., net costs or net benefits) of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Seafood dealers are expected to be positively affected through an annual increase in their purchases of queen, silk, and blackfin snapper under **Preferred Alternative 2**. Such changes would likely be minimal and imperceptible to most snapper grouper dealers.

Action 9. Reduce the commercial minimum size limit for gray triggerfish in the Exclusive Economic Zone off east Florida

A detailed analysis and discussion of the expected economic effects of the proposed action is included in **Section 4.9.2**. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo) for each action.

Preferred Alternative 2 for **Action 9** would reduce the commercial minimum size limit for gray triggerfish off east Florida to 12 inches fork length. The alternative would be expected to increase landings rates on average by about 20% and would likely result in a shorter gray triggerfish season than under the status quo. Increasing catch rates but shortening the season may benefit some vessels and fishing businesses in terms of greater harvesting efficiency earlier in the year but may also negatively affect others due to decreased access later in the year. These effects would depend on a variety of factors, including vessel harvesting characteristics and profit maximization strategies.

Changes in costs to the private sector (e.g., harvesting costs of commercial fishing vessels) are expected under **Preferred Alternative 2**. Models are not available to generate quantitative estimates of the expected change in costs, so these effects must be considered qualitatively. In general, minimum size limits are expected to increase costs in a manner similar to trip limits. Specifically, minimum size limits can lead to discarded fish. Thus, commercial fishing vessels may exert more effort per trip or take more trips to land the same amount of fish, which leads to higher costs. The more restrictive the size limit, the greater the amount of discarded fish and the greater the expected increase in costs. **Preferred Alternative 2** would implement a less restrictive size limit compared to the status quo and thus would also decrease estimated private sector costs. This alternative is also estimated to increase gross revenue largely due to a projected change in monthly landings of gray triggerfish in combination with differences in average ex-vessel prices across months. **Preferred Alternative 2** is anticipated to result in an estimated annual increase of $2,172 (2016 dollars) in gross revenue in aggregate and an estimated annual increase of $10 (2016 dollars) in gross revenue per vessel. Overall, the alternative is expected to directly increase net economic benefits.

Estimates of net revenues or economic profit are not available for snapper grouper dealers. Therefore, it is not possible to estimate the net indirect economic effect (i.e., net costs or net benefits) of changes in purchases on their profits. However, in general, dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change (e.g., increases in gross revenues are expected to indirectly benefit dealers and vice versa). Seafood dealers are expected to be positively affected through an annual increase in their purchases of gray triggerfish by approximately $5 (2016 dollars) per dealer under **Preferred Alternative 2**. Such changes would likely be imperceptible to most snapper grouper dealers.

Public Costs of Regulations

The preparation, implementation, enforcement, and monitoring of this or any federal action involves the expenditure of public and private resources which can be expressed as costs associated with the regulations. Costs to the private sector are discussed in the effects of management measures, with the exception of additional qualitative discussion on potential public cost reductions in **Action 5**. Estimated public costs associated with this action include:

South Atlantic Fishery Management Council (South Atlantic Council) costs of document preparation, meetings, public hearings, and information dissemination………………………………………………………………………..$45,000

NMFS administrative costs of document preparation, meetings, and review………….$20,000

TOTAL ………………………………………………………………………………..$65,000

The estimate provided above does not include any law enforcement costs. Any enforcement duties associated with this action would be expected to be covered under routine enforcement costs rather than an expenditure of new funds. South Atlantic Council and NMFS administrative costs directly attributable to this amendment and the rulemaking process will be incurred prior to the effective date of the final rule implementing this amendment.

Net Benefits of Regulatory Action

Actions in this amendment would have varying effects on vessels and dealers in regard to revenue and costs. While there are differences in how the actions would affect individual vessels and dealers on average, in aggregate the changes in gross revenues and dealer purchases are assumed to be the same amount and an increase in revenues equates to a benefit for dealers. In regard to annual gross revenue, **Actions 1**, **4**, **8**, and **9** are expected to result in increased total gross revenue of $57,464 (2016 dollars). **Action 2** is not expected to change total gross revenue. **Actions 3**, **5**, **6**, and **7** are estimated to result in decreased total gross revenue of $24,101 (2016 dollars). Cumulatively, these actions are anticipated to increase total annual gross revenue by $33,363 (2016 dollars) in 2019, the first year of implementation for the amendment. The estimated economic impacts of this increase in total annual gross revenue is provided in **Table E.1**.

Table E.1. Economic impacts associated with the anticipated net change in total annual gross revenue for Snapper Grouper Regulatory Amendment 27. All monetary estimates are in 2016 dollars.

Total Annual Gross Revenue	Total Jobs	Harvester Jobs	Income Impacts ($ thousands)	Value-Added Impacts ($ thousands)	Output (Sales) Impacts ($ thousands)
$33,363	4	1	$122	$172	$331

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).

In regard to costs, models are not available to generate quantitative estimates of changes in costs for the private sector (i.e., harvesting costs of commercial fishing vessels and operating costs of dealers), so these effects must be considered qualitatively. **Actions 3**, **6**, and **7** are expected to increase private sector costs. **Actions 1** and **2** are not expected to change private sector costs. **Actions 4**, **5**, **8**, and **9** are estimated to decrease costs for the private sector. **Action 5** is also anticipated to decrease public sector costs as well. Quantitative public sector costs as a result of this amendment are estimated to be $65,000.

In terms of net benefits, actions identified to increase gross revenue are also expected to increase net economic benefits. Conversely, actions identified to decrease gross revenue are also expected to decrease net economic benefits. The one potential exception being **Action 5**, where anticipated benefits incurred through lowering costs to the private and public sectors may outweigh a relatively modest reduction in gross revenue.

It is important to specify the time period being considered when evaluating benefits and costs. According to OMB's FAQs regarding Circular A-4,[15] "When choosing the appropriate time horizon for estimating costs and benefits, agencies should consider how long the regulation being analyzed is likely to have resulting effects. The time horizon begins when the regulatory

[15] See p. 4 at https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/OMB/circulars/a004/a-4_FAQ.pdf

action is implemented and ends when those effects are expected to cease. Ideally, analysis should include all future costs and benefits. Here as elsewhere, however, a ‘rule of reason’ is appropriate, and the agency should consider for how long it can reasonably predict the future and limit its analysis to this time period. Thus, if a regulation has no predetermined sunset provision, the agency will need to choose the endpoint of its analysis on the basis of a judgment about the foreseeable future. For most agencies, a standard time period of analysis is 10 to 20 years.”

For current purposes, the reasonably “foreseeable future” is considered to be the next 10 years. There are two primary reasons for considering the next 10 years the appropriate time period for evaluating the benefits and costs of this regulatory action rather than a longer (or shorter) time period. First, this regulatory action does not include a predetermined sunset provision. Second, based on the history of management in the snapper-grouper fishery in the South Atlantic, regulations are typically revisited at least once every 10 years or so.

The analyses of the net changes in annual gross revenue over all actions indicates an increase of $33,363 (2016 dollars). In discounted terms and over a 10-year time period, the total net present value of this increase in gross revenue is $234,328 using a 7% discount rate and $284,593 using a 3% discount rate. The non-discounted public costs resulting from the regulation are $65,000. The costs resulting from the amendment and the associated rulemaking process should not be discounted as they would be incurred prior to the effective date of the final rule.

Based on this information, this regulatory action is expected to increase net benefits to the Nation. Over a 10-year time period, the quantified net economic benefits are expected to be $169,328 using a 7% discount rate and $219,593 using a 3% discount rate.

Determination of Significant Regulatory Action

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

Appendix F. Initial Regulatory Flexibility Analysis

Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure such proposals are given serious consideration. The RFA does not contain any decision criteria; instead the purpose of the RFA is to inform the agency, as well as the public, of the expected economic effects of various alternatives contained in the regulatory action and to ensure the agency considers alternatives that minimize the expected economic effects on small entities while meeting the goals and objectives of the applicable statutes (e.g., the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)).

With certain exceptions, the RFA requires agencies to conduct an initial regulatory flexibility analysis (IRFA) for each proposed rule. The IRFA is designed to assess the effects various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those effects. An IRFA is primarily conducted to determine whether the proposed regulatory action would have a significant economic effect on a substantial number of small entities. In addition to analyses conducted for the RIR, the IRFA provides: 1) a description of the reasons why action by the agency is being considered; 2) a succinct statement of the objectives of, and legal basis for, the proposed regulatory action; 3) a description and, where feasible, an estimate of the number of small entities to which the proposed regulatory action will apply; 4) a description of the projected reporting, record-keeping, and other compliance requirements of the proposed regulatory action, including an estimate of the classes of small entities which will be subject to the requirements of the report or record; 5) an identification, to the extent practicable, of all relevant federal rules, which may duplicate, overlap, or conflict with the proposed rule; and 6) a description of any significant alternatives to the proposed regulatory action which accomplish the stated objectives of applicable statutes and would minimize any significant economic effects of the proposed regulatory action on small entities.

In addition to the information provided in this section, additional information on the expected economic effects of the proposed action is included in the Regulatory Impact Review (RIR).

Statement of the need for, objectives of, and legal basis for the rule

A discussion of the reasons why action by the agency is being considered is provided in **Section 1.5**. The goals of this proposed regulatory action are to enable more equitable access to the resource for fishermen from different areas of the South Atlantic, improve the marketability of certain species, and minimize discards. The objectives of this proposed regulatory action are to improve management of the commercial sector of the snapper grouper fishery in order to better achieve optimum yield, while minimizing, to the extent practicable, the adverse socio-economic effects of regulations on commercial fishing entities in the South Atlantic Region. The Magnuson-Stevens Fishery Conservation and Management Act serves as the legal basis for the proposed regulatory action.

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

This proposed regulatory action contains the following regulatory changes in the commercial sector of the snapper grouper fishery: 1) reduce the commercial trip limit for blueline tilefish from 300 pounds gutted weight (gw) to 100 pounds gw from January 1 through April 30; 2) for snowy grouper, establish two commercial fishing seasons of January 1 through June 30 (Season 1) and July 1 through December 31 (Season 2) rather than a single fishing year, allocate 70% of the commercial annual catch limit to Season 1 and 30% to Season 2, and transfer any remaining quota from Season 1 to Season 2; 3) for greater amberjack, establish two commercial fishing seasons of March 1 through August 31 (Season 1) and September 1 through the end of February (Season 2) rather than a single fishing year, allocate 50% of the commercial annual catch limit to Season 1 and 50% to Season 2, transfer any remaining quota from Season 1 to Season 2, and reduce the commercial trip limit from 1,200 pounds gw to 1,000 pounds gw for Season 2; 4) for red porgy, remove the sale and purchase prohibition and the possession limit of three per person per day or three per person per trip during January 1 through April 30 each year, specify two commercial fishing seasons of January 1 through April 30 (Season 1) and May 1 through December 31 (Season 2) rather than a single fishing year, allocate 30% of the commercial annual catch limit to Season 1 and 70% to Season 2, and establish a commercial trip limit of 60 fish in Season 1; 5) remove the trip limit "step-downs" for vermilion snapper; 6) establish a minimum commercial size limit of 20 inches fork length for almaco jack; 7) establish a commercial trip limit of 500 pounds gw for the Other Jacks Complex; 8) remove the 12-inch total length commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper; and 9) reduce the commercial minimum size limit for gray triggerfish in the exclusive economic zone off the east coast of Florida from 14 inches fork length to 12 inches fork length. Thus, this action is expected to directly regulate businesses that use commercial permits for the South Atlantic snapper grouper fishery for harvesting purposes.

As of August 17, 2018, the number of vessels with a valid or renewable snapper grouper commercial permit was 644, composed of 536 transferable, "unlimited" permits (SG1 permits) and 108 non-transferable, 225-pound trip limit permits (SG2 permits). With the exception of species-specific trip limits, there is no aggregate snapper grouper harvest limit per trip for vessels with SG1 permits, while vessels with SG2 permits cannot harvest more than 225 pounds per trip. On average, only 584 vessels used their commercial permits for harvesting purposes from 2012 through 2016. The vast majority of vessels harvest multiple snapper grouper species. Some permit holders retain their permits for speculative or other non-harvesting purposes. The proposed regulatory changes will only directly regulate permit holders that actually use their permits for harvesting purposes. Thus, it is expected that approximately 584 vessels will be directly regulated by this proposed regulatory action.

Although NMFS started to collect ownership data for businesses that possess commercial snapper grouper permits in 2017, this data is currently incomplete and historical data is not available. Therefore, it is not currently feasible to accurately determine affiliations between these particular businesses. As a result of the incomplete ownership data, for purposes of this analysis, it is assumed each of these vessels is independently owned by a single business, which is expected to result in an overestimate of the actual number of businesses directly regulated by this proposed regulatory action. Thus, this proposed regulatory action is estimated to directly regulate 584 businesses in the commercial sector of the South Atlantic snapper grouper fishery.

All monetary estimates are in 2016 dollars. For vessels with commercial South Atlantic snapper grouper permits that were active in the snapper grouper fishery from 2012 through 2016, average annual gross revenue was approximately $44,000 per vessel. Average annual net cash flow per vessel was approximately $8,300 while net revenue from operations was approximately $2,000 per vessel. Net revenue from operations is the best available estimate of economic profit.

The Small Business Administration has established size standards for all major industry sectors in the U.S. including commercial fishing businesses. On December 29, 2015, NMFS issued a final rule establishing a small business size standard of $11 million in annual gross receipts (revenue) for all businesses primarily engaged in the commercial fishing industry (NAICS code 11411) for RFA compliance purposes only (80 FR 81194, December 29, 2015). In addition to this gross revenue standard, a business primarily involved in commercial fishing is classified as a small business if it is independently owned and operated, and is not dominant in it field of operations (including its affiliates). The maximum average annual gross revenue from 2012 through 2016 for a single vessel in the South Atlantic snapper grouper fishery was about $1.6 million.

Based on the information above, all businesses directly regulated by this proposed regulatory action are determined to be small businesses for the purpose of this analysis.

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

This proposed regulatory action would not establish any new reporting or record-keeping requirements.

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

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

Significance of economic effects on small entities

Substantial number criterion

This proposed regulatory action, if implemented, would be expected to directly regulate the 584 active vessels with commercial permits in the South Atlantic snapper grouper fishery of the 644 vessels that currently possess those permits. All directly-regulated businesses have been determined, for the purpose of this analysis, to be small entities. Based on this information, the proposed regulatory action is expected to affect a substantial number of small businesses.

Significant economic effects

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

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

All entities directly regulated by this regulatory action have been determined to be small entities. Thus, the issue of disproportionality does not arise in the present case.

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

The proposed action to reduce the commercial trip limit for blueline tilefish from 300 pounds gutted weight (gw) to 100 pounds gw from January 1 through April 30 is expected to directly regulate approximately 134 vessels. These vessels' average annual gross revenues were $82,411 per vessel from 2012 through 2016. Average annual net revenue from operations for these vessels was approximately 4% of their average annual gross revenue from 2014 through 2016. Thus, annual net revenue from operations (economic profit) for these vessels is estimated to be about $3,300 per vessel. Average annual gross revenue per vessel is expected to increase by about $13 per year, which would result in an increase in economic profits of about 0.4%.

For snowy grouper, the proposed action to establish two commercial fishing seasons of January 1 through June 30 (Season 1) and July 1 through December 31 (Season 2) rather than a single fishing year, allocate 70% of the commercial annual catch limit to Season 1 and 30% to Season 2, and transfer any remaining quota from Season 1 to Season 2 is expected to directly regulate approximately 149 vessels. These vessels' average annual gross revenues were $85,475 per vessel from 2012 through 2016. Average annual net revenue from operations for these vessels was also approximately 4% of their average annual gross revenue from 2014 through 2016. Thus, annual net revenue from operations for these vessels is estimated to be about $3,400 per vessel. The proposed action is not expected to affect landings, annual gross revenue, or harvesting costs, and thus economic profit is not expected to change.

For greater amberjack, the action to establish two commercial fishing seasons of March 1 through August 31 (Season 1) and September 1 through the end of February (Season 2) rather than a single fishing year, allocate 50% of the commercial annual catch limit to Season 1 and 50% to Season 2, transfer any remaining quota from Season 1 to Season 2, and reduce the commercial trip limit from 1,200 pounds gw to 1,000 pounds gw for Season 2 is expected to directly regulate approximately 263 vessels. These vessels' average annual gross revenues were $62,578 per vessel from 2012 through 2016. Average annual net revenue from operations for these vessels was approximately 4% of their average annual gross revenue from 2014 through 2016. Thus, average annual net revenue from operations (economic profit) for these vessels is estimated to be about $2,500 per vessel. The proposed action is expected to reduce average annual gross revenues to these vessels by about $34, which represents less than 0.1% of their average annual gross revenues, and about 11.4% of their average annual economic profit. Furthermore, although a quantitative estimate cannot be provided due to lack of data, this action is also expected to have a modest increase in these vessels' operating costs. In general, trip limits are expected to increase costs because commercial fishing vessels must take more trips to harvest and land the same amount of fish. The more restrictive the trip limit, the greater the expected increase in costs. The proposed trip limit reduction for Season 2 is 200 pounds gw per trip, or about 17% of the current trip limit. This is not a large reduction and only applies in Season 2, so a minor increase in costs would be expected, which would be expected to slightly reduce these vessels' economic profits.

For red porgy, the action to remove the sale and purchase prohibition and the possession limit of three per person per day or three per person per trip during January 1 through April 30 each year, establishing two commercial fishing seasons of January 1 through April 30 (Season 1) and May 1 through December 31 (Season 2) rather than a single fishing year, allocate 30% of the commercial annual catch limit to Season 1 and 70% to Season 2, and establish a commercial trip limit of 60 fish in Season 1 is expected to directly regulate approximately 160 vessels. These vessels' average annual gross revenues were $73,366 per vessel from 2012 through 2016. Average annual net revenue from operations for commercial vessels in the snapper grouper fishery was approximately 4.5% of their average annual gross revenue from 2014 through 2016. Thus, annual net revenue from operations (economic profit) for these vessels is estimated to be about $3,300 per vessel. The expected increase in annual gross revenue from this action is about $335 per vessel, representing an increase of about 0.5% of average annual gross revenues but a 9% increase in economic profit. The decision to harvest red porgy during the months when sales and purchase are currently prohibited could lead to additional harvesting costs, but these will be self-imposed and, assuming owners of commercial vessels are rational, the additional gross revenues will exceed the additional costs (i.e., economic profit is expected to increase). Moreover, the red porgy that would be expected to be landed during January through April are likely fish that were previously discarded due to the current prohibition. If these landings are fish that were previously discarded, then no additional costs would be incurred and the additional gross revenue would represent additional economic profit as well.

The proposed action to remove the trip limit reduction (i.e., step-down) for vermilion snapper is expected to directly regulate approximately 206 vessels. These vessels' average annual gross revenues were $66,330 per vessel from 2011 through 2016. Average annual net revenue from operations for these vessels was approximately -1% of their average annual gross revenue from 2014 through 2016 (i.e., these vessels have been earning economic losses). Thus, annual net revenue from operations (economic profit) for these vessels is estimated to be about -$6,600 per vessel. The proposed action is expected to result in a reduction of $42 in average annual gross revenue per vessel, which is a minimal change relative to annual average gross revenues but would increase economic losses by about 0.6%. However, the proposed action is also expected to change the costs of harvesting vermilion snapper. In general, trip limits are expected to increase costs because commercial fishing vessels must take more trips to harvest and land the same amount of fish. The more restrictive the trip limit, the greater the expected increase in costs. Under the current regulations, the trip limit is reduced to 500 pounds when 75% of the commercial ACL is harvested, or by 50%, which is significant. Further, changes in trip limits within a year and particularly within a season can introduce inefficiencies into the production process as commercial fishing vessels must adjust their operations in order to account for such changes. While these inefficiencies are likely not as great when the trip limit changes are known well in advance, they become particularly acute when the owners of commercial fishing vessels do not know if or when the trip limit change is going to occur, which is the case under the current regulations. Further, because at least some owners of commercial fishing vessels would prefer to fish when the trip limit is higher, so-called "step downs" can result in mini-fishing derbies within a season. Splitting the commercial ACL between seasons only partially mitigates this effect. Although models are not available to quantitatively estimate the expected changes in costs, the elimination of the trip limit "step-down" is expected to significantly reduce these vessels' harvesting costs, likely more than offsetting the relatively minor reduction in gross revenues. Thus, economic profit for these vessels is expected to increase.

The proposed action to establish a minimum commercial size limit of 20 inches fork length for almaco jack is expected to directly regulate approximately 165 vessels. These vessels' average annual gross revenues were $77,267 per vessel from 2012 through 2016. Average annual net revenue from operations for these vessels was approximately 4% of their average annual gross revenue from 2014 through 2016. Thus, average annual net revenue from operations (economic profit) for these vessels is estimated to be about $3,100 per vessel. Average annual gross revenue per vessel is expected to decrease by about $4 per vessel under the proposed action, which is minimal (i.e., about .1% of economic profit), and thus unlikely to affect these vessels' fishing behavior. However, establishing a minimum size limit will lead to discarded fish. Thus, commercial fishing vessels must exert more effort per trip or take more trips to land the same amount of fish, which leads to higher costs. The more restrictive the size limit, the greater the amount of discarded fish and thus the greater the expected increase in costs. Given the minimal increase in average annual gross revenue per vessel, the increase in costs per vessel could be considerably higher depending on the amount of fish vessels are forced to discard and how much additional effort they exert to maintain their landings and revenue. On the other hand, the increase in cost may be partially offset through a higher price received for larger sized fish, but the extent to which this will occur is unknown due to lack of data on the variability of prices across fish of different sizes. Based on this information, this proposed action may reduce the economic profit of these 165 vessels.

The proposed action to establish a commercial trip limit of 500 pounds gw for the Other Jacks Complex is expected to directly regulate approximately 210 vessels. These vessels' average annual gross revenues were $69,363 per vessel from 2012 through 2016. Average annual net revenue from operations for these vessels was approximately 4% of their average annual gross revenue from 2014 through 2016. Thus, annual net revenue from operations (economic profit) for these vessels is estimated to be about $2,800 per vessel. Given the proposed minimum commercial size limit for almaco jack, this proposed action is expected to result in a reduction of $28 in average annual gross revenue per vessel, or about 1% of the average annual economic profit. However, the expected increases in costs would decrease economic profit even further, the magnitude of which depends on how much additional effort vessels must exert to maintain their landings and revenues. As such, economic profit is expected to be reduced under any of the other alternatives relative to Alternative 1 (No Action).

The proposed action to remove the 12-inch total length commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper is expected to directly regulate approximately 94 vessels. These vessels' average annual gross revenues were $93,154 per vessel from 2012 through 2016. Average annual net revenue from operations for these vessels was approximately 4% of their average annual gross revenue from 2014 through 2016. Thus, annual net revenue from operations (economic profit) for these vessels is estimated to be about $3,700 per vessel. A minimal increase in landings is expected as a result of this proposed action. However, commercial fishing vessels have only harvested about 43% of the commercial ACL for the deep-water complex since blueline tilefish was removed from that complex. Thus, landings could increase significantly without any concern of exceeding the commercial ACL. Further, with the elimination of the minimum size limit, vessels would be able to increase their landings of these species per unit of effort, thereby decreasing costs per pound of fish landed. Thus, this proposed action would be expected to increase the economic profits of these vessels to some extent.

The proposed action to reduce the commercial minimum size limit for gray triggerfish in the exclusive economic zone off the east coast of Florida from 14 inches fork length to 12 inches fork length is expected to directly regulate approximately 213 vessels. These vessels' average annual gross revenues were $65,661 per vessel from 2012 through 2016. Average annual net revenue from operations for these vessels was approximately 2% of their average annual gross revenue from 2014 through 2016. Thus, annual net revenue from operations (economic profit) for these vessels is estimated to be about $1,300 per vessel. This proposed action is expected to result in an increase in annual gross revenue per vessel of approximately $10, which would represent an increase the average vessel's economic profit of about 0.8% per year. Reducing the minimum size limit will also allow commercial fishing vessels to harvest these species with less effort. As such, this proposed action would also be expected to decrease the cost per pound of harvest, though by how much is unknown due to the lack of appropriate models. Thus, this proposed action is expected to result in a modest increase in these vessels' economic profits.

Based on the information above, average annual gross revenues for the 584 active commercial snapper grouper vessels is expected to increase by about $33,400, or approximately $57 per vessel, as a result of this proposed regulatory action. This increase represents only about 0.1% of these vessels' average annual gross revenues, but about 3% of their average annual economic profit. Harvesting costs are expected to significantly decrease for vessels harvesting vermilion snapper and slightly decrease for vessels harvesting grey triggerfish, while they are expected to increase for vessels harvesting greater amberjack, almaco jack, and species in the Other Jacks complex. Because of these countervailing effects on harvesting costs, harvesting costs for many commercial snapper grouper vessels will likely change little if at all. Thus, economic profit for the average commercial snapper grouper vessel is expected to increase slightly or remain relatively the same, though some vessels could experience a reduction in economic profit.

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

Five alternatives, including the status quo, were considered for the proposed action to reduce the commercial trip limit for blueline tilefish from 300 pounds gw to 100 pounds gw from January 1 through April 30. The status quo alternative and the other four alternatives were not selected because they are not expected to achieve the Council's goal of enabling more equitable access to the resource for fishermen from different areas of the South Atlantic, and the status quo is also not expected to increase economic profits for the affected small entities.

Two alternatives, including the status quo, were considered for the proposed action to establish, for snowy grouper, two commercial fishing seasons of January 1 through June 30 (Season 1) and July 1 through December 31 (Season 2) rather than a single fishing year, allocate 70% of the commercial annual catch limit to Season 1 and 30% to Season 2, and transfer any remaining quota from Season 1 to Season 2. The status quo alternative and the other alternative were not selected because they are not expected to achieve the Council's goal of enabling more equitable access to the resource for fishermen from different areas of the South Atlantic.

Nine alternatives, including the status quo, were considered for the proposed action to establish, for greater amberjack, two commercial fishing seasons of March 1 through August 31 (Season 1) and September 1 through the end of February (Season 2) rather than a single fishing year, allocate 50% of the commercial annual catch limit to Season 1 and 50% to Season 2, transfer any remaining quota from Season 1 to Season 2, and reduce the commercial trip limit from 1,200 pounds gw to 1,000 pounds gw for Season 2. The status quo alternative was not selected because it is not expected to achieve the Council's goal of enabling more equitable access to the resource for fishermen from different areas of the South Atlantic. Six of the other alternatives are expected to decrease economic profits for the affected small entities more than the proposed action and thus were not selected. The other two alternatives are expected to reduce economic profits less than the proposed action, but were not selected because they are not expected to achieve the Council's goal of enabling more equitable access to the resource for fishermen from different areas of the South Atlantic.

Seven alternatives, including the status quo, were considered for the proposed action to remove the sale and purchase prohibition and the possession limit of three per person per day or three per person per trip during January 1 to April 30 each year, specify two commercial fishing seasons of January 1 through April 30 (Season 1) and May 1 through December 31 (Season 2) rather than a single fishing year, allocate 30% of the commercial annual catch limit to Season 1 and 70% to Season 2, and establish a commercial trip limit of 60 fish in Season 1 for red porgy. The status quo was not selected because it is not expected to achieve the Council's goal of enabling more equitable access to the resource for fishermen from different areas of the South Atlantic and was also not expected to increase economic profits for the affected small entities.

Five alternatives, including the status quo, were considered for the proposed action to remove the trip limit "step-downs" for vermilion snapper. None of these alternatives were selected as they are expected to result in lower economic profits for the affected small entities, and three of these alternatives are expected to result in significantly higher regulatory costs to the government as well.

Four alternatives, including the status quo, were considered for the proposed action to establish a minimum commercial size limit of 20 inches fork length for almaco jack. The status quo was not selected because almaco jack less than 20 inches in fork length are not considered to be of a marketable size (i.e., they are difficult if not impossible to sell at a price that would not lead to economic losses) and therefore would likely be discarded. Thus, the status quo alternative is not expected to achieve the Council's goals of improving the marketability of certain species and minimizing discards. The other three alternatives are expected to result in even higher discards, which is contrary to the Council's goal of minimizing discards, and are also expected to reduce economic profits for the affected small entities more than the proposed action.

Three alternatives, including the status quo, were considered for the proposed action to establish a commercial trip limit of 500 pounds gw for the Other Jacks Complex. The status quo alternative was not selected as it is not expected to achieve the Council's goal of enabling more equitable access to the resource for fishermen from different areas of the South Atlantic. The other two alternatives are expected to reduce economic profits more than the proposed action and therefore were not selected.

One alternative, the status quo, was considered for the proposed action to remove the 12-inch total length commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper. The status quo alternative was not selected because it is expected to result in higher discards, which is contrary to the Council's goal of minimizing discards, and is also expected to result lower economic profits for the affected small entities.

One alternative, the status quo, was considered for the proposed action to reduce the commercial minimum size limit for gray triggerfish in the exclusive economic zone off the east coast of Florida from 14 inches fork length to 12 inches fork length. The status quo alternative was not selected because it is expected to result in higher discards, which is contrary to the Council's goal of minimizing discards, and is also expected to result lower economic profits for the affected small entities.

Appendix G. Other Applicable Laws

1.1 Administrative Procedure Act (APA)

All federal rulemaking is governed under the provisions of the APA (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Among other things under the APA, the National Marine Fisheries Service (NMFS) is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day wait period from the time a final rule is published until it takes effect, with some exceptions. Vision Blueprint Commercial Regulatory Amendment 27 (Regulatory Amendment 27) 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 27has 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 3.2.5 (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 final List of Fisheries (LOF) for 2017 and 2018 (82 FR 3655, January 12, 2017; and 83 FR 5349, February 7, 2018, respectively) because there have been no documented interactions between these gear and marine mammals. The black sea bass pot component of the South Atlantic snapper grouper fishery is part of the Atlantic mixed species trap/pot fishery, a Category II fishery, in the final List of Fisheries (LOF) for 2017 and 2018 (82 FR 3655, January 12, 2017; and 83 FR 5349, February 7, 2018, respectively). 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 Environmental Policy Act (NEPA)

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

<u>Purpose and Need for Action</u>

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

<u>Alternatives</u>

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

<u>Affected Environment</u>

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

<u>Impacts of the Alternatives</u>

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

1.12 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 H. Essential Fish Habitat and Ecosystem-based Management

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

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

Moving to Ecosystem-based Management

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

Assessments and Environmental Impact Statements associated with subsequent amendments to Council FMPs will draw from or cite by reference the FEP.

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

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

Ecosystem Approach to Deepwater Ecosystem Management

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

CE-BA 2 established annual catch limits (ACL) for octocorals in the South Atlantic as well as modifying the Fishery Management Unit (FMU) for octocorals to remove octocorals off the coast of Florida from the FMU (SAFMC 2011). The amendment also limited the possession of managed species in the SMZs off South Carolina to the recreational bag limit for snapper grouper and coastal migratory pelagic species; modified sea turtle release gear requirements for the snapper grouper fishery based upon freeboard height of vessels; amends Council fishery management plans (FMPs) to designate or modify EFH and EFH-HAPCs, including the FMP for Pelagic Sargassum Habitat; amended the Coral FMP to designate EFH for deep-water Coral

HAPCs designated under CE-BA 1; and amended the Snapper Grouper FMP to designate EFH-HAPCs for golden and blueline tilefish and the deep-water Marine Protected Areas. The final rule was published in the federal register on December 30, 2011, and regulations became effective on January 30, 2012.

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

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

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

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

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

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

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

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

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

In addition, the South Atlantic Council serves on the National Habitat Board and, as a member of the Southeast Aquatic Resource Partnership (SARP), has highlighted this collaboration by including the Southeast Aquatic Habitat Plan (SAHP) and associated watershed conservation restoration targets into the FEP. Many of the habitat, water quality, and water quantity conservation needs identified in the threats and recommendations Volume of the FEP are directly addressed by on-the-ground projects supported by SARP. This cooperation results in funding fish habitat restoration and conservation intended to increase the viability of fish populations and fishing opportunity, which also meets the needs to conserve and manage Essential Fish Habitat for Council managed species or habitat important to their prey. To date, SARP has funded 53 projects in the region through this program. This work supports conservation objectives identified in the SAHP to improve, establish, or maintain riparian zones, water quality, watershed connectivity, sediment flows, bottoms and shorelines, and fish passage, and addresses other key factors associated with the loss and degradation of fish habitats. SARP also developed the Southern Instream Flow Network (SIFN) to address the impacts of flow alterations in the Southeastern US aquatic ecosystems which leverages policy, technical experience, and scientific resources among partners based in 15 states. Maintaining appropriate flow into South Atlantic estuarine systems to support healthy inshore habitats essential to Council managed species is a major regional concern and efforts of SARP through SIFN are envisioned to enhance state and local partners ability to maintain appropriate flow rates.

Governor's South Atlantic Alliance (GSAA)

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

South Atlantic Landscape Conservation Cooperative

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

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

Building Tools to support Ecosystem-based Management in the South Atlantic Region

The Council has developed a Habitat and Ecosystem Section of the website http://www.safmc.net/ecosystem/Home/EcosystemHome/tabid/435/Default.aspx and, in cooperation with the Florida Wildlife Research Institute (FWRI), developed a Habitat and Ecosystem Internet Map Server (IMS). The IMS was developed to support Council and regional partners' efforts in the transition to ecosystem-based management. Other regional partners include NMFS Habitat Conservation, South Atlantic States, local management authorities, other Federal partners, universities, conservation organizations, and recreational and commercial fishermen. As technology and spatial information needs evolved, the distribution and use of GIS demands greater capabilities. The Council has continued its collaboration with FWRI in the now evolution to Web Services provided through the regional SAFMC Habitat and Ecosystem Atlas (http://ocean.floridamarine.org/safmc_atlas/) and the SAFMC Digital Dashboard (http://ocean.floridamarine.org/safmc_dashboard/). The Atlas integrates services for the following:

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

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

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

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

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

Ecosystem Based Action, Future Challenges and Needs

The South Atlantic Council has implemented ecosystem-based principles through several existing fishery management actions including establishment of deep-water Marine Protected Areas for the Snapper Grouper fishery, proactive harvest control rules on species (e.g., dolphin and wahoo) which are not overfished, implementing extensive gear area closures which in most cases eliminate the impact of fishing gear on Essential Fish Habitat, and use of other spatial management tools including Special Management Zones. Pursuant to development of the Comprehensive Ecosystem-Based Amendment, the South Atlantic Council has taken an ecosystem approach to protect deep-water ecosystems while providing for traditional fisheries for the Golden Crab and Royal Red shrimp in areas where they do not impact deep-water coral habitat. The stakeholder-based process taps in on an extensive regional Habitat and Ecosystem network. Support tools facilitate South Atlantic Council deliberations and with the help of regional partners, are being refined to address long-term ecosystem management needs.

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

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

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

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

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

5. Marine aquaculture;
6. Marine Ecosystems and Non-Native and Invasive Species: and
7. Estuarine Ecosystems and Non-Native and Invasive Species.

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

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

South Atlantic Bight Ecopath Model

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

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

Essential Fish Habitat and Essential Fish Habitat Areas of Particular Concern

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

Snapper Grouper FMP

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

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

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

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

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

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

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

Shrimp FMP

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

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

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

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

Coastal Migratory Pelagics FMP

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

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

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

Areas which meet the criteria for EFH-HAPCs include sandy shoals of Capes Lookout, Cape Fear, and Cape Hatteras from shore to the ends of the respective shoals, but shoreward of the

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

Golden Crab FMP

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

Spiny Lobster FMP

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

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

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

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

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

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

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

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

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

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

Dolphin and Wahoo FMP

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

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

Pelagic *Sargassum* Habitat FMP

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

Actions Implemented That Protect EFH and EFH-HAPCs

Snapper Grouper FMP

- Prohibited the use of the following gears to protect habitat: bottom longlines in the EEZ inside of 50 fathoms or anywhere south of St. Lucie Inlet, Florida; bottom longlines in the wreckfish fishery; fish traps; bottom tending (roller- rig) trawls on live bottom habitat; and entanglement gear.
- Established the *Oculina* Experimental Closed Area where the harvest or possession of all species in the snapper grouper complex is prohibited.
- Established deep-water Marine Protected Areas (MPAs) as designated in Snapper Grouper Amendment 14: Snowy Grouper Wreck MPA, Northern South Carolina MPA, Edisto MPA, Charleston Deep Artificial Reef MPA, Georgia MPA, North Florida MPA, St. Lucie Hump MPA, and East Hump MPA.

Shrimp FMP

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

***Pelagic Sargassum* Habitat FMP**

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

Coastal Migratory Pelagics FMP

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

Golden Crab FMP

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

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

Coral, Coral Reefs and Live/Hard Bottom FMP

- Established an optimum yield of zero and prohibiting all harvest or possession of these resources which serve as essential fish habitat to many managed species.
- Designated the *Oculina* Bank Habitat Area of Particular Concern.
- Expanded the *Oculina* Bank Habitat Area of Particular Concern (HAPC) to an area bounded to the west by 80°W. longitude, to the north by 28°30' N. latitude, to the south by 27°30' N. latitude, and to the east by the 100 fathom (600 feet) depth contour.
- Established the following two Satellite *Oculina* HAPCs: (1) Satellite *Oculina* HAPC #1 is bounded on the north by 28°30'N. latitude, on the south by 28°29'N. latitude, on the east by 80°W. longitude, and on the west by 80°3'W. longitude; and (2) Satellite *Oculina* HAPC #2 is bounded on the north by 28°17'N. latitude, on the south by 28°16'N. latitude, on the east by 80°W. longitude, and on the west by 80°3'W. longitude.
- Prohibited the use of all bottom tending fishing gear and fishing vessels from anchoring or using grapples in the *Oculina* Bank HAPC.
- Established a framework procedure to modify or establish Coral HAPCs.
- Established the following five deep-water CHAPCs:
    - Cape Lookout Lophelia Banks CHAPC;
    - Cape Fear Lophelia Banks CHAPC;
    - Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace (Stetson- Miami Terrace) CHAPC;
    - Pourtales Terrace CHAPC; and
    - Blake Ridge Diapir Methane Seep CHAPC.
- Within the deep-water CHAPCs, the possession of coral species and the use of all bottom damaging gear are prohibited including bottom longline, trawl (bottom and mid-water), dredge, pot or trap, or the use of an anchor, anchor and chain, or grapple and chain by all fishing vessels.

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

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

SAFMC EFH Policy Statements

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

References:

SAFMC (South Atlantic Fishery Management Council). 1998a. Habitat Plan for 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). 1998b. Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans 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). 2009a. Fishery Ecosystem Plan for 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 for the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Suite 201; North Charleston, SC 29405.

SAFMC (South Atlantic Fishery Management Council). 2011. Comprehensive Ecosystem-Based Amendment 2 for the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Suite 201; North Charleston, SC 29405.

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

Appendix I. SSC's final report to review the analytical methods

Meeting Report
May 7, 2018
Meeting via webinar

Overview

At their October 2017 meeting, the SSC reviewed Snapper Grouper Regulatory Amendment 27 (Attachment 2), the Commercial Visioning Amendment. The Committee was asked to review the use of two different modelling techniques used to conduct the same analyses. A new modelling technique for forecasting fishery landings using a Seasonal Autoregressive Integrated Moving Average (SARIMA, Attachment 3) model and the traditional approach of using the previous 3-year average. The SARIMA model was used to predict catch rates of fisheries on a monthly time scale using historical data, whereas the 3-year average method used only the most recent 3 years of data, for estimating impacts of proposed management alternatives (Attachments 1 and 2). Each method gave very different results for some of the actions and alternatives. The conclusions of the Committee are below.

The complexity of the SARIMA model makes it less favorable as a management tool. The last 3 years of data are likely more representative of the current fishery than using the entire data series.

However, the analyst who performed the SARIMA analysis was unavailable to answer questions of the Committee and the SSC also gave constructive feedback for testing and improving on the analysis.

In February 2018, the Socio-Economimc Panel (SEP) met and also reviewed the use of the SARIMA model for forecasting fisheries landings and for management advice. The SEP had a diverging opinion on the use of the SARIMA model in Regulatory Amendment 27. The conclusions of the SEP are below.

Regarding the appropriateness of the two models and methodologies used to predict landings under various scenarios, the SEP agreed that, in principle, the SARIMA method was superior to the "Last 3 Years" averaging method; however, the SEP recommends that the council be presented with results from both models, as both models have pros and cons. The "Last 3 Years" model is less complicated and easier to understand, but it puts perhaps too much weight on data from recent years at the expense of neglecting longer-run effects due to changes in year class abundance or environmental or policy shocks or cycles. The SARIMA model is more complicated but probably gives a better picture of the uncertainty involved in predicting landings through better modeling of the error term that incorporates the effects of factors left out of the model. Over time, as data availability and quality improve, the performance of the SARIMA model should improve relative to the "Last 3 Years" model.

After this meeting, a retrospective analysis was conducted, using 2016 data, to determine which method more accurately predicted the catch rates of the fishery in the following year. The results indicated that each method performed better under different circumstances.

The SSC and SEP are now meeting jointly via webinar to attempt to resolve the diverging opinions arrived at by the two groups.

Review and comment on the use and uncertainties of the two methods used in Actions 1-6 of Reg Amendment 27 to analyze the effects of the alternatives.

Is one methodology more appropriate for use in these analyses?

Relative to Reg Amendment 27 only:
In a new analysis presented during the webinar, the analyst generated predictions of closure dates in 2017 with both models and compared them with the actual timing of quota closures under current regulations. For Regulatory Amendment 27, he recommended using the model for each species that most closely predicted actual closure dates in 2017.

Based on the justifications given by the analyst, the SSC agrees with the recommended use of both the SARIMA and the Last 3 Years, depending on the retrospective performance analysis done for each Action in Reg Amendment 27.

The recommended model usage is as follows:
Action 1: Last 3 Years
When tested against actual closure dates for 2017, the predictions of closure dates for blueline tilefish were very close with both models, suggesting relatively robust estimates for closure dates for the various alternatives. The SSC recommends the use of the Last 3 Years model.

Action 2: Last 3 Years
Predictions of closure dates for snowy grouper were much earlier with the SARIMA model than with the Last 3 Years model. The SARIMA model interprets the higher observed catch rates in 2016 and 2017 as a rapid acceleration in fishing pressure, whereas the prediction of the Last 3 Years model is more consistent with observations of recent fishing pressure and the increasing ACL. The SSC agrees with Dr. Farmer's recommendation to use the Last 3 Years model.

Action 3: Last 3 Years
Predictions of closure dates for greater amberjack generally were earlier with the SARIMA model because it predicted an increase in catch per day, whereas there was no trend in aggregate landings over the previous 3 years. The SSC agrees with Dr. Farmer's recommendation to use the Last 3 Years model.

Action 4: SARIMA
Predictions of closure dates for red porgy differed substantially for the two models. The Last 3 Years model predicted closures even though landings from 2015 through 2017

were below the commercial ACL. The SARIMA model did not predict closures as it reflected the downward trend in landings and catch per day as predicted by SARIMA. The SSC agrees with Dr. Farmer's recommendation to use the SARIMA model.

Action 5: SARIMA
Based on Dr. Farmer's retrospective analysis, the SARIMA model more closely estimated actual landings in 2017, but it is noted that both models overestimated the 2017 landings. Thus, the predicted quota closure dates may be conservative. The SSC agrees with Dr. Farmer's recommendation to use the SARIMA model.

General recommendations for using SARIMA:

Suggest looking at including co-occurring targeted species that are associated with the incidentally caught species in this analysis.
To determine which (or both) of the two models (SARIMA and Last 3) is best to use for forecasting fishery catch rates and closure dates, a decision framework needs to be developed in advance for making such a decision.
Clear criteria for how to decide on which method to use is critical for stakeholder buy-in.
To clarify, these analyses are only used for Council management actions within amendments, not for annual analyses to look at in-season or post-season accountability measures.
Due to how sensitive the SARIMA seems to be to recent trends, it will take careful consideration by the analyst when deciding when to use this tool.
Suggest retrospective analysis of fitting SARIMA and Last 3 Years model to many types of fisheries under different conditions (stable fisheries, management changes, etc.).

Does either of these approaches provide clearer management advice to the Council?

The SSC recommends SARIMA become one of the tools used to analyze catch data and that it be explored as one of the possible models for use when predicting future catch rates and providing management advice.

Are there differences in relative risk or uncertainty between the two methods?

SARIMA more susceptible to recent trends in fisheries data than the Last 3 Years model. This can either increase or decrease the risk of uncertainty between these two approaches.
Volatility clustering may help to reduce sensitivity of SARIMA to recent fishery volatility.

Are there cases where one method may be superior to the other in providing management advice? If so, why and can the appropriate model be determined a priori?

The choice of model depends on whether trends in the last 2-3 years of data are present and if those trends are real or not.
The SARIMA will forecast a fishery's behavior more accurately if that fishery is relatively stable through time.
The Last 3 Years performs better under conditions of recent change (such as management changes) or recent hyper-stability that differs from the long-term trend.

One caveat about the predictive ability of the models is that neither model includes causative or behavioral variables. However, changes in regulations cause changes in fishing behavior, and for this reason could result in landings that deviate from historical averages, patterns or trends.

Appendix J. Commercial Data Analyses of Management Alternatives

Impacts of proposed alternatives in South Atlantic Regulatory Amendment 27: Commercial Visioning Blueprint

LAPP/DM Branch
Southeast Regional Office
NOAA Fisheries Service

Introduction

The South Atlantic Fishery Management Council (Council) manages Snapper-Grouper stocks in federal waters from the Florida Keys to the Virginia/North Carolina border. In Vision Blueprint Commercial Regulatory Amendment 27 for the Snapper Grouper Fishery of the South Atlantic Region (Reg-27), the Council has proposed modifications of commercial regulations such as fishing seasons, trip limits, seasonal closures, and size limits for species in the snapper grouper fishery. These proposed management measures are intended to address commercial stakeholder input to enable equitable access for fishermen participating in the snapper grouper, and to minimize discards. This document evaluates the impacts of proposed alternatives in Reg-27 and provides analytical support for the Council's decision-making process.

Methods & Results

For most actions, landings were expressed as daily catch rates by month, based on open federal days, and two catch rate projection models were developed: (1) based on the last three years of data (2014-2016; "Last 3"), and (2) a seasonal auto-regressive integrated moving average (SARIMA) model. In the "Last 3" model, the mean and standard deviation of the last three years of data were used to generate monthly mean and 95% confidence interval projection estimates for daily catch rates, which were subsequently expanded into estimates of monthly landings by multiplying by the number of days in each month. In a SARIMA(p,d,q)x(P,D,Q) model (Box et al. 2013), the autoregressive component (p) represents the lingering effects of previous observations, the integrated component (d) represents temporal trends, and the moving average component (q) represents lingering effects of previous random shocks (or error). The SARIMA models were implemented using Proc ARIMA in SAS version 9.2 (SAS Institute). Following Farmer & Froeschke (2015), all possible combinations of single-difference SARIMA models for landings per day by month were considered (**Table S-1**). A single-difference SARIMA model only considers a maximum of one differencing term in the annual and one differencing term in the seasonal component. Differencing terms considered were annual and monthly. All SARIMA models were fit using conditional least squares. Stationarity tests were used to guide differencing selection. Final SARIMA model selection was guided by the examination of autocorrelations, inverse autocorrelations, partial autocorrelations, cross-correlations, residual diagnostics, and AIC.

The Last 3 approach is a simple average and highly sensitive to recent trends. The SARIMA approach generates statistical fits to the data. The final SARIMA model, as selected by AIC and other factors, represents the best fit to the data, accounting for any seasonal and/or interannual trends. The SARIMA model approach is sensitive to recent trends, captures long term trends, and has been shown to provide superior fits to catch trends as compared to recent year's data approaches (Farmer & Froeschke 2015). When alternative projection modeling approaches provide very different mean estimates of catch rates and closure dates, this should be interpreted as an indication that historical data are not very informative of future trends. When different modeling approaches provide reasonably close estimates of catch rates and closure dates but confidence limits are wide, this should be interpreted as high variability within the historical data. Both modeling approaches were retained for projections to provide the Council information regarding the uncertainty in the projected closure dates. Most of the species under consideration in Reg-27 are indirectly harvested during trips targeting other stocks; for this reason, uncertainty in the historical data is often high. Similarly, actions involving targeted species often require extrapolation of catch rates to periods that have been subject to recent closures or a complex management history, further contributing to uncertainty.

Action 1. Establish a commercial split season and modify the commercial trip limit for blueline tilefish

- **Alternative 1 (No Action)**. The commercial fishing year for blueline tilefish in the South Atlantic EEZ is from January 1 to December 31. The commercial trip limit is 300 pounds gutted weight.
- **Alternative 2.** Specify two commercial fishing seasons for blueline tilefish. Allocate the blueline tilefish commercial ACL into two quotas: 40% to the period January 1 through June 30 and 60% to the period July 1 through December 31. Any remaining quota from Season One would transfer to Season Two. Any remaining quota from Season Two would not be carried forward.
  - **Sub-alternative 2a.** Season 1 trip limit = 100 pounds lbs gw, Season 2 trip limit = 300 pounds lbs gw.
  - **Sub-alternative 2b.** Season 1 trip limit = 150 pounds lbs gw, Season 2 trip limit = 300 pounds lbs gw.
- **Alternative 3.** Modify the commercial trip limit for blueline tilefish:
  - **Sub-alternative 3a**. 100 lbs gw from January 1 through April 30 and 300 lbs gw from May 1 through December 31
  - **Sub-alternative 3b**. 150 lbs gw from January 1 through April 30 and 300 lbs gw from May 1 through December 31
  - **Sub-alternative 3c.** 100 lbs gw from January 1 through June 30 and 300 lbs gw from July 1 through December 31.

Average monthly commercial landings for blueline tilefish by state from 2004-2013 are provided in **Figure 1**. The percentage of annual blueline tilefish landings from each state from 2002-2016 is provided in **Figure 2**. Due to recent quota closures (**Table 1**), data were not available from recent years to inform Season 2 landings. The Council may want to consider moving this action to blueline tilefish amendment (Amendment 38) given the pending completion in June 2018 of the SEDAR 50 stock assessment, which may provide updated stock status and ABC recommendations. Also, blueline tilefish management has been very dynamic over the past few years, with many regulatory changes including a prohibition of harvest beyond 240 fathoms in 2011. The input data available for forecasting future landings have consequently been affected, which has implications for the reliability of analyses. In general, the most recent year is probably the best available predictor of future trends.

Trip limit impacts were simulated by modifying and re-summarizing landings from commercial logbook trip records (SEFSC commercial logbook data, accessed April 2017). Total monthly landings 2006-2016 were compared between modified (500, 400, 300, 250, 200, 150, and 100-lb gw trip limit) and unmodified trip records. Monthly scalars were applied to projected landings data for the alternatives listed above. Monthly trip limit scalars on projected catches were determined using the last three fully open years without a trip limit in place within this range (**Table 2**). All trip limit scalars were based on a 300-lb trip limit baseline, with landings from Mar 2015-June 2016 scaled up from the 100-lb trip limit that was in place at that time.
To predict baseline 2018 landings for Alternative 1, monthly commercial landings data for 1997-2016 was obtained from the NOAA Southeast Fisheries Science Center (SEFSC) annual catch

limit (ACL) commercial database (accessed May 2017). Input data was evaluated from 1997 onward because species identification has improved through time. Landings under a back-calculated 300-lb trip limit were converted to daily catch rates by month, which considered the number of open days during months with quota closures or seasonal restrictions on harvest. Landings were projected using the Last 3 and SARIMA methods described above. Commercial discards were estimated by month using the SEFSC Commercial Logbook and Supplemental Discard Logbook (accessed May 2017) to develop a discard rate in numbers of fish per unit effort, by species, gear, and region, and expand that rate to the total effort in the fishery by gear and region. Note that a randomly selected comprehensive observer program is not available in the South Atlantic, thus estimation of commercial discards is reliant upon self-reported data. The final selected model was a ARIMA(1,0,0)X(0,1,1)s with Adj. R^2=0.53 (**Figure 3**). Projected mean and 95% confidence intervals for daily catch rates were expanded into estimates of monthly landings by multiplying by the number of days in each month. Peak blueline tilefish landings were projected for August, followed by July (**Figure 4**). Projections using the Last 3 model anticipated 50% of the ACL would be reached in April (95% CI: Mar-June). SARIMA projections estimated 50% of the ACL would be reached in May (95% CI: Jan-Dec). Projected season lengths under Alternatives 1-3 are provided in **Table 3**. Due to recent dynamic changes in the fishery and challenges accounting for the imposition of a 300-lb trip limit in July 2016, there is substantial uncertainty in these projections. Expanded estimates of commercial discards for blueline tilefish from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017) are provided in **Figure S-1**.

Action 2. Establish a commercial split season for snowy grouper

- **Alternative 1 (No Action)**. The commercial fishing year for snowy grouper in the South Atlantic federal waters is from January 1 to December 31.
- **Alternative 2**. Specify two commercial fishing seasons for snowy grouper. Allocate the snowy grouper commercial ACL into two quotas: 60% to the period January 1 through June 30 and 40% to the period July 1 through December 31. Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward.
- **Alternative 3**. Specify two commercial fishing seasons for snowy grouper. Allocate the snowy grouper commercial ACL into two quotas: 70% to the period January 1 through June 30 and 30% to the period July 1 through December 31. Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward.

Average monthly commercial landings for snowy grouper are provided by state 2002-2005 and 2007-2011 in **Figure 5**. The years 2006 and 2012-2016 were excluded due to closures. The percentage of annual snowy grouper landings from each state from 2002-2016 is provided in **Figure 6**. Similar to blueline tilefish (see Action 1, above), commercial landings data were converted to daily catch rates within months for 1997-2016. There have been several recent quota closures for snowy grouper (**Table 4**). Two projection models were fit to the data: (1) mean catch rates 2014-2016 ("Last 3") and (2) a SARIMA model. In the Last 3 model, the ratio of Sept to Oct-Dec landings 2010-2012 was used to generate extrapolated catch estimates for Oct-Dec due to quota closures in the 2014-2016 period. No data adjustments were made for the change in trip limit from 100 lbs to 200 lbs in Aug 2015. For the SARIMA model, a covariate was introduced for the trip limits of 2500 lbs (1994-Sept 2006), 275 lbs (Oct 2006-Dec 2006), 175 lbs (2007), 100 lbs (2008-July 2015), and 200 lbs (Aug 2015-on). Based on commercial logbook self-reported catch records, some trips with harvest above the status quo trip limit was identified in each year 2010-2015. The final selected SARIMA model was ARIMA(0,1,1)X(0,1,1)s with Adj. R^2=0.84 (**Figure 7**).

The numerous changes in trip limits and other regulations for snowy grouper likely make recent data a poor predictor of future trends. Under Alternative 1 (No Action), the ACL is anticipated to be met by Sept (95% CI: June-No Closure) or Mar (95% CI: Feb-Nov) by the Last 3 and SARIMA models, respectively (**Figure 8**). The Last 3 model predicts 50% of the ACL will be achieved by May (95% CI: Apr-Sept); the SARIMA model predicts 50% of the ACL will be met by Feb (95% CI: Jan-July). The broad confidence intervals for these predictions and the recent changes in the trip limit indicate high uncertainty in these predictions and they should be interpreted with caution.

Projected season lengths under Alternatives 1-3 are provided in **Table 5**. Expanded estimates of commercial discards for snowy grouper from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017) are provided in **Figure S-3**. Snowy grouper are landed in every state, with the majority of vessels landing snowy grouper operating out of Florida (**Figure S-10**).

Note this analysis was performed at the state level, so vessels landing in multiple states would be counted for each state.

Action 3. Establish a commercial split season for greater amberjack

- **Alternative 1 (No Action)**. The commercial fishing year for greater amberjack in the South Atlantic exclusive economic zone is from March 1 to the end of February. During April each year, no person may sell or purchase greater amberjack harvested from the South Atlantic exclusive economic zone, and the harvest and possession limit is one per person per day or one per person per trip, whichever is more restrictive. The commercial trip limit in March and from May through the end of February each fishing year is 1,200 pounds whole weight.
- **Alternative 2**. Specify two commercial fishing seasons for greater amberjack. Allocate the commercial ACL for greater amberjack into two quotas: 50% to the period March 1 through August 31 and 50% to the period September 1 through the end of February. Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward. During April, no person may sell or purchase a greater amberjack harvested from the South Atlantic exclusive economic zone.
    - **Sub-alternative 2a.** Season 1 trip limit = 1,200 pounds lbs ww, Season 2 trip limit = 1,000 pounds lbs ww.
    - **Sub-alternative 2b.** Season 1 trip limit = 1,000 pounds lbs ww, Season 2 trip limit = 800 pounds lbs ww.
    - **Sub-alternative 2c.** Trip limit equals 1,000 pounds whole weight in both seasons.
    - **Sub-alternative 2d.** Trip limit equals 1,000 pounds whole weight in both seasons. A trip limit reduction to 500 pounds whole weight would occur in each season once 75% of the seasonal quota is met or projected to be met. A trip limit reduction would not occur in Season 2 unless 75% of the season's quota is met or is projected to be met by January 31.
- **Alternative 3**. Specify two commercial fishing seasons for greater amberjack. Allocate the commercial ACL for greater amberjack into two quotas: 60% to the period March 1 through August 31 and 40% to the period September 1 through the end of February. Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward. Commercial harvest would still be prohibited annually in April.
    - **Sub-alternative 3a.** Season 1 trip limit equals 1,200 pounds whole weight, Season 2 trip limit equals 1,000 pounds whole weight.
    - **Sub-alternative 3b.** Season 1 trip limit equals 1,000 pounds whole weight, Season 2 trip limit equals 800 pounds whole weight.
    - **Sub-alternative 3c.** Trip limit equals 1,000 pounds whole weight in both seasons.

- **Alternative 4.** Reduce the greater amberjack commercial trip limit. During April each year, no person may sell or purchase a greater amberjack harvested from the South Atlantic exclusive economic zone.

- **Sub-alternative 4a.** 1,000 pounds whole weight
- **Sub-alternative 4b.** 800 pounds whole weight

Average monthly commercial landings for greater amberjack by state from 2005-2015 are provided in **Figure 9**. The percentage of annual greater amberjack landings from each state from 2012-2016 is provided in **Figure 10**. State landings of greater amberjack were restricted to the most recent five years of data due to high proportions of unclassified amberjacks prior to 2012. Even after 2012, some unclassified amberjacks (greater amberjack, lesser amberjacks, banded rudderfish, and almaco jack) were present in North Carolina landings. North Carolina's seafood dealers began using species-specific codes for greater amberjack in 2011, but it was not until 2015 that unclassified amberjack was completely removed as an option for all dealers. It was difficult to this evaluate alternative given the unspecified percentages. Similar to blueline tilefish (see Action 1, above), commercial landings data were converted to daily catch rates within months for 1997-2016. There have been several recent quota closures for greater amberjack (**Table 6**). Two projection models were fit to the data: (1) mean catch rates 2014-2016 ("Last 3") and (2) a SARIMA model. The final selected SARIMA model was a ARIMA(1,1,0)X(0,1,1)s with Adj. R^2=0.86 (**Figure 11**).

Under Alternative 1 (No Action), the ACL is anticipated to be met by Nov (95% CI: Sept-No Closure) or July (95% CI: Feb-No Closure) by the Last 3 and SARIMA models, respectively (**Figure 12**). The Last 3 model predicts 50% of the ACL will be achieved by June (95% CI: May-July); the SARIMA model predicts 50% of the ACL will be met by May (95% CI: Mar-Not Met). The broad confidence intervals indicate high uncertainty and these predictions should be interpreted with caution. Trip limit reductions are provided in **Table 7**. Estimated closure dates for the various alternatives are provided in **Table 8**.

Expanded estimates of commercial discards for greater amberjack from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017) are provided in **Figure S-4**.

Action 4. Establish a commercial split season and modify the trip limit for red porgy

- **Alternative 1 (No Action).** The commercial fishing year for red porgy in the South Atlantic exclusive economic zone is from January 1 to December 31. During January 1 through April 30 each year, no person may sell or purchase red porgy harvested from the South Atlantic exclusive economic zone, and the harvest and possession limit is three per person per day or three per person per trip, whichever is more restrictive. From May 1 through December 31 each year, the trip limit for red porgy is 120 fish.
- **Alternative 2.** Specify two commercial fishing seasons for red porgy. Allocate the commercial red porgy annual catch limit into two quotas: 30% to the period January 1 through April 30 and 70% to the period May 1 through December 31. Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward. Remove the sale and purchase prohibition during January 1 to April 30 each year. Retain the commercial trip limit of 120 fish from May 1 through December 31 and specify a commercial trip limit from January 1 through April 30 of:
    - **Sub-alternative 2a.** 30 fish
    - **Sub-alternative 2b.** 45 fish
    - **Sub-alternative 2c.** 60 fish
- **Alternative 3.** Specify two commercial fishing seasons for red porgy. Allocate the commercial red porgy ACL into two quotas: 50% to the period January 1 through April 30 and 50% to the period May 1 through December 31. Any remaining quota from Season 1 would transfer to Season 2. Any remaining quota from Season 2 would not be carried forward. Remove the sale and purchase prohibition during January 1 to April 30 each year. Retain the commercial trip limit of 120 fish from May 1 through December 31 and specify a commercial trip limit from January 1 through April 30 of:
    - **Sub-alternative 3a.** 30 fish
    - **Sub-alternative 3b.** 45 fish
    - **Sub-alternative 3c.** 60 fish
- **Alternative 4.** Remove the harvest and possession restrictions, and sale and purchase prohibition for red porgy from the South Atlantic during January 1 to April 30 each year. Specify a commercial trip limit of 120 fish from January 1 through December 31.

Average monthly commercial landings for red porgy by state from 2005-2012 and 2014-2016 are provided in **Figure 13**. The year 2013 was excluded due to a closure. The percentage of annual red porgy landings from each state from 2002-2016 is provided in **Figure 14**. It was difficult to this evaluate alternative given the unspecified percentages. Similar to blueline tilefish (see Action 1, above), commercial landings data were converted to daily catch rates within months for 1997-2016. There has only been one recent quota closure for red porgy (**Table 9**). Two projection models were fit to the data: (1) mean catch rates 2014-2016 (“Last 3”) and (2) a SARIMA model. For the Last 3 model, landings in the event of a Jan-Apr opening of the fishery were extrapolated from mean 2014-2016 May landings using the mean ratio of May landings to Jan-Apr landings 1986-1999 (the final year the fishery was open Jan-Apr). Final SARIMA model selection was guided by the examination of autocorrelations, inverse autocorrelations, partial autocorrelations, cross-correlations, residual diagnostics, and AIC. In the SARIMA model, Jan-Apr catch rates were left blank 2000-present, allowing the model to freely estimate these parameters from the input time series. The final selected model was a ARIMA(1,1,0)X(0,1,1)s with Adj. R^2=0.89 (**Figure 15**).

With a Jan-Apr closure, 50% of the ACL is projected to be caught by August (95% CI: July-Sept) or Sept (95% CI: June-No Closure) by the Last 3 and SARIMA models, respectively (**Figure 16: left**). Between Jan-June 30, 38,247 lbs ww (95% CI: 23,862-52,632 lbs ww) to 24,646 lbs ww (95% CI: 0-111,485 lbs ww) is projected to be caught by the Last 3 and SARIMA models, respectively.

Without a Jan-Apr closure, 50% of the ACL is projected to be caught by May (95% CI: Apr-July) or July (95% CI: Feb-Dec 31) by the Last 3 and SARIMA models, respectively (**Figure 16: right**). Between Jan-June 30, 110,456 lbs (95% CI: 63,041-157,871 lbs ww) to 60,393 lbs ww (95% CI: 0-294,705 lbs ww) is projected to be caught by the Last 3 and SARIMA models, respectively. The wide confidence intervals for these projections indicate the substantial uncertainty in the predictions, especially for the impacts of removing the January – April closure, which has been in place since 2000.

Expanded estimates of commercial discards for red porgy from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017) are provided in **Figure S-2**.
The Commercial Logbook provides landings at the trip-level in pounds, but the proposed red porgy trip limits are in numbers of fish. Commercial Trip Interview Program (TIP, accessed Oct 2017) data was used to evaluate the potential impacts of the various proposed trip limit alternatives. The TIP data is not a comprehensive sample of the fish landed on a given trip, and thus cannot be directly used for determination of trip limit impacts. Annual mean landed weight from representative samples from commercial trips intercepted by the TIP were used to estimate the number of fish landed in Commercial Logbook reported trips. Data were stratified by state for 1995-2005, and Florida and Georgia data were pooled for 2006-2016 because Georgia TIP data were very limited (n=1) from 2006-2016. Florida and Georgia data were more highly correlated than Georgia and South Carolina data during the 1995-2005 period (83.6% vs. 80.9%). Mean weights (pounds whole weight) were determined from TIP data using measured weights when available in either round (whole) weight or gutted weight with head on, using a conversion factor of 1.04 for gutted to whole weight. When measured weights were unavailable, meristic conversions were used to convert measured length (total, standard, or fork length) to total length in mm, and then to convert total length to whole weight in pounds using conversion factors found in Table 1 of SEDAR-1 Update (2006). These conversions were not updated by SEDAR-1 Update (2012), the most recent red porgy stock assessment. Numbers caught on Commercial Logbook trips were computed by dividing the reported landings in pounds whole weight by the annual mean weight from the TIP data by state and by year (**Figure 17**). Estimated reductions from projected landings for various trip limits are shown in **Table 10**. Projected quota closure dates are shown in **Table 11**. Projected cumulative landings trends are shown in **Figure 18**.

Action 5. Modify the commercial trip limit for vermilion snapper

- **Alternative 1 (No Action)**. The commercial fishing year for vermilion snapper in the South Atlantic exclusive economic zone is from January 1 to December 31. The commercial annual catch limit is split into two quotas: 50% to the period January 1 through June 30 and 50% to the period July 1 through December 31. Any remaining quota from Season 1 transfers to Season 2. Any remaining quota from Season 2 is not carried forward. The commercial trip limit for vermilion snapper in the South Atlantic exclusive economic zone is 1,000 pounds gutted weight. For both seasons, when 75% of the vermilion snapper seasonal quota is met or is projected to be met, the trip limit is reduced to 500 pounds gutted weight.
- **Alternative 2**. Retain the commercial trip limit and trip limit reduction in Season 1 (January 1 through June 30). For Season 2 (July 1 through December 31), modify the commercial trip limit to 750 pounds gutted weight and remove the trip limit reduction. Any remaining quota from Season 1 transfers to Season 2. Any remaining quota from Season 2 is not carried forward.
- **Alternative 3**. Retain the commercial trip limit and trip limit reduction in Season 1 (January 1 through June 30). For Season 2 (July 1 through December 31), modify the commercial trip limit to 500 pounds gutted weight and remove the trip limit reduction. Any remaining quota from Season 1 transfers to Season 2. Any remaining quota from Season 2 is not carried forward.
- **Alternative 4.** Modify the commercial trip limits for both seasons (January 1 through June 30; July 1 through December 31) and remove the trip limit reductions. Any remaining quota from Season 1 transfers to Season 2. Any remaining quota from Season 2 is not carried forward.
    - **Sub-alternative 5a.** 1,000 pounds
    - **Sub-alternative 5b.** 850 pounds
    - **Sub-alternative 5c.** 700 pounds

Similar to blueline tilefish (see Action 1, above), commercial landings data were converted to daily catch rates within months for 1997-2016. There have been several recent quota closures for vermilion snapper (**Table 12**). Two projection models were fit to the data: (1) mean catch rates 2014-2016 (“Last 3”) and (2) a SARIMA model. For vermilion snapper, models with differencing on the monthly term predicted population collapses; as such, model selection was restricted to annual differencing models. The final selected model was a ARIMA(1,0,0)X(0,1,1)s with Adj. R^2=0.88 (**Figure 19**). Trip limit impacts were simulated by modifying and re-summarizing landings from commercial logbook trip records (SEFSC commercial logbook data, accessed April 2017). Total monthly landings 2006-2016 were compared between modified (750 and 500 lbs gw trip limits) and unmodified trip records. Monthly scalars were applied to projected landings data for the alternatives listed above. Monthly trip limit scalars on projected catches were determined using the last three fully open years (**Table 13**).

Daily catches were projected for Season 1 and Season 2 using projected monthly catch rates. Cumulative landings were tracked and trip limits were applied to scale monthly catch rates when 75% of the ACL was met. For Season 1, the ACL is anticipated to be met by Mar (95% CI: Mar-Apr) or Apr (95% CI: Feb-June) by the Last 3 and SARIMA models, respectively. Projected trip limit reduction dates and closure dates for Season 2 are provided in **Table 14**. Last 3 and SARIMA model projections were relatively consistent, indicating fairly high confidence in projected closure dates (**Figure 20**).

Expanded estimates of commercial discards for vermilion snapper from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017) are provided in **Figure S-5**.

Action 8. Remove the commercial minimum size limits for deep-water species

- **Alternative 1 (No Action)**. The commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper in the South Atlantic EEZ is 12 inches total length (TL).
- **Alternative 2**. Remove the 12-inch TL commercial minimum size limit for queen snapper, silk snapper, and blackfin snapper in South Atlantic federal waters.

The current commercial size limit of 12 inches TL for queen snapper, silk snapper, and blackfin snapper was established in Amendment 9 (1998). It was difficult to determine the effects of Alternative 2 due to the lack of commercial discard data available. The only discard data available for the years 2014-2016 was from the SEFSC Supplemental Discard Logbook Program. The discard logbook database (accessed May 2017) contains self-reported discard reports from a 20 percent sub-sample (by region and gear fished) of all commercial vessels with federal fishing permits. From 2014-2016, only two trips reported discards for silk snapper and no discards were reported for queen snapper and blackfin snapper (**Table 15**). None of the three species were reported as kept for bait. For the only trips with reported discards for any of the three species, five silk snapper were discarded alive due to the local or federal size limit forbidding it. Barotrauma likely results in high fishing mortality of discards due to the relatively deep depth of capture for these species. Expanding the observed discard rates to the fishery as a whole is non-informative due to low reported encounters in recent years (**Figure S-7**). Available data suggests minimal changes in discard or harvest rates would be expected under Alternative 2. The reliability of this analysis is dependent upon the accuracy of the underlying data and input assumptions.

Action 9. Reduce the commercial minimum size limit for gray triggerfish in the exclusive economic zone off east Florida

- **Alternative 1 (No Action)**. The commercial minimum size limit for gray triggerfish in the South Atlantic federal waters off the east coast of Florida is 14 inches fork length (FL). The commercial minimum size limit for gray triggerfish in the federal waters off Georgia, South Carolina, and North Carolina is 12 inches FL.
- **Alternative 2**. Decrease the commercial minimum size limit for gray triggerfish in the federal waters off the east coast of Florida to 12 inches FL.

NOTE: Consider an alternative that would increase the MSL from 12 to 14 inches off GA, SC and NC. The Gulf Council is considering increasing the MSL to 15 inches as Gulf gray trigger is undergoing overfishing.

The South Atlantic Fishery Management Council recently modified the gray triggerfish minimum size limit for the commercial sector in federal waters off the east coast of Florida in Amendment 29, effective July 1, 2015. Amendment 29 raised the minimum size limit in federal waters off the east coast of Florida from 12 inches total length (TL) to 14 inches FL. Amendment 29 also established a minimum size limit of 12 inches FL in the federal waters off Georgia, South Carolina, and North Carolina where there had been no minimum size limit previously. To evaluate the effects of lowering the current minimum size limit, commercial catch data collected by the Southeast Fisheries Science Center's (SEFSC) Trip Intercept Program (TIP) prior to the current rule were used to determine the proposed impact. Only gray triggerfish harvested from January 2014 through June 2015 by the commercial sector in federal waters off east Florida were used in the analyses.

TIP recorded 2,616 gray triggerfish for this area and time period after eliminating a small number of outliers (FL < 4 inches). All lengths were converted to inches FL using standard conversion factors and equations used in SEDAR 41 (2016). The size limit analysis estimated the percent increase in landings in federal waters off the east coast of Florida if the current 14-inch FL size limit was reduced during this time, thus the weight of each fish was required. When whole weight data was available it was used, and gutted weights were converted using the SEFSC conversion factor of 1.04. When weight data was unavailable, it was estimated from length using the gray triggerfish weight-length equations defined in SEDAR 41 (2016).

Figure 21 provides the commercial gray triggerfish landings length distribution in 1-inch increments from January 2014 to June 2015 from federal waters off the east coast of Florida. The majority of the gray triggerfish landed were above the current minimum size limit of 14 inches FL. Lowering the current size limit to 12 inches FL (Alternative 2) would result approximately 20% additional gray triggerfish available for harvest. This is consistent with recent analyses from Amendment 29 that reported between 11% and 26% of the mean monthly landings were less than 14 inches FL in the South Atlantic from 2007-2012. Alternative 2 would also likely reduce discards when the season was open, but may increase harvest rates, possibly shortening the commercial fishing seasons. Quota closures have been implemented for gray triggerfish every year since 2012.

The percent increases in landings in weight were calculated for minimum size limits (MSL) at 1-inch intervals between 12-14 inches FL as follows:

$$\left(\frac{(Current\ Catch + \ Additional\ Catch)}{Current\ Catch}\right) * 100$$

where:

Current Catch = catch in pounds with a MSL of 14-inch FL
Additional Catch = catch in pounds of fish that are less than the MSL of 14-inch FL and greater than or equal to the reduced MSL

Data were pooled for the time with the assumption that recent lengths will likely reflect future lengths harvested in the fishery for federal waters off the east coast of Florida. All of the weights used in the analysis are in pounds whole weight. Similar to the length distribution, lowering the size limit to 12 inches FL would likely increase the rate of fish harvested, thus increasing the landings in federal waters off the east coast of Florida and shortening the current commercial seasons (**Table 16**). It is likely the majority of the undersized fish currently being discarded are surviving since SEDAR 41 (2016) estimated a relatively low discard mortality of 12.5%.

In addition to predicting the change in landings for federal waters off the east coast of Florida, the season lengths were predicted using recent landings compared to the ACL. Currently there are two commercial fishing seasons for gray triggerfish (January 1 – June 30 and July 1 – December 31) specified with any unused portion of the quota from the January through June season added to the later season. Future landings were predicted from the most recent three-year average of monthly landings available not affected by a closure (**Table 17**). Monthly averages were converted into daily rates by dividing each month by the number of days in that month. The predicted changes in landings in federal water off Florida since June 2015 were modified using the predicted increase from **Table 16**. The predicted changes off Florida were applied using the proportion of landings from federal to state waters (99.3%) using the same TIP data. For months prior to June 2015 when Amendment 29 was established, the predicted changes from analyses in Amendment 29 were used to adjust monthly landings to reflect the size limits not only in federal water off Florida, but also in Georgia, South Carolina, and North Carolina where there had been no minimum size limit prior. Finally, monthly landings prior to June 2015 were also reduced using the predicted changes from Amendment 29 to reflect the current 1000-lb trip limit.

Table 18 and **Figure 22** provide the projected mean and 95% confidence limits for each projected quota closure date under the two alternatives in Action 10 using the cumulative projected landings. For season one (Jan-Jun), Alternative 2 is projected to shorten the fishing season by seven days to April 9 compared to April 16 under Alternative 1 (No Action). For season two (Jul-Dec), Alternative 2 is only projected to shorten the fishing season by four days to November 2 compared to November 6 under Alternative 1 (No Action). The broad confidence intervals for these predictions suggest some uncertainty and they should be interpreted with caution, but the projected reduction in days between alternatives is consistent with analyses from Amendment 29 which predicted a change of three to seven days. The reliability of this analysis is dependent upon the accuracy of the underlying data and input assumptions.

References

Box GE, Jenkins GM, Reinsel GC, Ljung GM. 2013. Time series analysis: forecasting and control. John Wiley & Sons.

Farmer NA, Froeschke JT. 2015. Forecasting for recreational fisheries management: What's the catch? NAJFM, 35(4):720-735.

SEDAR 41. 2016. SEDAR 41 – South Atlantic Gray Triggerfish Assessment Report. SEDAR, North Charleston, SC. 428 pp. http://sedarweb.org/sedar-41.

SEDAR 49. 2016. SEDAR 49 – Gulf of Mexico Data-limited Species. SEDAR, North Charleston, SC. 618 pp. http://sedarweb.org/sedar-49.

Table 1. Blueline tilefish recent landings and quota closures.

Fishing Year	Current Landings	ACL	%ACL	Closure Date
2017	86,507	87,521	98.84	7/18/17; Reopened 10/24/17-11/1/17
2016	97,798	87,521	111.74	6/1/16; reopened 7/13/16, closed 8/30/16
2015	78,303	17,841	438.89	4/7/2015
2014	156,371	112,207	139.36	6/23/2014

Source: SERO ACL Monitoring Webpage [accessed 2/6/18].

Table 2. Projected blueline tilefish commercial trip limit scalars, by month, based on most recent three years without a quota closure.

Month	500-lb	400-lb	300-lb	250-lb	200-lb	150-lb	100-lb	Years
1	130%	116%	100%	90%	79%	66%	51%	2013-2015
2	125%	113%	100%	92%	82%	70%	56%	2013-2015
3	138%	120%	100%	89%	76%	63%	48%	2012*-2014
4	137%	120%	100%	89%	78%	65%	51%	2012*-2014
5	139%	120%	100%	89%	78%	65%	52%	2012-2014
6	139%	120%	100%	90%	79%	67%	53%	2012*-2014
7	146%	123%	100%	88%	75%	62%	47%	2011-2013
8	146%	124%	100%	87%	74%	60%	45%	2011-2013
9	151%	126%	100%	87%	73%	58%	42%	2010, 2011, 2013
10	149%	125%	100%	87%	73%	58%	43%	2010, 2011*, 2013*
11	149%	125%	100%	87%	73%	58%	43%	2010*, 2011*, 2013*
12	148%	125%	100%	87%	73%	59%	44%	2010*, 2011*, 2013*

*Some months aggregated to achieve sample size of n>30.

Table 3. Projected mean and 95% lower and upper (L95, U95) confidence limits quota closure dates for blueline tilefish under different alternatives proposed for Action 1. Blanks denote no projected quota closure.

		Mean 2014-2016			SARIMA		
Alternative	**Season**	**L95**	**MEAN**	**U95**	**L95**	**MEAN**	**U95**
Alt 1	Jan-Dec		7-Jul	22-Apr		13-Jul	2-May
Alt 2a	Jan-June		12-Jun	28-Mar		25-Jun	7-Apr
	July-Dec		11-Aug	27-Jul		9-Aug	30-Jul
Alt 2b	Jan-June		14-May	20-Mar		25-May	19-Mar
	July-Dec		11-Aug	27-Jul		9-Aug	30-Jul
Alt 3a	Jan-Dec		30-Jul	16-Jun		27-Jul	14-Jun
Alt 3b	Jan-Dec		24-Jul	4-Jun		23-Jul	30-May
OLD Alt 3c*	Jan-Dec		20-Jul	9-Jun		18-Jul	5-Jun
NEW Alt 3c	Jan-Dec		8-Aug	6-Jul		8-Aug	8-Jul

considered but rejected

Table 4. Snowy grouper recent landings and quota closures.

Year	Landings	ACL	Units		%ACL	Closure
2017	136,561	135,380	gw		100.87	6/22/17
2016	151,999	125,760	gw		120.86	6/14/2016
2015	131,063	115451	gw		113.52	9/22/2015
2014	94,491	82900	gw		113.98	7/25/2014
2013	79,695	82900	gw		96.13	8/10/2013
2012	89,413	82900	gw		107.53	12/19/2012
2011	37,461	82900	gw		45.19	
2010	86,692	82900	gw		104.57	
2009	75,614	82900	gw		91.21	
2008	72,971	84000	gw		86.87	
2007	112,385	118000	gw		95.24	
2006	214,064	151000	gw		141.76	10/23/2006
2005	206,636	344508	gw		59.98	
2004	220,958	344508	gw		64.14	

Source: SERO ACL Monitoring Webpage [accessed 2/6/18].

Table 5. Projected mean and 95% lower and upper (L95, U95) confidence limits quota closure dates for snowy grouper under different alternatives proposed for Action 2. Blanks denote no projected quota closure.

Alternative	Season	L95	MEAN	U95	L95	MEAN	U95
Alt 1	Jan-Dec		21-Sep	1-Jul	7-Nov	19-Mar	14-Feb
Alt 2	Jan-June		21-Jun	8-May		18-Feb	27-Jan
	July-Dec		26-Sep	26-Sep	7-Nov	28-Jul	15-Jul
Alt 3	Jan-June			21-May		25-Feb	31-Jan
	July-Dec		21-Sep	14-Sep	7-Nov	21-Jul	11-Jul

Table 6. Greater amberjack recent landings and quota closures.

Fishing Year	Total Landings	ACL	Units	ACL	Closure Date
March 1, 2017 – February 28, 2018	796,206	769,388	gw	103.5	10/18/17; April 1-30 SEASONAL CLOSURE
March 1, 2016 – February 28, 2017	748,950	769,388	gw	97.34	10/4/2016
March 1, 2015 - Feb 28, 2016	709,130	769,388	gw	92.17	1/21/2016
May 1, 2014 - Feb 28, 2015	754,429	769,388	gw	98.06	
May 1, 2013 - April 30, 2014	882,127	800,163	ww	110.24	
May 1, 2012 - April 30, 2013	972,308	800,163	ww	121.51	
May 1, 2011 - April 30, 2012	1,032,080	1,169,931	gw	88.22	
May 1, 2010 - April 30, 2011	857,838	1,169,931	gw	73.32	
May 1, 2009 - April 30, 2010	837,079	1,169,931	gw	71.55	
May 1, 2008 - April 30, 2009	648,250	1,169,931	gw	55.41	
May 1, 2007 - April 30, 2008	542,438	1,169,931	gw	46.36	

Source: SERO ACL Monitoring Webpage [accessed 2/6/18].

Table 7. Projected greater amberjack commercial trip limit scalars, by month, based on most recent three years without a quota closure.

Month	1200-lb	1000-lb	750-lb	600-lb	500-lb	350-lb	200-lb	Years
1	98.4	94.4	86.3	78.5	72.3	59.8	42.1	2013-2015
2	97.1	92.8	83.7	75.8	69.1	56.2	38.6	2013-2015
3	98.3	91.3	77.7	67.4	59.6	46.0	30.0	2014-2016
4	97.7	90.9	77.9	67.9	60.2	46.8	30.7	(2014-2016)*
5	97.4	90.6	78.0	68.2	60.6	47.3	31.2	2014-2016
6	99.1	94.2	84.6	76.3	69.5	57.2	40.4	2014-2016
7	99.2	95.3	87.1	79.6	73.0	60.7	44.0	2014-2016
8	99.3	95.1	84.6	75.8	68.7	55.8	39.0	2014-2016
9	98.8	93.9	84.7	76.8	70.1	57.4	40.3	2014-2016
10	98.9	94.3	83.9	75.0	67.8	54.7	37.3	2013-2015
11	95.0	89.1	77.2	67.6	60.4	47.5	31.7	2013-2015
12	98.1	92.1	79.0	68.3	60.2	46.6	30.8	2013-2015

*Some months aggregated to achieve sample size of n>30.

Table 8. Projected greater amberjack commercial closure dates under proposed alternatives. Note blank denotes no closure.

		MEAN 2014-2016			SARIMA		
Alternative	**Season**	**L95**	**MEAN**	**U95**	**L95**	**MEAN**	**U95**
Alt 1	Mar-Feb		8-Nov	30-Sep		27-Jul	21-May
Alt 2a	Mar-Aug	8-Jul	10-Jun	28-May		17-May	28-Mar
	Sept-Feb					16-Dec	4-Oct
Alt 2b	Mar-Aug	27-Jul	21-Jun	4-Jun		21-May	31-Mar
	Sept-Feb					28-Dec	6-Oct
Alt 2c	Mar-Aug	27-Jul	21-Jun	4-Jun		21-May	31-Mar
	Sept-Feb					16-Dec	4-Oct
Alt 2d	Mar-Aug	10-Aug	5-Jul	16-Jun		27-May	3-May
	Sept-Feb					30-Dec	7-Oct
Alt 3a	Mar-Aug	8-Jul	10-Jun	28-May		17-May	28-Mar
	Sept-Feb			13-Jan		22-Nov	27-Sep
Alt 3b	Mar-Aug	27-Jul	21-Jun	4-Jun		21-May	31-Mar
	Sept-Feb					16-Dec	3-Oct
Alt 3c	Mar-Aug	27-Jul	21-Jun	4-Jun		21-May	31-Mar
	Sept-Feb			12-Jan		21-Nov	27-Sep
Alt 4a	Mar-Feb		26-Dec	14-Oct		12-Aug	26-May
Alt 4b	Mar-Feb		27-Feb	5-Nov		2-Sep	1-Jun

Table 9. Red porgy recent landings and quota closures.

Year	Landings	ACL	Units	%ACL	Closure
2017	114,874	164,000	ww	70.05	
2016	120,104	164,000	ww	73.23	
2015	146,056	164,000	ww	89.06	
2014	155,743	154,500	ww	100.68	
2013	163,337	153,000	gw	106.76	12/02/13
2012	155,743	190,050	gw	81.95	
2011	195,215	190,050	gw	102.72	
2010	152,743	190,050	gw	80.37	
2009	158,219	190,050	gw	83.25	
2008	165,365	127,000	gw	130.21	
2007	138,737	127,000	gw	109.24	
2006	80,619	127,000	gw	63.48	
2005	46,821	None	gw		
2004	47,814	None	gw		

Source: SERO ACL Monitoring Webpage [accessed 2/6/18].

NEW Table 10. Mean weight of landed red porgy intercepted on commercial trips by the Trip Interview Program. Note FL and GA 2006-2016 have been pooled due to low sample sizes off GA.

Year	FL	GA	SC	NC
1995	1.93	1.49	1.60	1.84
1996	1.92	1.42	1.60	1.76
1997	1.89	1.49	1.65	1.77
1998	1.86	1.34	1.56	1.59
1999	1.82	1.83	1.74	2.06
2000	1.97	2.01	2.25	1.91
2001	2.21	1.88	2.19	2.03
2002	1.95	2.14	2.18	2.24
2003	2.26	2.21	2.19	2.09
2004	2.67	2.49	2.12	2.14
2005	2.57	2.76	2.13	2.17
2006	2.38		2.14	1.68
2007	2.70		2.07	1.82
2008	2.66		2.20	1.78
2009	3.45		2.09	1.69
2010	5.05		2.15	1.86
2011	5.26		2.31	1.82
2012	4.69		2.33	1.72
2013	4.24		2.13	1.66
2014	2.42		2.06	1.85
2015	2.10		2.24	1.76
2016	2.07		2.16	1.91

Table 11. Projected mean and 95% lower and upper (L95, U95) confidence limits for quota closure dates for red porgy under different alternatives proposed for Action 4. Blank cells denote no anticipated quota closure.

		MEAN 2014-2016			SARIMA		
Alternative	**Season**	L95	**MEAN**	U95	L95	**MEAN**	U95
Alt 1	Jan-Dec			11-Nov			23-Jul
Alt 2a	Jan-Apr			29-Apr			8-Mar
	May-Dec		**6-Nov**	25-Aug			2-Jul
Alt 2b	Jan-Apr			3-Apr			20-Feb
	May-Dec		**2-Oct**	25-Aug			2-Jul
Alt 2c	Jan-Apr		**22-Apr**	20-Mar			13-Feb
	May-Dec		**25-Sep**	25-Aug			2-Jul
Alt 3a	Jan-Apr						24-Apr
	May-Dec		**6-Nov**	24-Aug			15-Jun
Alt 3b	Jan-Apr						28-Mar
	May-Dec		**2-Oct**	9-Aug			15-Jun
Alt 3c	Jan-Apr						13-Mar
	May-Dec		**19-Sep**	29-Jul			15-Jun
Alt 4	Jan-Dec		**24-Aug**	6-Jul			18-Apr

Table 12. Vermilion snapper recent landings and quota closures.

Fishing Year	Landings	ACL	Units	ACL	Trip Limit	Closure
January 1 -June 30, 2017	410,786	431,460	ww	95.21	3/22/2017	5/17/17
July 1 - Dec 31, 2017	465,905	431,460		103.05	10/2/17	10/17/17
January 1 - June 30, 2016	393,911	431,460		91.3	3/2/2016	3/29/2016
July 1 - Dec 31, 2016	393,506	432,305		91.0	8/28/2016	10/11/16; reopened 12/14-12/15/16
Jan 1 - June 30, 2015	431,760	438,260		98.5	3/2/2015	4/15/2015
July 1 - Dec 31, 2015	452,519	438,260		103.3	9/10/2015	9/22/2015
Jan 1 - June 30, 2014	463,881	446,080		104.0	3/11/2014	4/19/2014
July 1 - Dec 31, 2014	461,061	446,080		103.4	8/23/2014	9/12/2014
Jan 1 - June 30, 2013	312,150	466,480		66.9		2/13/2013
July 1 - Dec 31, 2013	665,613	613,278		108.5		12/2/2013
Jan 1 - June 30, 2012	395,733	315,523	gw	125.4		2/29/2012
July 1 - Dec 31, 2012	499,980	302,523		165.3		9/28/2012
Jan 1 - June 30, 2011	331,418	315,523		105.0		3/10/11; Re-opened 5/1/11-5/8/11
July 1 - Dec 31, 2011	585,742	302,523		193.6		9/30/2011
Jan 1 - June 30, 2010	356,823	315,523		113.1		3/19/2010
July 1 - Dec 31, 2010	520,067	302,523		171.9		10/6/2010
Jan 1 - June 30, 2009	421,831	315,523		133.7		
July 1 - Dec 31, 2009	406,166	302,523		134.3		9/18/2009

Source: SERO ACL Monitoring Webpage [accessed 2/6/18].

Table 13. Projected vermilion snapper commercial trip limit scalars, by month, based on most recent three years without a quota closure.

Month	500	700	750	850	1000	Years
1	60%	78%	83%	90%	100%	2014-2016
2	62%	80%	84%	91%	100%	2014-2016
3	71%	85%	88%	93%	100%	2007-2009
4	70%	85%	88%	93%	100%	2007-2009
5	74%	87%	90%	94%	100%	2007-2009
6	76%	89%	91%	95%	100%	2007-2009
7	64%	82%	86%	92%	100%	2014-2016
8	63%	80%	84%	91%	100%	2012-2013, 2015
9	64%	81%	85%	92%	100%	2008, 2010, 2013
10	69%	84%	87%	93%	100%	2006-2008
11	68%	84%	87%	93%	100%	2006-2008
12	72%	86%	89%	94%	100%	2006-2008

Table 14. Projected mean and 95% lower and upper (L95, U95) confidence limits trip limit reduction and quota closure dates for vermilion snapper under different alternatives proposed for Action 5. Note, Alternatives 2-3 do not have trip limit reductions in Season 2, and Alternative 4 does not have trip limit reductions for either Season.

	TRIP LIMIT REDUCED					
Season 1	**Last 3 Years**			**SARIMA**		
Alt	L95_Last3	**Last3**	U95_Last3	L95_SARIMA	**SARIMA**	U95_SARIMA
1	28-Mar	**4-Mar**	20-Feb	27-May	**27-Feb**	6-Feb
2	28-Mar	**4-Mar**	20-Feb	27-May	**27-Feb**	6-Feb
3	28-Mar	**4-Mar**	20-Feb	27-May	**27-Feb**	6-Feb
Alt	**FISHERY CLOSED**					
1	27-Apr	**31-Mar**	14-Mar		**29-Apr**	26-Feb
2	27-Apr	**31-Mar**	14-Mar		**29-Apr**	26-Feb
3	27-Apr	**31-Mar**	14-Mar		**29-Apr**	26-Feb
4a	19-Apr	**24-Mar**	7-Mar	23-Jun	**14-Apr**	19-Feb
4b	26-Apr	**31-Mar**	13-Mar		**27-Apr**	24-Feb
4c	5-May	**7-Apr**	21-Mar		**6-May**	7-Mar
	TRIP LIMIT REDUCED					
Season 2	**Last 3 Years**			**SARIMA**		
Alt	L95_Last3	**Last3**	U95_Last3	L95_SARIMA	**SARIMA**	U95_SARIMA
1	18-Sep	**25-Aug**	13-Aug	4-Oct	**22-Aug**	4-Aug
Alt	**FISHERY CLOSED**					
1	25-Oct	**17-Sep**	31-Aug		**16-Sep**	23-Aug
2	1-Nov	**20-Sep**	1-Sep		**19-Sep**	25-Aug
3	18-Dec	**14-Oct**	19-Sep		**12-Oct**	11-Sep
4a	13-Oct	**9-Sep**	24-Aug	14-Nov	**7-Sep**	16-Aug
4b	23-Oct	**14-Sep**	28-Aug	28-Dec	**13-Sep**	20-Aug
4c	8-Nov	**23-Sep**	4-Sep		**22-Sep**	27-Aug

Table 15. The number of self-reported discards reported to the coastal logbook program from 2014-2016 for the South Atlantic for queen, silk, and blackfin snapper.

Species	Number Discarded	Discard Condition	Discard Reason
Queen Snapper	0	———	———
Silk Snapper	5	All Alive	Size Limit
Blackfin Snapper	0	———	———

Table 16. The estimated percent increase in landings of commercial gray triggerfish landings from federal waters off the east coast of Florida at 1-inch intervals between 12-14 inches FL. The increases were generated with TIP data from January 2014 to June 2015 from a sample of 2,616 fish.

Minimum Size Limit (Inches FL)	Percent Increase in Landings
12	17.9%
13	11.4%
14	0.0%

Table 17. The most recent three years of data without a quota closure, by month, used to predict future South Atlantic gray triggerfish landings.

Month	**Years Used**
January	2014-2016
February	2014-2016
March	2014-2016
April	2013-2015
May	2011-2013
June	2011-2013
July	2012,2015,2016
August	2012,2015,2016
September	2010,2011,2016
October	2010,2011,2016
November	2010,2011,2016
December	2009-2011

Table 18. Projected mean and 95% lower and upper (L95, U95) confidence limits for the quota closure dates projected for gray triggerfish under each alternative proposed in Action 10 by season. Note when no closure was projected the cumulative pounds projected is given.

Alternative	Season	ACL (lbs ww)	L95	MEAN	U95
1	Jan-Jun	156,162	24-Jun	**16-Apr**	26-Mar
1	Jul-Dec	156,162	No Closure (121,040 lbs ww)	**6-Nov**	4-Oct
2	Jan-Jun	156,162	7-Jun	**9-Apr**	20-Mar
2	Jul-Dec	156,162	No Closure (126,510 lbs ww)	**2-Nov**	30-Sep

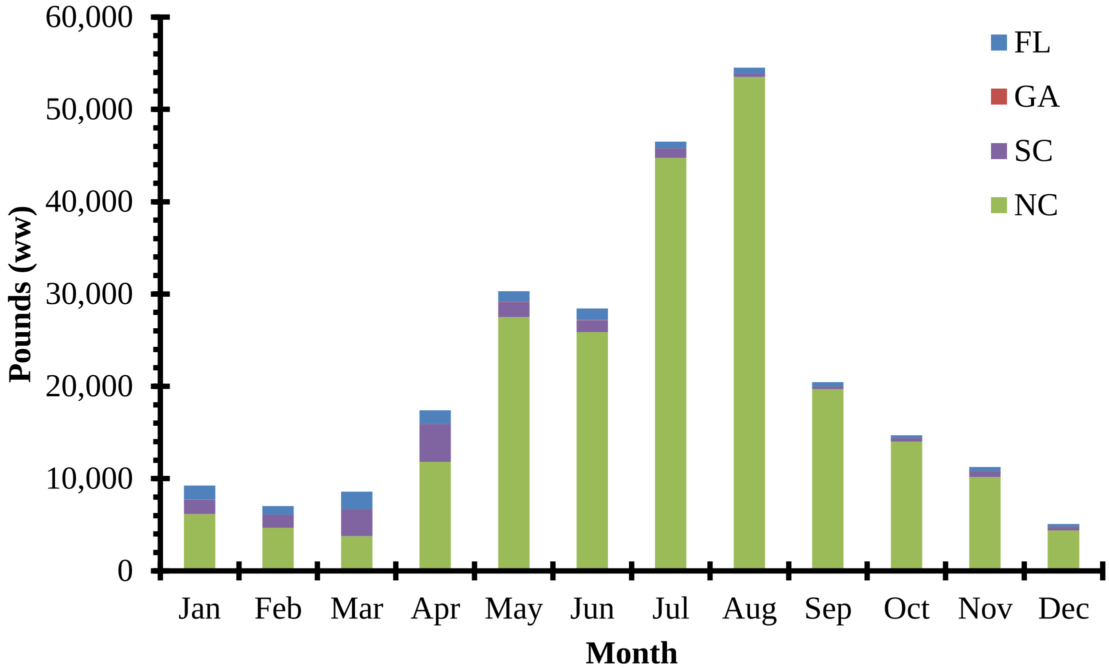

Figure 1. The average monthly South Atlantic blueline tilefish landings by state from 2004-2013 in pounds whole weight. The years 2014-2016 were excluded due to closures. Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

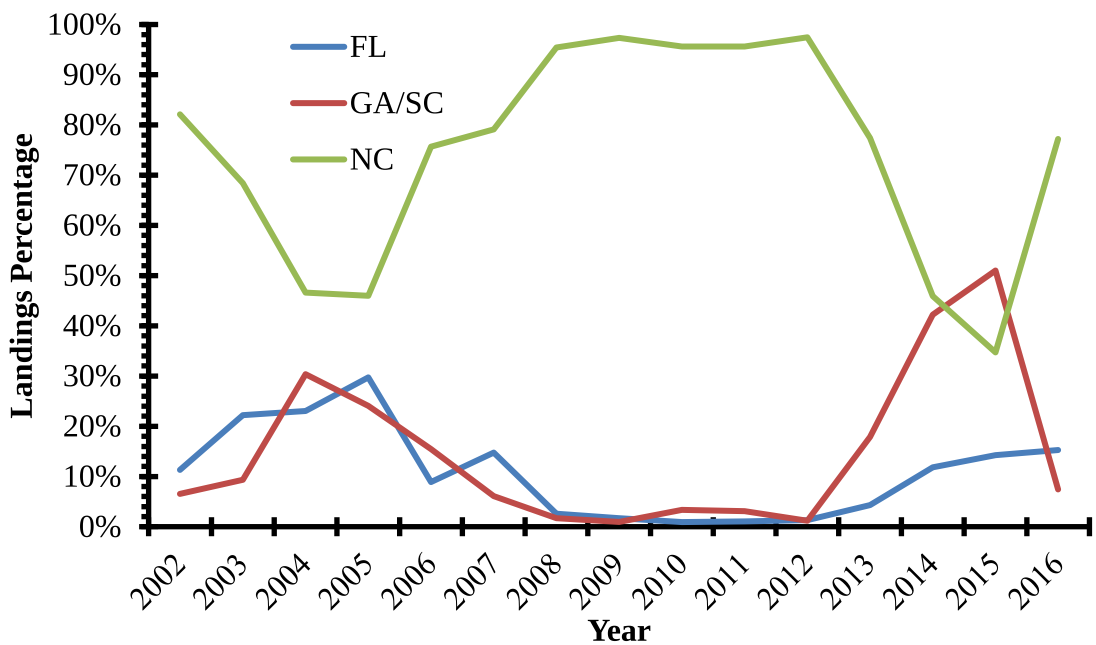

Figure 2. The percentage of annual South Atlantic blueline tilefish landings by state from 2002-2016. Georgia and South Carolina were combined due to confidentiality concerns. Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

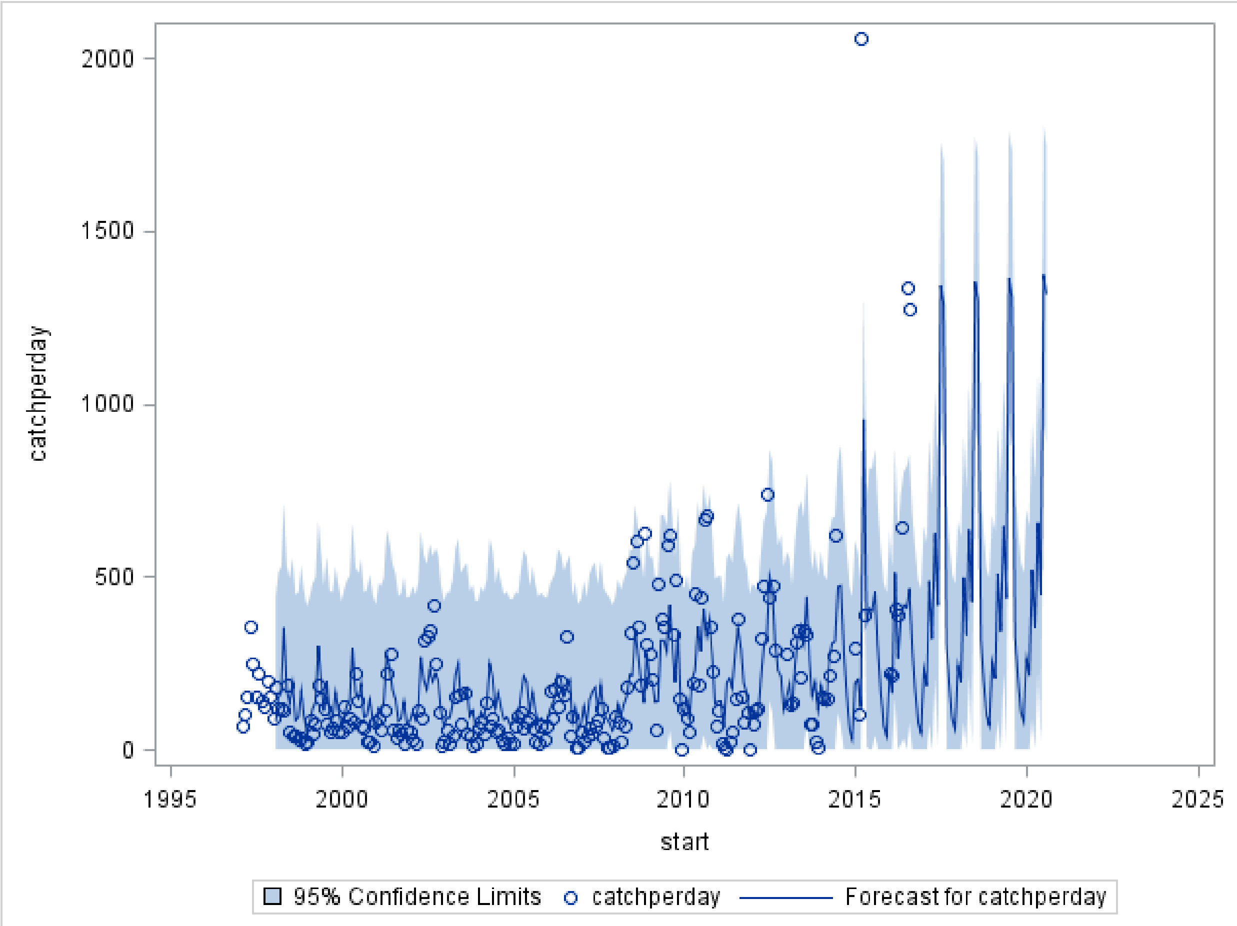

Figure 3. Final SARIMA model fit for blueline tilefish monthly commercial landings (lbs ww) per open day.

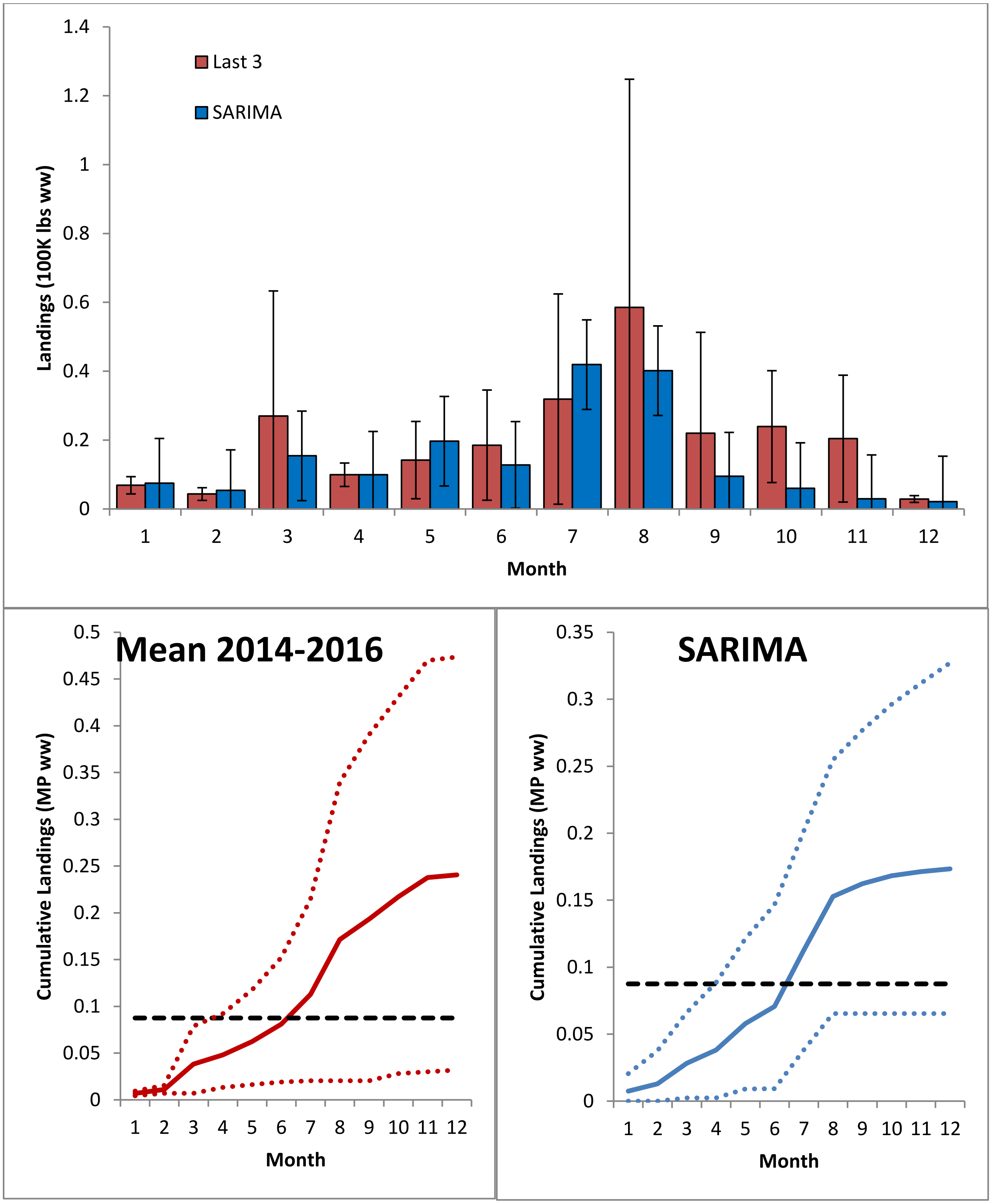

Figure 4. Blueline tilefish projected commercial landings (MP: million pounds, whole weight) by month (top) and mean (solid line) and 95% confidence limits (dotted lines) estimates for cumulative landings relative to ACL (bottom) for two projection models: Mean of last 3 years (2014-2016) and SARIMA.

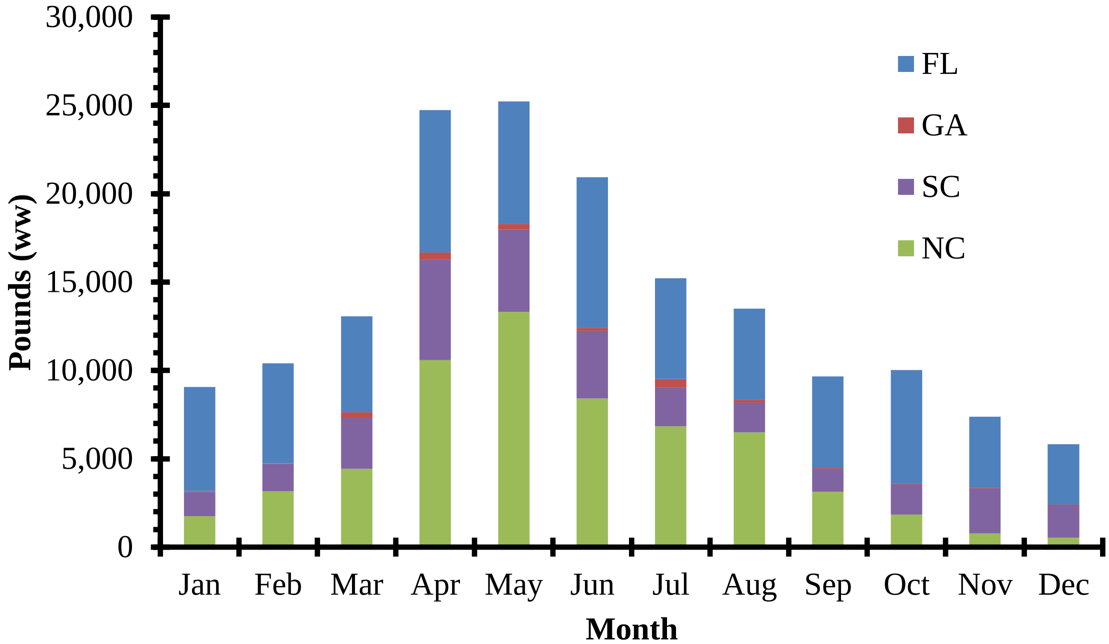

Figure 5. The average monthly South Atlantic snowy grouper landings by state from 2002-2005 and 2007-2011 in pounds whole weight. The years 2006 and 2012-2016 were excluded due to closures. Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

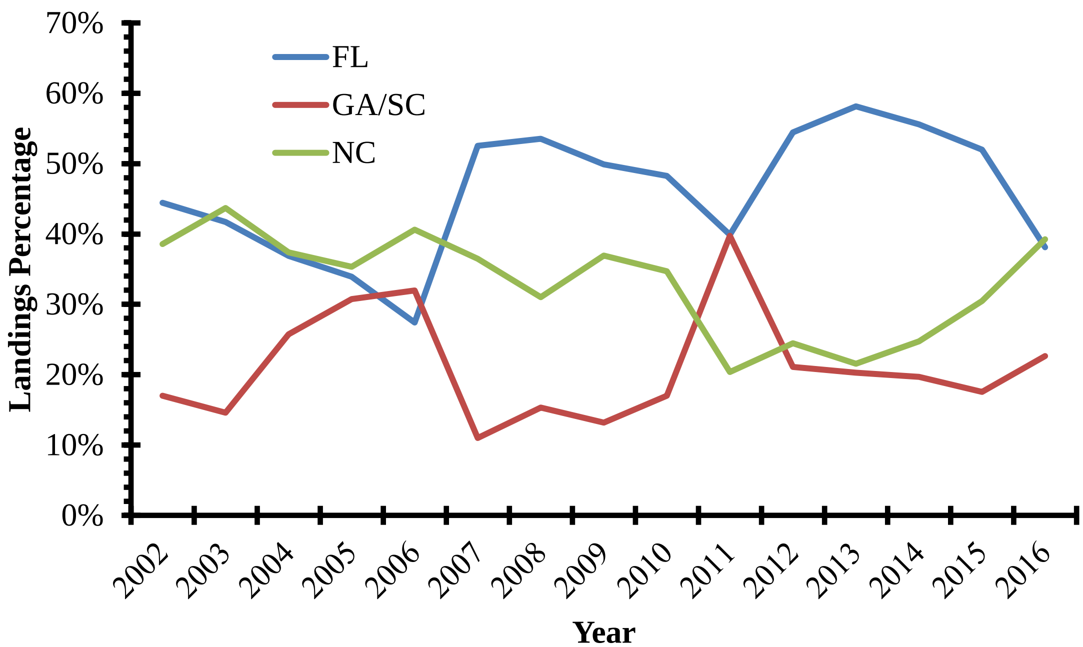

Figure 6. The percentage of annual South Atlantic snowy grouper landings by state from 2002-2016. Georgia and South Carolina were combined due to confidentiality concerns. Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

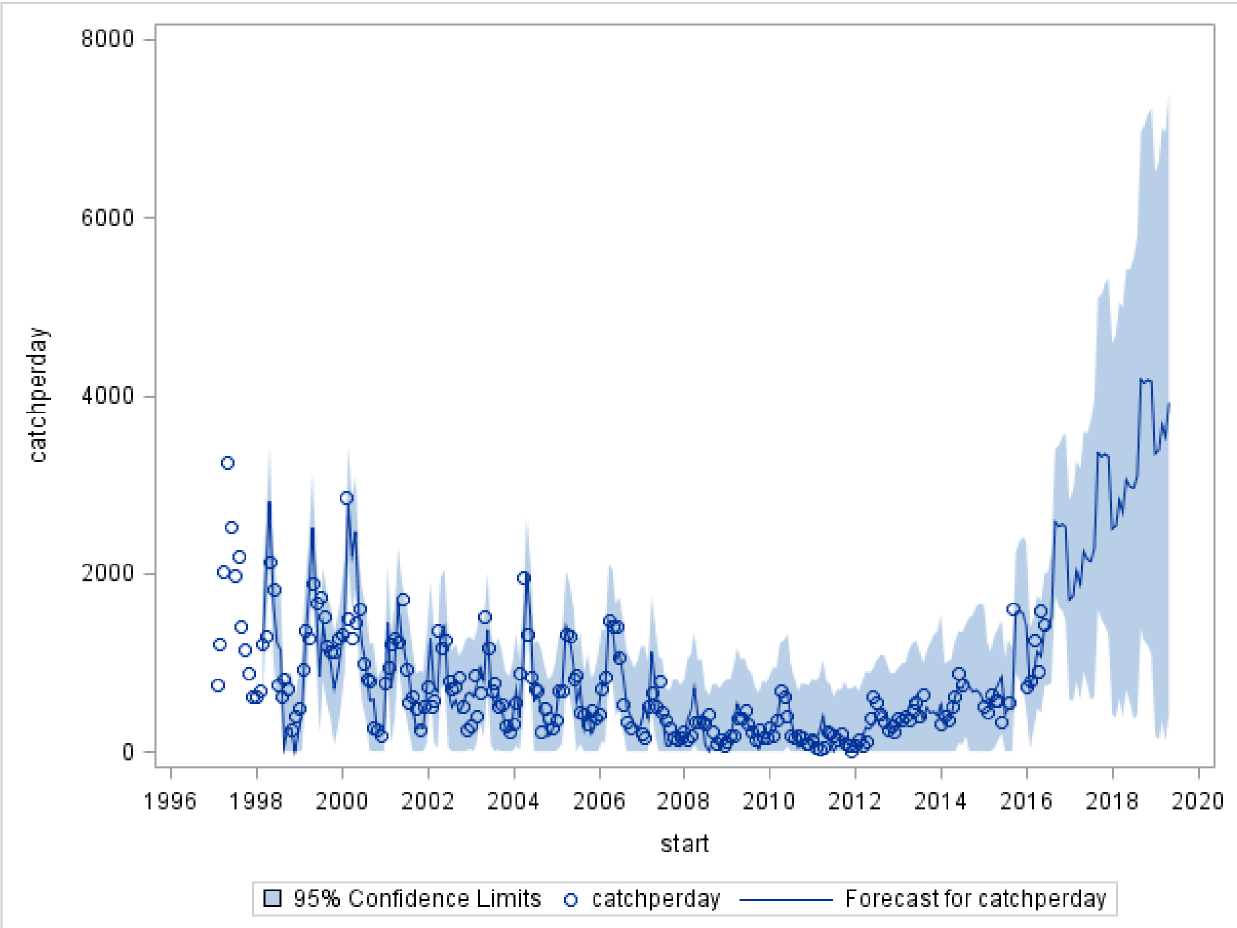

Figure 7. Final SARIMA model fit for snowy grouper monthly commercial landings (lbs ww) per open day.

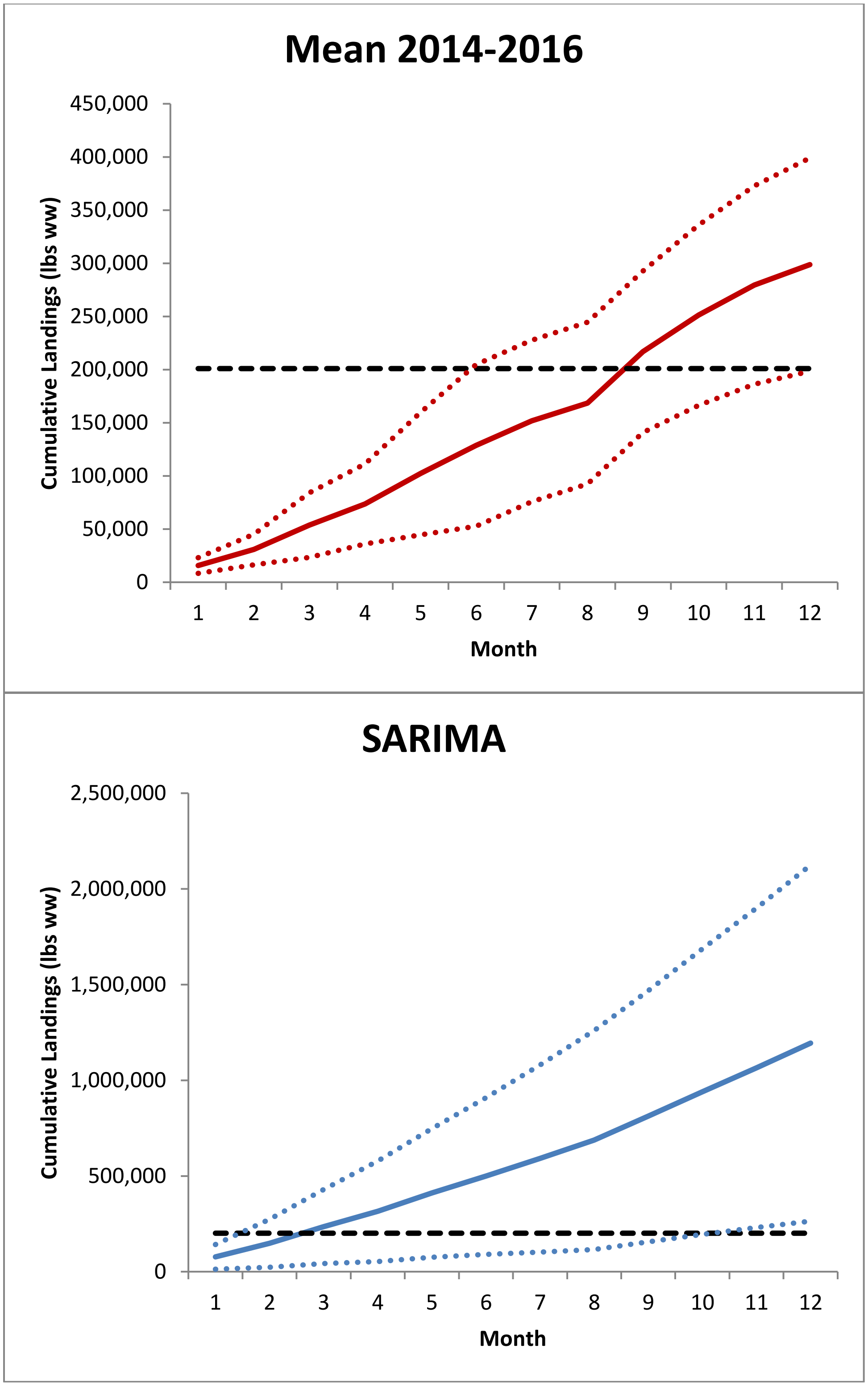

Figure 8. Mean (solid line) and 95% confidence limits (dotted lines) for Snowy grouper projected cumulative landings relative to ACL under two projection models: Mean of last 3 years (2014-2016) and SARIMA.

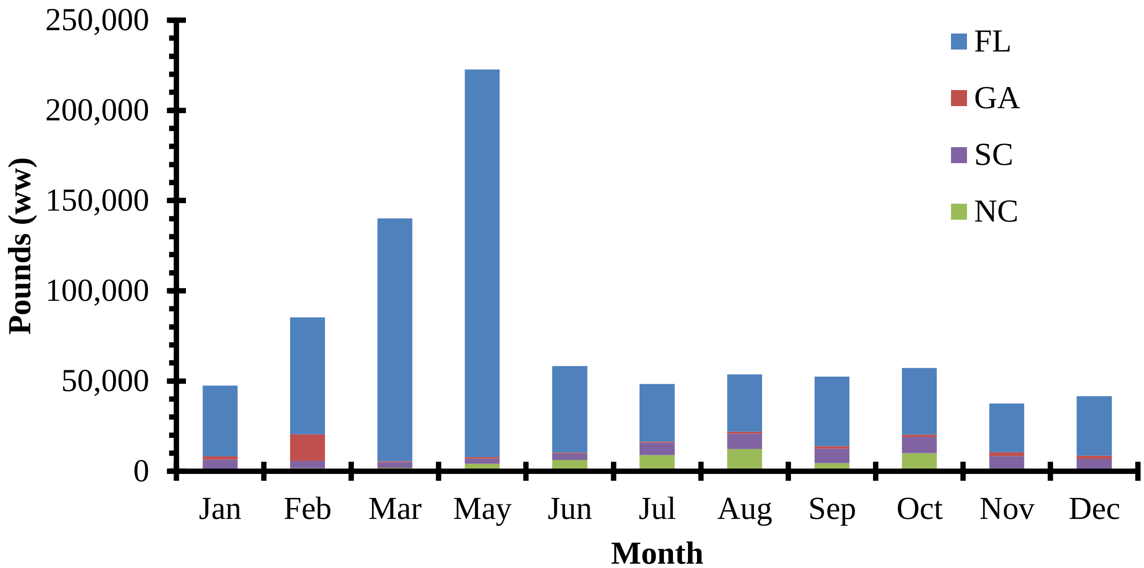

Figure 9. The average monthly South Atlantic greater amberjack landings by state from 2005-2015 in pounds whole weight. Data from the month of April was not available due to the seasonal closure in place since 1999. The year 2016 was excluded due to a closure. Source: Southeast Fisheries Science Center commercial (10/5/2017) ACL dataset.

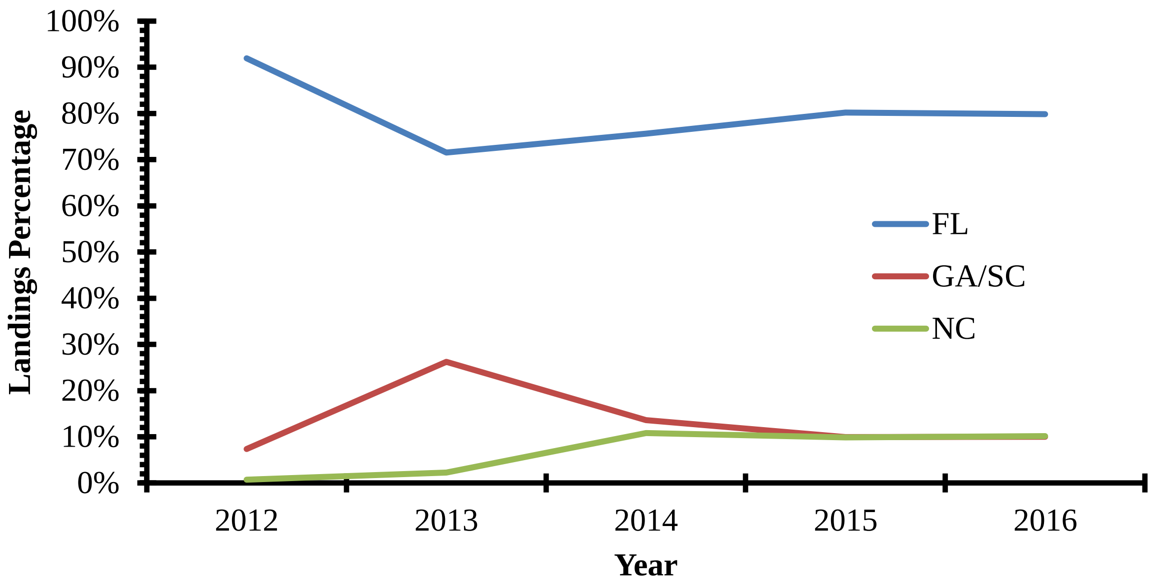

Figure 10. The percentage of annual South Atlantic greater amberjack landings by state from 2012-2016. Georgia and South Carolina were combined due to confidentiality concerns. North Carolina's seafood dealers began using a species-specific code for greater amberjack in 2011, but it was not until 2015 that unclassified amberjacks was completely removed as an option. Source: Southeast Fisheries Science Center commercial (10/5/2017) ACL dataset.

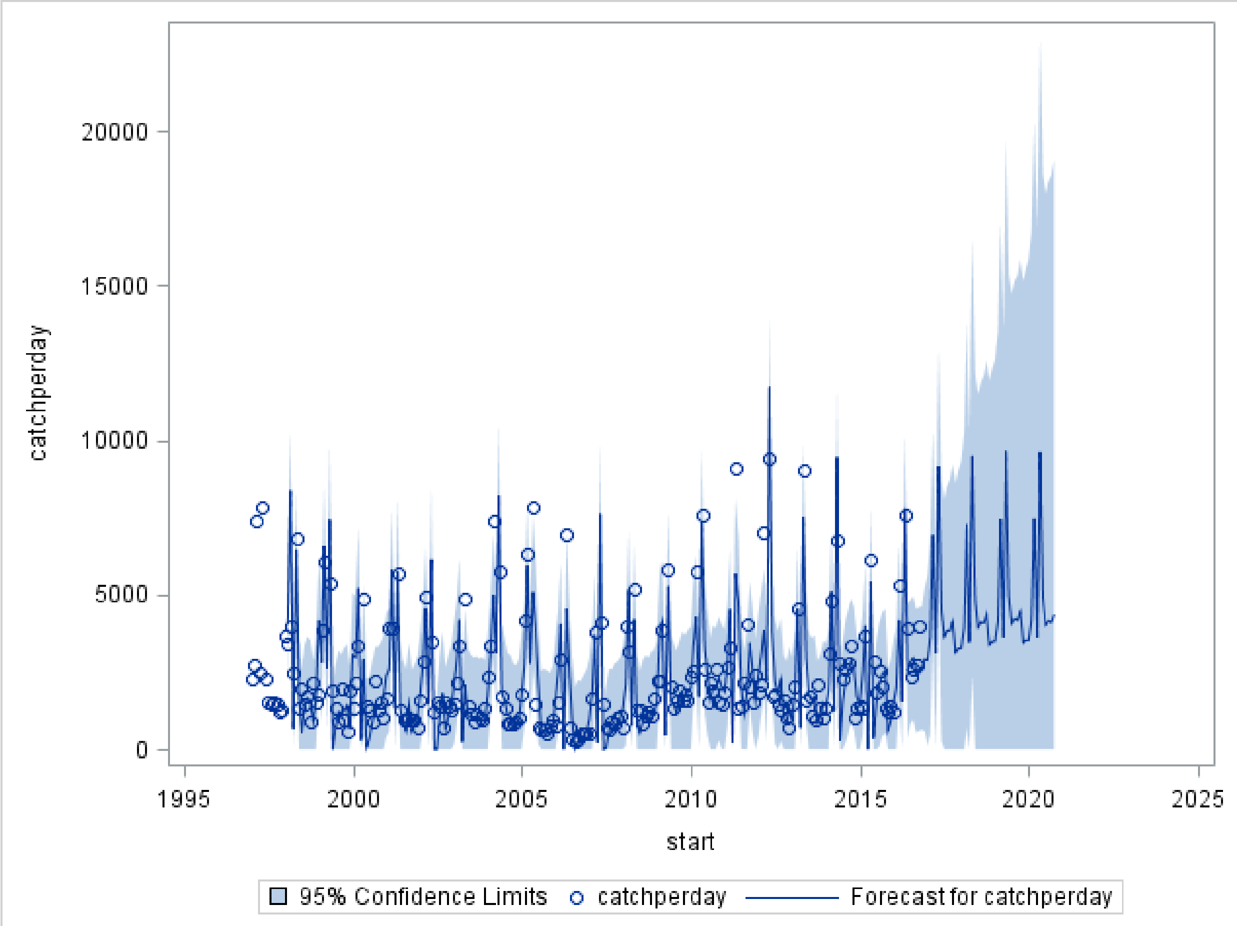

Figure 11. Final SARIMA model fit for greater amberjack monthly commercial landings (lbs ww) per open day.

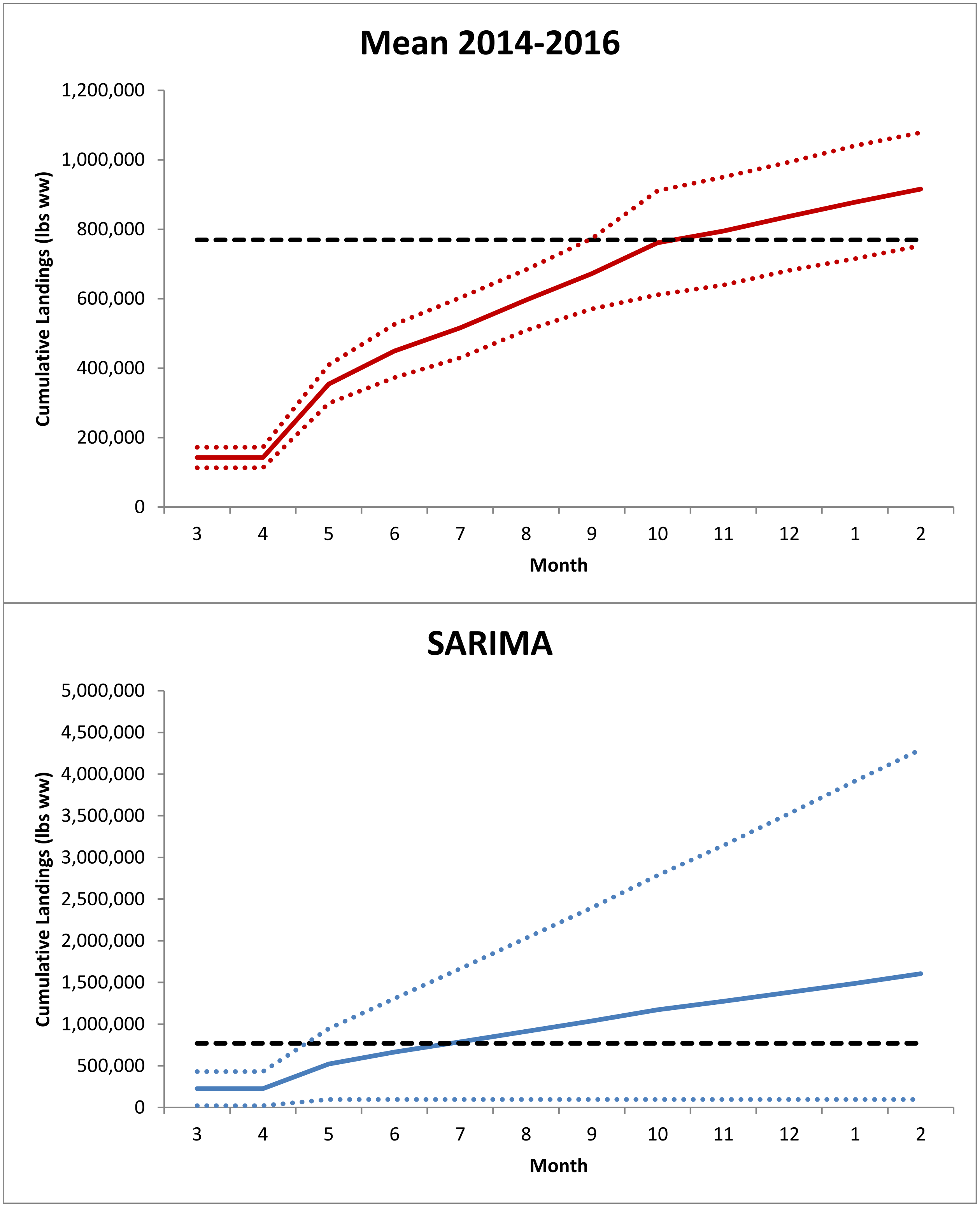

Figure 12. Mean (solid line) and 95% confidence limits (dotted lines) for Greater amberjack projected cumulative landings relative to ACL under two projection models: Mean of last 3 years (2014-2016) and SARIMA.

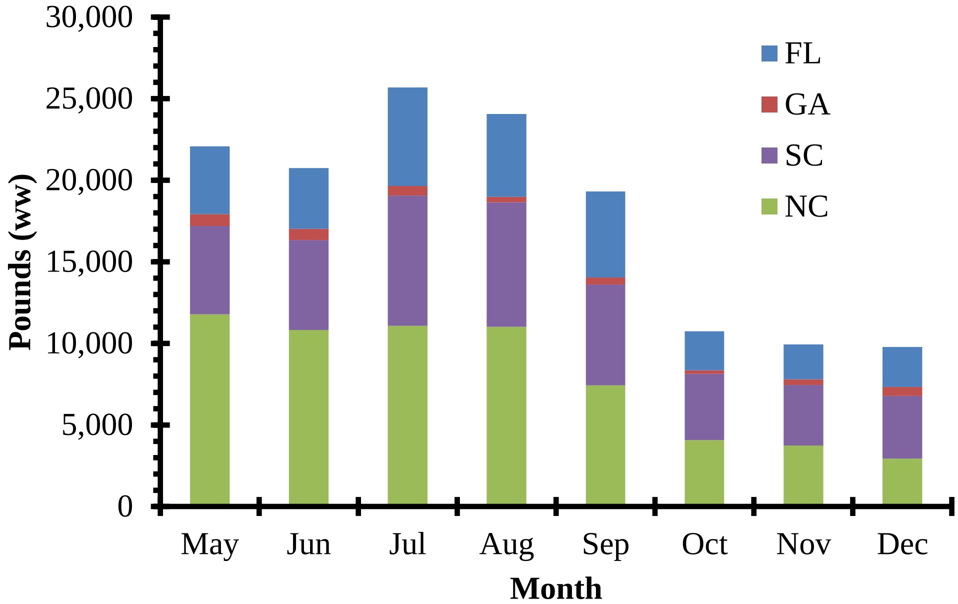

Figure 13. The average monthly South Atlantic red porgy landings by state from 2005-2012 and 2014-2016 in pounds whole weight. The year 2013 was excluded due to a closure. Data from the months of January to April was not available due to the seasonal closure in place since 2000. Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

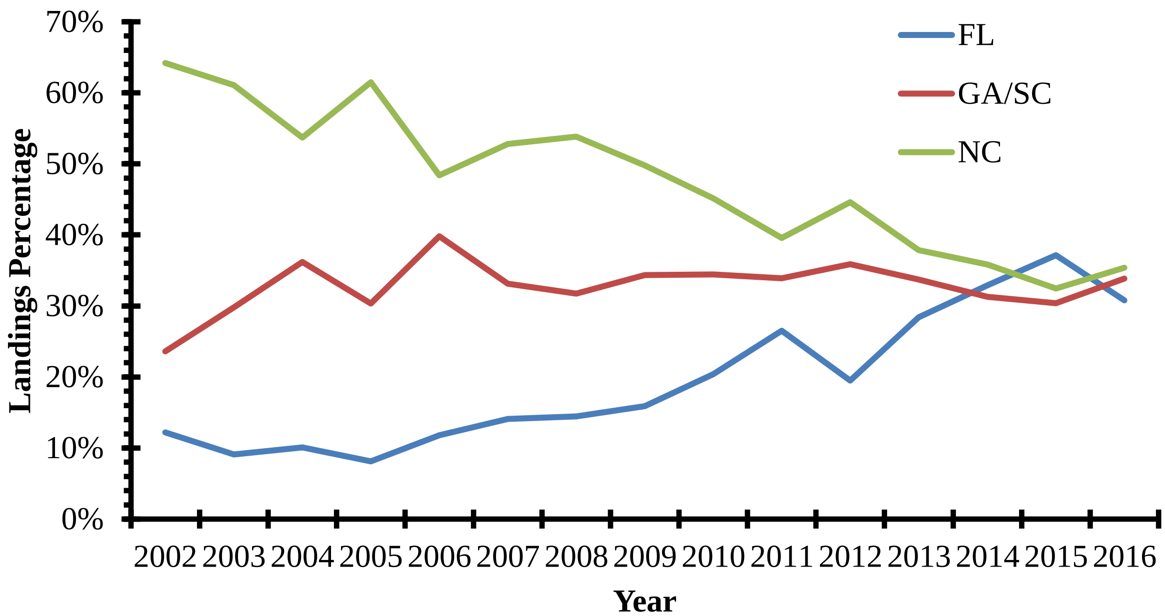

Figure 14. The percentage of annual South Atlantic red porgy landings by state from 2002-2016. Georgia and South Carolina were combined due to confidentiality concerns. Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

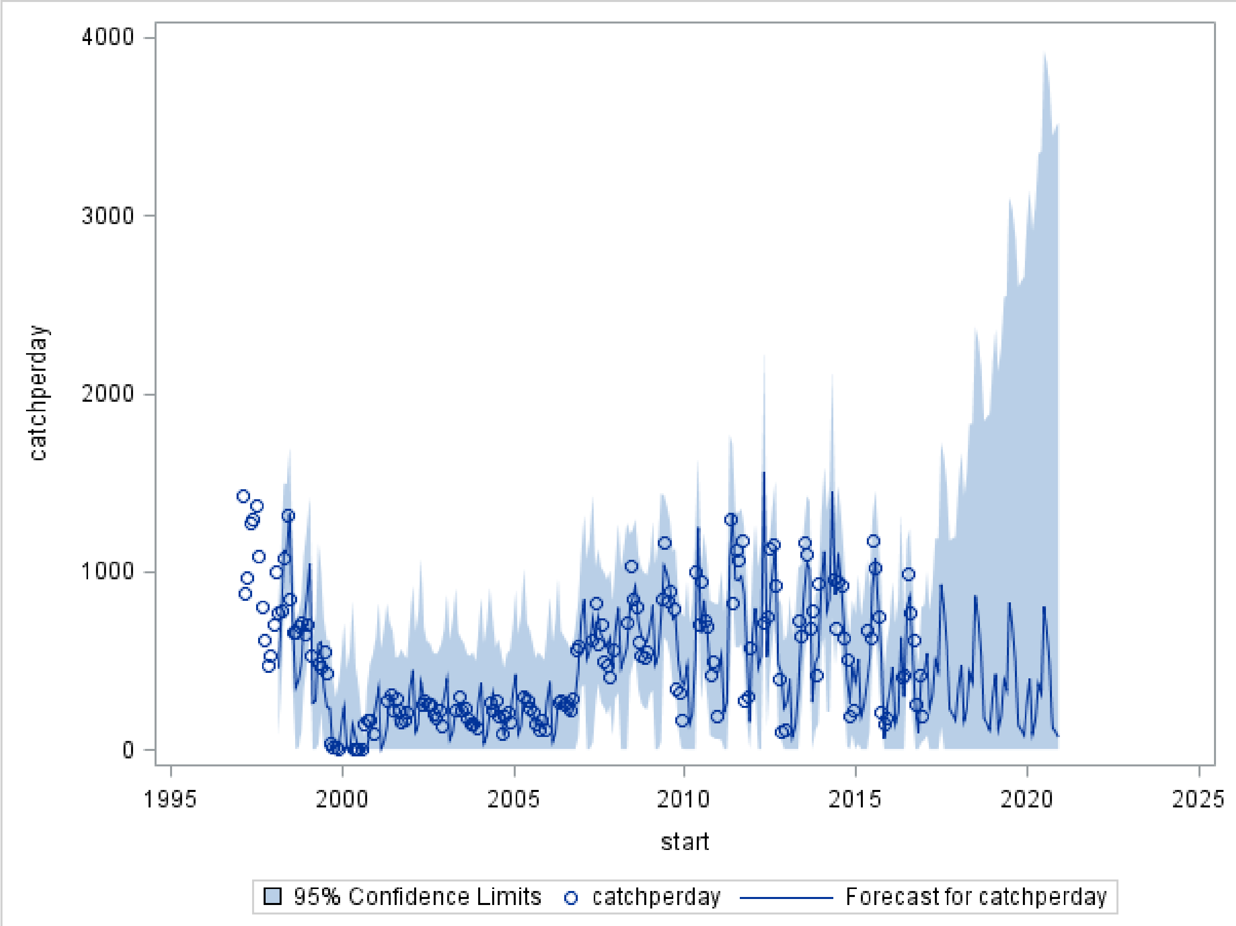

Figure 15. Final SARIMA model fit for red porgy monthly commercial landings (lbs ww) per open day.

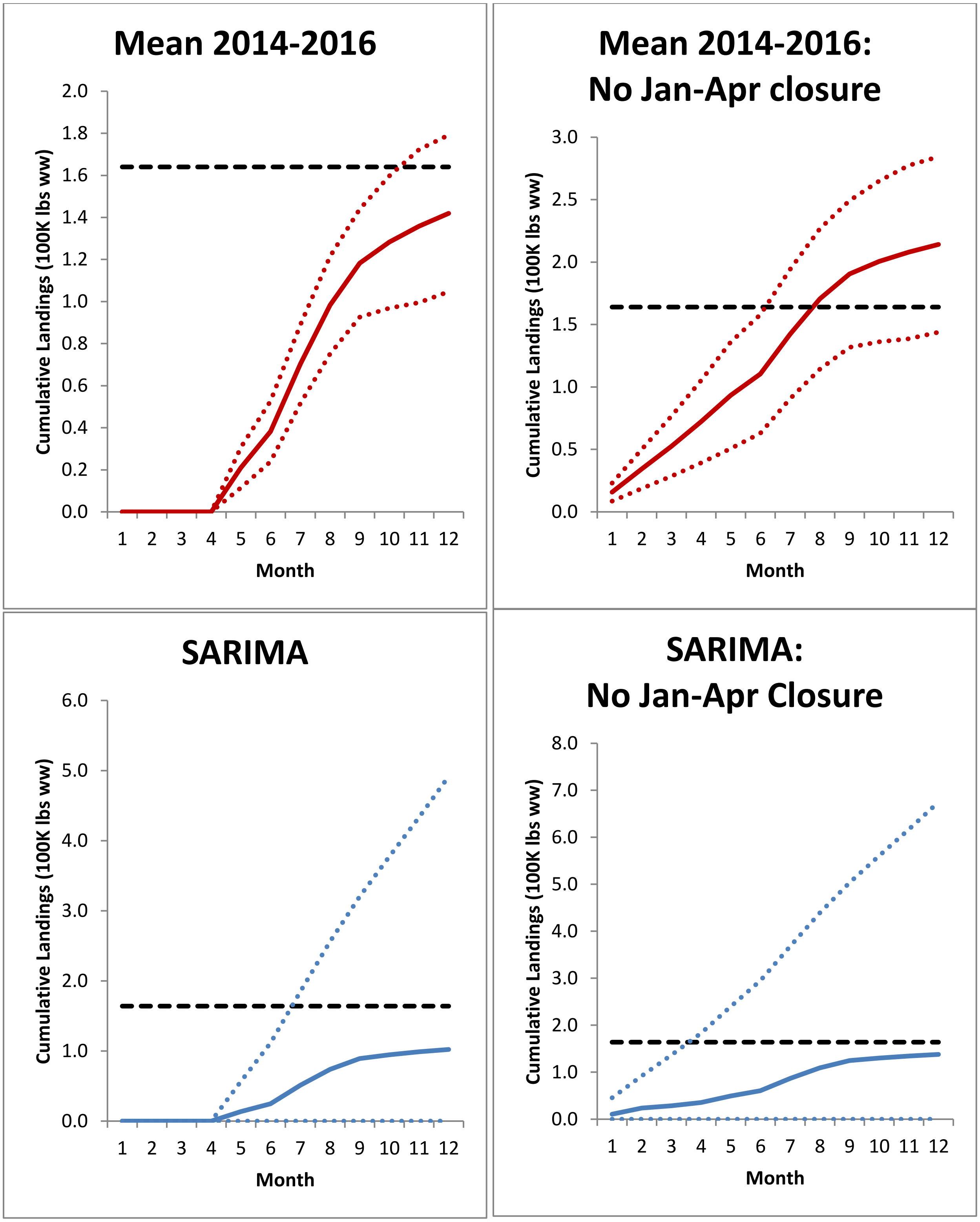

Figure 16. Mean (solid line) and 95% confidence limits (dotted lines) for Red porgy projected cumulative landings relative to ACL, with and without Jan-Apr closure, for two projection models: Mean of last 3 years (2014-2016) and SARIMA.

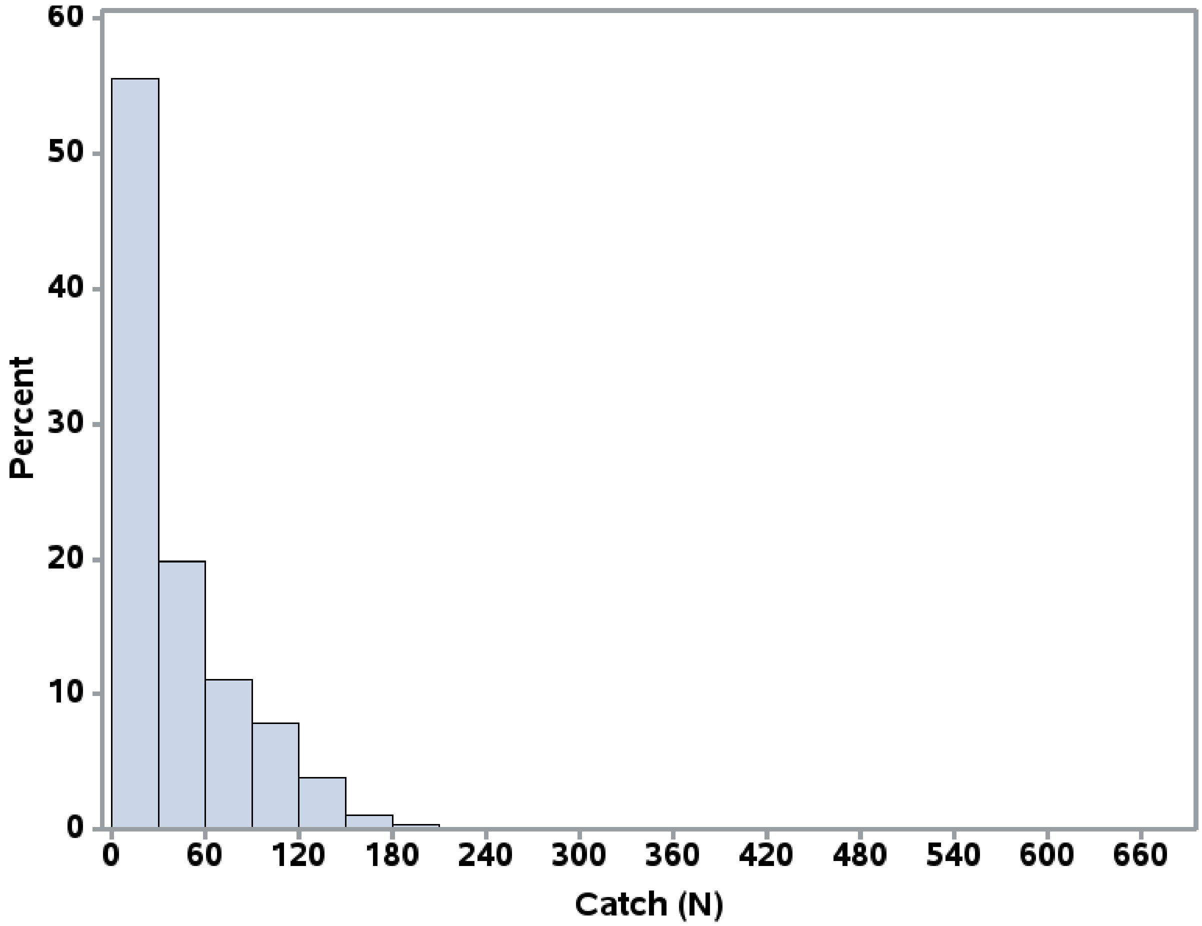

Figure 17. Histogram of estimated number of red porgy caught per trip based on Commercial Logbook reported landings in pounds whole weight divided by mean weights for red porgy intercepted by the Trip Interview Program, by state and year, 2006-2016.

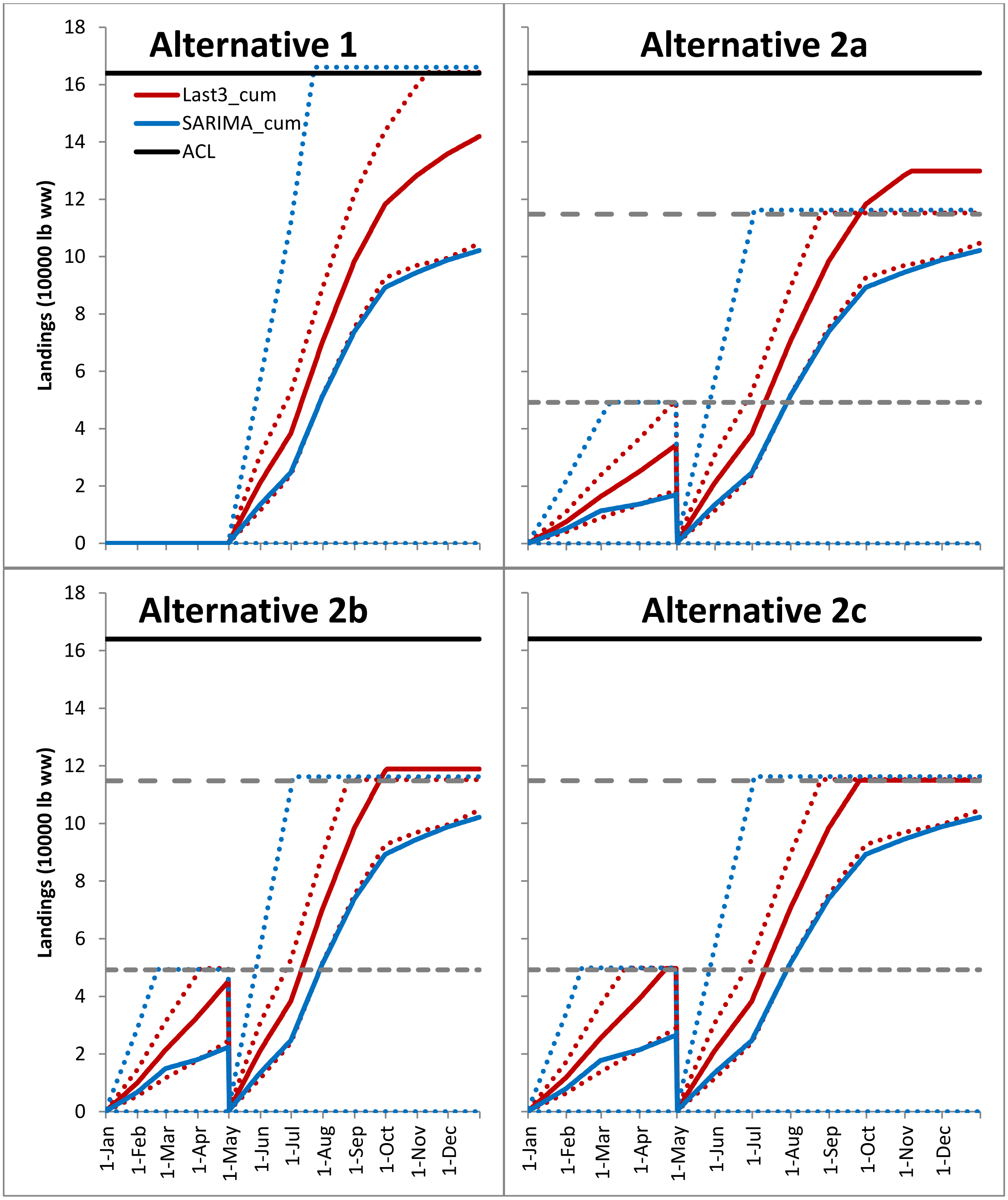

Figure 18. Mean (solid line) and 95% confidence limits (dotted lines) for red porgy projected cumulative landings relative to ACL under two projection models: Mean of last 3 years (2014-2016; red) and SARIMA (blue) relative to ACL (black) and seasonal quotas of 30%, 50%, and 70% of the ACL (gray).

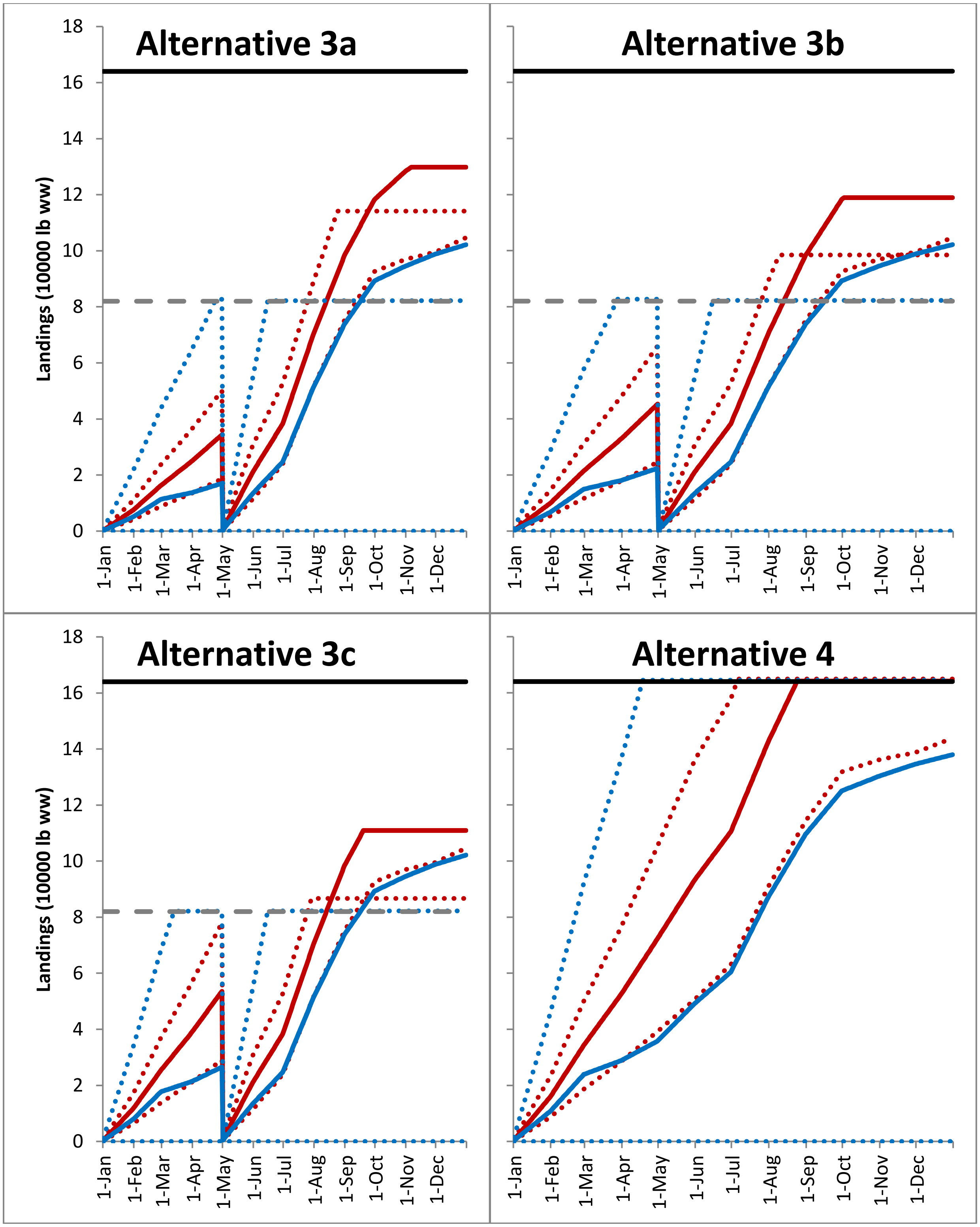

Figure 18 (cont.)

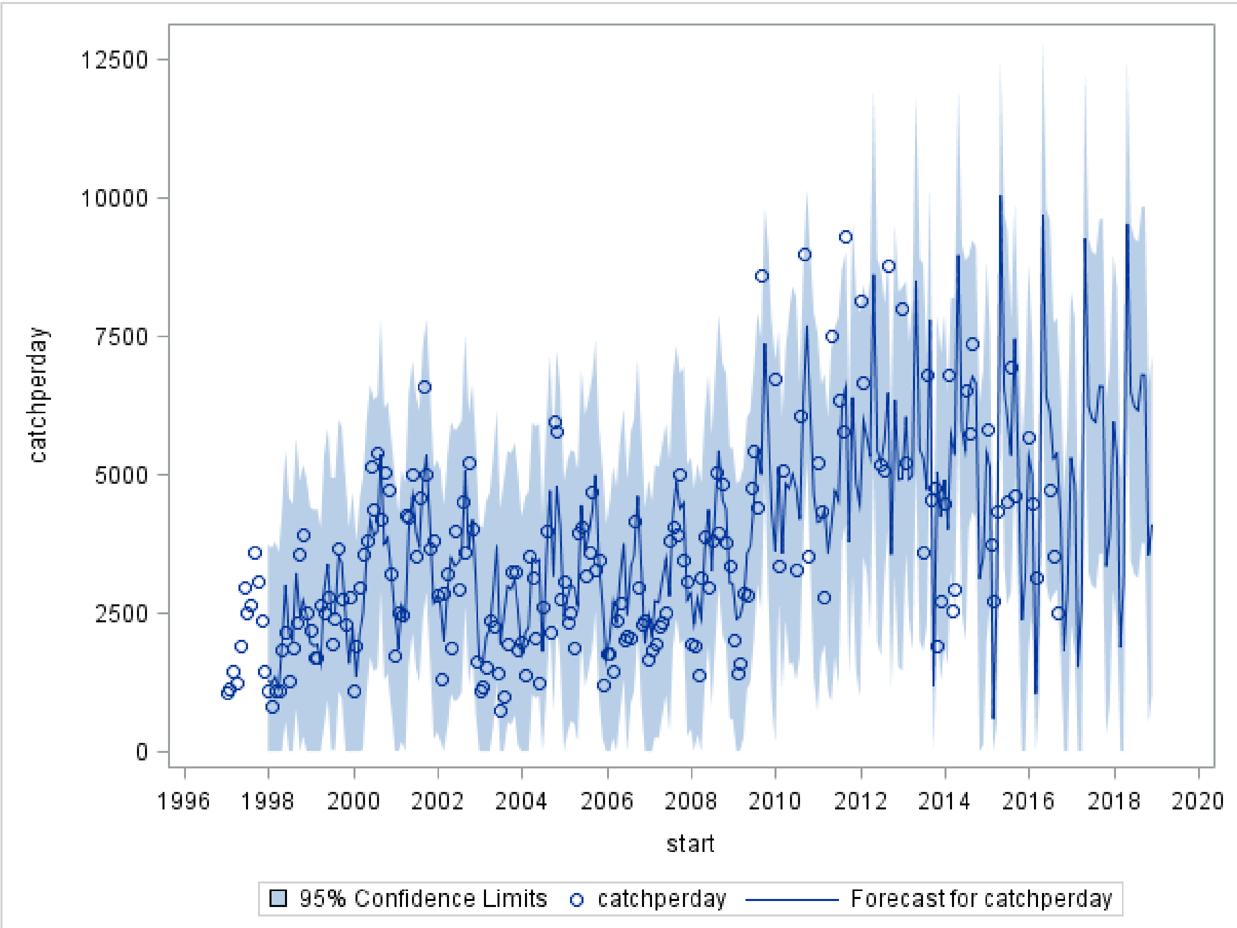

Figure 19. Final SARIMA model fit for vermilion snapper monthly commercial landings (lbs ww) per open day.

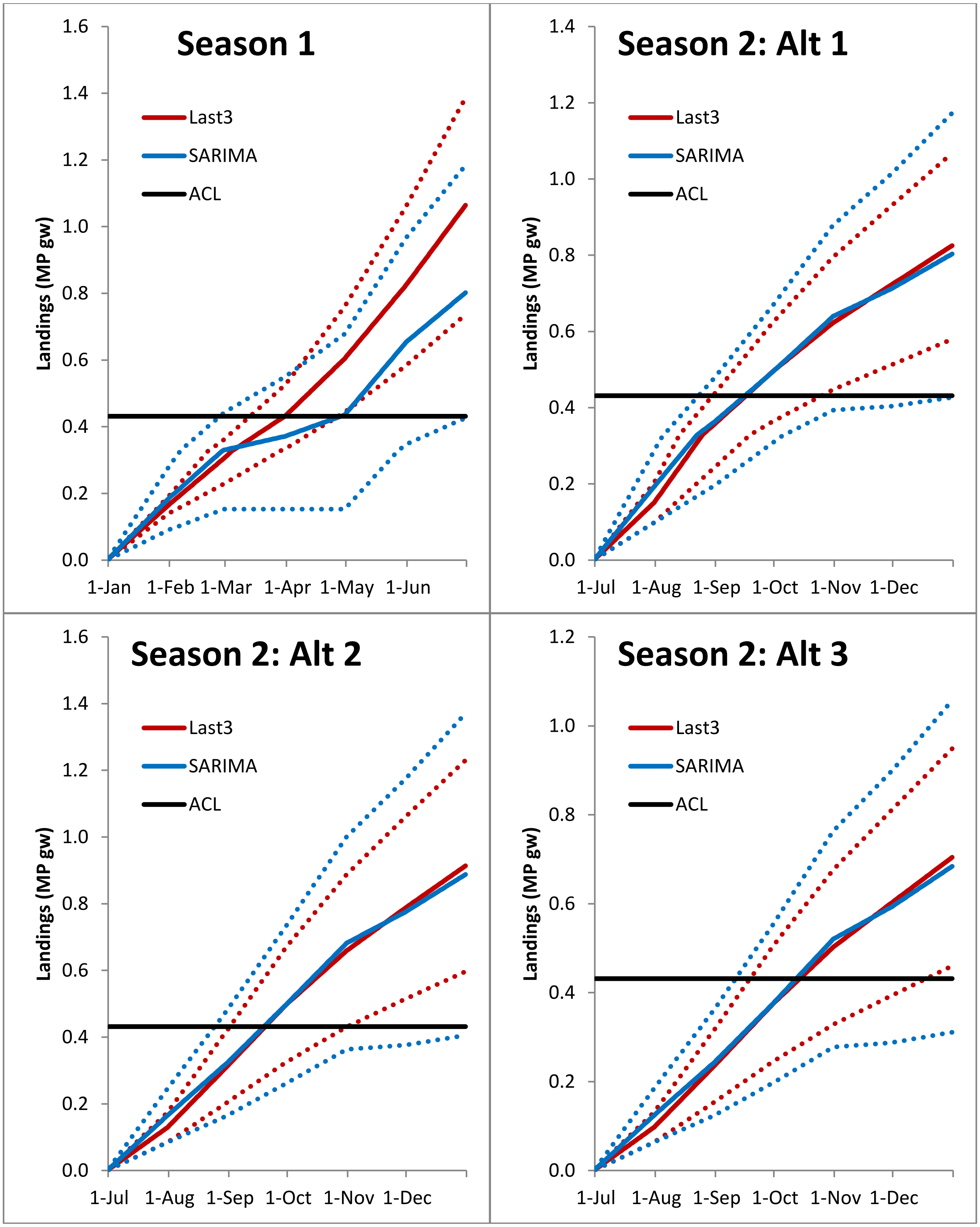

Figure 20. Mean (solid line) and 95% confidence limits (dotted lines) for vermilion snapper projected cumulative landings relative to ACL under two projection models: Mean of last 3 years (2014-2016) and SARIMA.

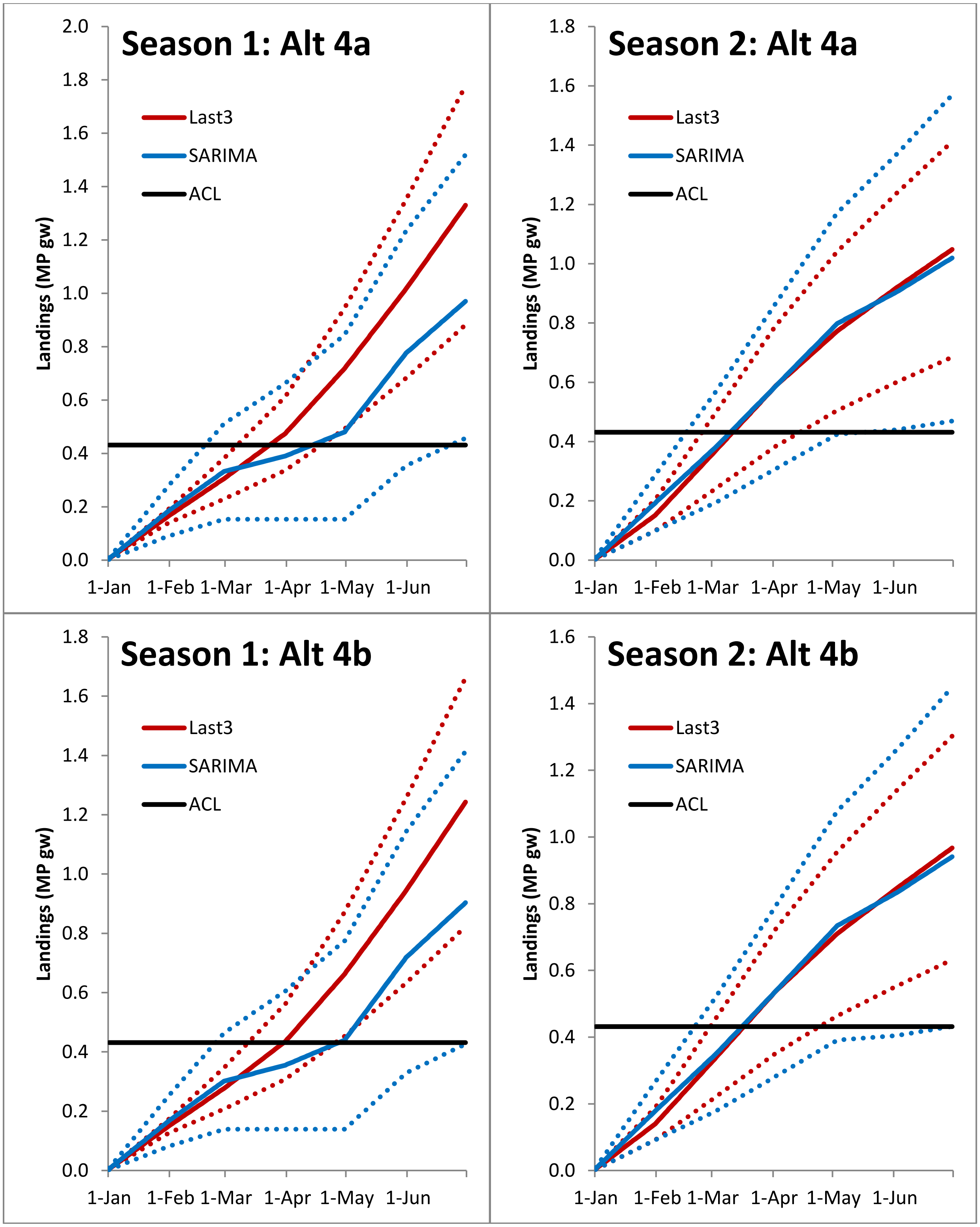

Figure 20 (cont.).

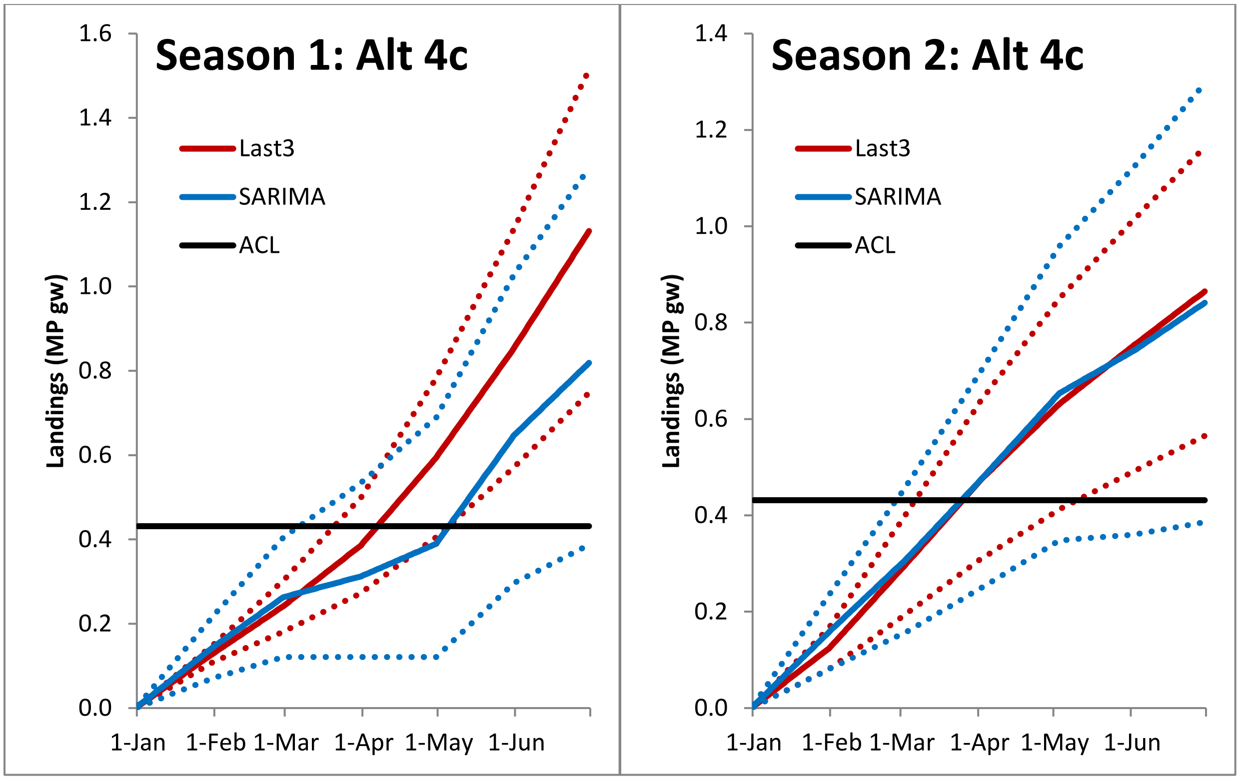

Figure 20 (cont.).

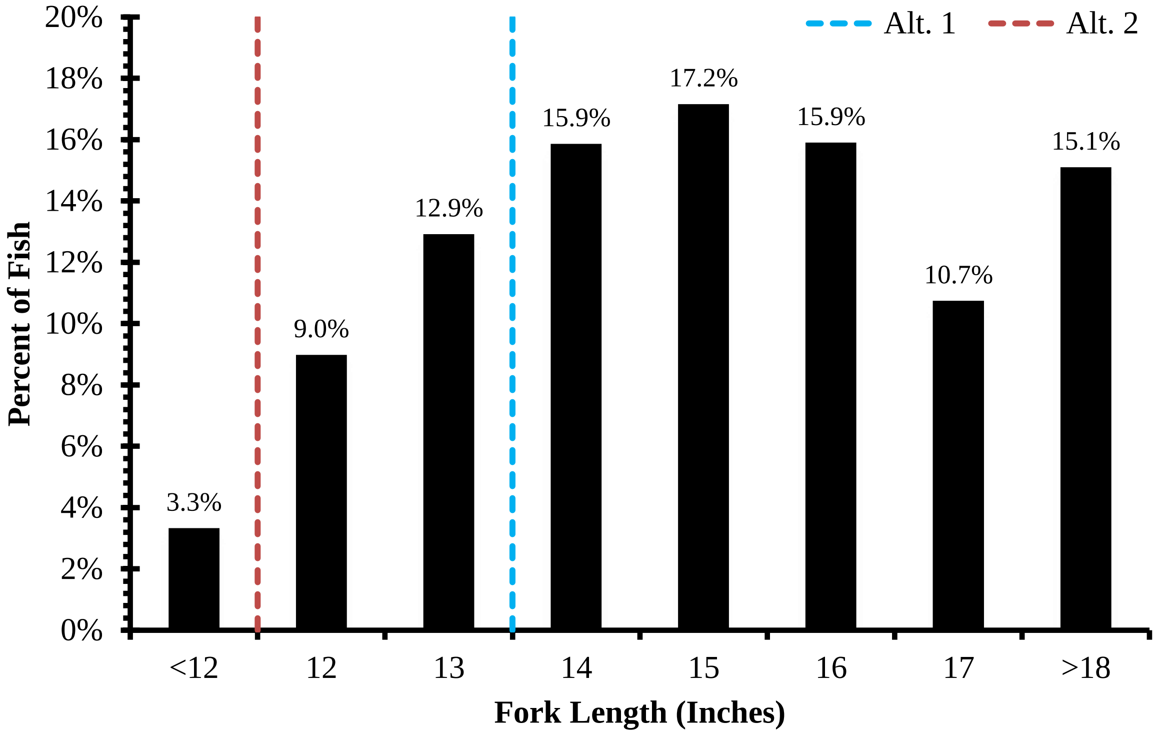

Figure 21. The length distribution of gray triggerfish captured in federal waters off east Florida generated from commercial TIP (n=2,616) data from January 2014 to June 2015. The dashed lines denote the commercial minimum size limit proposed in each alternative.

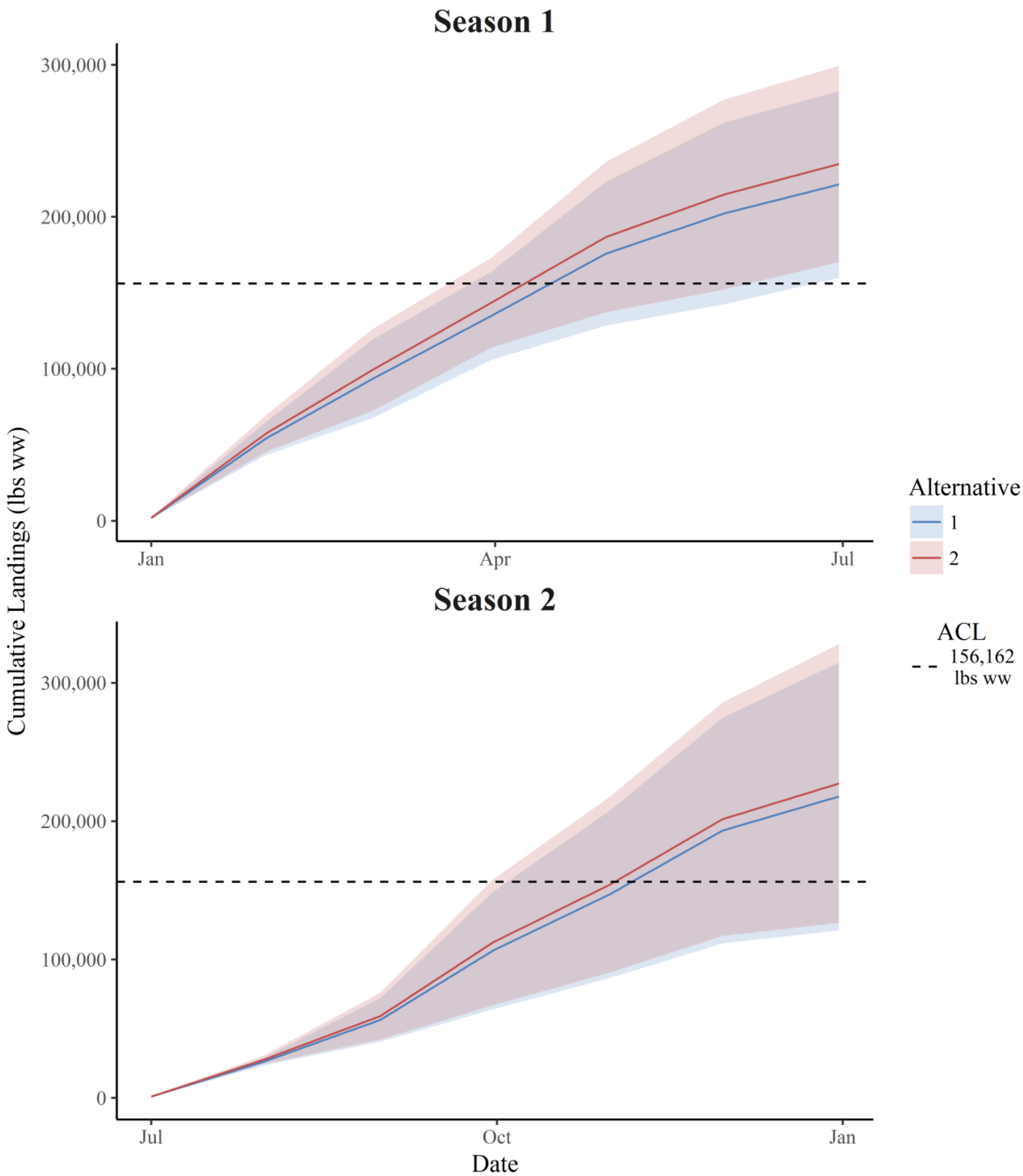

Figure 22. Mean (solid lines) and 95% confidence limits (shaded areas) for gray triggerfish projected cumulative landings relative to the ACL (156,162 lbs ww) for each season and alternative.

SUPPLEMENTAL TABLES AND FIGURES

Table S-1. Seasonal (*s*) autoregressive integrated moving average (SARIMA) (*p*,*d*,*q*)x(*P*,*D*,*Q*)s model combinations evaluated, where the autoregressive component (*p*) represents the lingering effects of previous observations, the integrated component (*d*) represents temporal trends, the moving average component (*q*) represents lingering effects of previous random shocks (or error), and s denotes the seasonal time step. As recreational landings are primarily collected in 2-month waves, *s* was set to 6. A “1” denotes an active component in the model.

ARIMA(*p*,*d*,*q*)X(*P*,*D*,*Q*)s Model
ARIMA(0,1,1)X(0,1,1)*s*
ARIMA(1,0,0)X(0,1,1)*s*
ARIMA(0,0,1)X(0,1,1)*s*
ARIMA(0,1,1)X(1,1,0)*s*
ARIMA(1,0,0)X(1,1,0)*s*
ARIMA(0,0,1)X(1,1,0)*s*
ARIMA(1,1,0)X(0,1,1)*s*
ARIMA(1,1,0)X(1,1,0)*s*

Table S-2. Mean monthly estimates of discards (numbers of fish) from all South Atlantic commercial trips (2014-2016) based on self-reported discard rates (SEFSC Supplemental Discard Logbook, accessed May 2017) expanded to overall South Atlantic commercial fishing effort (SEFSC Commercial Logbook, accessed May 2017), aggregated across all gears. Note that SEDAR has found this approach consistently underestimates discarded fish relative to observer data in the Gulf of Mexico, and the 95% confidence limits for many of these expanded estimates overlap zero, indicating substantial uncertainty in the data (see **Figures S1-8**).

Month	Blueline Tilefish	Red Porgy	Snowy Grouper	Greater Amberjack	Vermilion Snapper	Jacks	DWS	Gray Triggerfish
1	3.36	4301.28	21.79	252.35	1473.76	51.45	0.00	473.48
2	5.46	4400.48	9.69	201.91	1555.67	47.70	0.00	509.79
3	12.17	5008.66	31.40	194.86	1802.61	69.51	3.90	272.92
4	1564.03	2868.43	37.91	146.88	1129.58	15.29	0.00	134.62
5	811.20	2068.36	63.34	524.34	5131.96	65.40	0.00	4242.74
6	313.83	1054.46	103.30	578.14	3532.59	132.38	0.00	2145.66
7	115.53	1428.28	106.24	338.61	2435.49	596.83	0.00	2730.68
8	899.71	1498.00	19.76	369.51	2394.22	1183.32	0.00	1985.43
9	1260.22	924.08	13.41	312.48	1972.90	751.37	0.00	2419.15
10	14.98	251.32	1.70	368.43	2529.10	738.61	0.00	1799.98
11	3.15	70.92	23.75	94.12	2123.60	149.76	0.00	812.42
12	0.00	112.81	1.57	72.31	1838.30	247.58	0.00	609.86

DWS: Deep-water snapper (blackfin, queen, silk snapper), Jacks: lesser amberjack, almaco jack, banded rudderfish.

Table S-3. The average monthly South Atlantic blueline tilefish landings by state from 2004-2013 in pounds whole weight. The years 2014-2016 were excluded due to closures.

Month	FL	GA	NC	SC
Jan	1,535	0	6,171	1,551
Feb	952	2	4,651	1,428
Mar	1,879	4	3,776	2,921
Apr	1,500	5	11,815	4,080
May	1,125	34	27,503	1,636
Jun	1,255	25	25,878	1,264
Jul	721	11	44,735	1,046
Aug	637	10	53,516	365
Sep	481	0	19,697	264
Oct	308	2	13,983	387
Nov	453	1	10,171	650
Dec	265	2	4,389	428

Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

Table S-4. The percentage of annual South Atlantic blueline tilefish landings by state from 2002-2016. Georgia and South Carolina were combined due to confidentiality concerns.

Year	FL	GA/SC	NC
2002	11.3%	6.5%	82.1%
2003	22.2%	9.3%	68.4%
2004	23.0%	30.4%	46.6%
2005	29.7%	24.0%	46.0%
2006	8.9%	15.5%	75.6%
2007	14.8%	6.1%	79.1%
2008	2.6%	1.7%	95.5%
2009	1.7%	1.0%	97.3%
2010	0.9%	3.4%	95.6%
2011	1.1%	3.1%	95.6%
2012	1.3%	1.2%	97.5%
2013	4.3%	17.9%	77.4%
2014	11.8%	42.2%	45.9%
2015	14.3%	51.0%	34.7%
2016	15.3%	7.5%	77.2%

Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

Table S-5. The average monthly South Atlantic snowy grouper landings by state from 2002-2005 and 2007-2011 in pounds whole weight. The years 2006 and 2012-2016 were excluded due to closures.

Month	FL	GA	NC	SC
Jan	5,879	63	1,755	1,367
Feb	5,664	17	3,167	1,551
Mar	5,434	300	4,437	2,892
Apr	8,056	419	10,583	5,684
May	6,917	330	13,307	4,660
Jun	8,519	171	8,409	3,836
Jul	5,701	498	6,830	2,196
Aug	5,149	168	6,486	1,693
Sep	5,198	50	3,135	1,284
Oct	6,429	33	1,842	1,716
Nov	4,022	43	773	2,537
Dec	3,417	56	543	1,809

Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

Table S-6. The percentage of annual South Atlantic snowy grouper landings by state from 2002-2016. Georgia and South Carolina were combined due to confidentiality concerns.

Year	FL	GA/SC	NC
2002	44.4%	17.0%	38.6%
2003	41.7%	14.6%	43.7%
2004	36.9%	25.8%	37.4%
2005	33.9%	30.8%	35.3%
2006	27.4%	32.0%	40.6%
2007	52.5%	11.0%	36.5%
2008	53.5%	15.3%	31.0%
2009	49.9%	13.2%	36.9%
2010	48.3%	17.0%	34.7%
2011	39.9%	39.7%	20.4%
2012	54.4%	21.1%	24.5%
2013	58.1%	20.3%	21.6%
2014	55.6%	19.7%	24.7%
2015	52.0%	17.5%	30.5%
2016	38.1%	22.6%	39.3%

Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

Table S-7. The average monthly South Atlantic greater amberjack landings by state from 2005-2015 in pounds whole weight. Data from the month of April was not available due to the seasonal closure in place since 1999. The year 2016 was excluded due to a closure.

Month	FL	GA	SC	NC
Jan	39,199	1,790	5,238	1,273
Feb	64,819	14,725	4,116	1,617
Mar	134,461	618	3,257	1,766
May	214,751	882	2,827	4,170
Jun	48,072	389	3,581	6,322
Jul	31,943	654	6,886	8,956
Aug	31,834	943	8,569	12,326
Sep	38,475	1,388	8,120	4,428
Oct	36,763	1,340	9,051	10,002
Nov	26,862	2,199	6,950	1,478
Dec	33,049	1,905	5,870	868

Source: Southeast Fisheries Science Center commercial (10/5/2017) ACL dataset.

Table S-8. The percentage of annual South Atlantic greater amberjack landings by state from 2012-2016. Georgia and South Carolina were combined due to confidentiality concerns. North Carolina's seafood dealers began using a species-specific code for greater amberjack in 2011, but it was not until 2015 that unclassified amberjacks was completely removed as an option.

Year	FL	GA/SC	NC
2012	92.0%	7.3%	0.7%
2013	71.5%	26.2%	2.2%
2014	75.6%	13.6%	10.8%
2015	80.2%	9.9%	9.9%
2016	79.9%	10.0%	10.1%

Source: Southeast Fisheries Science Center commercial (10/5/2017) ACL dataset.

Table S-9. The average monthly South Atlantic red porgy landings by state from 2005-2012 and 2014-2016 in pounds whole weight. The year 2013 was excluded due to a closure. Data from the months of January to April was not available due to the seasonal closure in place since 2000.

Month	FL	GA	SC	NC
May	4,158	731	5,410	11,785
Jun	3,733	677	5,515	10,816
Jul	6,040	596	7,987	11,064
Aug	5,077	337	7,635	11,013
Sep	5,290	426	6,183	7,416
Oct	2,395	211	4,056	4,071
Nov	2,138	364	3,693	3,742
Dec	2,452	545	3,841	2,931

Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

Table S-10. The percentage of annual South Atlantic red porgy landings by state from 2002-2016. Georgia and South Carolina were combined due to confidentiality concerns.

Year	FL	GA/SC	NC
2002	12.2%	23.6%	64.2%
2003	9.1%	29.8%	61.1%
2004	10.1%	36.2%	53.7%
2005	8.1%	30.3%	61.5%
2006	11.8%	39.8%	48.4%
2007	14.1%	33.1%	52.8%
2008	14.4%	31.7%	53.8%
2009	15.9%	34.3%	49.8%
2010	20.4%	34.4%	45.2%
2011	26.5%	33.9%	39.6%
2012	19.5%	35.9%	44.6%
2013	28.4%	33.7%	37.9%
2014	32.9%	31.3%	35.8%
2015	37.1%	30.4%	32.5%
2016	30.8%	33.8%	35.4%

Source: Southeast Fisheries Science Center commercial (5/2/2017) ACL dataset.

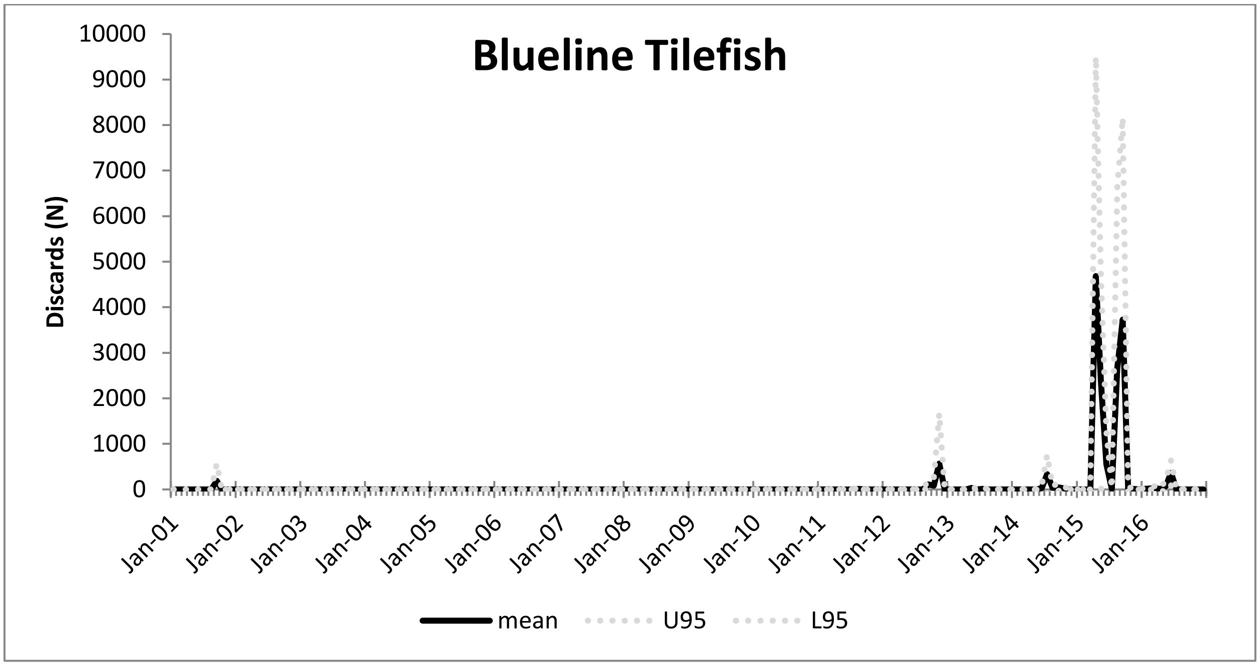

Figure S-1. Blueline tilefish expanded monthly commercial discard estimates (numbers of fish) from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017). Black line denotes mean, dotted lines denote 95% confidence limits for estimate.

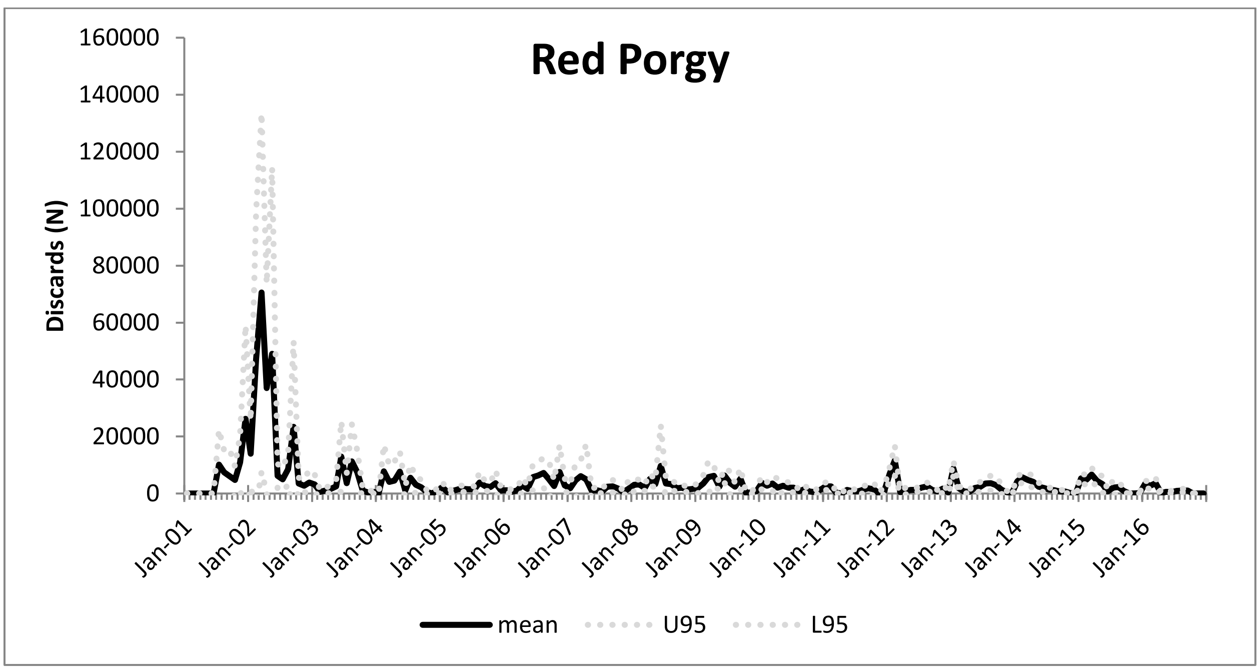

Figure S-2. Red porgy expanded monthly commercial discard estimates (numbers of fish) from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017). Black line denotes mean, dotted lines denote 95% confidence limits for estimate.

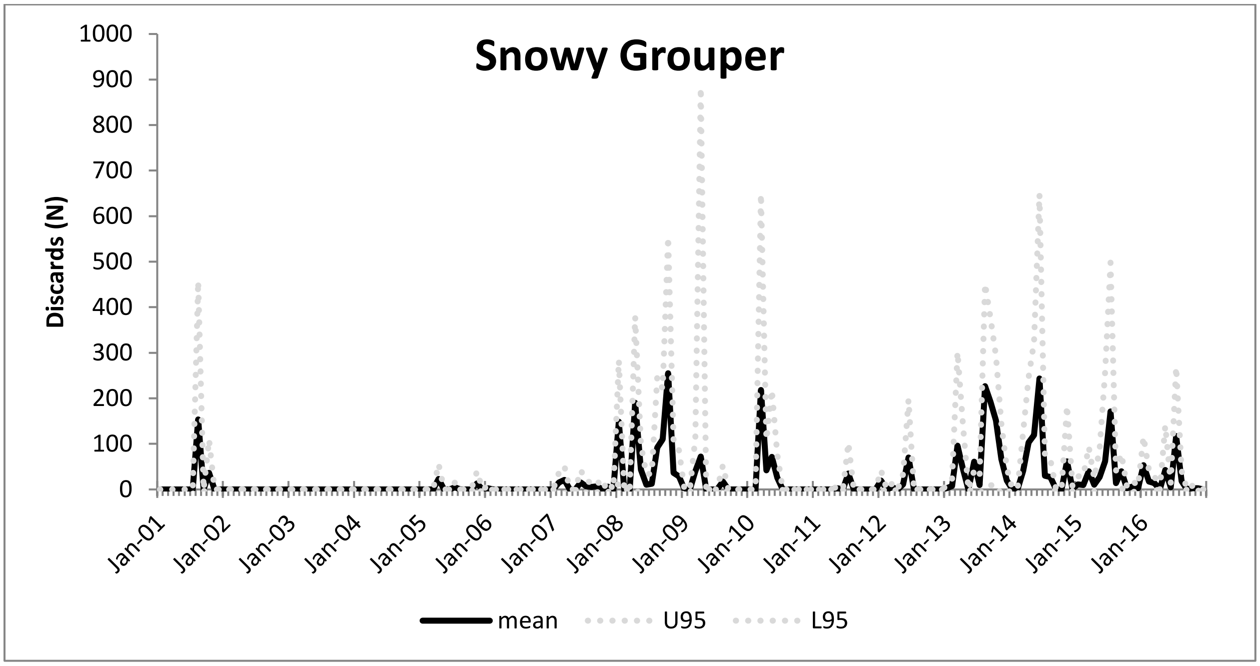

Figure S-3. Snowy grouper expanded monthly commercial discard estimates (numbers of fish) from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017). Black line denotes mean, dotted lines denote 95% confidence limits for estimate.

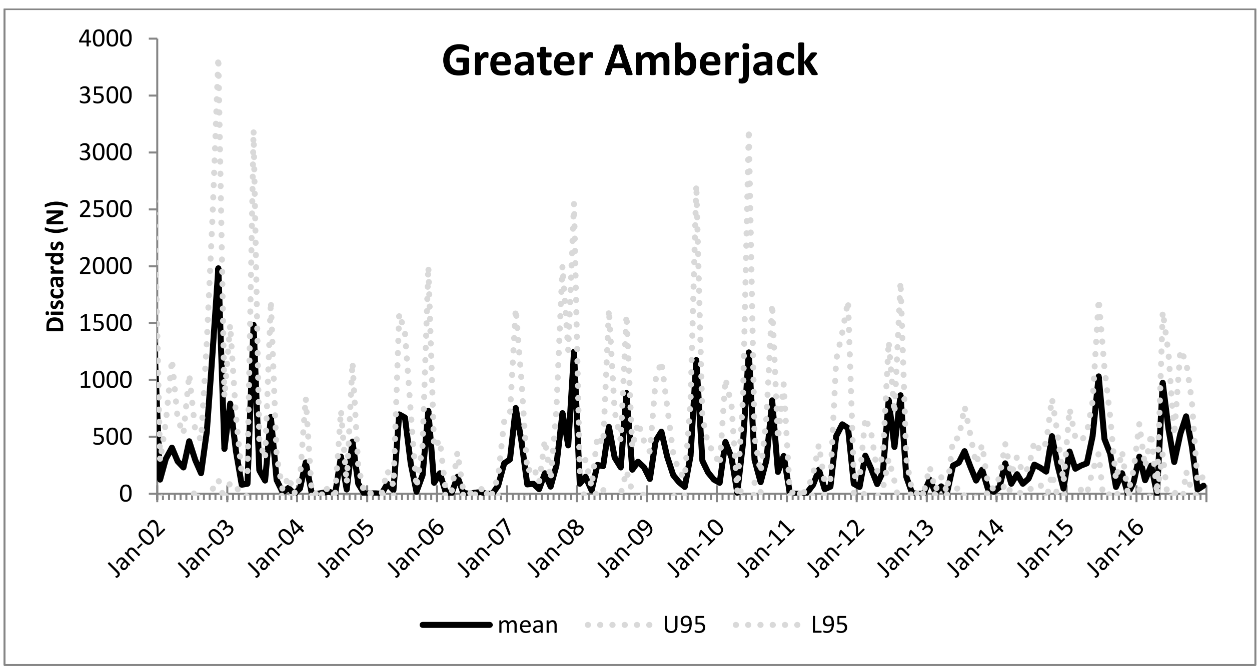

Figure S-4. Greater amberjack expanded monthly commercial discard estimates (numbers of fish) from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017). Black line denotes mean, dotted lines denote 95% confidence limits for estimate.

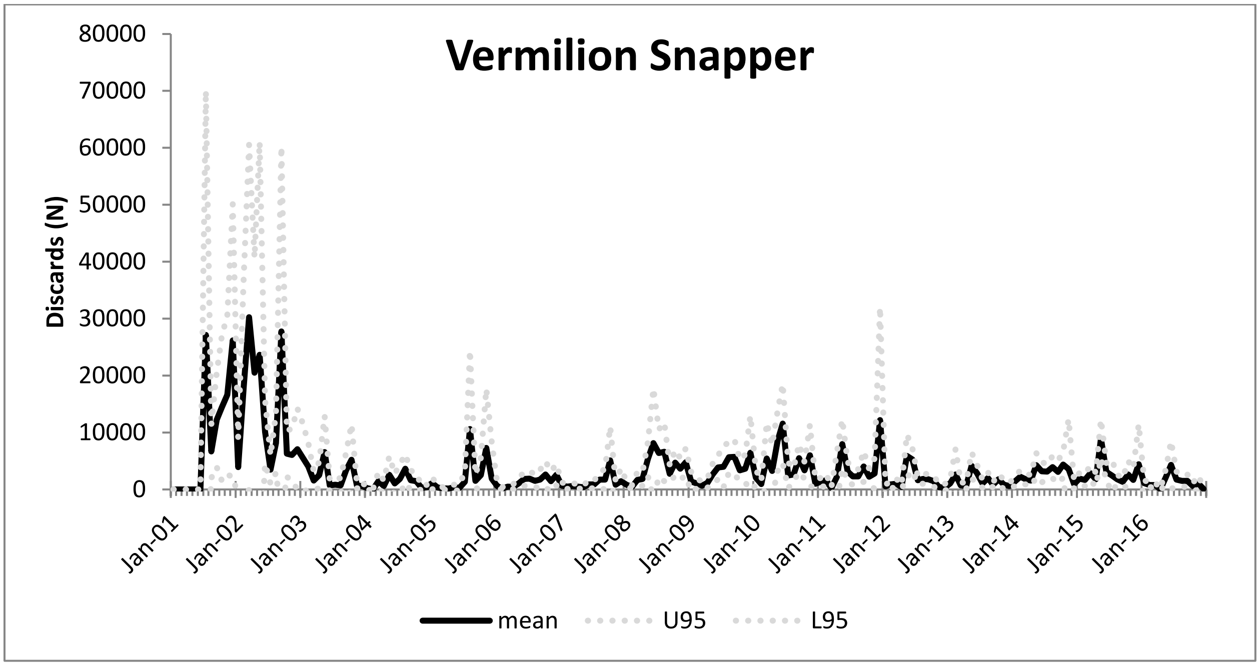

Figure S-5. Vermilion snapper expanded monthly commercial discard estimates (numbers of fish) from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017). Black line denotes mean, dotted lines denote 95% confidence limits for estimate.

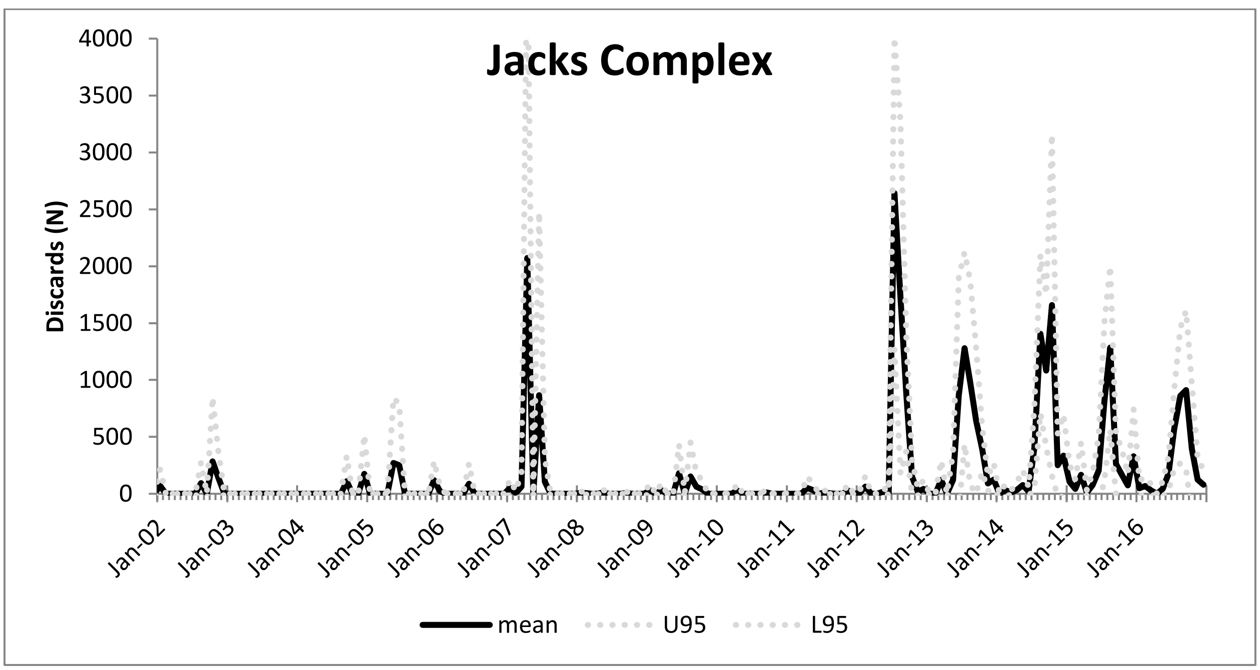

Figure S-6. Jacks complex (lesser amberjack, banded rudderfish, almaco jack) expanded monthly commercial discard estimates (numbers of fish) from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017). Black line denotes mean, dotted lines denote 95% confidence limits for estimate.

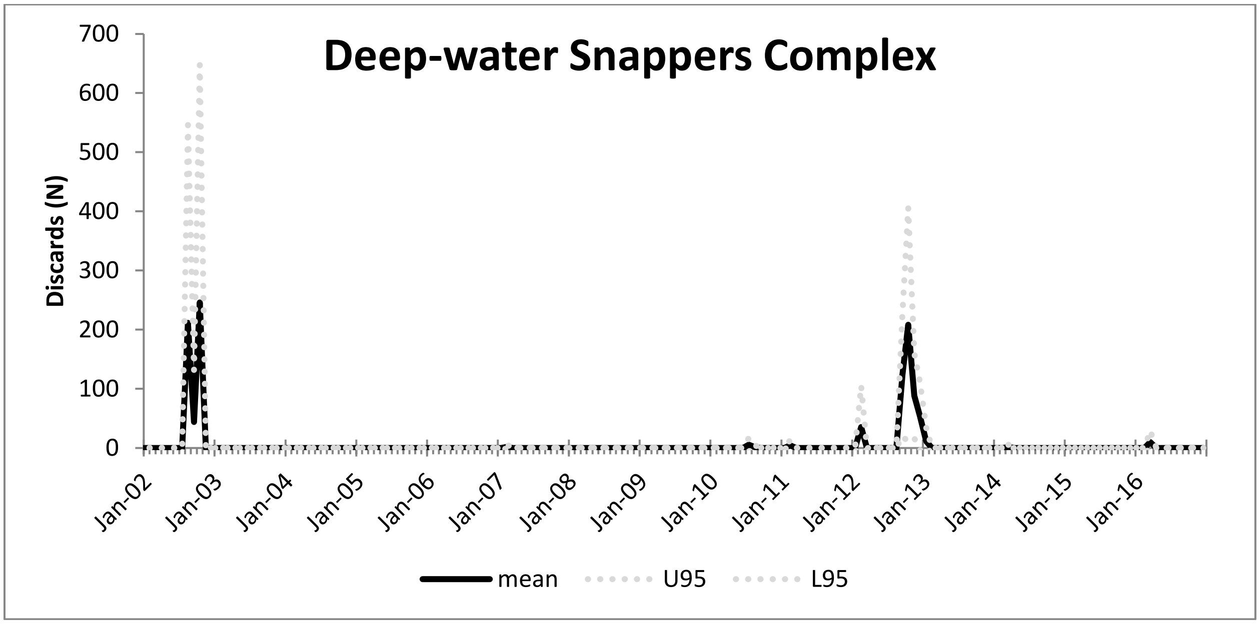

Figure S-7. Deep-water snapper (queen snapper, silk snapper, blackfin snapper) expanded monthly commercial discard estimates (numbers of fish) from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017). Black line denotes mean, dotted lines denote 95% confidence limits for estimate.

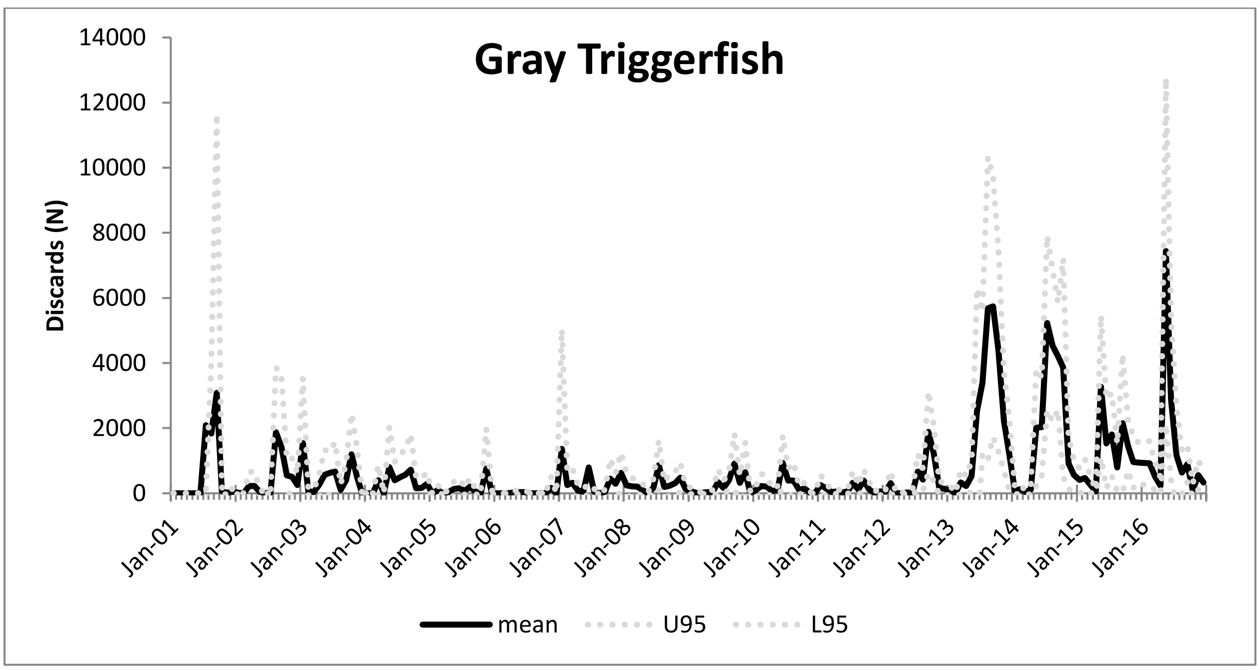

Figure S-8. Gray triggerfish expanded monthly commercial discard estimates (numbers of fish) from the SEFSC Supplemental Commercial Discard Logbook (accessed May 2017). Black line denotes mean, dotted lines denote 95% confidence limits for estimate. Note an outlier was removed for trolling gear in Nov 2006.

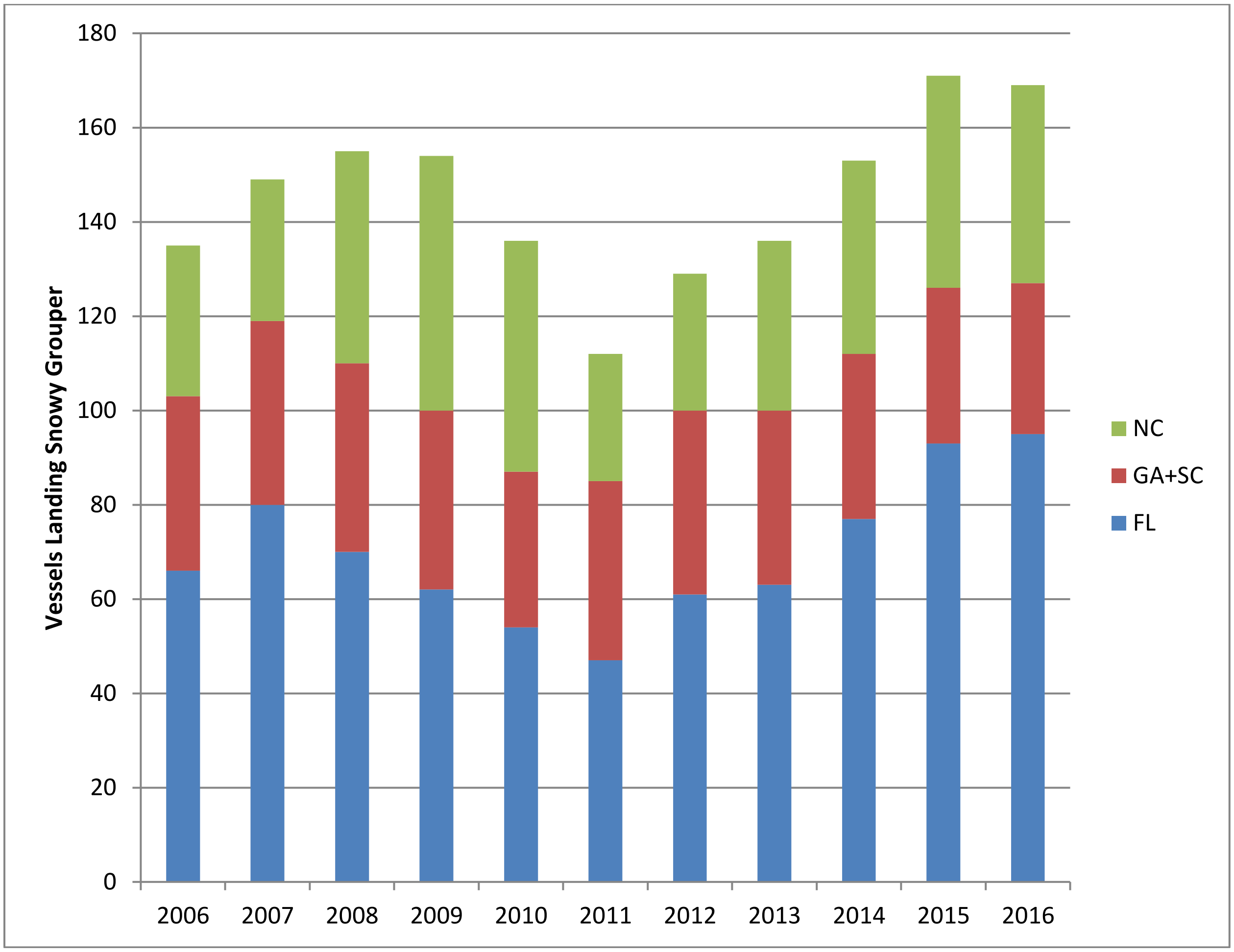

Figure S-9. Number of vessels reporting landings of snowy grouper, by state and year. Note that Georgia and South Carolina have been aggregated to protect confidentiality.

Appendix K. Commercial Data Analyses for Actions 6 & 7

Data

For all the analyses, data from 2009 to 2011 and 2014 to 2016 was used. Three datasets were used to perform these analyses. Data from the Trip Intercept Program (TIP) was used to calculate average weights and length frequencies of Almaco Jack in the catch. The commercial Snapper Grouper logbook data was used to calculate daily catch rates of the fishery. Actual monthly landings were estimated using the Accumulated Landings System (ALS) data, which was used in conjunction with the catch rates estimated from the logbook data for estimating closure dates and harvest under each of the alternative trip and size limits. It should be noted that by using data from 2009-2011 and 2014-2016, the assumption is being made that fishing behavior will continue as it has been in those years. It also assumes that Almaco Jack and those species in the Jacks Complex will have the same catchability and selectivity to the fishery as they did in the years used.

Methods

The TIP data was used to calculate the proportion of Almaco Jack above each of the alternative minimum sizes. First, a Length-Weight conversion was developed to fill in the weights for samples that had lengths only. All samples were pooled across 2014-2016. The length frequency distribution was then calculated using the weight of fish rather than the number of fish to calculate the frequency per length bin. This allowed for the direct calculation of the effects of the proposed minimum size limit alternatives from Action 6. The length composition of the catch was constructed for all gears combined (**Figure K-2**).

From 2014 to 2016, the Jacks complex closed early, which affects this analysis. In 2014 it closed at the end of July, in 2015 it close at the end of June, and in 2016 it closed at the beginning of August. Therefore, data from previous years when there wasn't a closure needed to be used to estimate the catch rates during the months when Jacks were closed in 2014-2016. The most recent 3 years when the Jacks complex was open year-round were 2009 to 2011. Data from August to December from 2009-2011 were used to fill in for the missing data from 2014-2016. The average across 2009-2011 was used to replace the missing data from July 2015.
For each of the size limit alternatives (20", 22", 24", and 26"), the proportion of Almaco Jack below that minimum size was calculated using the appropriate weight frequency distribution by length bin and then removed from each trip in the logbook dataset. This process effectively created 5 datasets to use in the rest of the analyses, one for the no action and one for each size limit. Estimated landings and 95% confidence intervals (CI) were calculated for each minimum size alternative using the modified logbook data. The CI were calculated using variances calculated at a monthly timescale and then summed to get the variance estimate at the yearly timescale. This was done for several reasons. First, it was felt that calculating the variance at the yearly scale directly was considerably underestimating the true variance in the data. Another reason is that the data used to calculate closure dates was at the monthly level, so using the

monthly timescale for the variance in the overall estimated landings made these 2 calculations comparable.

The analysis for the trip limit sub-alternatives under Action 7, alternative 3 was done in much the same way the minimum size alternatives were done. The logbook data was analyzed trip by trip to look at the total weight of the Jacks Complex (Jacks) on each trip. If the weight of Jacks on a trip was less than the proposed trip limit, then no alteration was made. However, if the weight of Jacks on a trip was above the proposed trip limit alternative, then the weight of Jacks was set equal to the new trip limit. This was done for each of the minimum size datasets.

The sub-alternatives under Action 7, alternative 2 were a bit more complex, but had the same basic principle. Step-downs were incorporated into the analysis by first sorting the logbook data by trip date. A cumulative landings column needed to be added to keep track of what proportion of the ACL had been caught when each trip was analyzed. If less than 75% of the commercial ACL has been caught, the trip limit is used in the analysis. However, if 75% or more of the commercial ACL has been caught, the step-down is used in the analysis.

For calculating potential closure dates, the logbook data was used to calculate the proportion of landings per day of each month for each alternative under Action 7. The actual landings are calculated using the ALS dataset to obtain the average landings across the years for each month and multiplying that by the proportion of landings caught in each day for each of the 5 datasets across each of the alternatives under Action 6. The daily landings are then summed cumulatively until either the commercial ACL is reached or the end of the year is reached. The 95% CI was calculated for each month in the same manner as was described above for the minimum size alternatives. The upper and lower CI values for each month were divided by the number of days in each month to get the estimated landing per day. The assumption here is that the daily catch rate is divided evenly throughout the month. The analysis proceeded in the same manner as the analysis of the average estimates.

One important caveat to the analysis involving the step-downs is that it was conducted without any implementation error. This means the assumption was made that the step-down went into effect at the precise moment that the landings reached 75% of the commercial ACL. In practice, this is most likely not reflective of what happens in the fishery due to the lag time in reporting, late reporting, and misreporting.

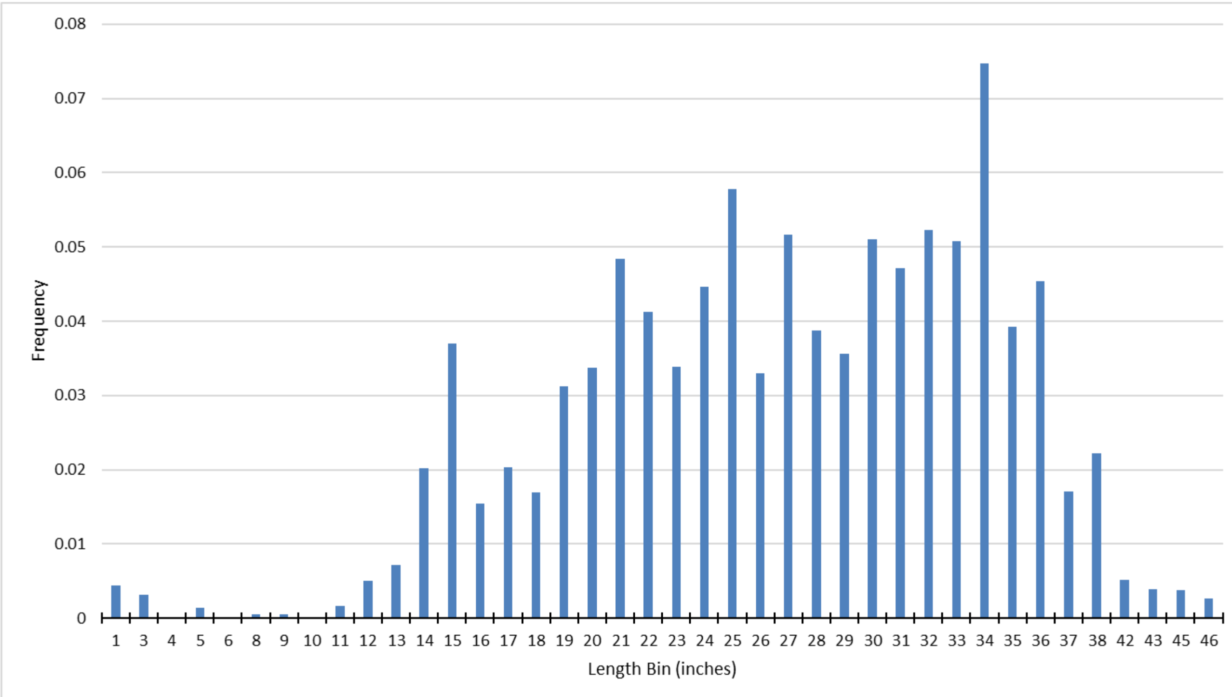

Figure K-2. Length frequency of Almaco Jack catch from the TIP data using weight instead of numbers to calculate the frequency per bin.

Results

To see the relative effect of the Almaco Jack minimum size limit, the average annual landings of Jacks for 2014-2016 were calculated for each alternative under Action 6 (**Figure 4.6.1.1**). **Figure 4.6.1.1** shows that as the minimum size of Almaco Jack increases, the estimated annual landings of Jacks decreases. However, if left open year-round, none of the alternative minimum sizes keeps the annual landings of Jacks below the commercial ACL by itself.

Table 4.6.1 shows the estimated closure dates and 95% CI for the minimum size alternatives under Action 6. As can be seen from the size of the 95% CI, these closure dates have been estimated with a high degree of uncertainty.

The sub-alternatives under Action 7, alternative 2 were analyzed for each of the alternative minimum size limits under Action 6. The relative effect of each trip limit under each size limit is depicted in **Figure K-4** below. The trip limits have the expected effect of reducing the estimated landings of Jacks as the trip limit gets smaller. Within each trip limit sub-alternative, the size limit of Almaco Jack has the same basic pattern as it did when no trip limit was imposed. As the size limit increases, the estimated landings of Jacks decrease. However, the 95% CI for each bar in the graph are wide and overlap many of the other alternatives, making it difficult to definitively determine the true effects of each alternative combination under Actions 6 and 7. **Table K-1** shows the estimated closure dates and 95% CI for each of the trip limits under Action 7, alternative 2. Each of these sub-alternatives was analyzed under each of the size limits under Action 6. Again the 95% CI are very wide and are even wider here than when only looking at the effects of the minimum size of Almaco Jack in Action 6. This is due to the compounding uncertainty of combining the analyses for minimum size and trip limit.

To help put these closure dates in perspective, the average monthly landings of Jacks for 2014-2016 were estimated using the logbook data, with 95% CI (**Figure K-5**). The monthly landings show a clear pattern, or season, for Jacks that starts in April and is over by August. The rest of the year has Jacks landings, but at a much lower level. It should also be noted that the 95% CI around these monthly estimates are very wide and include zero for several of the months.

Table K-1. Estimated closure dates and 95% CI for the alternative Almaco Jack minimum sizes under Action 6.

Alt Num	Alternatives	Closure Date	Upper 95%	Lower 95%
1	No Size Limit	7/2	6/2	No Closure
2a	20 in	7/14	6/9	No Closure
2b	22 in	7/26	6/13	No Closure
2c	24 in	8/18	6/19	No Closure
2d	26 in	9/23	6/27	No Closure

Table K-2. Estimated closure dates and 95% CI for each sub-alternative under Action 7, alternative 3 analyzed under each alternative under Action 6.

Action 7 Alt	Action 6 Alt	Alternatives	Closure Date	Est. Landings (gw)	Upper 95%	Lower 95%
2a	1	500 lbs, No Size Lim	8/16	182,138	6/9	No Closure
2a	2a	500 lbs, 20 in	9/14	182,138	6/10	No Closure
2a	2b	500 lbs, 22 in	10/3	182,138	6/11	No Closure
2a	2c	500 lbs, 24 in	11/4	182,138	6/15	No Closure
2a	2d	500 lbs, 26 in	12/17	182,138	6/27	No Closure
2b	1	400 lbs, No Size Lim	9/9	182,138	6/16	No Closure
2b	2a	400 lbs, 20 in	10/11	182,138	6/17	No Closure
2b	2b	400 lbs, 22 in	11/1	182,138	6/17	No Closure
2b	2c	400 lbs, 24 in	12/6	182,138	6/22	No Closure
2b	2d	400 lbs, 26 in	No Closure	178,291	6/29	No Closure
2c	1	300 lbs, No Size Lim	10/28	182,138	6/27	No Closure
2c	2a	300 lbs, 20 in	12/2	182,138	6/28	No Closure
2c	2b	300 lbs, 22 in	12/20	182,138	6/29	No Closure
2c	2c	300 lbs, 24 in	No Closure	176,195	7/4	No Closure
2c	2d	300 lbs, 26 in	No Closure	164,759	7/12	No Closure

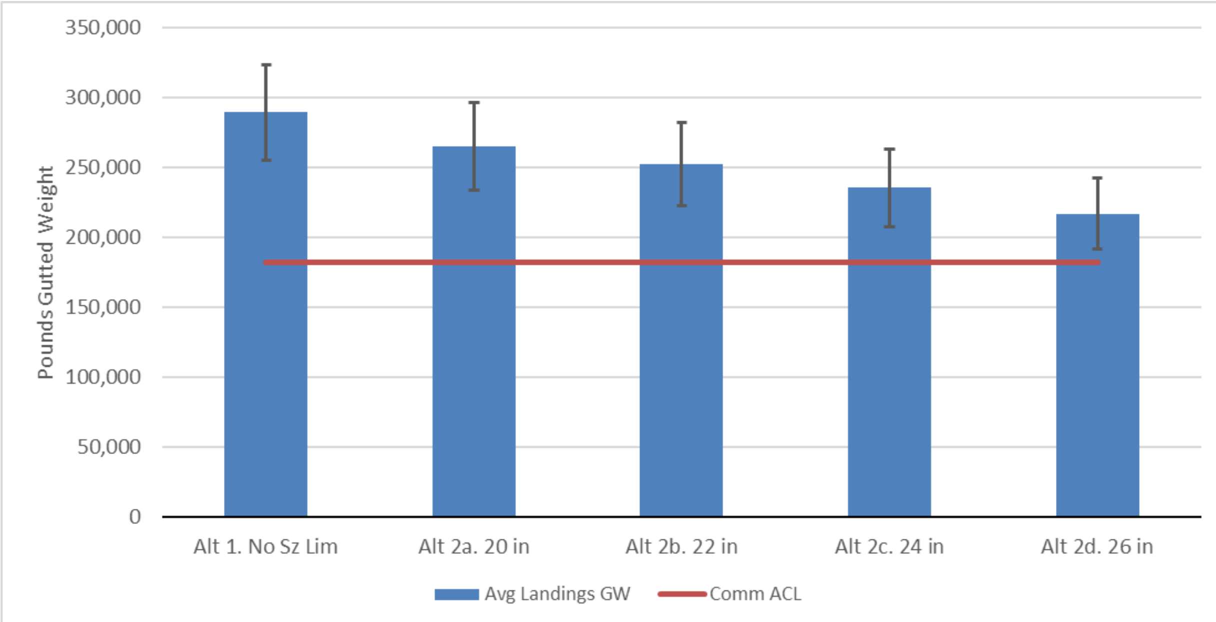

Figure K-3. Estimated annual commercial landings of the Jacks Complex for each of the alternative Almaco Jack minimum sizes under Action 6 with 95% CI and the commercial ACL for reference.

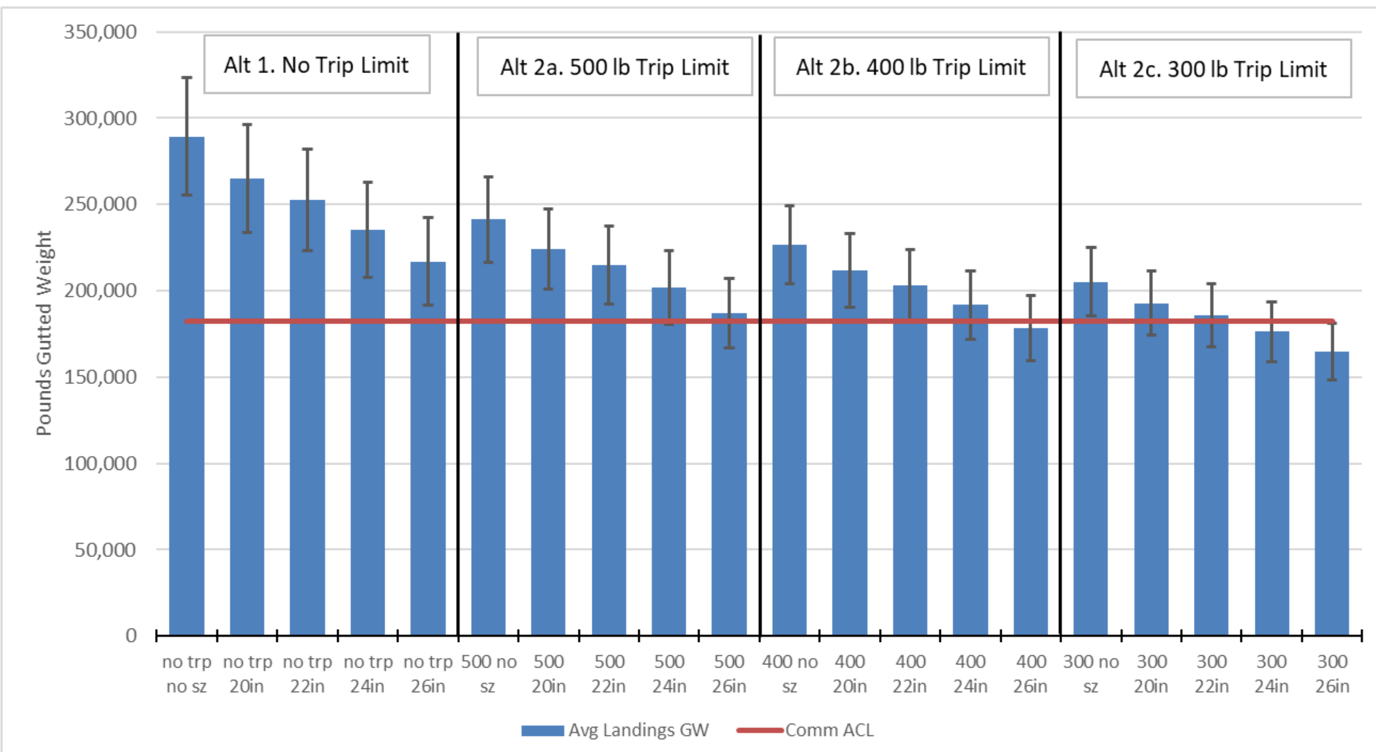

Figure K-4 Estimated annual commercial landings of the Jacks Complex for each of the trip limit sub-alternatives under Action 7, alternative 3. Each sub-alternative from Action 7 was analyzed for each of the Almaco Jack minimum size alternatives under Action 6.

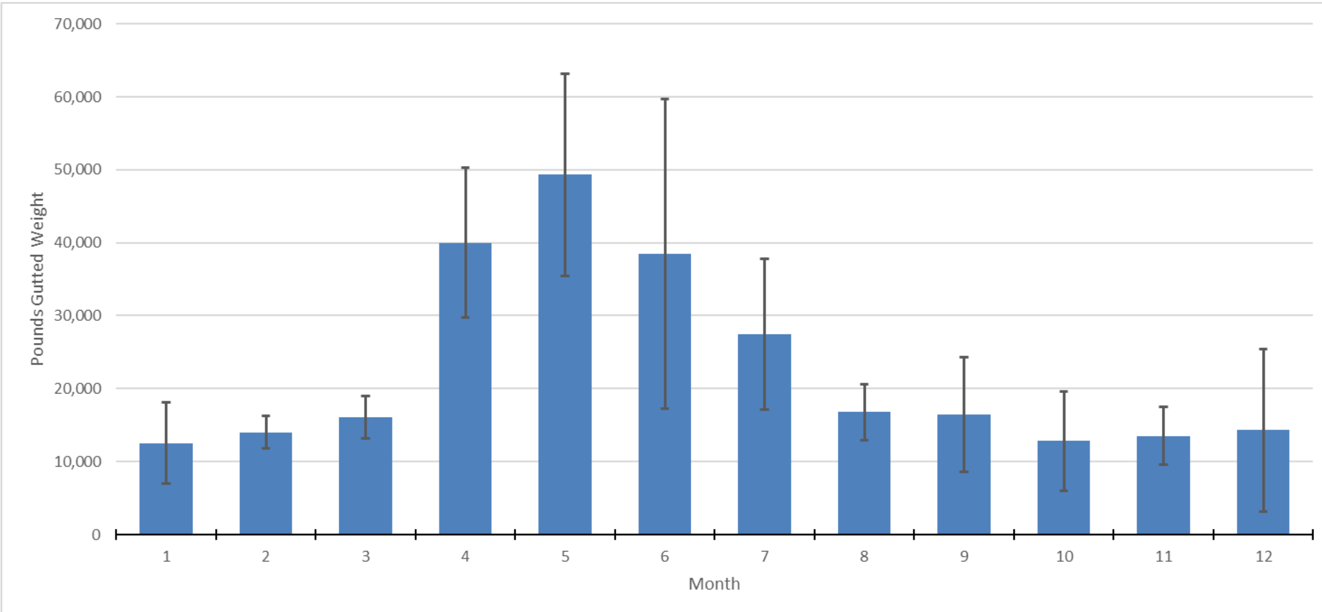

Figure K-5. Estimated average monthly landings of Jacks 2014-2016 with 95% confidence intervals.