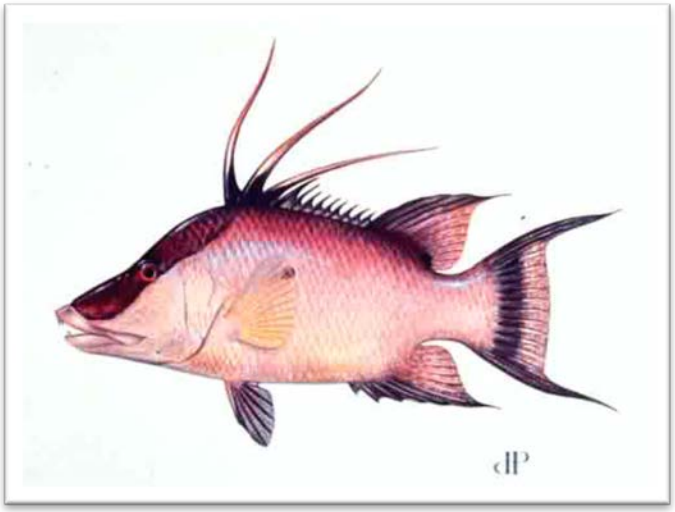
Amendment 37 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region



Modification to the hogfish fishery management unit, fishing level specifications for the two South Atlantic hogfish stocks, rebuilding plan for the Florida Keys/East Florida stock, and establishment/revision of management measures for both stocks

October 6, 2015

Environmental Impact Statement Regulatory Impact Review Regulatory Flexibility Analysis Fishery Impact Statement

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

Abbreviations and Acronyms Used in the FMP

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

Amendment 37 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region

Proposed action:	The purpose for the action is to: modify the management unit for hogfish, specify fishing levels for the Georgia-North Carolina (GA-NC) and Florida Keys/East Florida (FLK/EFL) stocks of hogfish, and modify or establish management measures. For the FLK/EFL stock of hogfish, establish a rebuilding plan to increase hogfish biomass to sustainable levels.
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Summary

Background

The Florida Fish and Wildlife Conservation Commission completed a stock assessment for hogfish in 2014 (SEDAR 37 2014). The South Atlantic Council's SSC reviewed the assessment and provided fishing level recommendations in October 2014. The Council received the SSC's recommendations at their December 2014 meeting. Based on genetic evidence the SSC supported treating hogfish in the South Atlantic as two stocks: Georgia-North Carolina (GA-NC) and Florida Keys/East Florida (FLK/EFL). Each assessment was then evaluated with regard to fishing level recommendations. The SSC developed catch level recommendations for the GA-NC stock using the Only Reliable Catch Stocks (ORCS) approach, as outlined in Level 4 of the Council's ABC control rule. For the FLK/EFL stock, the SSC considered the benchmark assessment to represent the best available science and recommended it for use in management. The Southeast Fisheries Science Center (SEFSC) concurred with this determination. The assessment results indicated the FLK/EFL stock is undergoing overfishing and is overfished and, therefore, in need of a rebuilding plan.

Amendment 37 would address specifying the boundary between the FLK/EFL stock, managed by the South Atlantic Council, and the Gulf of Mexico stock, managed by the Gulf Council. This demarcation needs to take place to aid in enforcing regulations and for proper tracking of the ACLs for each stock. Amendment 37 also includes actions to specify Acceptable Biological Catch (ABC), Annual Catch Limits (ACLs), and Optimum Yield (OY) for both stocks, establish a rebuilding plan for the FLK/EFL stock, and implement or modify management measures for both stocks to attain the desired level of harvest.

Purpose for Actions

The *purpose* of this amendment is to modify the management unit for hogfish, specify fishing levels based on Scientific and Statistical Committee recommendations for the Georgia-North Carolina and Florida Keys/East Florida stocks of hogfish, and modify or establish management measures. For the Florida Keys/East Florida stock of hogfish, establish a rebuilding plan to increase hogfish biomass to sustainable levels within a specified time period based on results of the recent stock assessment conducted with data through 2012.

Need for Actions

The *need* for this amendment is to align the management boundaries for hogfish with the best available science (i.e., genetic information), and end overfishing and rebuild the Florida Keys/East Florida stock of hogfish while minimizing, to the extent practicable, adverse social and economic effects.

Action 1.

Alternative 1. No Action.

Alternative 2.

Summary of Effects

Biological Effects

Economic Effects

Social Effects

Action 2.

Alternative 1 (No Action).

Alternative 2.

Summary of Effects

Biological Effects

Economic Effects

Social Effects

Chapter 1. Introduction

1.1 What Actions Are Being Proposed in this Amendment?

Amendment 37 includes 11 actions to address:

- Modification of the hogfish fishery management unit
- Specification of ABC, ACL, and OY for the GA-NC stock
- Management and Accountability Measures for the GA-NC stock
- Specification of fishing levels and rebuilding plan for the FLK/EFL stock
- Management and Accountability Measures for the FLK/EFL stock

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 Director 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. For CMP species, the South Atlantic Council manages through the Mid-Atlantic Region

1.2 Who is Proposing the Amendment?

The South Atlantic Council develops the amendment and submits it to the National Marine Fisheries Service (NMFS) who, on behalf of the Secretary of Commerce, ultimately approves, disapproves, or partially approves, and implements the actions in the amendment through the development of regulations. NMFS is a line office of the National Oceanic and Atmospheric Administration. The South Atlantic Council and NMFS are also responsible for making this document available for public comment. The draft environmental impact statement (EIS) will be made available to the public during the scoping process, public hearings, and in South Atlantic Council meeting briefing books. The final EIS/amendment will be published for public comment during the notice of availability and proposed rule stages of the rulemaking process. The public hearing draft and final EIS/amendment may be found online at: (insert link when available)

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 Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP, SAFMC 1983) (**Figure 1.3.1**). Hogfish is one of fifty-nine species managed by the Council under the Snapper Grouper FMP.

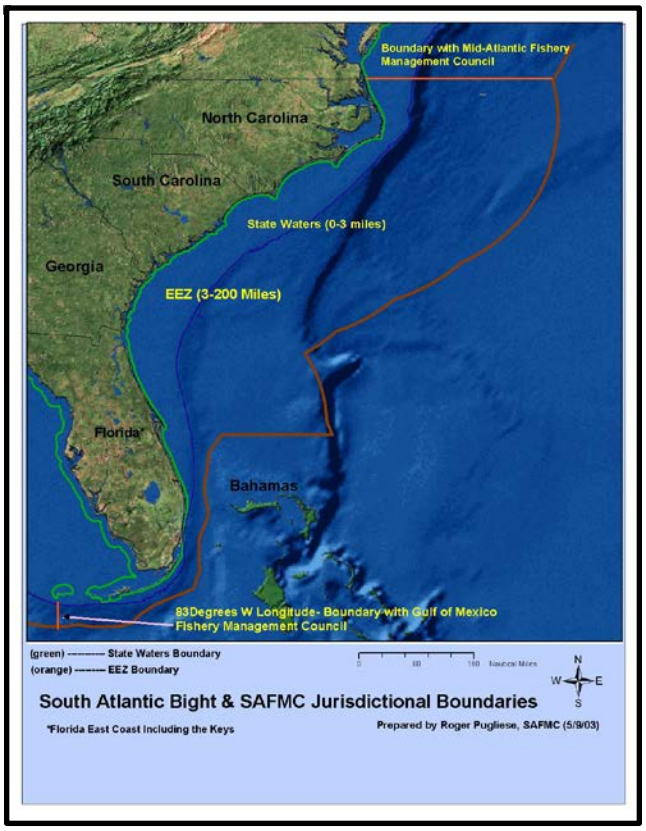


Figure 1.3.1. Jurisdictional boundaries of the South Atlantic Fishery Management Council.

1.4 Why are the Council and NMFS Considering Action?

The Florida Fish and Wildlife Conservation Commission completed a stock assessment for hogfish in 2014 (SEDAR 37 2014). The South Atlantic Council's SSC reviewed the assessment and provided fishing level recommendations in October 2014. The Council received the SSC's recommendations at their December 2014 meeting. Based on genetic evidence the SSC supported treating hogfish in the South Atlantic as two stocks: Georgia-North Carolina (GA-NC) and Florida Keys/East Florida (FLK/EFL). Each assessment was then evaluated with regard to fishing level recommendations. The SSC developed catch level recommendations for the GA-NC stock using the Only Reliable Catch Stocks (ORCS) approach, as outlined in Level 4 of the Council's ABC control rule. For the FLK/EFL stock, the SSC considered the benchmark assessment to represent the best available science and recommended it for use in management. The Southeast Fisheries Science Center (SEFSC) concurred with this determination. The assessment results indicated the FLK/EFL stock is undergoing overfishing and is overfished and, therefore, in need of a rebuilding plan.

Amendment 37 would address specifying the boundary between the FLK/EFL stock, managed by the South Atlantic Council, and the Gulf of Mexico stock, managed by the Gulf Council. This demarcation needs to take place to aid in enforcing regulations and for proper tracking of the ACLs for each stock. Amendment 37 also includes actions to specify Acceptable Biological Catch (ABC), Annual Catch Limits (ACLs), and Optimum Yield (OY) for both stocks, establish a rebuilding plan for the FLK/EFL stock, and implement or modify management measures for both stocks to attain the desired level of harvest.

Purpose for Actions

The *purpose* of this amendment is to modify the management unit for hogfish, specify fishing levels based on the South Atlantic Fishery Management Council's Scientific and Statistical Committee recommendations for the Georgia-North Carolina and Florida Keys/East Florida stocks of hogfish, and modify or establish management measures. For the Florida Keys/East Florida stock of hogfish, this amendment would establish a rebuilding plan to increase hogfish biomass to sustainable levels within a specified time period based on results of the recent stock assessment conducted with data through 2012.

Need for Actions

The *need* for this amendment is to align the management boundaries for hogfish with the best available science (i.e., genetic information), and end overfishing and rebuild the Florida Keys/East Florida stock of hogfish while minimizing, to the extent practicable, adverse social and economic effects.

1.5 What are Annual Catch Limits (ACLs) and Accountability Measures (AMs) and Why are they Required?

A reauthorization of the Magnuson-Stevens Act in 2007 required implementation of new tools to end and prevent overfishing to achieve the optimum yield from a fishery. The tools are ACLs and AMs. An ACL is the level of annual catch of a stock that, if met or exceeded, triggers some corrective action. The AMs are the corrective action, and they are management controls to prevent ACLs from being exceeded and to correct overages of ACLs if they occur. Two examples of AMs include an in-season closure if catch is projected to reach the ACL and reducing the ACL by an overage that occurred the previous fishing year. Amendment 37 includes alternatives that would revise the current ACLs and AMs for hogfish

Definitions

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

Annual Catch Targets
The level of annual catch (lbs 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
Management controls to prevent ACLs, including sector ACLs, from being exceeded, and to correct or mitigate overages of the ACL if they occur.

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

Maximum Sustainable Yield
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
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
A status determination criterion. If current stock size is below MSST, the stock is overfished.

1.6 How Does the Council Determine the Annual Catch Limits?

ACLs are derived from the overfishing limit (OFL) and the ABC **(Figure 1.6.1)**. The Council's Scientific and Statistical Committee (SSC) determines the OFL from the stock assessment and the ABC (based on the Council/SSC's ABC control rule), and recommends those to the Council. The OFL is an estimate of the catch level above which overfishing is occurring. The ABC is defined as the level of a stock or stock complex's annual catch that accounts for the scientific uncertainty in the estimate of OFL and any other scientific uncertainty.

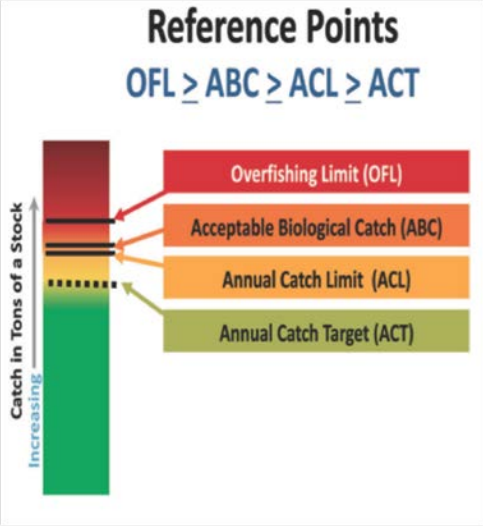


Figure 1.6.1. The relationship of the reference points to each other.

1.7 How is the Council Modifying the Overfishing Definition for Hogfish and Other Snapper Grouper Species?

The Magnuson-Stevens Act National Standard 1 Guidelines provide a definition of overfishing that allows overfishing to be determined in two ways, by a fishing mortality rate or by a level of catch:

50 C.F.R § 600.310 (e)(2)(i)(B)

> *Overfishing (to overfish) occurs whenever a stock or stock complex is subjected to a level of fishing mortality or annual total catch that jeopardizes the capacity of a stock or stock complex to produce maximum sustainable yield (MSY) on a continuing basis.*

The National Standard 1 Guidelines provide more detail about these two methods, and require that FMPs describe which method will be used to determine an overfishing status:

50 C.F.R. § 600.310 (e)(2)(ii)(A)

> *Status Determination Criteria to determine overfishing status. Each fishery management plan (FMP) must describe which of the following two methods will be used for each stock or stock complex to determine an overfishing status.*
>
> *(1) Fishing mortality rate exceeds maximum fishing mortality threshold (MFMT). Exceeding the MFMT for a period of 1 year or more constitutes overfishing. The MFMT or reasonable proxy may be expressed either as a single number (a fishing mortality rate or F value), or as a function of spawning biomass or other measure of reproductive potential.*
>
> *(2) Catch exceeds the overfishing limit (OFL). Should the annual catch exceed the annual OFL for 1 year or more, the stock or stock complex is considered subject to overfishing.*

The OFL is defined as an annual level of catch that corresponds directly to the MFMT, and is the best estimate of the catch level above which overfishing is occurring.

MFMT Method - Overfishing occurring if fishing mortality exceeds the MFMT

This method is a more direct way than the OFL method of comparing the fishing rate to the maximum allowed rate of fishing, and it is less sensitive to recent fluctuations in recruitment. The estimates of fishing mortality are based on the maximum annual fishing mortality at any age. However, fishing mortality rates cannot be directly measured. They must be calculated as part of a stock assessment or assessment update, thus fishing mortality rates are only available for years when assessments are conducted.

The "current" fishing mortality rate for an assessed stock corresponds to the last year of data used in the assessment. Therefore, use of the "current fishing mortality" rate may not reflect the true status of the stock in years following a stock assessment, particularly if actions are taken to constrain effort and harvest.

OFL Method - Overfishing occurring if annual landings exceed the OFL

The OFL method is based on catch levels that are more easily understood by constituents than fishing mortality. Unlike fishing mortality rates, a determination can be made on an annual basis as soon as catch totals are available. However, the use of the OFL method might not be appropriate for stocks with highly variable recruitment that cannot be predicted and therefore incorporated into the forecast of stock condition on which the OFL is based.

Overfishing Definition for the FLK/EFL stock of hogfish and other assessed snapper grouper stocks in the South Atlantic region

Each of the two methods for determining overfishing has benefits and drawbacks with MFMT being a better estimate of overfishing status in a year in which a stock is assessed and OFL a better estimate of overfishing status in years when a current estimate of fishing mortality is not available. Therefore, the Council proposes the use of both the MFMT and OFL as metrics to determine the overfishing status of the FLK/EFL stock of hogfish and (insert list of SG species for which this definition should apply).

For the FLK/EFL stock of hogfish and (insert list of SG species for which this definition should apply), overfishing will be determined on an annual basis by the MFMT and OFL methods. The estimate of F_{MSY} (MFMT) for an assessed stock is a single value, while the corresponding OFL values increase as the stock rebuilds. If either the MFMT (during an assessment year) or the OFL method (during a non-assessment year) is exceeded, the stock will be considered to be undergoing overfishing. Two examples are below:

(NOTE TO IPT: examples below are for bueline tilefish. Do we need specific ones for hogfish?)
Example 1. As a stock assessment was not conducted in 2014, the Council does not receive an updated estimate of fishing mortality that can be compared to F_{MSY} (MFMT). The OFL for 2015 is 54,612 lbs ww and provides the basis for the overfishing definition. Total landings in 2015 are 32,000 lbs ww and below the OFL (54,612 lbs ww). Overfishing in 2015 is not occurring.

Example 2. A SEDAR assessment is completed in 2015 and provides an updated estimate of fishing mortality that can be compared to the MFMT. The assessment changes the F_{MSY} (MFMT) value to 0.205. The current estimate of the fishing mortality, termed $F_{CURRENT}$, is 0.302. Landings in 2015 are 32,000 lbs ww, below OFL. However, even though landings are below OFL, $F_{CURRENT}$ is greater than MFMT. Overfishing in 2015 is occurring.

Chapter 2. Proposed Actions and Alternatives

2.1 Action 1. Modify the Fishery Management Unit for hogfish

Alternative 1 (No action). Do not establish separate stocks of hogfish in the South Atlantic. There is a Gulf of Mexico stock and South Atlantic stock of hogfish separated at the jurisdictional boundary between the South Atlantic Fishery Management Council and the Gulf of Mexico Fishery Management Council:
The boundary coincides with the line of demarcation between the Atlantic Ocean and the Gulf of Mexico, which begins at the intersection of the outer boundary of the EEZ, as specified in the Magnuson-Stevens Act, and 83°00′ W. long., proceeds northward along that meridian to 24°35′ N. lat., (near the Dry Tortugas Islands), thence eastward along that parallel, through Rebecca Shoal and the Quicksand Shoal, to the Marquesas Keys, and then through the Florida Keys to the mainland at the eastern end of Florida Bay, the line so running that the narrow waters within the Dry Tortugas Islands, the Marquesas Keys and the Florida Keys, and between the Florida Keys and the mainland, are within the Gulf of Mexico.

Preferred Alternative 2. Modify the snapper grouper fishery management unit (FMU) to specify two separate stocks of hogfish: (1) a Georgia through North Carolina (GA-NC) stock from the Georgia/Florida state boundary to the North Carolina/Virginia state boundary, and (2) a Florida Keys/East Florida (FLK/EFL) stock from the Florida/Georgia state boundary south to:

Sub-alternative 2a. The South Atlantic/Gulf of Mexico Council boundary.
Sub-alternative 2b. The Monroe/Collier County line.
Preferred Sub-alternative 2c. A line just south of Cape Sable running due west (25^0 09'.000 North Latitude).

(insert map)

Figure 1. Proposed **Sub-alternative 2c** boundary: a line due west from a point just south of Cape Sable on Florida's west coast (25^o09'.000 N lat.).

Discussion

Alternative 1 (No Action) would make no changes to specify separate stocks of hogfish within the snapper grouper fishery management unit (FMU) and would, therefore, fail to recognize the latest scientific information on those stocks. **Alternative 2** would specify the boundaries for the GA-NC stock of hogfish and the sub-alternatives would define the boundary between the FLK/EFL stock of hogfish managed by the South Atlantic Fishery Management Council (South Atlantic Council), and the Gulf of Mexico stock managed by the Gulf of Mexico Fishery Management Council (Gulf Council). **Sub-alternative 2a** would use the jurisdictional

boundary between the South Atlantic and Gulf Councils but would not fit the biological demarcation of the two stocks so that a portion of the FLK/EFL stock would remain within the Gulf Council's jurisdiction. **Sub-alternative 2b** uses the Monroe/Collier County line to differentiate the two stocks. This boundary would result in a better fit to the areas in which the two stocks are contained, but there could be negative law enforcement issues associated with different regulations for hogfish in the two areas. The Monroe/Collier County line was used in the SEDAR 37 (2014) assessment to differentiate between the FLK/EFL stock of hogfish and that in the West Florida shelf. **Preferred Sub-alternative 2c** considers a point just south of Cape Sable as a starting point for the boundary line to differentiate the two stocks. According to local law enforcement officials, this would be a good demarcation point because "it is far enough north of the Keys and far enough South of Naples and Marco Island so that Monroe is not simply shifting the regulatory problem north to Collier County."

Commercial landings for annual catch limit (ACL) monitoring by the Southeast Fisheries Science Center (SEFSC) and the National Marine Fisheries Service (NMFS) Southeast Regional Office are assigned to region based on captain-reported catch area. Headboat landings for ACL monitoring are assigned to an area fished; for vessels in Monroe County, landings are assigned to a region based on port. Marine Recreational Information Program (MRIP) hogfish landings for recreational ACL monitoring are based on reported catch area, with Monroe County landings re-assigned ('post-stratified') from the Gulf of Mexico to the South Atlantic, consistent with decisions made in SEDAR 37 (2014). Minor changes to regional boundaries such as those being considered in **Action 1** may facilitate enforcement of management regulations but would not impact approaches to ACL monitoring. Thus, ACL monitoring for hogfish would remain consistent with past approaches with regard to the assignment of landings to region in Monroe County; these approaches are consistent with those used in SEDAR 37 (2014).

2.2 Action 2. Specify Maximum Sustainable Yield (MSY) for the GA-NC and the Florida Keys/ East Florida (FLK/EFL) stocks of hogfish

Alternative 1 (No Action). Do not define MSY for the GA-NC or the FLK/EFL stocks of hogfish. Currently, MSY equals the yield produced by F_{MSY}. $F_{30\%SPR}$ is used as the F_{MSY} proxy for hogfish in the South Atlantic.

Preferred Alternative 2. MSY equals the yield produced by F_{MSY} or the F_{MSY} proxy ($F_{30\%SPR}$). MSY and F_{MSY} are recommended by the most recent SEDAR/SSC.

Preferred Sub-alternative 2a. GA-NC stock of hogfish.

Preferred Sub-alternative 2b. FLK/EFL stock of hogfish.

Alternatives	Equation	F_{MSY}	MSY Values (lbs whole weight)
Alternative 1 (No Action)	MSY is not defined for the GA-NC stock or the FLK/EFL stock	unknown	unknown
Alternative 2 (Preferred)	**MSY equals the yield produced by F_{MSY} or the F_{MSY} proxy. MSY and F_{MSY} are recommended by the most recent SEDAR/SSC.**	**Sub-alt 2a: GA-NC = unknown** **Sub-alt 2b: FLK/EFL = 0.138**	**GA-NC = unknown** **FLK/EFL = 346,095**

Discussion

Maximum Sustainable Yield (MSY) is the largest long-term average catch that can be taken from a stock or stock complex under prevailing ecological and environmental conditions. MSY for snapper grouper species was initially specified in Amendment 11 (SAFMC 1998) to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP). For hogfish, Amendment 11 defined MSY as the yield produced when fishing at a rate that will produce MSY where $F_{30\%SPR}$ is used as the F_{MSY} proxy. At that time, MSY was unknown for hogfish due to a lack of data. When a stock assessment is conducted; however, the model produces estimates of MSY. In the case of hogfish, a stock assessment could only be conducted for the FLK/EFL stock; hence, an estimate of MSY is available for the FLK/EFL stock but not the GA-NC stock. The South Atlantic Council needs to take action to adopt the new definition and value for MSY. Selecting a definition for MSY would allow for any subsequent revisions to that value when the stock assessment is updated or a new assessment is performed without the Council having to take action. **Preferred Alternative 2** would provide the South Atlantic Council with that option. SEDAR 37 (2014) produced estimates for F_{MSY} and

the yield at F_{MSY} for the FLK/EFL stock. Those values are 0.138 and 346,095 lbs ww, respectively, and correspond to **Preferred Sub-alternative 2b (Table 2.2.1)**.

Table 2.2.1. Hogfish recommendations for the Florida Keys/East Florida stock of hogfish. Note: values are in metric tons.

Criteria	Deterministic	Probabilistic
Overfished evaluation	Yes, F/Fmsy= 1.593	1.440
Overfishing evaluation	Yes, SSB/MSST= 0.466	0.494
MFMT (Fmsy)	0.138	0.140
SSBmsy (male & female mature biomass, units not reported)	1,043.44	1,033.725
MSST (male & female mature biomass, units not reported)	856.664	848.688
MSY (1000 lb)	156.986	156.973
Y at 75% Fmsy (1000 lb)	Not reported	Not reported
ABC Control Rule Adjustment	22.5%	
P-Star (Prebuild)	27.5% (72.5%)	
OFL (1000 lb)		
ABC RECOMMENDATIONS: Projection results at the recommended P* were not available when this report was finalized. The projection report will be included as an appendix to this report.		

Source: SSC report, October 2014.

For the GA-NC stock of hogfish, the MSY value is still unknown (**Preferred Sub-alternative 2a**) because a stock assessment could not be performed. However, should data become available to conduct an assessment on that stock, **Preferred Alternative 2** would allow the South Atlantic Council to adopt the new MSY value without having to prepare an additional amendment to do so.

2.3 Action 3. Specify Minimum Stock Size Threshold (MSST) for the GA-NC and the Florida Keys/ East Florida (FLK/EFL) stocks of hogfish

Alternative 1 (No Action). Do not define minimum stock size threshold (MSST) for the GA-NC and Florida Keys/East Florida (FLK/EFL) stocks of hogfish. MSST for hogfish in the South Atlantic is equal to SSB_{MSY} ((1-M) or 0.5, whichever is greater).

Alternative 2. Minimum Stock Size Threshold **(**MSST) = SSB_{MSY} ((1-M) or 0.5, whichever is greater).

Sub-alternative 2a. For the GA-NC stock of hogfish.

Sub-alternative 2b. For the FLK/EFL stock of hogfish.

Alternative 3. Minimum Stock Size Threshold (MSST) = 50% of SSB_{MSY}

Sub-alternative 3a. For the GA-NC stock of hogfish.

Sub-alternative 3b. For the FLK/EFL stock of hogfish.

Preferred Alternative 4. Minimum Stock Size Threshold (MSST) = 75% of SSB_{MSY}

Preferred Sub-alternative 4a. For the GA-NC stock of hogfish.

Preferred Sub-alternative 4b. For the FLK/EFL stock of hogfish.

Alternatives	MSST Equation	M	MSST Values (lbs whole weight)
1 (No Action)	MSST = SSB_{MSY} ((1-M) or 0.5, whichever is greater).	0.25	unknown
2	MSST = SSB_{MSY} ((1-M) or 0.5, whichever is greater).	0.179	GA-NC = unknown FLK/EFL = 1,888,621
3	MSST = 50% of SSB_{MSY}	0.179	GA-NC = unknown FLK/EFL = 1,150,195
4 (Preferred)	**MSST = 75% of SSB_{MSY}**	**0.179**	**GA-NC = unknown** **FLK/EFL = 1,725,293**

Discussion:

The Minimum Stock Size Threshold (MSST) is the level below which a stock is considered to be overfished. MSST for hogfish in the South Atlantic is currently specified as MSST = SSB_{MSY}*((1-M) or 0.5, whichever is greater) where SSB_{MSY} is the spawning stock biomass at the MSY level and M is the natural mortality rate. MSST has not been specified for the GA-NC and FLK/EFL stocks (**Alternative 1 (No Action)**). Regulatory Amendment 21 to the Snapper

Grouper FMP, effective November 6, 2014, changed the definition for MSST for select snapper grouper species (red snapper, blueline tilefish, gag, black grouper, yellowtail snapper, vermilion snapper, red porgy, and greater amberjack) with low natural mortality (M) from MSST = SSB_{MSY}*((1-M) or 0.5, whichever is greater) to MSST = 75% SSB_{MSY}. Other Snapper Grouper FMP amendments changed MSST to 75% SSB_{MSY} for snowy grouper, golden tilefish, and red grouper because natural mortality rate is very low (Amendments 15A, 15B, and 24, respectively). When the natural mortality rate is low (i.e., less than 0.25), even small fluctuations in biomass due to natural variations not related to fishing mortality may cause a stock to vary between an overfished or rebuilt condition. When a species is identified as overfished, the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires that a plan be implemented to rebuild the stock. Redefining MSST for these species was done to help prevent unnecessary overfished designations when small drops in biomass are due to natural variation in recruitment or other environmental variables, and ensure that rebuilding plans are applied to stocks when truly appropriate. Natural mortality for the FLK/EFL stock of hogfish is estimated at 0.179, which is within the range of natural mortality values for species addressed in Regulatory Amendment 21, Amendment 15A, Amendment 15B, and Amendment 24 (0.08 – 0.23). **Alternative 2** would retain the current MSST formula (SSB_{MSY} *(1-M) or 0.5, whichever is greater) but apply it to each of the two hogfish stocks. **Alternative 3** would specify MSST for the GA-NC and FLK/EFL stocks, allowing MSST to be set at 50% of the SSB_{MSY}, which would result in a lower threshold than that proposed under **Preferred Alternative 4** (75% SSB_{MSY}).

2.4 Action 4. Establish Annual Catch Limits (ACLs) for the GA-NC stock of hogfish

Alternative 1 (No action). Do not establish ACLs for the GA-NC stock of hogfish. The current ABC for the entire stock of hogfish is 137,824 lbs ww and ACL = OY = ABC. The commercial ACL = 49,469 lbs ww (36.69%) and the recreational ACL = 85,355 lbs ww (63.31%).

Alternative 2. Establish an ACL for the GA-NC stock. Specify commercial and recreational ACLs using re-calculated sector allocations based on proposed modifications to the management unit (81.91% commercial and 18.09% recreational). The ABC for the GA-NC stock = 28,161 pounds whole weight (lbs ww).

Sub-alternative 2a. ACL = OY = ABC

Sub-alternative 2b. ACL = OY = 95% ABC

Sub-alternative 2c. ACL = OY = 90% ABC

Discussion

Table 2.4.1. Commercial and recreational ACLs provided by Sub-alternatives 2a-2c. Pounds are in whole weight. Recreational catch converted from pounds to numbers using a conversion factor of 9.99 lbs ww per fish.

ABC lbs	Sub-alternative 2a			Sub-alternative 2b			Sub-alternative 2c		
	Rec lbs	Rec #s	Comm lbs	Rec lbs	Rec #s	Comm lbs	Rec lbs	Rec #s	Comm lbs
28,161	5,094	510	23,067	4,840	484	21,913	4,585	459	20,760

Revise and update:

Excerpt from the October 2014 SSC Report:

The SSC agreed with recommendations from the CIE reviewers to not consider assessment results for the GA-NC stock as sufficient to determine stock status and inform management decisions. Although there isn't another analysis available for this stock a statistical catch at age model is not the appropriate modeling framework to analyze the available data and therefore this assessment is not considered the best available science. The Committee recommends that catch level recommendations for the GA-NC hogfish stock be developed using the ORCS approach, as outlined in the Council's ABC control rule:

For application of the ORCS approach the SSC considered the fishery-dependent indices in the assessment model as well as landings trends. Significant discussion points included:

- Many uncertainties in the trends displayed, including competing trends between some of the indices. This indicates a critical need for data workshop participants to prioritize indices for modeling uses and for determination of abundance trends over time. Prioritization of indices would have helped the SSC with respect to decisions used to complete the ORCs approach.

- The SSC did not feel compelling evidence was available to change the Risk of Overexploitation designation given to hogfish during the ORCS Workshop. Therefore, the Committee recommended the use a Risk of Overexploitation of Moderate-High:
    - Leads to a risk of overexploitation scalar of 1.25
    - 1999 is the year of maximum landings within the 1999-2007 time period designated as appropriate during ORCS Workshop.

Table 2.4.2. The South Atlantic's Scientific and Statistical Committee (SSC) Acceptable Biological Catch (ABC) recommendation for the GA-NC stock of hogfish.

Statistic	Value
Risk of Overexploitation	Moderately High
Associated Scalar	1.25
Range of Years	1999-2007
Year of Max Landings	1999
Catch Statistic	32,184 lbs ww
Council Risk Scalar (Preferred from Am 29)	0.7
Proposed ABC	28,161 lbs ww

The allocation formula from the Comprehensive ACL Amendment (SAFMC 2011) was used to specify commercial and recreational allocations for the GA-NC hogfish stock: (0.5 * catch history) + (0.5 * current trend) where catch history = average landings 1986-2008, current trend = average landings 2006-2008. The formula was applied to SEFSC commercial ACL data, accessed in July 2014, and post-stratified SEFSC recreational data accessed in February 2015). Recreational data were post-stratified to include MRIP landings from Monroe County in the FLK/EFL sub-region, consistent with the SEDAR 37 stock assessment. Commercial and recreational landings used to recalculate sector allocations are shown in **Table 2.6.1** (Action 6).

2.5 Action 5. Establish a rebuilding plan for the Florida Keys/East Florida (FLK/EFL) stock of hogfish

Alternative 1 (No Action). Do not establish a rebuilding plan the Florida Keys/East Florida (FLK/EFL) stock of hogfish. The current ABC for the entire stock of hogfish is 137,824 lbs ww

Alternative 2. Define a rebuilding plan where the rebuilding strategy for the Florida Keys/East Florida (FLK/EFL) stock of hogfish sets ABC equal to the yield at a constant fishing mortality rate and rebuilds the stock in 10 years with a 50% probability of rebuilding success. The Overfishing Limit (OFL) is the yield at F_{MSY}. The Spawning Stock Biomass (SSB_{MSY}) is 2,300,391 lbs ww. Year 1 = 2016.

Year	F	ABC (lbs ww)	ABC (numbers)	OFL* (lbs ww)	OFL* (numbers)	Spawning Stock Biomass (lbs ww)
2016	0.10	91,660	38,160	127,490	53,140	806,960
2017	0.10	109,130	44,230	146,850	59,930	968,620
2018	0.10	127,540	49,900	166,560	66,060	1,141,610
2019	0.10	146,310	55,680	185,930	72,140	1,319,490
2020	0.10	165,030	61,530	204,610	78,130	1,498,360
2021	0.10	183,370	67,250	222,310	83,830	1,674,830
2022	0.10	201,010	72,700	238,830	89,130	1,845,660
2023	0.10	217,700	77,780	253,990	93,950	2,008,090
2024	0.10	233,250	82,460	267,700	98,280	2,160,050
2025	0.10	247,540	86,710	279,930	102,120	2,300,230

Source: Table 6, Appendix A. (*) OFL values from Table 5, Appendix A.

Preferred Alternative 3. Define a rebuilding plan where the rebuilding strategy for the Florida Keys/East Florida (FLK/EFL) stock of hogfish sets ABC equal to the yield at a constant fishing mortality rate and rebuilds the stock in 10 years with a 72.5% probability of rebuilding success. The Overfishing Limit (OFL) is the yield at F_{MSY}. The Spawning Stock Biomass (SSB_{MSY}) is 2,300,391 lbs ww. Year 1 = 2016.

Year	F	ABC (lbs ww)	ABC (numbers)	OFL* (lbs ww)	OFL* (numbers)	Spawning Stock Biomass (lbs ww)
2016	0.089	81,610	33,970	127,490	53,140	806,960
2017	0.087	96,230	38,930	146,850	59,930	977,990
2018	0.086	111,800	43,570	166,560	66,060	1,164,540
2019	0.085	127,900	48,380	185,930	72,140	1,360,450
2020	0.084	144,210	53,330	204,610	78,130	1,561,760
2021	0.083	160,440	58,250	222,310	83,830	1,764,760
2022	0.083	176,310	63,000	238,830	89,130	1,965,690
2023	0.082	191,560	67,490	253,990	93,950	2,161,160
2024	0.082	206,010	71,680	267,700	98,280	**2,348,410**
2025	0.081	219,520	75,540	279,930	102,120	2,525,440

Source: Table 7, Appendix A. (*) OFL values from Table 5, Appendix A.

Note: Projections for various F scenarios were completed using Stock Synthesis (SS3). Under a constant F scenario, the F values vary over the span of the projection due to changes in the stock's vulnerable biomass and age composition.

Note: The projection calculated what the landings should be to give a 72.5% chance of rebuilding in 10 years. Because of the inherent uncertainties in the model, the estimated SSB at the end of the 10-year period will be necessarily higher than the SSB_{MSY} estimate from the model. Therefore, in order to have a 72.5% chance of rebuilding, the projections continue until the model estimates the SSB to be 2,525,440 for this particular scenario. In 9 years, the probability of rebuilding success is actually closer to 50% (or more likely somewhere between 50% and 72.5%).

Alternative 4. Define a rebuilding plan where the rebuilding strategy for the Florida Keys/East Florida (FLK/EFL) stock of hogfish sets ABC equal to the yield at a constant fishing mortality rate and rebuilds the stock in 7 years with a 50% probability of rebuilding success. The Overfishing Limit (OFL) is the yield at F_{MSY}. The Spawning Stock Biomass (SSB_{MSY}) is 2,300,391 lbs ww. Year 1 = 2016.

Year	F	ABC (lbs ww)	ABC (numbers)	OFL* (lbs ww)	OFL* (numbers)	Spawning Stock Biomass (lbs ww)
2016	0.049	44,580	18,530	127,490	53,140	806,960
2017	0.049	55,360	22,250	146,850	59,930	1,012,600
2018	0.049	67,250	25,870	166,560	66,060	1,242,980
2019	0.049	79,960	29,700	185,930	72,140	1,491,870
2020	0.049	93,250	33,720	204,610	78,130	1,754,380
2021	0.049	106,870	37,800	222,310	83,830	2,025,520
2022	0.049	120,560	41,840	238,830	89,130	2,299,990

Source: Table 8, Appendix A. (*) OFL values from Table 5, Appendix A.

Alternative 5. Define a rebuilding plan where the rebuilding strategy for the Florida Keys/East Florida (FLK/EFL) stock of hogfish sets ABC equal to the yield at a constant fishing mortality rate that rebuilds the stock in 7 years with a 72.5% probability of rebuilding success. The Overfishing Limit (OFL) is the yield at F_{MSY}. The Spawning Stock Biomass (SSB_{MSY}) is 2,300,391 lbs ww. Year 1 = 2016.

Year	F	ABC (lbs ww)	ABC (numbers)	OFL (lbs ww)	OFL (numbers)	Spawning Stock Biomass (lbs ww)
2016	0.044	39,820	16,550	127,490	53,140	806,960
2017	0.043	48,950	19,650	146,850	59,930	1,017,060
2018	0.043	59,060	22,680	166,560	66,060	1,254,210
2019	0.042	69,980	25,920	185,930	72,140	1,512,500
2020	0.042	81,520	29,370	204,610	78,130	1,787,130
2021	0.042	93,480	32,920	222,310	83,830	2,073,050
2022	0.042	105,630	36,470	238,830	89,130	**2,364,740**

Source: Table 9, Appendix A. (*) OFL values from Table 5, Appendix A.
Note: Projections for various F scenarios were completed using Stock Synthesis (SS3). Under a constant F scenario, the F values vary over the span of the projection due to changes in the stock's vulnerable biomass and age composition.

In the tables above, the terminal Spawning Stock Biomass (SSB) in the rebuilding projections may not equal or exceed the base run estimate of SSB_{MSY} because the SSB estimates in the projections were generated from multiple bootstrap iterations in order to incorporate uncertainty into the projections. Therefore, the actual SSB_{MSY} that the projections are rebuilding to is not the estimate from the base run but the median (or other type of estimate in the case of the 72.5% probability of success runs) from the bootstrap distribution.

Table 2.5.1 below provides a summary of the alternatives for **Action 5**.

Table 2.5.1. A summary of the various rebuilding scenarios (Alternatives 1-6) for the Florida Keys/East Florida (FLK/EFL) stock of hogfish.

Alternatives	F rate strategy	F rate	Year 1 ABC (pounds)	Rebuilt stock (years)	Probability of rebuilt stock
1 (No action)	Do not specify a rebuilding plan. The current ABC for the entire stock of hogfish is 137,824 lbs ww				
2	Constant	0.100	91,660	10	50%
3 (Preferred)	Constant	0.089 (year 1)	81,610	10	72.5%
4	Constant	0.049	44,580	7	50%
5	Constant	0.044 (year 1)	39,820	7	72.5%

Discussion

The last year of data in the hogfish assessment report (SEDAR 37 2014) was 2012. Projections for various fishing mortality (F) scenarios were completed using Stock Synthesis (SS3) base model configurations for the Florida Keys/East Florida (FLK/EFL) hogfish stock (SEDAR 37 2014). Projection results are based on year 1 = 2016 and extending through 2026, or to the point of stock rebuilding if a scenario did not result in rebuilding within 10 years. The projected OFLs and ABCs in **Appendix A** assume the current minimum size limit (12 inches fork length). If this size limit is modified in Action 8, updated average weights would be used to update the yield streams in numbers.

Since the stock assessment for the FLK/EFL stock falls under Tier 1 of the ABC control rule, the SSC recommended a P* = 0.275 with a probability of rebuilding success of 72.5%, which corresponds to the values shown under **Preferred Alternative 3**. **Alternative 2** would rebuild the stock in the required 10 years but at a lower probability of success than that recommended by the SSC **Alternatives 4** and **5** would rebuild the stock in 7 years with 50% and 72.5% probabilities of rebuilding success, respectively. Since the stock would rebuild in a shorter time period, **Alternatives 4** and **5** would implement lower ABCs (and consequently lower ACLs) than alternatives that rebuild the stock in the required 10 years.

2.6 Action 6. Establish Annual Catch Limits (ACLs) for the Florida Keys/East Florida (FLK/EFL) stock of hogfish

Alternative 1 (No action). Do not establish ACLs for the Florida Keys/East Florida (FLK/EFL) hogfish stock. The current Acceptable Biological Catch (ABC) for the entire stock of hogfish is 137,824 lbs ww and Annual Catch Limit (ACL) = OY = ABC. The commercial annual catch limit (ACL) = 49,469 lbs ww (36.69%) and the recreational annual catch limit (ACL) = 85,355 lbs ww (63.31%).

Preferred Alternative 2. Establish annual catch limits (ACLs) for the Florida Keys/East Florida (FLK/EFL) stock of hogfish. Specify commercial and recreational ACLs for 2017-2025. ACLs will not increase automatically in a subsequent year if present year projected catch has exceeded the total ACL. Specify commercial and recreational ACLs using re-calculated sector allocations based on proposed modifications to the management unit (24.29% commercial and 75.71% recreational).

Preferred Sub-alternative 2a. ACL = OY = ABC

Sub-alternative 2b. ACL = OY = 95% ABC

Sub-alternative 2c. ACL = OY = 90% ABC

Discussion:

The allocation formula from the Comprehensive ACL Amendment (SAFMC 2011) was used to specify commercial and recreational allocations for the FLK/EFL hogfish stock: (0.5 * catch history) + (0.5 * current trend) where catch history = average landings 1986-2008, current trend = average landings 2006-2008. The formula was applied to SEFSC commercial ACL data, accessed in July 2014, and post-stratified SEFSC recreational data accessed in February 2015). Recreational data were post-stratified to include MRIP landings from Monroe County in the FLK/EFL sub-region, consistent with the SEDAR 37 stock assessment. Commercial and recreational landings data used to re-calculate sector allocations are shown in **Table 2.6.1**.

Tracking the recreational ACL would be more timely if the South Atlantic Council were to specify the recreational ACL in numbers of fish and not pounds. MRIP and the headboat logbook programs collect data in numbers of fish. Quota/ACL tracking is delayed beyond the 2 month MRIP waves for the SEFSC to conduct their own conversion of numbers to pounds separate from the conversion MRIP provides for the rest of the regions. Headboat owners are required to provide electronic data each week in terms of numbers of fish, and time is needed for quality control, expanding values for non-compliance, and to convert numbers into pounds. The timing of recreational ACL tracking could be improved by specifying the recreational ACL in numbers of fish rather than pounds. The South Atlantic and Gulf Councils are considering a similar weekly/electronic requirement for charter vessels.

Table 2.6.1. Commercial and recreational landings used to re-calculate hogfish sector allocations for the GA-NC and Florida Keys/East Florida regions.

Year	Recreational (lbs ww)		Commercial (lbs ww)		Total (lbs ww)	
	FLK/EFL	GA-NC	FLK/EFL	GA-NC	FLK/EFL	GA-NC
1986	133,346	10,571	28,878	8,040	162,224	18,611
1987	88,805	4,457	44,300	9,295	133,105	13,752
1988	61,183	603	48,362	10186	109,545	10,789
1989	12,633	1,619	54155	15177	66,788	16,796
1990	3,345	1,543	53914	27862	57,259	29,405
1991	38,521	3,181	53590	23886	92,111	27,067
1992	67,363	3,534	54495	32274	121,858	35,808
1993	132,208	4,093	42646	31739	174,854	35,832
1994	125,667	1,245	34716	23063	160,383	24,308
1995	88,972	84,247	39433	36903	128,405	121,150
1996	69,917	691	40136	17471	110,053	18,162
1997	53,227	1,728	42573	25394	95,800	27,122
1998	50,125	2,004	31211	21959	81,336	23,963
1999	79,525	2,998	24155	29186	103,680	32,184
2000	35,553	2,387	28015	24104	63,568	26,491
2001	79,061	1,372	18455	14193	97,516	15,565
2002	60,415	3,626	19525	20557	79,940	24,183
2003	93,334	579	20623	17337	113,957	17,916
2004	77,458	1,021	23299	19295	100,757	20,316
2005	54,066	3,746	12380	19255	66,446	23,001
2006	36,590	4,653	11337	23433	47,927	28,086
2007	140,561	4,289	14402	20754	154,963	25,043
2008	53,806	2,815	17882	30437	71,688	33,252

Sources: SEFSC Recreational (Feb 2015) and Commercial (July 2014) ACL Datasets and 2014 SEFSC Commercial In-Season Monitoring data.

Table 2.6.2. Sector ACLs in pounds and numbers (recreational) for **Sub-alternatives 2a-2c** in **Action 6** and based on ABC projections from **Alternative 2** in **Action 5** where ABC is equal to the yield at a constant fishing mortality rate and rebuilds the stock in 10 years with a 50% probability of rebuilding success.

		Sub-Alternative 2a			Sub-Alternative 2b			Sub-alternative 2c		
Year	ABC	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)
2016	91,660	69,396	32,428	22,264	65,926	30,807	21,151	62,456	29,185	20,038
2017	109,130	82,622	38,609	26,508	78,491	36,678	25,182	74,360	34,748	23,857
2018	127,540	96,561	45,122	30,979	91,733	42,866	29,430	86,904	40,610	27,882
2019	146,310	110,771	51,762	35,539	105,233	49,174	33,762	99,694	46,586	31,985
2020	165,030	124,944	58,385	40,086	118,697	55,466	38,081	112,450	52,547	36,077
2021	183,370	138,829	64,874	44,541	131,888	61,630	42,314	124,946	58,386	40,087
2022	201,010	152,185	71,114	48,825	144,575	67,559	46,384	136,966	64,003	43,943
2023	217,700	164,821	77,019	52,879	156,580	73,168	50,235	148,339	69,317	47,591
2024	233,250	176,594	82,520	56,656	167,764	78,394	53,824	158,934	74,268	50,991
2025	247,540	187,413	87,576	60,127	178,042	83,197	57,121	168,671	78,818	54,115

Table 2.6.3. Sector ACLs in pounds and numbers (recreational) for **Sub-alternatives 2a-2c** in **Action 6** and based on ABC projections from **Preferred Alternative 3** in **Action 5** where ABC equal to the yield at a constant fishing mortality rate and rebuilds the stock in 10 years with a 72.5% probability of rebuilding success.

		Sub-Alternative 2a			Sub-Alternative 2b			Sub-alternative 2c		
Year	ABC	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)
2016	81,610	61,787	28,872	19,823	58,698	27,429	18,832	55,608	25,985	17,841
2017	96,230	72,856	34,045	23,374	69,213	32,342	22,206	65,570	30,640	21,037
2018	111,800	84,644	39,553	27,156	80,412	37,576	25,798	76,179	35,598	24,441
2019	127,900	96,833	45,249	31,067	91,991	42,987	29,514	87,150	40,724	27,960
2020	144,210	109,181	51,019	35,029	103,722	48,468	33,277	98,263	45,917	31,526
2021	160,440	121,469	56,761	38,971	115,396	53,923	37,022	109,322	51,085	35,074
2022	176,310	133,484	62,376	42,826	126,810	59,257	40,684	120,136	56,138	38,543
2023	191,560	145,030	67,771	46,530	137,779	64,383	44,203	130,527	60,994	41,877
2024	206,010	155,970	72,883	50,040	148,172	69,239	47,538	140,373	65,595	45,036
2025	219,520	166,199	77,663	53,321	157,889	73,780	50,655	149,579	69,897	47,989

Table 2.6.4. Sector ACLs in pounds and numbers (recreational) for **Sub-alternatives 2a-2c** in **Action 6** and based on ABC projections from **Alternative 4** in **Action 5** where ABC equal to the yield at a constant fishing mortality rate and rebuilds the stock in 7 years with a 50% probability of rebuilding success.

		Sub-Alternative 2a			Sub-Alternative 2b			Sub-alternative 2c		
Year	ABC	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)
2016	44,580	33,752	15,772	10,828	32,064	14,983	10,287	30,376	14,195	9,746
2017	55,360	41,913	19,586	13,447	39,817	18,606	12,775	37,722	17,627	12,102
2018	67,250	50,915	23,792	16,335	48,369	22,602	15,518	45,823	21,413	14,702
2019	79,960	60,538	28,289	19,422	57,511	26,874	18,451	54,484	25,460	17,480
2020	93,250	70,600	32,990	22,650	67,070	31,341	21,518	63,540	29,691	20,385
2021	106,870	80,911	37,809	25,959	76,866	35,919	24,661	72,820	34,028	23,363
2022	120,560	91,276	42,652	29,284	86,712	40,520	27,820	82,148	38,387	26,356

Table 2.6.5. Sector ACLs in pounds and numbers (recreational) for **Sub-alternatives 2a-2c** in **Action 6** and based on ABC projections from **Alternative 5** in **Action 5** where ABC equal to the yield at a constant fishing mortality rate that rebuilds the stock in 7 years with a 72.5% probability of rebuilding success.

		Sub-Alternative 2a			Sub-Alternative 2b			Sub-alternative 2c		
Year	ABC	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)	Rec ACL (lbs)	Rec ACL (#s)	Comm ACL (lbs)
2016	39,820	30,148	14,088	9,672	28,640	13,383	9,189	27,133	12,679	8,705
2017	48,950	37,060	17,318	11,890	35,207	16,452	11,295	33,354	15,586	10,701
2018	59,060	44,714	20,895	14,346	42,479	19,850	13,628	40,243	18,805	12,911
2019	69,980	52,982	24,758	16,998	50,333	23,520	16,148	47,684	22,282	15,298
2020	81,520	61,719	28,841	19,801	58,633	27,399	18,811	55,547	25,957	17,821
2021	93,480	70,774	33,072	22,706	67,235	31,418	21,571	63,696	29,765	20,436
2022	105,630	79,972	37,370	25,658	75,974	35,502	24,375	71,975	33,633	23,092

2.7 Action 7. Establish a recreational Annual Catch Target (ACT) for the GA-NC and the Florida Keys/East Florida (FLK/EFL) stocks of hogfish

Alternative 1 (No Action). Do not establish recreational annual catch targets (ACTs) for the GA-NC and Florida Keys/East Florida (FLK/EFL) stocks of hogfish. The current ACT is 59,390 lbs ww and applies to hogfish throughout the South Atlantic Council's jurisdiction. The ACT = recreational ACL*(1-PSE) or ACL*0.5, whichever is greater, and where Percent Standard Error (PSE) = average PSE 2005-2009.

Year	Hogfish PSE
2005	28.7
2006	34.3
2007	23.9
2008	30.9
2009	29.5
Average	29.5

Source: NMFS Office of Science and Technology MRIP Domain Catch Totals (2015)

Preferred Alternative 2. Establish an annual catch target (ACT) for the GA-NC stock of hogfish for the recreational sector.

Sub-alternative 2a. ACT = recreational ACL*(1-PSE) or ACL*0.5, whichever is greater.

Preferred Sub-alternative 2b. ACT =85% recreational ACL.

Sub-alternative 2c. ACT = 75% recreational ACL.

	Hogfish ACT (numbers of fish)								
Year	**Action 4, Sub-alt 2a (ACL=ABC)**			**Action 4, Sub-alt 2b (ACL=95%ABC)**			**Action 4, Sub-alt 2c (ACL=90%ABC)**		
Action 7, Alternative	2a	2b	2c	2a	2b	2c	2a	2b	2c
2016	255	433	382	242	412	363	229	390	344

Note: Sub-alternative 2a calculations used rec ACL*0.5 because it is greater than 1-PSE. ACTs in pounds were converted to numbers of fish using 9.99 lbs average weight.

Year	Hogfish PSE (GA-NC)
2010	61.9
2011	67.3
2012	63.1
2013	56.1
2014	n/a
Average	**62.1%**

Source: NMFS Office of Science and Technology MRIP Domain Catch Totals (2015)

Preferred Alternative 3. Establish an annual catch target (ACT) for the Florida Keys/East Florida (FLK/EFL) stock of hogfish for the recreational sector.

Sub-alternative 3a. ACT = recreational ACL*(1-PSE) or ACL*0.5, whichever is greater.

Preferred Sub-alternative 3b. ACT =85% recreational ACL.

Sub-alternative 3c. ACT = 75% recreational ACL.

Year	Hogfish PSE East FL-FL Keys
2010	30.5
2011	22.0
2012	24.7
2013	14.7
2014	10.7
Average	**20.5**

Source: NMFS Office of Science and Technology MRIP Domain Catch Totals (2015)

Discussion

The National Standard 1 guidelines recommend the use of ACTs to prevent ACLs from being exceeded. For species without in-season management control to prevent the ACL from being exceeded, managers may utilize ACTs that are set below ACLs so that catches do not exceed the ACLs. If an ACT is specified as part of the system of accountability measures (AMs) for hogfish, an ACT control rule that accounts for management uncertainty may be utilized for setting the ACT. The objective for establishing an ACT and related AMs is to prevent the ACL from being exceeded. In managing the snapper grouper fishery; however, the South Atlantic Council has chosen not to use ACTs to trigger AMs because it is anticipated that improvements in reporting will significantly reduce management uncertainty.

Since the ACT is typically set lower and would be reached sooner than the ACL for any given species, using an ACT rather than the ACL as a trigger for AMs in the recreational sector may prevent an ACL overage. This more conservative approach, would likely help to ensure that recreational data uncertainties do not cause or contribute to excessive ACL overages for vulnerable species. Using recreational ACTs rather than the ACLs to trigger recreational AMs may not eliminate ACL overages completely; however, using such a strategy for the recreational sector may reduce the need to compensate for very large overages.

The updated framework procedure included in Amendment 17B to the Snapper Grouper FMP (SAFMC 2010b) allows for the timely establishment and adjustment of ACTs (and ACLs) if the South Atlantic Council and NOAA Fisheries determine they are necessary.

The NS1 guidelines recommend a performance standard by which the efficacy of any system of ACLs and AMs can be measured and evaluated. According to the guidelines:

> *…if catch exceeds the ACL for a given stock or stock complex more than once in the last four years, the system of ACLs and AMs should be*

re-evaluated, and modified if necessary, to improve its performance and effectiveness (74 FR 3178).

If an evaluation concludes that the ACL is being chronically exceeded for any one species or species group, and post-season AMs are repeatedly needed to correct for ACL overages, adjustments to management measures would be made. As stated previously, the updated framework procedure implemented through Amendment 17B (SAFMC 2010b) could be utilized to modify management measures such as bag limits, trip limits, seasonal closures, and gear prohibitions in a timely manner. Using the regulatory amendment process to implement such changes, if needed, is the most timely method of addressing issues associated with repeated ACL overages through permanent regulations.

2.8 Action 8. Increase the commercial and recreational minimum size limit for the GA-NC and the Florida Keys/East Florida (FLK/EFL) stocks of hogfish

Alternative 1 (No Action). Do not increase the commercial and recreational minimum size limit for hogfish. The current minimum size limit for hogfish is 12 inches fork length (FL) for both the commercial and recreational sectors in federal waters of the South Atlantic Region, and state waters of South Carolina, North Carolina, and Florida. There is no minimum size limit for hogfish in state waters of Georgia.

Preferred Alternative 2. Increase the commercial and recreational minimum size limit for the GA-NC stock of hogfish in the South Atlantic Region.

Sub-alternative 2a. 16 inches FL

Sub-alternative 2b. 17 inches FL

Sub-alternative 2c. 18 inches FL

Sub-alternative 2d. 19 inches FL

Preferred Sub-alternative 2e. 20 inches FL

Sub-alternative 2f. Increase the minimum size limit from 12" to 15" in year 1, to 18" in year 2, and to 20" in year 3.

Preferred Alternative 3. Increase the commercial and recreational minimum size limit for the Florida Keys/East Florida (FLK/EFL) stock of hogfish in the South Atlantic Region.

Sub-alternative 3a. 14 inches FL

Preferred Sub-alternative 3b. 15 inches FL

Sub-alternative 3c. 16 inches FL

Sub-alternative 3d. 17 inches FL

Sub-alternative 3e. Increase the minimum size limit from 12" to 14" in year 1 and to 16" in year 3.

Discussion

2.9 Action 9. Establish a commercial trip limit for the GA-NC and the Florida Keys/East Florida (FLK/EFL) stocks of hogfish

Alternative 1 (No Action). Do not establish a commercial trip limit for the GA-NC and Florida Keys/East Florida (FLK/EFL) stocks of hogfish in the South Atlantic Region. Currently there is no commercial trip limit for hogfish in the South Atlantic Region.

Alternative 2. Establish a commercial trip limit for the GA-NC stock of hogfish in the South Atlantic Region.

Sub-alternative 2a. 100 lbs per trip.
Sub-alternative 2b. 250 lbs per trip.
Sub-alternative 2c. 500 lbs per trip.
Sub-alternative 2d. 750 lbs per trip.

Alternative 3. Establish a commercial trip limit for the Florida Keys/East Florida stock of hogfish in the South Atlantic Region.

Sub-alternative 3a. 25 lbs per trip.
Sub-alternative 3b. 50 lbs per trip.
Sub-alternative 3c. 100 lbs per trip.
Sub-alternative 3d. 150 lbs per trip.
Sub-alternative 3e. 200 lbs per trip.

Discussion

2.10 Action 10. Modify and/or establish recreational bag limits for the GA-NC and the Florida Keys/East Florida (FLK/EFL) stocks of hogfish

Alternative 1 (No Action). Do not modify and/or establish recreational bag limits for the GA-NC and Florida Keys/East Florida (FLK/EFL) stocks of hogfish in the South Atlantic Region. Currently the recreational bag limit is 5 fish per person per day off Florida and there is no recreational bag limit off Georgia, South Carolina, and North Carolina.

Alternative 2. Establish a recreational bag limit for the GA-NC stock of hogfish in the South Atlantic Region.

Sub-alternative 2a. 2 fish per person per day.
Sub-alternative 2b. 1 fish per person per day.
Sub-alternative 2c. 1 fish per vessel per day.

Alternative 3. Modify the recreational bag limit for the Florida Keys/East Florida (FLK/EFL) stock of hogfish in the South Atlantic Region.

Sub-alternative 3a. 3 fish per person per day.
Sub-alternative 3b. 2 fish per person per day.
Sub-alternative 3c. 1 fish per person per day.
Sub-alternative 3d. 1 fish per vessel per day.

~~**Alternative 4.** Establish a season for the GA-NC stock of hogfish in the South Atlantic region.~~

~~**Sub-alternative 4a.** May-August~~
~~**Sub-alternative 4b.** July-August~~
~~**Sub-alternative 4c.** May-June~~

~~**Alternative 5.** Establish a season for the Florida Keys/East Florida (FLK/EFL) stock of hogfish in the South Atlantic region.~~

~~**Sub-alternative 5a.** May-June~~
~~**Sub-alternative 5b.** July-August~~

Discussion:

2.11 Action 11. Establish a recreational fishing season for the GA-NC and Florida Keys/East Florida (FLK/EFL) stocks of hogfish

Alternative 1 (No Action). There is no recreational fishing season for hogfish in the South Atlantic.

Alternative 2. Establish a recreational fishing season for the GA-NC stock of hogfish in the South Atlantic region.

Sub-alternative 2a. May-August
Sub-alternative 2b. July-August
Sub-alternative 2c. May-June

Alternative 3. Establish a recreational fishing season for the Florida Keys/East Florida (FLK/EFL) stock of hogfish in the South Atlantic region.

Sub-alternative 3a. May-June
Sub-alternative 3b. July-August

Discussion:

2.12 Action 12. Establish commercial and recreational accountability measures (AMs) for the GA-NC and the Florida Keys/East Florida (FLK/EFL) stocks of hogfish

Alternative 1 (No Action). Do not establish AMs for the GA-NC and Florida Keys/East Florida (FLK/EFL) stocks of hogfish. Current commercial and recreational AMs apply to hogfish throughout the South Atlantic Council's area of jurisdiction.

Preferred Alternative 2. If commercial landings reach or are projected to reach the commercial annual catch limit (ACL), NMFS would close the commercial sector for the remainder of the fishing year. On and after the effective date of such a notification, all sale or purchase is prohibited and harvest or possession of hogfish in or from the EEZ would be limited to the recreational bag and possession limit. Additionally, if the commercial ACL is exceeded, NMFS would reduce the commercial ACL in the following fishing year by the amount of the commercial overage, only if hogfish is overfished **and** the total ACL (commercial ACL and recreational ACL) of the respective stock is exceeded.

Preferred Sub-alternative 2a: For the GA-NC stock of hogfish.

Preferred Sub-alternative 2b: For the Florida Keys/East Florida (FLK/EFL) stock of hogfish.

Preferred Alternative 3. If recreational landings reach or are projected to reach the recreational ACL, NMFS would close the recreational sector for the remainder of the fishing year, unless, using the best scientific information available, NMFS determines that a closure is unnecessary.

Sub-alternative 3a. For the GA-NC stock of hogfish if the stock is overfished.

Preferred Sub-alternative 3b. For the GA-NC stock of hogfish regardless of stock status.

Sub-alternative 3c. For the Florida Keys/East Florida (FLK/EFL) stock of hogfish if the stock is overfished.

Preferred Sub-alternative 3d. For the Florida Keys/East Florida (FLK/EFL) stock of hogfish regardless of stock status.

Preferred Alternative 4. If recreational landings exceed the recreational annual catch limit (ACL), then during the following fishing year, recreational landings will be monitored for a persistence in increased landings. If necessary, NMFS would reduce the length of fishing season and the recreational ACL in the following fishing year by the amount of the recreational overage, only if the species is overfished **and** the total ACL (commercial ACL and recreational ACL) of the respective stock is exceeded. The length of the recreational season and recreational ACL will not be reduced if NMFS determines, using the best scientific information available, that a reduction is unnecessary.

Preferred Sub-alternative 4a. For the GA-NC stock of hogfish.

Preferred Sub-alternative 4b. For the Florida Keys/East Florida (FLK/EFL) stock of hogfish.

Discussion:

The proposed action would contribute to creating a consistent regulatory environment in the South Atlantic. The Generic AM and Dolphin Allocations Amendment (Amendment 34 to the Snapper Grouper FMP), currently pending approval by the Secretary of Commerce, would make AMs for hogfish consistent with those for other snapper grouper species. However, since this amendment proposes two hogfish stocks, AMs need to be specified for each stock. Current AMs for hogfish throughout the South Atlantic region are below. The South Atlantic Council's preferred alternatives from the Generic AM and Dolphin Allocations Amendment are shown above.

Commercial: If commercial landings, as estimated by the Science and Research Director, reach or are projected to reach the commercial ACL, the Assistant Administrator will file a notification with the Office of the Federal Register to close the commercial sector for the remainder of the fishing year. On and after the effective date of such a notification, all sale or purchase is prohibited and harvest or possession of this species in or from the South Atlantic EEZ is limited to the bag and possession limit. This bag and possession limit applies in the South Atlantic on board a vessel for which a valid Federal commercial or charter vessel/headboat permit for South Atlantic snapper grouper has been issued, without regard to where such species were harvested, i.e., in state or Federal waters. If commercial landings exceed the ACL, and the species is overfished, based on the most recent Status of U.S. Fisheries Report to Congress, the Assistant Administrator will file a notification with the Office of the Federal Register, at or near the beginning of the following fishing year to reduce the ACL for that following year by the amount of the overage in the prior fishing year.

Recreational: If recreational landings, as estimated by the Science and Research Director, exceed the recreational ACL, then during the following fishing year, recreational landings will be monitored for a persistence in increased landings and, if necessary, the Assistant Administrator will file a notification with the Office of the Federal Register, to reduce the length of the following recreational fishing season by the amount necessary to ensure recreational landings do not exceed the recreational ACL in the following fishing year. However, the length of the recreational season will also not be reduced during the following fishing year if the Regional Administrator determines, using the best scientific information available, that a reduction in the length of the following fishing season is unnecessary.

Chapter 3. Affected Environment

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

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

3.1 Habitat Environment

3.1.1 Inshore/Estuarine Habitat

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

3.1.2 Offshore Habitat

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

The exact extent and distribution of productive snapper grouper habitat in South Atlantic continental shelf habitats is unknown 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: http://ocean.floridamarine.org/safmc_atlas/. An introduction to the system is found at: http://www.safmc.net/ecosystem-management/mapping-and-gis-data.

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 Volume II of the Fishery Ecosystem Plan (SAFMC 2009b). The FEP can be found at: http://www.safmc.net/ecosystem-management/fishery-ecosystem-plan-1.

3.1.3 Essential Fish Habitat

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

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

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

3.1.4 Habitat Areas of Particular Concern

Areas which meet the criteria for Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-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 deepwater MPAs. Areas that meet the criteria for EFH-HAPCs include habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages).

In addition to protecting habitat from fishing related degradation though fishery management plan regulations, the 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 invasive species 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. **Appendix H** has detailed information on EFH and EFH-HAPCs for all Council managed species.

3.2 Biological and Ecological Environment

3.2.1 Fish Populations Affected by this Amendment

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

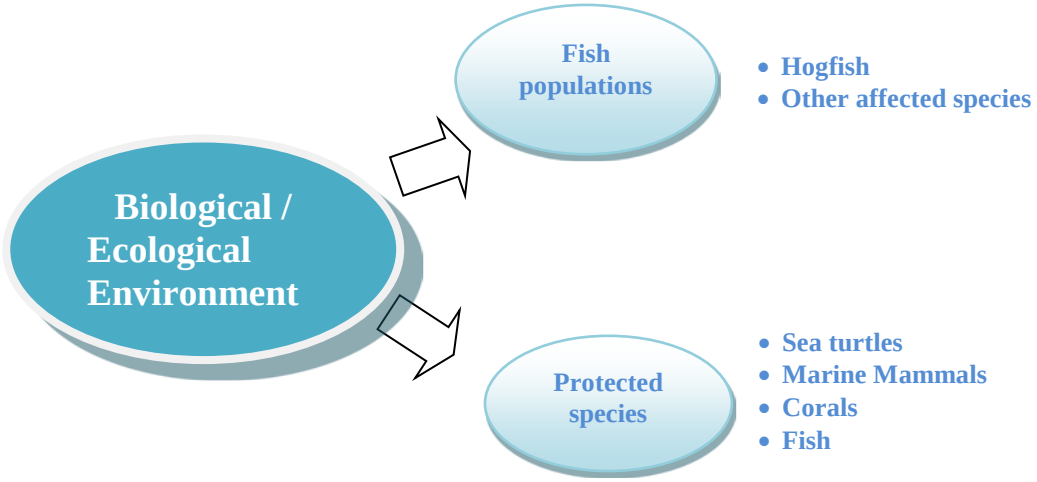


Figure 3.2.1. Two components of the biological environment described in this document.

The waters off the South Atlantic coast are home to a diverse population of fish. The snapper grouper fishery management unit contains 59 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.

Hogfish occur in tropical, subtropical and warm temperate waters of the Atlantic Ocean (Brazil to Bermuda), and throughout the Gulf of Mexico and Caribbean Sea. After a planktonic larval phase (30-40 days), juvenile Hogfish settle nearshore in estuaries, seagrass beds or shallow reef habitats (Davis 1976, Colin 1982, Ault et al. 2003), and gradually move offshore with growth (Collins and McBride 2011). Adults are typically associated with hard bottom, reef habitats, and individuals have been observed as deep as 65 m (Collins and McBride 2011). Hogfish are visual predators that feed primarily during daylight hours on benthic invertebrates (Randall and Warmke 1967), so their depth range is likely limited by light availability and food sources.

Hogfish are protogynous hermaphrodites that form harems. All fish mature as females first, and eventually become male if they live long enough. A single male maintains harems of 5 to 15 females (Colin 1982, Munoz et al. 2010) during extended spawning seasons that last for months. Hogfish are pair spawners (Davis 1976, Colin 1982), and spawning occurs daily during the spawning season (McBride and Johnson 2007, Collins and McBride 2008, Munoz et al. 2010). The size (197-727 mm FL) and age (1-11 yr) range at which sexual transition occurs indicates that transition is socially mediated (Collins and McBride 2011). Sex change can take several months (McBride and Johnson 2007), so removal of the dominant male has the potential to significantly affect harem stability and decrease reproductive potential (Munoz et al. 2010).

Hogfish Life History
An Overview

- Extend from Brazil to Bermuda, throughout the Gulf of Mexico and Caribbean Sea.
- Adults are typically associated with hard bottom and reef habitats, as deep as 65 m, with juveniles in nearshore estuaries, seagrass beds or shallow reef habitats.
- Protogynous hermaphrodites, form harems.
- The spawning season extends from December through April.
- Oldest fish reported is 23 years old.

Peak spawning activity for this species has been repeatedly demonstrated to occur during the winter and spring months (Davis 1976, Colin 1982, Claro et al. 1989, McBride and Johnson 2007, Collins and McBride 2008, Munoz et al 2010). These studies have demonstrated that spawning activity occurs predominantly during the months of December through April, and begins (and ends) slightly earlier in the Florida Keys than on the West Florida shelf (Davis 1976, McBride et al. 2008).

Hogfish have been managed as a single stock within the United States since initial regulations were implemented in 1994 by the State of Florida. Landings within the US occur predominantly within state and federal waters adjacent to the state of Florida. Management regulations are consistent between state and federal waters throughout their US range. Genetic data were not available for this species prior to 2013, so previous stock assessments have treated Hogfish as a single stock (Ault et al. 2003). However, recent genetic analyses by Seyoum et al. (2014) have demonstrated distinct stocks between the eastern Gulf of Mexico (WFL), the Florida Keys and southeast Florida (FLK/EFL), and the Carolinas (GA-NC).

Additional life history, biological characteristics, and stock status information for hogfish may be found the Southeast Data, Assessment, and Review (SEDAR) report, SEDAR 37 (2015), which is available on the SEDAR web site http://www.sefsc.noaa.gov/sedar/ and is hereby incorporated by reference (see **Section 3.2.3** of this document for more information on the SEDAR process).

3.2.2 Other Species Affected

For details on the life histories and ecology of co-occurring species, the reader is referred to Volume II of the Fishery Ecosystem Plan (SAFMC 2009b) available at: http://www.safmc.net/ecosystem-management/fishery-ecosystem-plan-1.

An expanded discussion of life history traits, population characteristics, and stock status of snapper grouper species affected by this amendment can be found in **Sections 3.2.1** and **3.3** of the Comprehensive Annual Catch Limit Amendment (SAFMC 2011c), which are hereby incorporated by reference and may be found at https://www.dropbox.com/s/mp3xwedsrarfpjn/Comp%20ACL%20Am%20101411%20FINAL.pdf.

3.2.3 The Stock Assessment Process

SEDAR is a cooperative Fishery Management Council process initiated 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.

3.2.4 Protected Species

There are 49 species, or distinct population segments (DPSs) of species, protected by federal law that may occur in the exclusive economic zone (EEZ) of the South Atlantic Region. Thirty-one of these species are marine mammals protected under the Marine Mammal Protection Act (MMPA) (Wynne and Schwartz 1999, Waring et al. 2013). The MMPA requires that each commercial fishery be classified by the number of marine mammals they seriously injure or kill. NMFS's List of Fisheries (LOF) classifies U.S. commercial fisheries into three categories based on the number of incidental mortality or serious injury they cause to marine mammals. More information about the LOF and the classification process can be found at: http://www.nmfs.noaa.gov/pr/interactions/lof/

Six of the marine mammal species (sperm, sei, fin, blue, humpback, and North Atlantic right whales) protected by the MMPA, are also listed as endangered under the Endangered Species Act (ESA). In addition to those six marine mammals, five species of sea turtles (green, hawksbill, Kemp's ridley, leatherback, and loggerhead); the smalltooth sawfish; five DPSs of Atlantic sturgeon; and six species of coral [elkhorn coral (*Acropora palmata*), staghorn coral (*A. cervicornis*) ("*Acropora*" collectively); lobed star coral (*Orbicella annularis*), mountainous star coral (*O. faveolata*), and knobby star coral (*O. franksi*) ("*Orbicella*" collectively); and rough cactus coral (*Mycetophylia ferox*)] are also protected under the ESA. Portions of designated critical habitat for North Atlantic right whales, the Northwest Atlantic (NWA) 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. Information on these, as well as sea turtles and smalltooth sawfish and how they are adversely affected by the snapper grouper fishery are discussed below.

Subsequent to the June 7, 2006, biological opinion, elkhorn and staghorn coral (*Acropora cervicornis* and *Acropora palmata*) were listed as threatened. In a consultation memorandum dated July 9, 2007, NMFS concluded the continued authorization of the South Atlantic snapper grouper fishery is not likely to adversely affect these *Acropora* species. On November 26, 2008, an *Acropora* critical habitat was designated. In a consultation memorandum dated December 2, 2008, NMFS concluded the continued authorization of the snapper grouper fishery is not likely to adversely affect *Acropora* critical habitat. On September 10, 2014, NMFS listed 20 new coral species under the ESA, five of those species occur in the Caribbean (including Florida) and all of these are listed as threatened. The 2 previously listed *Acropora* coral species remain protected as threatened. In an "ESA section 7 consultation on the continued authorization of the snapper grouper and dolphin and wahoo fisheries following the listing of new coral species", dated September 11, 2014, NMFS indicated that the previous determination remains valid and the South Atlantic snapper grouper fishery is still not likely to adversely affect *Acropora* corals.

The September 10, 2014, final listing rule provided some new information on the threats facing *Acropora*; however, none of the information suggested that previous determinations were no longer valid. For this reason, a memo dated September 11, 2014, indicates that previous determination remains valid and the South Atlantic snapper grouper fishery is still not likely to adversely affect *Acropora* corals. For the remaining 5 species of coral (*Mycetophyllia ferox*,

Dendrogyra cylindrus, Orbicella annularis, O. faveolata, and O. franksi), the threats to corals from fishing identified in the status review for these species (SSR) include (1) trophic effects, (2) human-induced physical damage, and (3) destructive fishing practices. The September 11, 2014, memo indicates South Atlantic snapper grouper fishery will not cause trophic effects because it does not capture herbivorous fish.

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

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

Kemp's ridley hatchlings are also pelagic during the early stages of life and feed in surface waters (Carr 1987, Ogren 1989). Once the juveniles reach approximately 20 cm carapace length they move to relatively shallow (less than 50 m) benthic foraging habitat over unconsolidated substrates (Márquez-M. 1994). They have also been observed transiting long distances between foraging habitats (Ogren 1989). Kemp's ridleys feeding in these nearshore areas primarily prey

on crabs, though they are also known to ingest mollusks, fish, marine vegetation, and shrimp (Shaver 1991). The fish and shrimp Kemp's ridleys ingest are not thought to be a primary prey item but instead may be scavenged opportunistically from bycatch discards or from discarded bait (Shaver 1991). Given their predilection for shallower water, Kemp's ridleys most routinely make dives of 50 m or less (Soma 1985, Byles 1988). Their maximum diving range is unknown. Depending on the life stage, Kemp's ridleys may be able to stay submerged anywhere from 167 minutes to 300 minutes, though dives of 12.7 minutes to 16.7 minutes are much more common (Soma 1985, Mendonca and Pritchard 1986, Byles 1988). Kemp's ridleys may also spend as much as 96% of their time underwater (Soma 1985, Byles 1988).

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

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

Sea turtles are vulnerable to capture by bottom longline and vertical hook-and-line gear. The magnitude of the interactions between sea turtles and the South Atlantic snapper grouper fishery was evaluated in NMFS (2006) using data from the Supplementary Discard Data Program (SDDP). Three loggerheads and three unidentified sea turtles were caught on vertical lines; one leatherback and one loggerhead were caught on bottom longlines, all were released alive. The effort reported in the program represented between approximately 5% and 14% of all South Atlantic snapper grouper fishing effort. These data were extrapolated in NMFS (2006) to better estimate the number of interactions between the entire snapper-grouper fishery and ESA-listed sea turtles. The extrapolated estimate was used to project future interactions (**Table 3.2.4.1**).

Table 3.2.4.1. Three-year South Atlantic anticipated takes sea turtles in the snapper grouper fishery.

Species	Amount of Take	Total
Green	Total Take	39
	Lethal Take	14
Hawksbill	Total Take	4
	Lethal Take	3
Kemp's Ridley	Total Take	19
	Lethal Take	8
Leatherback	Total Take	25
	Lethal Take	15
Loggerhead	Total Take	202
	Lethal Take	67

Source: NMFS 2006. NMFS (National Marine Fisheries Service). 2006. Endangered Species Act Section 7 consultation on the continued authorization of snapper grouper fishing under the Snapper Grouper FMP and Proposed Amendment 13C. Biological Opinion. June 7.

The SDDP does not provide data on recreational fishing interactions with ESA-listed sea turtle species. However, anecdotal information indicates that recreational fishermen occasionally take sea turtles with hook-and-line gear. The biological opinion also used the extrapolated data from the SDDP to estimate the magnitude of recreational fishing on sea turtles (**Table 3.2.4.1**).

Regulations implemented through Amendment 15B to the Snapper Grouper FMP (74 FR 31225; June 30, 2009; SAFMC 2008b) required 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 and smalltooth sawfish. 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 and smalltooth sawfish.

On July 10, 2014, NMFS published a final rule designating critical habitat for the Northwest Atlantic Ocean (NWA) Loggerhead Sea Turtle DPS in the *Federal Register* (79 FR 39856). The final rule, effective August 11, 2014, designates 38 marine areas within the Atlantic Ocean and Gulf of Mexico, which contain the physical or biological features essential for the conservation of the loggerhead sea turtle. A memorandum dated September 16, 2014, evaluated the effects of continued authorization of federal fisheries, including snapper grouper, on the newly-designated critical habitat. The memo concluded that activities associated with the snapper grouper fishery would not adversely affect any of the NWA loggerhead DPS critical habitat units.

3.2.4.2 ESA-Listed Marine Fish

Historically the **smalltooth sawfish** in the U.S. ranged from New York to the Mexico border. Their current range is poorly understood but believed to have contracted from these historical

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

On September 22, 2011, NMFS and the U.S. Fish and Wildlife Service determined the loggerhead sea turtle population consists of nine distinct population segments (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 (NWA) DPS, which remains listed as threatened. Five DPSs of Atlantic sturgeon were also listed since the completion of the 2006 biological opinion. In a consultation memorandum dated February 15, 2012, NMFS concluded the continued authorization of the South Atlantic snapper grouper fishery is not likely to adversely affect the Atlantic sturgeon. The February 15, 2012, memorandum also stated that because the 2006 biological opinion had evaluated the impacts of the fishery on the loggerhead subpopulations now wholly contained within the NWA DPS, the opinion's conclusion that the fishery is not likely to jeopardize the continued existence of loggerhead sea turtles remains valid.

3.3 Economic and Social Environment

A description of the hogfish stock is provided in **Section 3.2**. Additional details on the South Atlantic Snapper Grouper Fishery can be found in the Comprehensive ACL Amendment for the South Atlantic Region (SAFMC 2011c) and Amendment 24 (SAFMC 2011d) and are incorporated herein by reference.

3.3.1 Economic Environment

3.3.1.1 Commercial Sector

The major sources of data summarized in this description are the NMFS SERO Permits Information Management System (PIMS) and the Federal Logbook System (FLS), supplemented by average prices calculated from the Accumulated Landings System (ALS) and price indices taken from the Bureau of Labor Statistics (BLS). Inflation adjusted revenues and prices are reported in 2014 dollars. Landings are expressed in pounds (lbs) gutted weight (gw) to match the method for collecting ex-vessel price information. The gutted to whole weight (ww) conversion rate is ww = gw x 1.11.

Permits

Any fishing vessel that harvests and sells any of the snapper grouper species from the South Atlantic EEZ must have a valid South Atlantic commercial snapper grouper permit, which is a limited access permit. As of June 30, 2015, there were 557 valid or renewable South Atlantic Snapper Grouper Unlimited Permits and 118 valid or renewable 225-lb Trip-limited Permits. After a permit expires, it can be renewed or transferred up to one year after the date of expiration. The number of valid or renewable snapper grouper permits declined steadily from 2010 through 2014 (**Table 3.3.1.1**).

Table 3.3.1.1. Number of valid or renewable South Atlantic commercial snapper grouper permits (2010 through 2014).

	Unlimited	225-lb Trip-limited
2010	624	139
2011	615	138
2012	604	132
2013	592	129
2014	584	125
Average	604	133

Source: NMFS SERO Permits Dataset, 2015.

Landings, Value, and Effort

Landings of hogfish for each proposed stock area from 2010 through 2014 are presented in **Figure 3.3.1.1**. Landings in Georgia through North Carolina decreased by approximately 50% from 2010 through 2014, whereas landings from the Florida Keys and East Florida increased by approximately 31%.

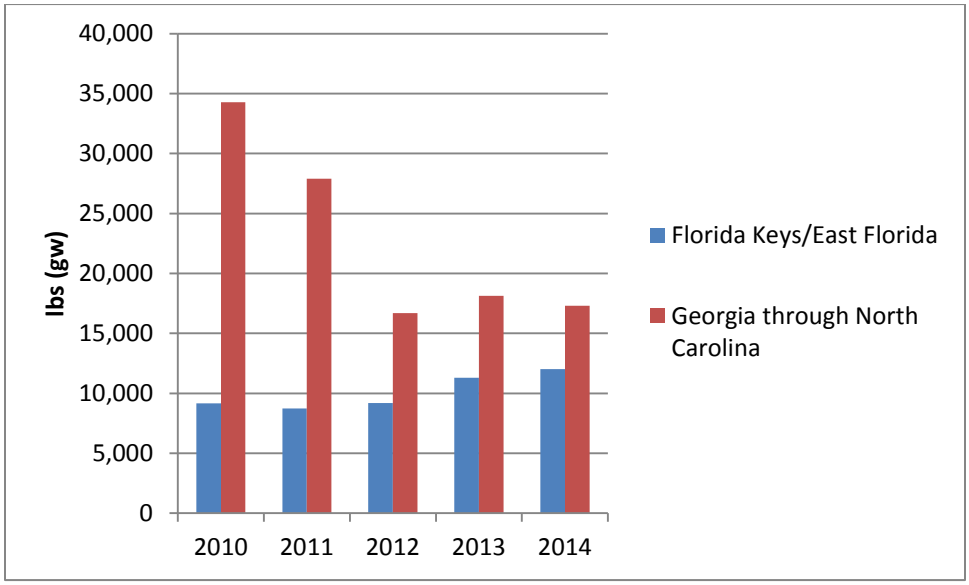


Figure 3.3.1.1. Annual commercial landings of hogfish (lbs gw) by stock area.
Source: NMFS SEFSC Coastal Fisheries Logbook.

On average (2010 through 2014), for the vessels that landed hogfish each year, hogfish accounted for only 1.2% of all species landings and 1.5% of all species revenue (**Table 3.3.1.2** and **Table 3.3.1.3**). Vessels with reported landings of hogfish took almost 5 times as many non-hogfish trips as hogfish trips. The average annual price per pound of hogfish during 2010 through 2014 was $3.64 (2014 dollars) and average prices were mostly stable across years.

Table 3.3.1.2. Number of vessels, number of trips and landings (lbs gw) by year.

Year	Number of vessels that caught hogfish (> 0 lbs gw)	Number of trips that caught hogfish	hogfish landings (lbs gw)	Other species' landings jointly caught with hogfish (lbs gw)	Number of SATL trips that only caught other species	Other species' landings on SATL trips without hogfish (lbs gw)
2010	131	573	43,421	609,628	2,942	2,035,375
2011	147	617	36,619	600,670	3,326	2,450,628
2012	131	607	25,895	497,928	2,901	1,848,574
2013	129	700	29,440	479,596	3,127	2,142,733
2014	136	711	29,317	473,602	3,262	2,081,666
Average	135	642	32,938	532,285	3,112	2,111,795

Source: NMFS SEFSC Coastal Fisheries Logbook.

Table 3.3.1.3. Number of vessels and ex-vessel revenues by year (2014 dollars)*.

	Number of vessels that caught hogfish	Dockside revenue from hogfish	Dockside revenue from 'other species' jointly caught with hogfish	Dockside revenue from 'other species' caught on SATL trips without hogfish	Total dockside revenue	Average total dockside revenue per vessel
2010	131	$146,109	$1,926,324	$5,694,058	$7,766,491	$59,286
2011	147	$131,513	$1,915,203	$6,872,024	$8,918,740	$60,672
2012	131	$92,580	$1,781,292	$5,452,284	$7,326,156	$55,925
2013	129	$108,809	$1,835,368	$6,249,005	$8,193,182	$63,513
2014	136	$116,120	$1,766,921	$5,988,655	$7,871,696	$57,880
Average	135	$119,026	$1,845,022	$6,051,205	$8,015,253	$59,455

Source: NMFS SEFSC Coastal Fisheries Logbook for landings and NMFS Accumulated Landings System for prices.
*Revenues converted to 2014 dollars using the 2014 annual Consumer Price Index (CPI) for all US urban consumers provided by the Bureau of Labor and Statistics (BLS) (http://www.bls.gov/data/).

On average (2010 through 2014), most of the hogfish trips that occurred in Georgia through North Carolina landed less than 250 lbs gw of hogfish per trip (**Table 3.3.1.4**). Only approximately 9% of the vessels that landed hogfish in Georgia through North Carolina from 2010 through 2014 reported landings in excess of 250 lbs gw on a single trip. In the Florida Keys and East Florida, on average (2010 through 2014), the majority of hogfish effort occurred on trips with reported hogfish landings of less than 25 lbs gw per trip (**Table 3.3.1.5**). Approximately half of the vessels that landed hogfish in the Florida Keys and East Florida,

however, reported taking a trip with hogfish landings in excess of 25 lbs gw.

Table 3.3.1.4. Number of trips that landed hogfish in Georgia through North Carolina in excess of each proposed trip limit and number of vessels that took such trips (2010 through 2014 average).

	Trip Limit (lbs gw)			
	250	**500**	**750**	**1,000**
Number of trips with hogfish landings in excess of each trip limit option	23	9	5	4
(percent of all hogfish trips)	(8.3%)	(3.4%)	(1.9%)	(1.6%)
Number of vessels that took a trip with hogfish landings in excess of each trip limit option	5	***	***	***
(percent of all hogfish vessels)	(8.7%)	***	***	***

Source: NMFS SEFSC Coastal Fisheries Logbook.
*** 3 or fewer vessels.

Table 3.3.1.5. Number of trips that landed hogfish in the Florida Keys/East Florida in excess of each proposed trip limit and number of vessels that took such trips (2010 through 2014 average).

	Trip Limit (lbs gw)				
	25	**50**	**75**	**100**	**200**
Number of trips with hogfish landings in excess of each trip limit option	103	50	25	15	4
(percent of all hogfish trips)	(28.1%)	(13.6%)	(6.7%)	(4.0%)	(1.1%)
Number of vessels that took a trip with hogfish landings in excess of each trip limit option	37	23	15	10	4
(percent of all hogfish vessels)	(48.2%)	(29.9%)	(19.0%)	(13.0%)	(4.9%)

Source: NMFS SEFSC Coastal Fisheries Logbook.

Imports

Imports of seafood products compete in the domestic seafood market and have in fact dominated many segments of the seafood market. Imports aid in determining the price for domestic seafood products and tend to set the price in the market segments in which they dominate. Seafood imports have downstream effects on the local fish market. At the harvest level for snapper and grouper species, including hogfish, 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 which directly compete with domestic harvest of snappers and groupers, including hogfish.

Imports[1] of fresh snapper were 22.8 million lbs product weight (pw) in 2010. They decreased to 21.7 million lbs pw in 2011, then increased steadily to 23.6 million lbs pw in 2014. Total revenue from fresh snapper imports increased from $64.5 million (2014 dollars[2]) in 2010 to a five-year high of $72.1 million in 2014. Imports of fresh snappers primarily originated in Mexico, Central America, or South America, and entered the U.S. through the port of Miami. Imports of fresh snapper were highest on average (2010 through 2014) during the months March through July.

Imports of frozen snapper were substantially less than imports of fresh snapper from 2010 through 2014. The annual value of frozen snapper imports ranged from $20.9 million (2014 dollars) to $30 million during the time period, with a peak in 2012. Imports of frozen snapper primarily originated in South America (especially Brazil), Indonesia, and Mexico. The majority of frozen snapper imports entered the U.S. through the ports of Miami and New York. Imports of frozen snappers tended to be lowest during March through June when fresh snapper imports were the highest.

Imports of fresh grouper ranged from 8.2 million lbs pw to 10 million lbs pw from 2010 through 2014. Total revenue from fresh grouper ranged from $27.6 million (2014 dollars) to $36.8 million during this time period, with a peak in 2013. The bulk of fresh grouper imports originated in Mexico and entered the U.S. through Miami. From 2010 through 2014 fresh grouper imports were lowest on average during the month of March and higher the rest of the year, with a peak in July.

Imports of frozen grouper were minimal and stable from 2010 through 2014, ranging from 1.3 million lbs pw worth $2.5 million (2014 dollars) to 2 million lbs pw worth $3.6 million. Frozen grouper imports generally originated in Mexico and to a lesser extent, Asia and entered the U.S. through Miami and Tampa. There was an inverse relationship in monthly landings between frozen and fresh groupers, with average imports being the highest in March for frozen grouper and lower during other months.

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 hogfish 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 and services. 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.

[1] 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.

[2] Converted to 2014 dollars using the 2014 annual Consumer Price Index (CPI) for all US urban consumers provided by the Bureau of Labor and Statistics (BLS) (http://www.bls.gov/data/).

Estimates of the average annual business activity associated with the commercial harvest of hogfish, and all species harvested by the vessels that harvested hogfish, were derived using the model developed for and applied in NMFS (2011b) and are provided in **Table 3.3.1.6**. This business activity is characterized as full-time equivalent jobs, income impacts (wages, salaries, and self-employed income), and output (sales) impacts (gross business sales). Income impacts should not be added to output (sales) impacts because this would result in double counting. It should be noted that the results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species. Separate models to address individual species are not available. For example, the results provided here apply to a general reef fish category rather than just hogfish and a harvester job is "generated" for approximately every $45,000 in ex-vessel revenue. These results contrast with the information provided in **Table 3.3.1.2** which shows an average of 135 harvesters (vessels) with recorded landings of hogfish from 2010 through 2014.

Table 3.3.1.6. Average annual business activity (2010 through 2014) associated with the commercial harvest of hogfish and the harvest of all species by vessels that landed hogfish. All monetary estimates are in 2014 dollars.

Species	Average Ex-vessel Value ($ thousands)	Total Jobs	Harvester Jobs	Output (Sales) Impacts ($ thousands)	Income Impacts ($ thousands)
Hogfish	$119	20	3	$1,567	$668
All species on all trips made by vessels that landed greater than one pound of hogfish in a year.	$8,015	1,374	179	$105,533	$44,977

Source: Calculated by NMFS SERO using the model developed for NMFS (2011b).

3.3.1.2 Recreational Sector

The recreational sector of the snapper grouper fishery is comprised of a private and for-hire component. The private component includes anglers fishing from shore (all land-based structures) and private/rental boats. The for-hire component is composed of charter boats and headboats (also called party boats). Charter boats generally carry fewer passengers and charge a fee on an entire vessel basis, whereas headboats carry more passengers and payment is per person.

Landings

The vast majority of estimated recreational landings from 2010 through 2014 occurred in the Florida Keys/East Florida stock area, which includes Monroe County (**Table 3.3.2.1**). Landings fluctuated during this time period in all areas.

Table 3.3.2.1. Recreational landings (lbs gw) of hogfish, by area, 2010-2014.

Year	North Carolina	South Carolina	Georgia / East FL*	East Florida	Monroe County	Total
2010	1,771	1,992	108	54,078	128,002	185,952
2011	461	79	744	48,525	40,797	90,606
2012	4,178	3	178	84,042	281,172	369,573
2013	825	5	255	63,998	92,768	157,852
2014	8	16	368	111,410	154,087	265,889
Average	1,448	419	331	72,411	139,365	213,974

Source: SEFSC Marine Recreational Information Program (MRIP) ACL datasets (July 2015).
*Landings estimates from the Southeast Region Headboat Survey (SRHS) are pooled between Northeast Florida (north of Sebastian, FL) and Georgia.

Permits

For-hire vessels are required to have a for-hire snapper grouper permit to fish for or possess snapper grouper species in the South Atlantic EEZ. As of June 30, 2015, there were 1,381 valid for-hire snapper grouper permits. This sector operates as an open access fishery and not all permitted vessels are necessarily active in the fishery. Some vessel owners may have obtained open access permits as insurance for uncertainties in the fisheries in which they currently operate. The number of for-hire vessel permits issued for the South Atlantic snapper grouper fishery decreased from 1,812 permits in 2010 to a five-year low of 1,727 permits in 2014 (**Table 3.3.2.2**). The majority of snapper grouper for-hire permitted vessels were home-ported in Florida; a relatively high proportion of these permitted vessels were also home-ported in North Carolina and South Carolina. Many vessels with South Atlantic for-hire snapper grouper permits were home-ported in states outside of the SAFMC's area of jurisdiction. On average (2010 through 2014), these vessels accounted for approximately 11% of the total number of for-hire snapper grouper permits issued.

Table 3.3.2.2. Number of South Atlantic for-hire snapper grouper permits, by homeport state, 2010-2014.

Home Port	2010	2011	2012	2013	2014	Average
North Carolina	331	330	312	307	294	315
South Carolina	145	132	138	150	160	145
Georgia	27	26	26	30	34	29
Florida	1,109	1,099	1,122	1,121	1,062	1,103
Gulf (AL-TX)	86	91	93	91	81	88
Others	114	103	106	100	96	104
Total	1,812	1,781	1,797	1,799	1,727	1,783

Source: NMFS SERO Permits Dataset, 2015.

Although the for-hire permit application collects information on the primary method of operation, the permit itself does not identify the permitted vessel as either a headboat or a charter

vessel and vessels may operate in both capacities. However, only federally permitted headboats are required to submit harvest and effort information to the NMFS Southeast Region Headboat Survey (SRHS). Participation in the SRHS is based on determination by the Southeast Fishery Science Center (SEFSC) that the vessel primarily operates as a headboat. As of April 24, 2015, 77 South Atlantic headboats were registered in the SRHS (K. Fitzpatrick, NMFS SEFSC, pers. comm.). The majority of these headboats were located in Florida/Georgia (49), followed by North Carolina (18) and South Carolina (10).

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

Angler Effort

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

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

Other measures of effort are possible, such as directed trips (the number of individual angler trips that either targeted or caught a particular species), among other measures. **Table 3.3.2.3** and **Table 3.3.2.4** present target and catch effort estimates associated with hogfish. Most of the estimated target and catch effort for hogfish occurred in Florida, with the private mode being the most prevalent mode of fishing. Although not shown, on average (2010 through 2014), hogfish target trips, across all modes and states, accounted for approximately 8.9% of all snapper grouper target trips and hogfish catch trips accounted for approximately 1.6% of all snapper grouper catch trips.

Table 3.3.2.3. Hogfish recreational target trips, by mode and state, 2010-2014*.

	Florida	North Carolina**	Total
Charter Mode			
2010	1,478	0	1,478
2011	262	0	262
2012	0	0	0
2013	152	0	152
2014	207	0	207
Average	420	0	420
Private/Rental Mode			
2010	24,982	0	24,982
2011	10,445	0	10,445
2012	17,926	734	18,660
2013	23,297	0	23,297
2014	16,361	0	16,361
Average	18,602	147	18,749
All Modes			
2010	26,460	0	26,460
2011	10,707	0	10,707
2012	17,926	734	18,660
2013	23,449	0	23,449
2014	16,568	0	16,568
Average	19,022	147	19,169

Source: MRIP database, NOAA Fisheries, NMFS, SERO.
*There were no hogfish target trips estimated for Georgia or South Carolina and none for the shore mode.
**2012 estimates were expanded from only three intercepted trips. There were no intercepted hogfish target trips in North Carolina for other years.
Note: Effort estimates have been post-stratified to include Monroe County, FL.

Table 3.3.2.4. Hogfish recreational catch trips, by mode and state, 2010-2014*.

	Florida	North Carolina	South Carolina**	Total
Shore Mode				
2010	327	263	0	590
2011	0	900	0	900
2012	1,458	0	0	1,458
2013	294	0	0	294
2014	1,329	3,080	0	4,409
Average	682	849	0	1,530
Charter Mode				
2010	814	35	15	864
2011	1,491	0	0	1,491
2012	1,402	89	0	1,491
2013	2,998	243	0	3,241
2014	4,030	0	0	4,030
Average	2,147	73	3	2,223
Private/Rental Mode				
2010	16,926	872	758	18,555
2011	13,519	499	0	14,017
2012	27,686	686	0	28,372
2013	28,080	387	0	28,467
2014	28,561	0	0	28,558
Average	22,954	489	152	23,594
All Modes				
2010	18,067	1,170	773	20,009
2011	15,009	1,398	0	16,408
2012	30,545	775	0	31,321
2013	31,372	630	0	32,002
2014	33,918	3,080	0	36,998
Average	25,782	1,411	155	27,348

Source: MRIP database, NOAA Fisheries, NMFS, SERO.
*There were no hogfish catch trips estimated for Georgia.
**2010 estimates were expanded from only two intercepted trips. There were no intercepted hogfish catch trips in South Carolina for other years.
Note: Effort estimates have been post-stratified to include Monroe County, FL.

Similar analysis of recreational effort is not possible for the headboat mode because headboat data are not collected at the angler level. Estimates of effort by the headboat mode are provided in terms of angler days, or the total number of standardized full-day angler trips[3]. Headboat effort, in terms of angler days, increased substantially in Florida/Georgia from 2010 through 2014, while effort remained relatively constant in North Carolina and South Carolina (**Table 3.3.2.5**). Headboat effort was the highest, on average, during the summer months of June through August (**Table 3.3.2.6**).

Table 3.3.2.5. Headboat angler days and percent distribution by state (2010 through 2014).

	Angler Days			Percent Distribution		
	Florida/Georgia	North Carolina	South Carolina	Florida/Georgia	North Carolina	South Carolina
2010	123,662	21,071	44,951	65.2%	11.1%	23.7%
2011	124,041	18,457	44,645	66.3%	9.9%	23.9%
2012	139,623	20,766	41,003	69.3%	10.3%	20.4%
2013	165,679	20,547	40,963	72.9%	9.0%	18.0%
2014	195,890	22,691	42,025	75.2%	8.7%	16.1%
Average	149,779	20,706	42,717	70.3%	9.7%	20.0%

Source: NMFS SRHS.

Table 3.3.2.6. Headboat angler days and percent distribution by month (2010 – 2014).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Headboat Angler Days												
2010	5,937	6,437	12,786	18,329	19,898	29,301	31,801	25,123	10,755	13,313	8,458	7,546
2011	8,011	10,688	13,718	17,472	17,786	29,793	33,259	21,634	11,107	8,352	6,491	8,832
2012	9,230	9,663	17,307	19,587	18,232	27,819	35,115	25,052	15,894	8,677	6,564	8,252
2013	10,182	10,892	14,541	16,129	20,969	33,079	39,463	33,830	16,335	14,534	6,698	10,537
2014	8,748	13,512	19,808	22,570	25,764	39,115	44,066	32,886	15,203	15,235	9,088	14,611
Avg	8,422	10,238	15,632	18,817	20,530	31,821	36,741	27,705	13,859	12,022	7,460	9,956
Percent Distribution												
2010	3.1%	3.4%	6.7%	9.7%	10.5%	15.4%	16.8%	13.2%	5.7%	7.0%	4.5%	4.0%
2011	4.3%	5.7%	7.3%	9.3%	9.5%	15.9%	17.8%	11.6%	5.9%	4.5%	3.5%	4.7%
2012	4.6%	4.8%	8.6%	9.7%	9.1%	13.8%	17.4%	12.4%	7.9%	4.3%	3.3%	4.1%
2013	4.5%	4.8%	6.4%	7.1%	9.2%	14.6%	17.4%	14.9%	7.2%	6.4%	2.9%	4.6%
2014	3.4%	5.2%	7.6%	8.7%	9.9%	15.0%	16.9%	12.6%	5.8%	5.8%	3.5%	5.6%
Avg	4.0%	4.8%	7.3%	8.9%	9.6%	14.9%	17.3%	13.0%	6.5%	5.6%	3.5%	4.6%

Source: NMFS SRHS.

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

Economic Value

Participation, effort, and harvest are indicators of the value of saltwater recreational fishing. However, a more specific indicator of value is the satisfaction that anglers experience over and above their costs of fishing. The monetary value of this satisfaction is referred to as consumer surplus (CS). The value or benefit derived from the recreational experience is dependent on several quality determinants, which include fish size, catch success rate, and the number of fish kept. These variables help determine the value of a fishing trip and influence total demand for recreational fishing trips.

Direct estimates of the CS for hogfish are not currently available. There are, however, estimates for snapper and grouper species in general. Haab et al. (2012) estimated the CS (willingness to pay (WTP) for one additional fish caught and kept) for snappers and groupers in the Southeastern U.S. using four separate econometric modeling techniques. The finite mixture model, which takes into account variation in the preferences of fishermen, had the best prediction rates of the four models and, as such, was selected for presentation here. The WTP for an additional snapper (excluding red snapper) estimated by this model was $12.37 (2014 dollars) [4]. This value may seem low and may be strongly influenced by the pooling effect inherent to the model in which it was estimated. The WTP for an additional red snapper, in comparison, was estimated to be $140.23 (2014 dollars). The WTP for an additional grouper was estimated to be $134.73 (2014 dollars). Another study estimated the value of the consumer surplus for catching and keeping a second grouper on an angler trip at approximately $103 (2014 dollars) and lower thereafter (approximately $69 for a third grouper, $51 for a fourth grouper, and $40 for a fifth grouper) (Carter and Liese 2012). Additionally, this study estimated the value of harvesting a second red snapper at approximately $81 (2014 dollars) and lower thereafter. No estimates were provided for other snapper species.

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

With regards to for-hire businesses, economic value can be measured by producer surplus (PS) per passenger trip (the amount of money that a vessel owner earns in excess of the cost of providing the trip). Estimates of the PS per for-hire passenger trip are not available. Instead, net operating revenue (NOR), which is the return used to pay all labor wages, returns to capital, and owner profits, is used as a proxy for PS. For the South Atlantic region, estimated NOR values are $163 (2014 dollars) per charter angler trip and $44 per headboat angler trip (C. Liese, NMFS SEFSC, pers. comm.)[5].

[4] Estimates converted to 2014 dollars using the 2014 annual Consumer Price Index (CPI) for all US urban consumers provided by the Bureau of Labor and Statistics (BLS) (http://www.bls.gov/data/).

[5] Estimates were converted to 2014 dollars using the 2014 annual CPI for all US urban consumers provided by the BLS (http://www.bls.gov/data/).

Business Activity

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

Estimates of the business activity (economic impacts) associated with recreational angling for hogfish were derived using average impact coefficients for recreational angling for all species, as derived from an add-on survey to the Marine Recreational Fisheries Statistics Survey (MRFSS) to collect economic expenditure information, as described and utilized in NMFS (2011b). Estimates of the average expenditures by recreational anglers are also provided in NMFS (2011b) and are incorporated herein by reference.

Recreational fishing generates business activity (economic impacts). Business activity for the recreational sector is characterized in the form of full-time equivalent jobs, output (sales) impacts (gross business sales), and value-added impacts (difference between the value of goods and the cost of materials or supplies). Estimates of the average target effort (2010-2014) for hogfish and associated business activity (2014 dollars) are provided in **Table 3.3.2.7**. The average impact coefficients, or multipliers, used in the model are invariant to the "type" of effort and can therefore be directly used to measure the impact of other effort measures such as catch trips if desired. To calculate the multipliers from **Table 3.3.2.7**, simply divide the desired impact measure (output impact, value-added impact, or jobs) associated with a given state and mode by the number of target trips for that state and mode. It is noted that multipliers are not provided for combinations of states and modes that had zero estimated hogfish target trips from 2010 through 2014.

The estimates provided in **Table 3.3.2.7** only apply at the state-level. These numbers should not be added across the region. Addition of the state-level estimates to produce a regional (or national) total could either under- or over-estimate the actual amount of total business activity because of the complex relationship between different jurisdictions and the expenditure/impact multipliers. Neither regional nor national estimates are available at this time.

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

Table 3.3.2.7. Summary of hogfish target trips (2010 through 2014 average) and associated business activity (2014 dollars)*. Output and value added impacts are not additive.

	East Florida	North Carolina
	Private/Rental Mode	
Target Trips	18,602	147
Output Impact	$967,360	$12,392
Value Added Impact	$544,606	$7,025
Jobs	8	0
	Charter Mode	
Target Trips	420	0
Output Impact	$334,777	$0
Value Added Impact	$220,338	$0
Jobs	3	0
	All Modes	
Target Trips	19,022	147
Output Impact	$1,302,136	$12,392
Value Added Impact	$764,944	$7,025
Jobs	11	0

*There were no hogfish target trips estimated for Georgia or South Carolina and none for the shore mode.
Source: effort data from MRIP; economic impact results calculated by NMFS SERO using the model developed for NMFS (2011b).

3.3.2 Social Environment

The social environment includes a description of the commercial and recreational components of the snapper grouper fishery. The description is based on the geographical distribution of landings and the relative importance of the species for commercial and recreational fishing communities. A spatial approach enables the consideration of the importance of fishery resources to those communities, as required by National Standard 8.

3.3.3 Environmental Justice Considerations

3.4 Administrative Environment

3.4.1 The Fishery Management Process and Applicable Laws

3.4.1.1 Federal Fishery Management

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

Responsibility for federal fishery management decision-making is divided between the U.S. Secretary of Commerce (Secretary) and eight regional fishery management councils that represent the expertise and interests of constituent states. Regional councils are responsible for preparing, monitoring, and revising management plans for fisheries needing management within their jurisdiction. The Secretary is responsible for collecting and providing the data necessary for the councils to prepare fishery management plans and for promulgating regulations to implement proposed plans and amendments after ensuring that management measures are consistent with the Magnuson-Stevens Act and with other applicable laws. In most cases, the Secretary has delegated this authority to NMFS.

The 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 mi 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.

3.4.1.2 State Fishery Management

The state governments of North Carolina, South Carolina, Georgia, and Florida have the authority to manage fisheries that occur in waters extending three nautical miles from their respective shorelines. North Carolina's marine fisheries are managed by the Marine Fisheries Division of the North Carolina Department of Environment and Natural Resources. 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 (ASMFC) in management of marine fisheries. This commission was created to coordinate state regulations and develop management plans for interstate fisheries. It has significant authority, through the Atlantic Striped Bass Conservation Act and the Atlantic Coastal Fisheries Cooperative Management Act, to compel adoption of consistent state regulations to conserve coastal species. The ASFMC is also represented at the 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.

3.4.1.3 Enforcement

Both the NMFS Office for Law Enforcement (NOAA/OLE) and the United States Coast Guard (USCG) have the authority and the responsibility to enforce 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 Consequences

Action 1. Modify the Fishery Management Unit for hogfish

4.1.1 Biological Effects

Alternatives (preferred alternatives in bold)

1. No Action. Do not establish separate stocks of hogfish in the South Atlantic. There is a Gulf of Mexico stock and South Atlantic stock of hogfish separated at the jurisdictional boundary between the South Atlantic Fishery Management Council and the Gulf of Mexico Fishery Management Council.

2. Modify the Snapper Grouper Fishery Management Unit (FMU) to specify two separate stocks of hogfish: (1) a Georgia through North Carolina (GA-NC) stock from the Georgia/Florida state boundary to the North Carolina/Virginia state boundary, and (2) a Florida Keys/East Florida (FLK/EFL) stock from the Florida/Georgia state boundary south to:

2a. The South Atlantic/Gulf of Mexico Council boundary.

2b. The Monroe/Collier County line.

2c. A line just south of Cape Sable running due west.

Hogfish are currently managed as a single stock within the South Atlantic Council's area of jurisdiction. Recently, however, research on the genetic structure of hogfish (Seyoum et al. 2015) indicated that three genetically distinct population segments are present in the Southeastern U.S.: (1) the eastern Gulf of Mexico, (2) the Florida Keys and the southeast coast of Florida, and (3) the Carolinas. Two of the population segments are within the South Atlantic Council's area of jurisdiction. An amendment to the Snapper Grouper Fishery Management Plan (FMP; SAFMC 1983) is therefore needed to delineate the two stocks of hogfish. Under **Alternative 1 (No Action)**, hogfish would continue to be managed as s single stock, thus ignoring the latest scientific evidence. As such, management measures might not be as effective because biological parameters such as growth rates, natural mortality, etc. might not accurately be ascribed to at least some portion of the population. **Preferred Alternative 2** would specify a GA-NC stock of hogfish north of the GA/FL border and a Florida Keys/East Florida stock south of the GA/FL border according to recommendations in Seyoum et al. (2015). Hence, **Preferred Alternative 2** would result in positive biological benefits since management would be based on the latest scientific research and regulations could be better tailored to address specific management issues pertinent to each stock. **Sub-alternatives 2a-2c (Preferred)** specify the dividing line between the Gulf of Mexico stock (under the jurisdiction of the Gulf of Mexico Fishery Management Council) and the Florida Keys/East Florida stock. Seyoum et al. (2015) state that the two stocks split from each other along the "coastal area west of the Florida Everglades". Thus, from a biological standpoint, **Sub-alternatives 2a-2c (Preferred)** would result in similar biological effects. No changes to

how landings are monitored for tracking annual catch limits would result from any of the sub-alternatives considered under this action.

4.1.2 Economic Effects

4.1.3 Social Effects

4.1.4 Administrative Effects

Alternative 2 (Preferred) would split the current stock of hogfish in the South Atlantic into two: to a GA-NC stock and a FLK/EFL stock separated by a line due west from just south of Cape Sable (**Sub-alternative 2c, Preferred**). **Sub-alternative 2c (Preferred)** would have greater administrative effects compared with **Sub-alternatives 2b** and **2a**, since the South Atlantic/Gulf of Mexico Council boundary and the Monroe/Collier County line are already established boundaries. Under **Sub-alternative 2c (Preferred)**, the Gulf of Mexico Council would need to remove the portion of hogfish in Monroe County, Florida, from the Reef Fish FMU and give management jurisdiction to the South Atlantic Council. Compared to **Alternative 1 (No Action)**, the preferred alternatives would increase the administrative burden for both Councils (South Atlantic and Gulf of Mexico) and for the National Marine Fisheries Service. Administrative impacts resulting from the new regulations would include tracking Annual Catch Limits (ACLs) for two stocks instead of one and educating the public and law enforcement personnel on the new boundaries. However, according to input received from Florida law enforcement personnel, **Sub-alternative 2c (Preferred)** would offer benefits over **Sub-alternatives 2a** and **2b** since the proposed boundary " is far enough north of the Keys and far enough South of Naples and Marco Island so that Monroe is not simply shifting the regulatory problem north to Collier County."

Action 2. Specify Maximum Sustainable Yield (MSY) for the GA-NC and the FLK/EFL stocks of hogfish

4.2.1 Biological Effects

Alternatives (preferred alternatives in bold)

1 (No Action). Do not define MSY for the GA-NC or the FLK/EFL stocks of hogfish. Currently, MSY equals the yield produced by F_{MSY}. $F_{30\%SPR}$ is used as the F_{MSY} proxy for hogfish in the South Atlantic.

2. MSY equals the yield produced by F_{MSY} or the F_{MSY} proxy. MSY and F_{MSY} are recommended by the most recent SEDAR/SSC.

2a. GA-NC stock of hogfish. MSY = $F_{30\%SPR}$.

2b. FLK/EFL stock of hogfish. MSY = 0.138.

MSY is a reference point used by managers to assess fishery performance over the long term. Defining MSY for each of the stocks of hogfish under **Preferred Alternative 2** would not alter the current harvest or use of the resource. Specification of this metric merely establishes a benchmark for resource evaluation on which additional management actions would be based, if necessary. MSY in **Alternative 1 (No Action)** is defined as the yield produced by F_{MSY} where $F_{30\%SPR}$ is used as a proxy for F_{MSY} and represents the overfishing level defined in Amendment 11 (SAFMC 1998b). In **Alternative 1 (No Action)**, a poundage for MSY is not specified since one was not specified in Amendment 11. **Alternative 2 (Preferred)** would allow for periodic adjustments of F_{MSY} and MSY values based on estimates from new assessments without the need for a plan amendment. Because the SEDAR 37 (2014) stock assessment was not considered applicable to the GA-NC stock of hogfish, **Sub-alternative 2a (Preferred)** would essentially maintain the status quo for that stock. However, it differs from **Alternative 1 (No Action)** in that it would allow future adjustments without the need for a plan amendment if a stock assessment were to produce an estimate of MSY for that stock. **Sub-alternative 2b (Preferred)** would redefine MSY for the Florida Keys/East Florida stock based on the recommendation of SEDAR 37 (2014) and the Council's SSC to equal the value associated with the yield at F_{MSY} (346,095 lbs ww). The specification of a MSY equation would have beneficial effects on the Florida Keys/East Florida stock of hogfish as it provides a reference point to monitor the long-term performance of the stock.

As none of the alternatives considered under this action would have direct effects on resource harvest or use, biological effects would be neutral. However, **Alternative 2 (Preferred)**, which is recommended in the most recent SEDAR and by the SSC, has a better scientific basis and thus provides a more solid ground for management actions that have economic and social implications.

4.2.2 Economic Effects

4.2.3 Social Effects

4.2.4 Administrative Effects

The potential administrative effects of these alternatives differ in terms of the implied restrictions required to constrain the fisheries to the respective benchmarks. Defining a MSY proxy establishes a harvest goal for the fishery, for which management measures will be implemented. Those management measures would directly impact the administrative environment according to the level of conservativeness associated with the chosen MSY and subsequent restrictions placed on the fishery to constrain harvest levels. For the GA-NC stock of hogfish, **Sub-alternative 2a (Preferred)** differs from **Alternative 1 (No Action)** in that it would allow for periodic adjustments of F_{MSY} and MSY values based on estimates from new assessments without the need for a plan amendment. As such, **Sub-alternative 2a (Preferred)** would reduce the administrative burden from current levels. For the FLK/EFL stock of hogfish, **Sub-alternative 2b (Preferred)** would allow for adoption of the MSY value recommended by the latest stock assessment as well as subsequent adjustments as new assessments or updates are conducted without the need for a plan amendment. Therefore, none of the alternatives considered under this action would result in significant changes in administrative effects compared to **Alternative 1 (No Action).**

Action 3. Specify Minimum Stock Size Threshold (MSST) for the GA-NC and the FLK/EFL stocks of hogfish

Alternatives (preferred alternatives in bold)

1 (No Action). Do not define MSST for the GA-NC and FLK/EFL stocks of hogfish. MSST for hogfish in the South Atlantic is equal to SSB_{MSY} ((1-M) or 0.5, whichever is greater).

2. MSST = SSB_{MSY} ((1-M) or 0.5, whichever is greater).
   - 2a. For the GA-NC stock of hogfish.
   - 2b. For the FLK/EFL stock of hogfish.

3. MSST = 50% of SSB_{MSY}.
   - 3a. For the GA-NC stock of hogfish.
   - 3b. For the FLK/EFL stock of hogfish.

4. MSST = 75% of SSB_{MSY}.
   - **4a. For the GA-NC stock of hogfish.**
   - **4b. For the FLK/EFL stock of hogfish.**

4.3.1 Biological Effects

The Minimum Stock Size Threshold (MSST) corresponds to the level of biomass below which a stock is considered overfished. If it is determined that a stock's biomass is below the MSST the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires a rebuilding plan, which could result in harvest reductions. **Alternative 1 (No Action)** would retain the MSST definition established in Amendment 11 to the Snapper Grouper FMP (SAFMC 1998b) for the entire stock of hogfish in the South Atlantic. **Alternative 2** would impart the same definition of MSST to each of the two stocks of hogfish being defined in this amendment. Hence, in terms of biological effects, **Alternatives 1 (No Action)** and **2** are identical. The current definition of MSST under **Alternatives 1 (No Action)** and **2** requires that MSST be at least one half of SSB_{MSY}, but allows for it to be greater than this value if natural mortality (M) is suitably low. If (1-M) is equal to 0.5, then the value obtained from this alternative would be the same as that obtained from **Alternative 3,** which sets the MSST at 50% of the Spawning Stock Biomass at MSY (SSB_{MSY}). The least biologically conservative alternative is **Alternative 4**, which would establish MSST at 75% of SSB_{MSY}.

SEDAR 37 (2014) estimated natural mortality for hogfish at 0.179. However, because the stock assessment was not deemed applicable to the GA-NC stock, this estimate is valid for the Florida Keys/East Florida stock only. For a species such low natural mortality, such as hogfish, the biomass threshold for determining if the stock is overfished (MSST) under the current definition (**Alternatives 1 (No Action)** & **2**) is very close to the biomass level when the stock is not considered overfished (SSB_{MSY}). Since **Alternative 1 (No Action)** nearly eliminates the buffer between MSST and SSB_{MSY} for stocks with low natural mortality rates, a stock would never be permitted to fall below SSB_{MSY} without triggering an "overfished" determination and a mandatory development of a rebuilding plan. The most biologically conservative alternatives are

Alternatives 1 (No Action) and **2** because they would ensure that a rebuilding plan is developed for hogfish; however, under these alternatives a rebuilding plan may also be required when it is not biologically necessary. The biological benefits of **Alternative 1 (No Action)** would take the form of increased harvest restrictions that would be implemented with the intent to rebuild the stock according to the current MSST threshold criterion. **Alternative 3** and its sub-alternatives would be the least biologically beneficial since it would allow biomass to decrease significantly before triggering the rebuilding plan requirement. **Preferred Alternative 4** and its sub-alternatives would still require the development of a rebuilding plan if hogfish was deemed overfished, but would reduce the risk of requiring a rebuilding plan when decreased biomass was due to natural variations in recruitment.

Additionally, if the same management measures are used to rebuild a stock under all the alternatives considered, the stock would be expected to rebuild fastest under **Alternative 1 (No Action)** because the overfished threshold (MSST) would be closest to the rebuilt threshold SSB_{MSY}. Therefore, **Alternative 1 (No Action)** could be considered to have the greatest biological benefit among alternatives considered in this action. The tradeoff associated with the assurance provided by this conservative definition of MSST is that natural variation in recruitment could cause stock biomass to frequently alternate between an overfished and rebuilt condition (biomass at SSB_{MSY}), even if the fishing mortality rate applied to the stock was within the limits specified by the maximum fishing mortality threshold (MFMT). If realized, this situation could result in administrative and socio-economic burdens related to developing and implementing multiple rebuilding plans that may not be biologically necessary. However, simulations on a wide variety of species by Restrepo et al. (1998) indicated that stocks at biomass levels approximating $75\%SSB_{MSY}$ can rebuild to SSB_{MSY} fairly quickly with little constraint on fishing mortality. Therefore, it is not biologically necessary to have extremely small buffers between overfished and rebuilt thresholds.

Preferred Alternative 4, which would set MSST equal to 75% SSB_{MSY}, is consistent with how the South Atlantic Council has approached defining MSST for other snapper grouper stocks with low natural mortality estimates. The South Atlantic Council changed the MSST definition to $75\%SSB_{MSY}$ for snowy grouper (SAFMC 2008a), golden tilefish (SAFMC 2008b), red grouper (SAFMC 2011d) and, more recently, several other snapper grouper species (red snapper, blueline tilefish, gag, black grouper, yellowtail snapper, vermilion snapper, red porgy, and greater amberjack (SAFMC 2014). These species have low estimates of natural mortality, and the overfished threshold from the status quo MSST definition is very close to the biomass threshold when stocks are not considered overfished. The biological benefits of **Preferred Alternative 4**, which would trigger a rebuilding plan when biomass is at 75% of SSB_{MSY}, would be expected to be greater than **Alternative 3**, which would have a lower biomass threshold for an overfished determination ($50\%SSB_{MSY}$) because biomass would not be allowed to decrease as much as it would under **Alternative 3** before triggering implementation of a rebuilding plan. At their October 2013 meeting, the South Atlantic Council's Scientific and Statistical Committee acknowledged that the $75\%SSB_{MSY}$ approach is an acceptable choice for MSST, and they voiced no concern regarding the adoption of this management reference point for South Atlantic Council managed species.

4.3.2 Economic Effects

4.3.3 Social Effects

4.3.4 Administrative Effects

The MSST is the level of biomass below which a fishery would be considered overfished and is thus tied to implementation of management measures. Those management measures would directly impact the administrative environment according to the level of conservativeness associated with the chosen MSST and subsequent restrictions placed on the fishery to constrain harvest levels. The current MSST definition under **Alternative 1 (No Action)** could cause hogfish to fluctuate between an overfished and rebuilt condition (constantly triggering rebuilding plans). **Alternative 2** is identical to **Alternative 1 (No Action)** but would apply to each individual stock of hogfish. Hence both alternatives would be the most administratively burdensome of the MSST alternatives under consideration. The larger the buffer between MSST and SSB_{MSY}, the lower the probability that hogfish would be considered overfished and require a rebuilding plan. Therefore, **Alternative 3** and its sub-alternatives are the least administratively burdensome of the alternatives considered since under **Alternative 3** hogfish would be least likely to be considered overfished and least likely to require a rebuilding plan. Potential administrative impacts increase as the distance between the MSST value and SSB_{MSY} decreases, therefore, **Alternatives 3** and **4 (Preferred)**, and their sub-alternatives, would result in increasingly greater administrative impacts, respectively. However, **Sub-alternatives 3a** and **4a (Preferred)**, would not result in any changes to the administrative burden relative to **Alternative 1 (No Action)** as the MSST value for the GA-NC stock of hogfish would remain unknown.

Action 4. Establish ACLs for the GA-NC stock of hogfish.

4.4.1 Biological Effects

Genetic evidence (Seyoum et al. 2015) indicates that hogfish within the South Atlantic Council's area of jurisdiction belong to two distinct stocks. The SEDAR 37 (2014) assessment, however, was not deemed applicable to the GA-NC stock due to lack of data hence the status of the GA-NC stock is currently unknown. Based on methodology in *Calculating Acceptable Biological Catch for Stocks That Have Reliable Catch Data Only* (Only Reliable Catch Stocks – ORCS) (Berkson et al. 2011), the South Atlantic Council's SSC recommended an approach to compute the Acceptable Biological Catch (ABC) for unassessed stocks with only reliable catch data. The approach involves selection of a "catch statistic", a scalar to denote the risk of overexploitation for the stock, and a scalar to denote the management risk level. The SSC provides the first two criteria for each stock, and the South Atlantic Council specifies their risk tolerance level for each stock.

Alternatives (preferred alternatives in bold)

1 (No Action). Do not establish ACLs for the GA-NC stock of hogfish. The current ABC for the entire stock of hogfish is 137,824 lbs ww and ACL = OY = ABC. The commercial ACL = 49,469 lbs ww (36.69%) and the recreational ACL = 85,355 lbs ww (63.31%).

2. Establish an ACL for the GA-NC stock. Specify commercial and recreational ACLs using re-calculated sector allocations based on proposed modifications to the management unit (81.91% commercial and 18.09% recreational). The ABC for the GA-NC stock = 28,161 pounds whole weight (lbs ww).

2a. ACL = OY = ABC.

2b. ACL = OY = 95%.

2c. ACL = OY = 90%.

Catch Statistic: The median was considered inadequate to represent the high fluctuation in landings—i.e., to appropriately capture the range of occasional high landings—therefore, the maximum catch over the period 1999-2007 was chosen instead. This time period was chosen to (1) be consistent with the period of landings used in the South Atlantic Council's Comprehensive ACL Amendment (SAFMC 2011c), and (2) to minimize the impact of recent regulations and the economic downturn on the landings time series. For the GA-NC stock of hogfish, 1999 was the year of highest landings over the 1999-2007 time period and was selected as the "catch statistic."

Risk of Overexploitation: Based on SSC consensus and expert judgment each stock was assigned to a final risk of exploitation category based on a suite of attributes used to assess the level of risk. For hogfish, the SSC assigned a risk of overexploitation of 1.25, indicating the species is at moderately high risk of overexploitation.

Risk Tolerance: The next step in the process involves multiplying the "catch statistic x scalar" metric by a range of scalar values that reflects the South Atlantic Council's risk tolerance level.

For instance, the South Atlantic Council may choose to be more risk-averse in computing the ABC for a stock that exhibits a moderately high risk of overexploitation. As such, the South Atlantic Council may use a scalar of 0.50 for such stocks to specify a more conservative ABC. On the other hand, stocks with low risk of overexploitation, and thus able to tolerate a higher level of management risk, may be assigned a less conservative scalar, such as 0.90. For hogfish, the South Atlantic Council selected a risk tolerance scalar of 0.7.

Table 4.4.1.1 below summarizes the ORCS approach to arrive at the ABC for the GA-NC stock of hogfish.

Table 4.4.1.1. The South Atlantic's Scientific and Statistical Committee (SSC) Acceptable Biological Catch (ABC) recommendation for the GA-NC stock of hogfish.

Statistic	Value
Risk of Overexploitation	Moderately High
Associated Scalar	1.25
Range of Years	1999-2007
Year of Max Landings	1999
Catch Statistic	32,184 lbs ww
Council Risk Scalar (Preferred from Am 29)	0.7
Proposed ABC	28,161 lbs ww

To set the Annual Catch Limit (ACL) and Optimum Yield (OY) for the GA-NC stock of hogfish, the South Atlantic Council may exercise varying degrees of precaution to account for management uncertainty: **Sub-alternative 2a** would set the ACL and OY at the same level as ABC, whereas **Sub-alternatives 2b** and **2c** would each provide a management uncertainty buffer of 5% and 10%, respectively.

Sub-alternatives 2a-2c would set OY equal to the ACL. National Standard 1 (NS1) establishes the relationship between conservation and management measures, preventing overfishing, and achieving OY from each stock, stock complex, or fishery. The NS1 guidelines discuss the relationship of OFL to the MSY and ACL to OY. The OFL is an annual amount of catch that corresponds to the estimate of maximum fishing mortality threshold applied to a stock; MSY is the long-term average of such catches. The ACL is the limit that triggers AMs and is the management target for the species. Management measures for a fishery should, on an annual basis, prevent the ACL from being exceeded. The long-term objective is to achieve OY through annual achievement of an ACL. The NS1 guidelines state that if OY is set close to MSY, the conservation and management measures in the fishery must have very good control of the amount of catch in order to achieve the OY without overfishing.

The South Atlantic Council and their SSC have established an ABC control rule that takes into consideration scientific and management uncertainty to ensure catches are maintained below OFL. Setting the ACL equal to the ABC (**Sub-alternative 2a**) leaves no buffer between the two

harvest parameters, which may increase risk that harvest could exceed the ABC. The South Atlantic Council considered alternatives in the Comprehensive ACL Amendment (SAFMC 2011a) and Amendment 24 (SAFMC 2011b) that would set the ACL below the ABC but selected ACL=OY=ABC as their preferred alternative. More recently, the South Atlantic Council has frequently set ACLs for snapper grouper species at the same level as the ABC. However, AMs and ACLs are in place to ensure overfishing of hogfish does not occur. The NS1 Guidelines recommend a performance standard by which the system of ACLs and AMs can be measured and evaluated. If the ACL is exceeded more than once over the course of four years, the South Atlantic Council would reassess the system of ACLs and AMs for the species. The South Atlantic Council is taking action in Amendment 34 (SAFMC 2015) to enhance the effectiveness of the AMs for hogfish.

Sub-alternatives 2b and **2c** would have a greater positive biological effect than **Sub-alternative 2a** because they would create a buffer between the ACL/OY and ABC, with **Sub-alternative 2c** setting the most conservative ACL at 90% of the ABC (**Tables 4.4.1.x-4.4.1.x**). Creating a buffer between the ACL/OY and ABC would provide greater assurance that overfishing is prevented, and the long-term average biomass is near or above SSB_{MSY}. However, the South Atlantic Council's ABC control rule takes into account scientific uncertainty. The Magnuson-Stevens Act national standard 1 guidelines indicate an ACL may typically be set very close to the ABC. Setting a buffer between the ACL and ABC would be appropriate in situations where there is uncertainty in whether or not management measures are constraining fishing mortality to target levels. An ACT, which is not required, can also be set below the ACL to account for management uncertainty and provide greater assurance overfishing does not occur.

With vastly improved commercial monitoring mechanisms recently implemented, it is unlikely that repeated commercial ACL overages would occur. The Commercial Landings Monitoring System (CLM) came online in June 2012 and is now being used to track commercial landings of federally-managed fish species. This system is able to track individual dealer reports, track compliance with reporting requirements, project harvest closures using five different methods, and analyze why ACLs are exceeded. The CLM performs these tasks by taking into account: (1) spatial boundaries for each stock based on fishing area; (2) variable quota periods such as overlapping years or multiple quota periods in one year; and (3) overlapping species groups for single species as well as aggregated species. Data sources for the CLM system include the Standard Atlantic Fisheries Information System for Georgia and South Carolina, and the Bluefin Data file upload system for Florida and North Carolina. The CLM system is also able to track dealer reporting compliance with a direct link to the permits database in NMFS Southeast Regional Office (SERO).

Additionally, the Southeast Fisheries Science Center (SEFSC) worked with SERO, the Gulf of Mexico Fishery Management Council (Gulf of Mexico Council), and South Atlantic Council to develop a Joint Dealer Reporting Amendment (GMFMC & SAFMC 2013b), which became effective on August 7, 2014. The Joint Dealer Reporting Amendment requires electronic reporting, increases required reporting frequency for dealers to once per week, and requires a single dealer permit for all finfish dealers in the Southeast Region. The CLM and the new dealer

reporting requirements constitute major improvements to how commercial fisheries are monitored, and go beyond monitoring efforts that were in place when the NS1 guidelines were developed. The new CLM quota monitoring system and actions in the Joint Generic Dealer Reporting amendment are expected to provide more timely and accurate data reporting and would thus reduce the incidence of quota overages.

Harvest monitoring efforts in the recreational sector have also been improved. On January 27, 2014, regulations became effective requiring headboats to report their landings electronically once per week (Generic Headboat Amendment, GMFMC & SAFMC 2013a). The SEFSC is also developing an electronic reporting system for charter boats operating the Southeast Region and the Gulf of Mexico and South Atlantic Councils are developing a joint amendment that would require electronic reporting for charterboats with a set reporting frequency. These recreational harvest monitoring efforts could substantially increase the accuracy and timeliness of in-season reporting and reduce the risk of recreational ACL overages, which would be biologically beneficial for hogfish. Therefore, there is a low risk of exceeding the commercial and recreational ACLs and **Alternative 2** and its sub-alternatives can be used as part of a successful harvest management system for hogfish with little risk of overfishing.

4.4.2 Economic Effects

4.4.3 Social Effects

4.4.4 Administrative Effects

Negative administrative impacts of this action are likely to be minimal. **Alternative 1 (No Action)**, and **Alternative 2** (including its sub-alternatives) would not result in significant administrative cost or time burdens other than notifying fishery participants of the change in the sector ACLs and continued monitoring of the sector ACLs. The burden on law enforcement would not change under either alternative since commercial quota closures and bag limits implemented are currently enforced.

Action 5. Establish a rebuilding plan for the FLK/EFL stock of hogfish

4.5.1 Biological Effects

4.5.2 Economic Effects

4.5.3 Social Effects

4.5.4 Administrative Effects

In general, the shorter the rebuilding schedule the more restrictive the harvest limitations needed in order to rebuild the stock within the specified timeframe. Greater restrictions can result in increased impacts on the administrative environment due to an increased need to closely track landings; enforce bag, trip, and size limits; or implement in-season and post-season AMs.

Alternatives
(preferred alternatives in bold)

1 (No Action). Do not establish a rebuilding plan for the FLK/EFL stock of hogfish.

2. Define a rebuilding plan where the rebuilding strategy for the FLK/EFL stock of hogfish sets ABC equal to the yield at a constant fishing mortality rate and rebuilds the stock in 10 years with a 50% probability of rebuilding success. The Overfishing Limit is the yield at F_{MSY}. The spawning stock siomass at MSY (SSB_{MSY}) is 2,300,391 pounds whole weight (lbs ww). Year 1 = 2016.

3. Define a rebuilding plan where the rebuilding strategy for the FLK/EFL stock of hogfish sets ABC equal to the yield at a constant fishing mortality rate and rebuilds the stock in 10 years with a 72.5% probability of rebuilding success. The Overfishing Limit is the yield at F_{MSY}. The Spawning Stock Biomass at MSY (SSB_{MSY}) is 2,300,391 pounds whole weight (lbs ww). Year 1 = 2016.

4. Define a rebuilding plan where the rebuilding strategy for the FLK/EFL stock of hogfish sets ABC equal to the yield at a constant fishing mortality rate and rebuilds the stock in 7 years with a 50% probability of rebuilding success. The Overfishing Limit is the yield at FMSY. The Spawning Stock Biomass at MSY (SSB_{MSY}) is 2,300,391 pounds whole weight (lbs ww). Year 1 = 2016.

5. Define a rebuilding plan where the rebuilding strategy for the FLK/EFL stock of hogfish sets ABC equal to the yield at a constant fishing mortality rate that rebuilds the stock in 7 years with a 72.5% probability of rebuilding success. The Overfishing Limit is the yield at F_{MSY}. The Spawning Stock Biomass at MSY (SSB_{MSY}) is 2,300,391 pounds whole weight (lbs ww). Year 1 = 2016.

Alternative 1 (No Action) would not establish a rebuilding schedule for the FLK/EFL stock of hogfish and would therefore, not comply with Magnuson-Stevens Act requirements for developing rebuilding plans. **Alternative 2** would rebuild the FLK/EFL stock of hogfish in 10 years, but with only a 50% probability of success. **Alternative 3 (Preferred)** would rebuild the FLK/EFL stock of hogfish in 10 years with a 72.5% probability of rebuilding success. **Alternatives 4** and **5** have the shortest rebuilding schedule considered and would require implementation of additional harvest restrictions to meet the goal of rebuilding the stock within 7 years. Therefore, of all the rebuilding schedule alternatives that specify a timeframe, **Alternatives 4** and **5** would be most likely to impact the administrative environment in the form of developing, implementing, and monitoring more restrictive harvest regulations for hogfish.

Of all the alternatives considered, **Alternative 3 (Preferred)** would be the most efficient rebuilding strategy and least likely to impact the administrative environment.

Action 6. Establish ACLs for the FLK/EFL stock of hogfish.

4.6.1 Biological Effects

4.6.2 Economic Effects

4.6.3 Social Effects

4.6.4 Administrative Effects

Negative administrative impacts of this action are likely to be minimal. **Alternative 1 (No Action),** and **Alternative 2 (Preferred)**, (including its sub-alternatives) would not result in significant administrative cost or time burdens other than notifying fishery participants of the change in the sector ACLs and continued monitoring of the sector ACLs. The burden on law enforcement would not change under either alternative since commercial quota closures and bag limits implemented are currently enforced.

Alternatives (preferred alternatives in bold)

1 (No Action). Do not establish ACLs for the FLK/EFL hogfish stock. The current ABC for the entire stock of hogfish is 137,824 lbs ww and ACL = OY = ABC. The commercial ACL = 49,469 lbs ww (36.69%) and the recreational ACL = 85,355 lbs ww (63.31%).

2. Establish ACLs for the FLK/EFL stock of hogfish. Specify commercial and recreational ACLs for 2017-2025. ACLs will not increase automatically in a subsequent year if present year projected catch has exceeded the total ACL. Specify commercial and recreational ACLs using re-calculated sector allocations based on proposed modifications to the management unit (24.29% commercial and 75.71% recreational).

2a. ACL = OY = ABC.

2b. ACL = OY = 95%.

2c. ACL = OY = 90%.

Action 7. Establish a recreational Annual Catch Target (ACT) for the GA-NC and the FLK/EFL stocks of hogfish

Alternatives (preferred alternatives in bold)

1 (No Action). Do not modify recreational ACTs for hogfish for the GA-NC and FLK/EFL stocks of recreational sector hogfish. The current ACT is 59,390 lbs ww and applies to hogfish throughout the South Atlantic Council's jurisdiction. The ACT = recreational ACL*(1-PSE) or ACL*0.5, whichever is greater, and where Percent Standard Error (PSE) = average PSE 2005-2009.

2. Establish an ACT for the GA-NC stock of hogfish for the recreational sector.

2a. ACT = recreational ACL*(1-PSE) or ACL*0.5, whichever is greater.

2b. ACT =85% recreational ACL.

2c. ACT = 75% recreational ACL.

3. Establish an ACT for the FLK/EFL stock of hogfish for the recreational sector.

3a. ACT = recreational ACL*(1-PSE) or ACL*0.5, whichever is greater.

3b. ACT =85% recreational ACL.

3c. ACT = 75% recreational ACL.

4.7.1 Biological Effects

4.7.2 Economic Effects

4.7.3 Social Effects

4.7.4 Administrative Effects

Under this action, it is important to note that recreational data collection can be more administratively burdensome due to time delays and lengthy reviews. Specifying an ACT alone would not increase the administrative burden over the status quo, other than adding an additional layer of precautionary monitoring to the system of AMs. In-season monitoring needed for tracking how much of the ACT has been harvested throughout a particular fishing season can potentially result in a need for additional cost and personnel resources if a monitoring mechanism is not already in place. However, because the ACT alternatives as they are presented here, do not trigger any corrective or preventative action, no additional in-season monitoring is required regardless of where the ACT level is set. Therefore, there is no difference in the potential administrative impacts associated with **Preferred Alternatives 2** and **3** (including their sub-alternatives) when compared with **Alternative 1 (No Action)**.

Action 8. Increase the commercial and recreational minimum size limit for hogfish for the GA-NC and the FLK/EFL stocks of hogfish

Alternatives
(preferred alternatives in bold)

1 (No Action). Do not increase the commercial and recreational minimum size limit for hogfish. The current minimum size limit for hogfish is 12 inches fork length (FL) for both the commercial and recreational sectors in federal waters of the South Atlantic Region, and state waters of South Carolina, North Carolina, and Florida. There is no minimum size limit for hogfish in state waters of Georgia.

2. Increase the commercial and recreational minimum size limit for the GA-NC stock of hogfish in the South Atlantic Region.

2a. 16 inches FL
2b. 17 inches FL
2c. 18 inches FL
2d. 19 inches FL
2e. 20 inches FL
2f. Increase the minimum size limit from 12" to 15" in year 1, to 18" in year 2, and to 20" in year 3.

3. Increase the commercial and recreational minimum size limit for the FLK/EFL stock of hogfish in the South Atlantic Region.

3a. 14 inches FL
3b. 15 inches FL
3c. 16 inches FL
3d. 17 inches FL
3e. Increase the minimum size limit from 12" to 14" in year 1 and to 16" in year 3.

4.8.1 Biological Effects

Commercial and recreational hogfish size limit analysis assumed a 10% release mortality rate based on estimates for hook-and-line releases SEDAR 37 (2014). Spearfishing release mortality is estimated to be 100%, but for the purposes of the recreational size limit analysis for hogfish, all landings were treated as hook-and-line. Spearfishing gear is not used on headboats.. Although the majority of MRIP landings are likely from spearfishing gear, it is unlikely that all fishermen would spear undersized fish when the size limit is increased. Further, it is unlikely that fishermen who use spearfishing gear would discard many fish. Hence, the assumption of 10% release mortality for size limit analyses is more realistic. A similar rationale was applied to the size limit analysis for the commercial sector; the assignment of a 10% release mortality rate to spearfishing records of fish that would be undersized if the size limit were increased accounts for some level of estimation error by spearfishermen but avoids the unrealistic assumption that 100% of undersized fish between the current and increased size limit would be killed. Projected reductions in recreational hogfish harvest under different minimum size limits for the recreational and commercial sectors are shown in **Tables 4.8.1** and **4.8.2**, respectively.

Hogfish are monandric, protogynous hermaphrodites. Fish mature as females first, and are expected to eventually become male if they live long enough. Research conducted on hogfish that would belong to the Florida Keys/East Florida stock, indicate that a single male maintains harems of 5 to 15 females (Colin 1982, Munoz et al. 2010) during extended spawning seasons

that last for months. Hogfish are pair spawners (Davis 1976, Colin 1982), and spawning occurs daily during spawning season (McBride and Johnson 2007, Collins and McBride 2008, Munoz et al. 2010). The size (7.8-28.6 inches FL) and age (1-11 years) range at which sexual transition occurs indicates that transition is socially mediated (Collins and McBride 2011).

Life history studies on hogfish that would belong to the Florida Keys/East Florida stock have estimated female size and age at 50% maturity to occur between 6.0 and 7.6 inches fork length (FL) and 0.9 to 1.6 years (McBride et al. 2008, Collins and McBride 2011). Males may occur as small as 7.8 inches FL, but size at 50% male maturity has been estimated as 16.4 inches FL and 7 years in the Florida Keys (McBride et al. 2008; **Figure 4.8.1**). Sex change in hogfish can take several months (McBride and Johnson 2007), so removal of the dominant male has the potential to significantly affect harem stability and decrease reproductive potential (Munoz et al. 2010). Size limits above 16 inches FL (**Sub-alternatives a-e**) may provide hogfish the opportunity to form harems and transition to males. McBride et al. (2008) state: "…the size of 50% male maturation, approximately 415 to 425 mm (16.3-16.7 inches) FL, is well above the current minimum size limit. Evidently, to reduce disruption to spawning harems and avoid recruitment overfishing, the minimum size limit should be increased."

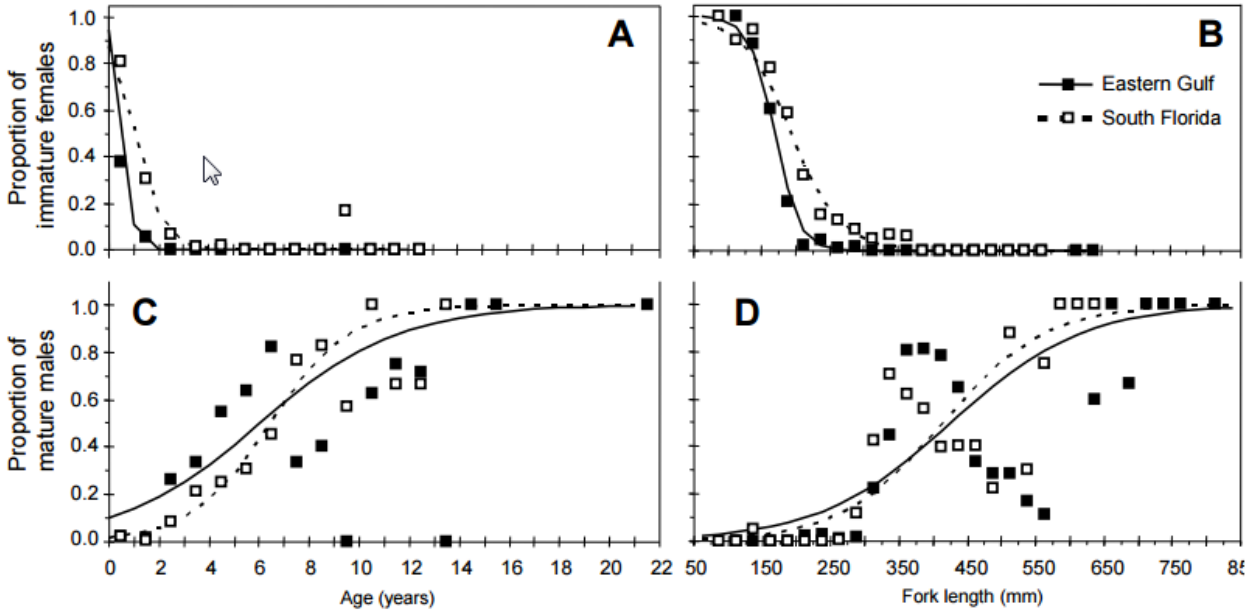


Figure 4.8.1. Maturation of hogfish (*Lachnolaimus maximus*) from the eastern Gulf of Mexico and south Florida for (A) females by age, (B) females by size, (C) males by age, and (D) males by size (Fig. 4 in McBride et al. 2008).

For hogfish in the GA-NC stock, the size at transition was calculated based on macroscopic investigation of gonad samples collected in 2013 through 2015 from vessels fishing off North Carolina (Scott Van Sant, SEFSC, unpublished data). The size at which 50% of females transition to males was estimated to be 24 inches fork length (**Figure 4.8.2**) using binary logistic regression implemented in SAS 9.1. The smallest male observed was 15 inches fork length. No female hogfish were observed greater than 30 inches fork length. These data are preliminary and

will likely change when a complete historical analysis is completed; however, they provide a general estimate of the transition size for hogfish off North Carolina that can be considered in the management of the GA-NC stock.

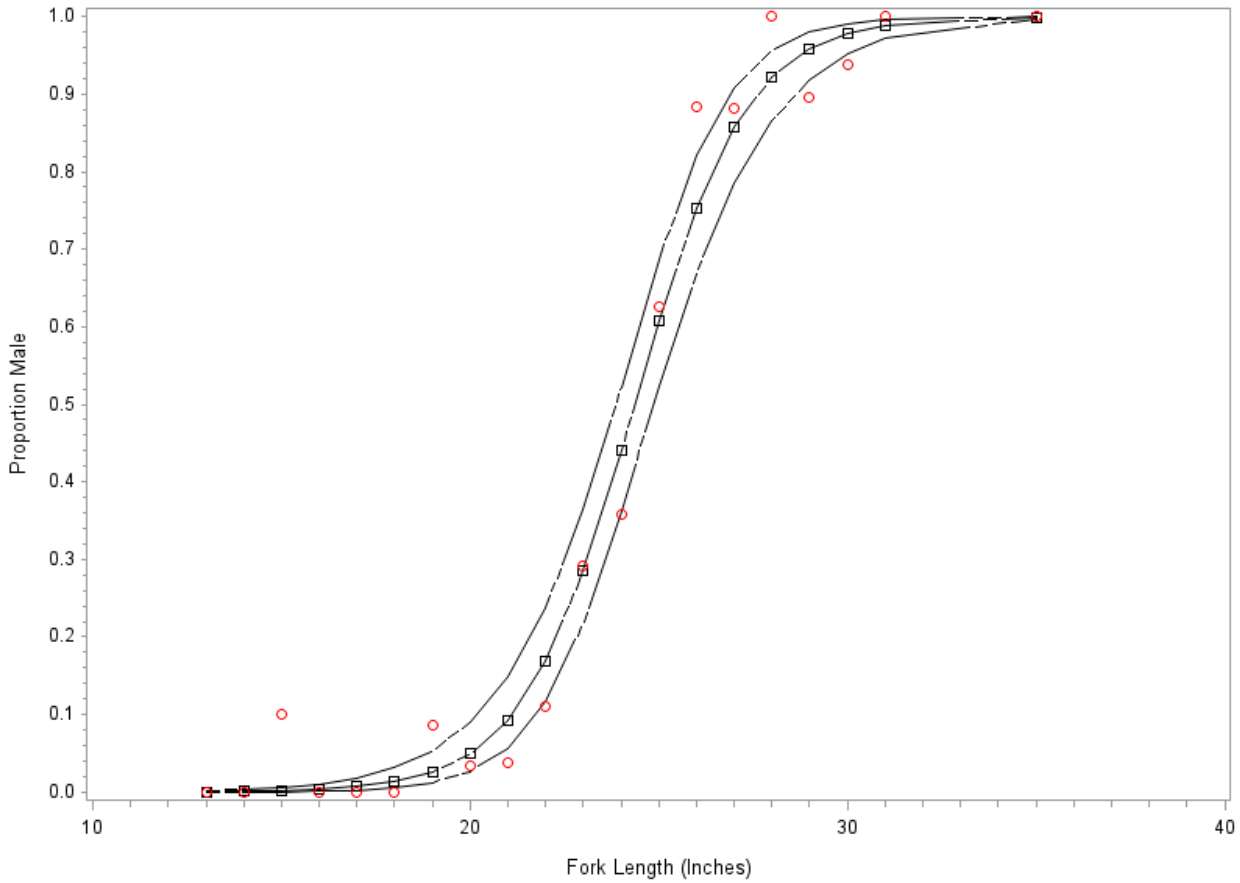


Figure 4.8.2. Size at transition (female to male) for hogfish in North Carolina (preliminary data). Source: Scott Van Sant, SEFSC.

Table 4.8.1. Projected reductions in recreational hogfish harvest under different minimum size limits based on the mean of 2012-2014 MRIP data and 2011-2013 Southeast Region Headboat Survey data. Note some months have been pooled to achieve sample sizes >30.

	Wave											
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	**6**
Size Limit	**% reduction FLK/EFL stock**						**% reduction GA-NC stock**					
12" FL (current)	0	0	0	0	0	0	0	0	0	0	0	0
13	24	30	10	26	24	24	22	22	14	11	22	22
14	52	45	19	45	52	52	39	39	34	35	39	39
15	58	51	62	45	58	58	51	51	43	53	51	51
16	69	64	64	53	69	69	55	55	59	71	55	55
17	79	68	78	65	79	79	66	66	63	78	66	66
18	89	72	90	87	89	89	68	68	65	78	68	68
19	90	76	90	90	90	90	71	71	65	78	71	71
20	90	82	90	90	90	90	79	79	70	85	79	79

Sources: SEFSC Southeast Region Headboat Survey data, MRIP post-stratified data, SEFSC Recreational ACL data.

Table 4.8.2. Projected reductions in commercial hogfish harvest under different minimum size limits based on mean of 2012-2014 TIP data. Note some months have been pooled with surrounding months to achieve sample size > 30.

% reduction - FLK/EFL stock												
	Month											
Size Limit	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
12" FL (current)	0	0	0	0	0	0	0	0	0	0	0	0
13	29	46	48	7	2	5	6	19	34	45	30	30
14	58	64	66	12	3	9	12	24	45	68	48	61
15	71	71	73	18	9	15	17	59	61	68	58	76
16	76	77	77	19	9	66	22	61	64	68	66	80
17	81	77	77	21	13	70	36	62	72	90	76	85
18	81	77	77	24	16	71	42	71	80	90	80	85
19	81	77	77	25	17	76	47	71	80	90	90	85
20	81	77	77	25	19	77	48	71	80	90	90	85
% reduction - GA-NC stock												
	Month											
Size Limit	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
12" FL (current)	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	1	0	0	0	0	0	0	0	0	0
16	1	1	1	1	0	1	0	0	0	0	0	0
17	1	3	3	4	3	3	3	1	1	1	1	1
18	3	4	4	5	3	4	3	2	2	1	2	2
19	7	7	9	7	4	6	5	5	2	2	5	6
20	9	12	11	8	5	8	8	7	3	4	7	9

Sources: SEFSC TIP data (accessed May 2015).

Figure 4.8.3 shows the length composition of recreationally caught hogfish from 1995 to 2012. The solid black line represents the 12-inch (fork length) minimum size limit. The average length in the time series was 14.07 inches.

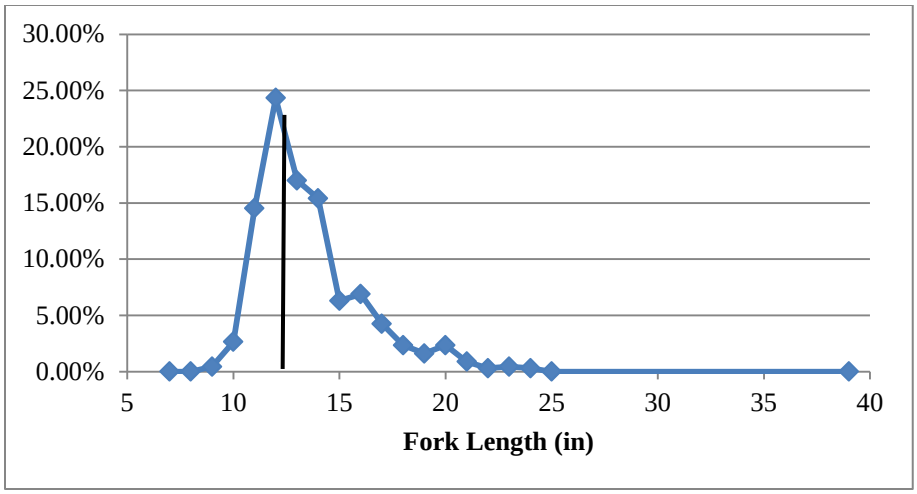
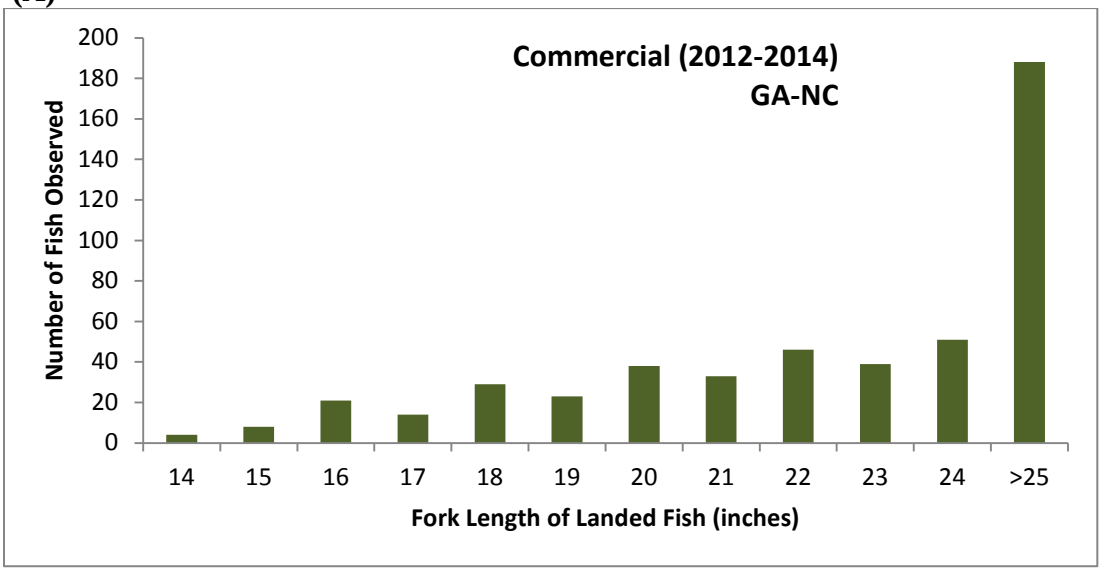


Figure 4.8.3. Length composition (inches fork length) of recreationally caught hogfish, 1995-2012. N=682.
Source: SEDAR 37 (2014).

Figure 4.8.4 shows the size distribution (inches fork length) of commercially-harvested hogfish in the South Atlantic. The majority of hogfish in the GA-NC portion of the stock are harvested at 25 inches and greater. In Florida, the majority of commercially-harvested hogfish are at the 12-inch minimum size limit.

(A)



(B)

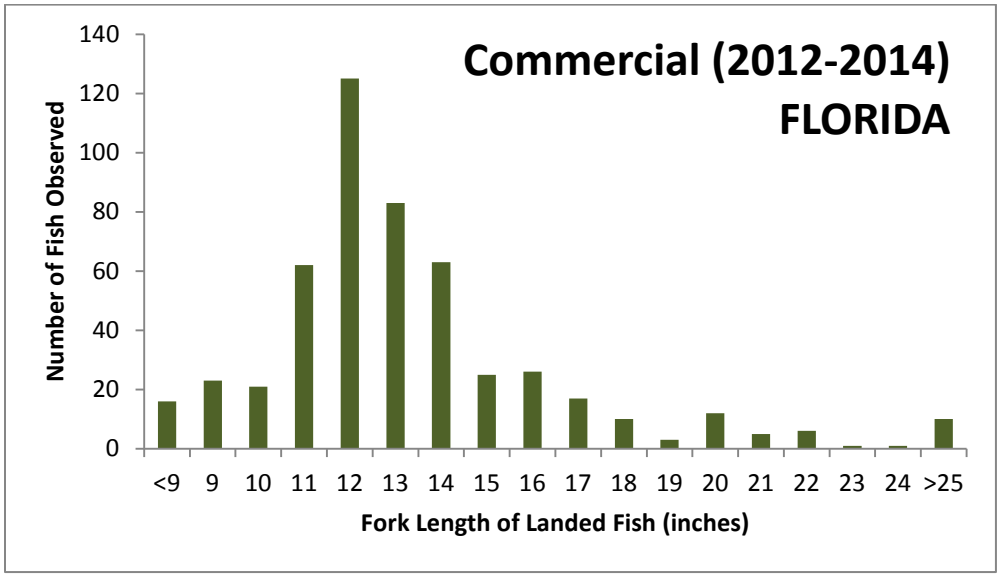
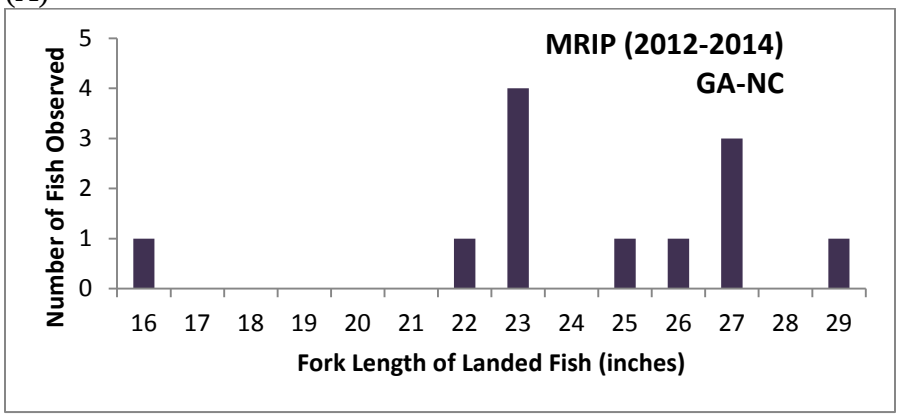


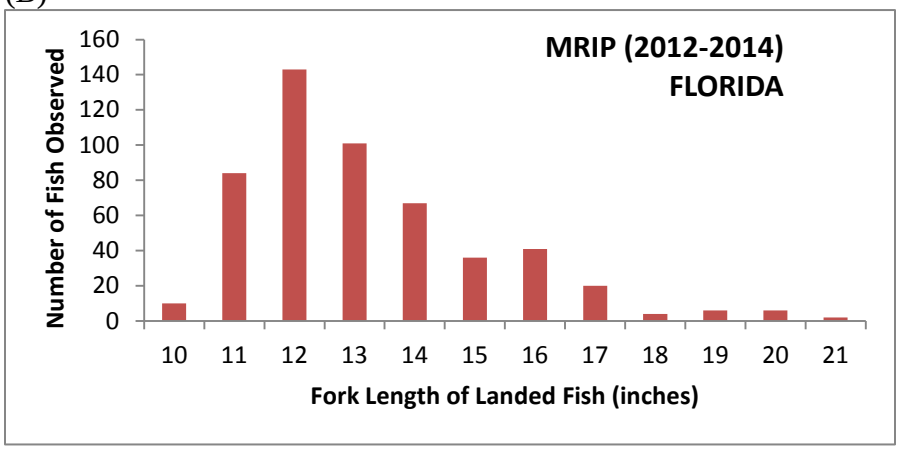
Figure 4.8.4. Size distribution in inches fork length (FL) of hogfish landed commercially in two areas: (A) GA-NC and (B) Florida Keys/East Florida, 2012-2014.
Source: NMFS SERO. Commercial TIP data (L. Beerkircher, SEFSC, pers. comm.)

Figure 4.8.5 shows the size distribution (inches fork length) of hogfish harvested recreationally in the South Atlantic. For the GA-NC stock, the size distribution of recreationally caught hogfish (based on MRIP) in 2012-2014 shows two peaks at 23 and 27 inches; however, this distribution is based on a very low sample size. Headboat landings (for South Atlantic hogfish overall), show a peak at 12 inches whereas in Florida, similar to the size distribution of commercial landings, the majority of recreationally harvested hogfish are also 12 inches.

(A)



(B)



(C)

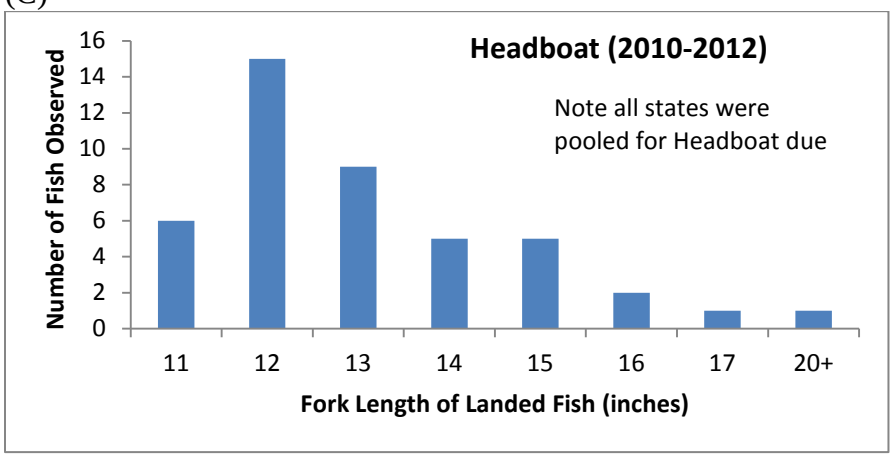


Figure 4.8.5. Size distribution in inches fork length (FL) of hogfish landed recreationally in 2012-2014: (A) GA-NC based on Marine Recreational Information Program (MRIP) estimates; (B) Florida Keys/East Florida based on Marine Recreational Information Program (MRIP) estimates, and (C) entire South Atlantic based on Southeast Headboat Survey.
Sources: NMFS SERO. MRIP (NMFS OST, accessed May 2015) and Southeast Headboat Survey (HBS bp72_13 file).

Preferred Sub-alternative 2e would increase the minimum size limit for the GA-NC stock (both sectors) to 20 inches fork length (FL). Off North Carolina, 50% of hogfish transition to males at 24.5 inches FL (**Figure 4.8.2**). Hence the proposed minimum size limit would continue to allow removal of the most reproductively successful individuals with potentially negative biological effects on the population. Commercial landings show the bulk of hogfish off Georgia and the Carolinas are harvested at 25 inches and above (**Figure 4.8.3 (A)**), whereas the size distribution of recreationally-caught fish peaks at 23 and 27 inches FL (**Figure 4.8.4 (A)**).

(to be completed)

4.8.2 Economic Effects

4.8.3 Social Effects

4.8.4 Administrative Effects

Beneficial administrative effects would be expected from **Preferred Alternatives 2** and **3**, including their sub-alternatives compared to **Alternative 1 (No Action)** which would continue to have a minimum size limit for three out of the four states in the South Atlantic Region. Alternatives that specify a consistent minimum size limit 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.

Action 9. Establish a commercial trip limit for the GA-NC and the FLK/EFL stocks of hogfish

4.9.1 Biological Effects

Alternative 1 (No Action) would not establish a commercial trip limit for the GA-NC and FLK/EFL stocks of hogfish. **Alternatives 2** and **3** (including their respective sub-alternatives) would establish a commercial trip limit for the GA-NC and FLK/EFL stocks of hogfish, respectively.

Alternatives
(preferred alternatives in bold)

1 (No Action). Do not establish a commercial trip limit for the GA-NC and FLK/EFL stocks of hogfish in the South Atlantic Region. Currently there is no commercial trip limit for hogfish in the South Atlantic Region.

2. Establish a commercial trip limit for the GA-NC stock of hogfish in the South Atlantic Region.

- 2a. 100 lbs per trip.
- 2b. 250 lbs per trip.
- 2c. 500 lbs per trip.
- 2d. 750 lbs per trip.

3. Establish a commercial trip limit for the FLK/EFL stock of hogfish in the South Atlantic Region.

- 3a. 25 lbs per trip.
- 3b. 50 lbs per trip.
- 3c. 100 lbs per trip.
- 3d. 150 lbs per trip
- 3e. 200 lbs per trip

Commercial logbook data were explored to determine harvest of hogfish per trip and to analyze trip limit options. During 2012-2014 (the most recent years of complete data), 2,008 commercial trips landed hogfish in the South Atlantic (**Figure 4.9.1**). During 2012-2014, 64% of the commercial trips landed 25 lbs ww or less, 14% landed 50 lbs ww, 9% landed 75 lbs ww, 5% landed 200 lbs ww, 2% landed 300 lbs ww, 1% landed 400 lbs ww, and <1% landed 500 lbs ww or more (**Figure 4.9.1**).

Hogfish are commercially harvested primarily by spear and hook-and-line gear. **Figure 4.9.2** shows the distribution of hogfish landings per trip by gear type. The majority of the trips that landed hogfish during 2012-2014 used spear (47%, 950 trips) and hook and line gear (42%, 842 trips). **Figure 4.9.3** shows hogfish harvested commercially per trip (lbs ww) in two areas of the South Atlantic, GA-NC, and FLK/EFL, during 2012-2014.

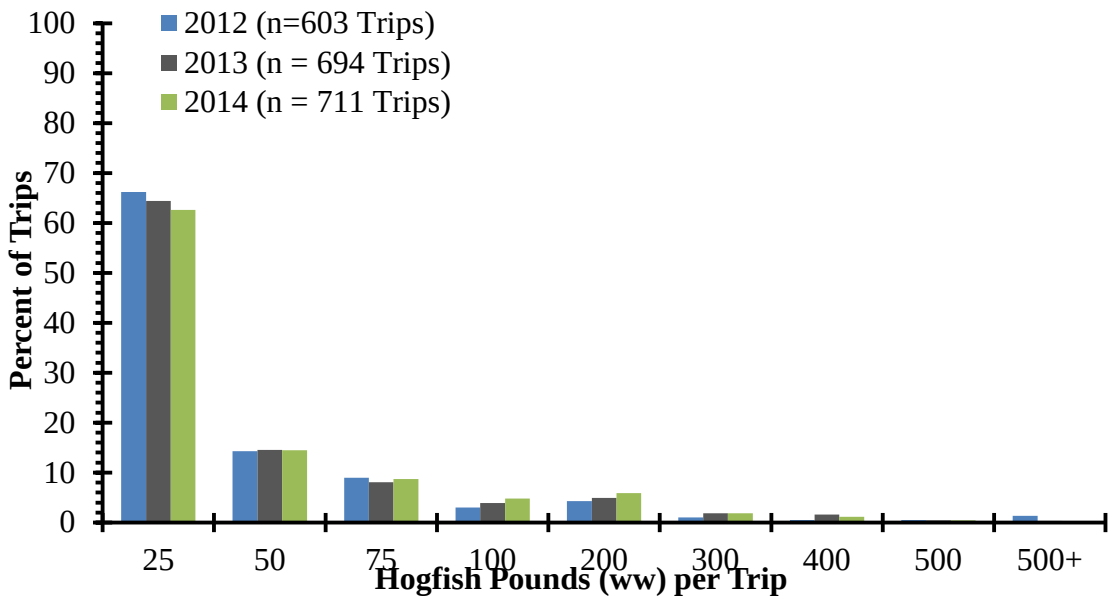


Figure 4.9.1. Distribution of commercially harvested hogfish per trip (lbs ww) by year, from 2012 to 2014, in the South Atlantic. Source: Commercial logbook dataset accessed April 2, 2015.

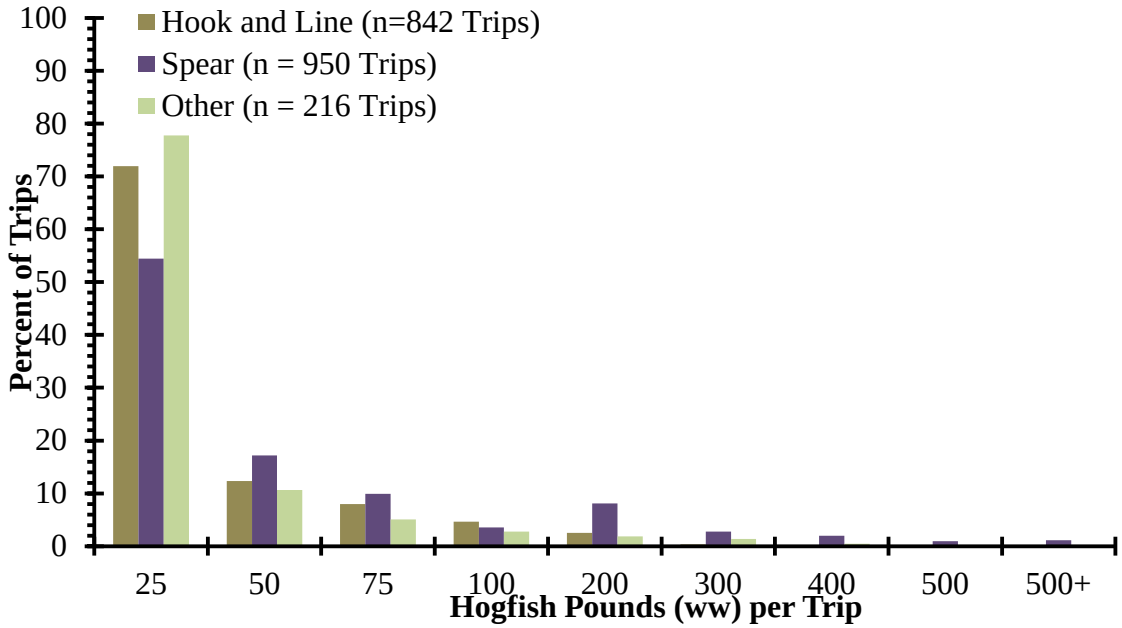


Figure 4.9.2. Distribution of hogfish harvested per trip (lbs ww), and by gear during 2012 to 2014 in the South Atlantic. Note: The "Other" gear type consists of hogfish landings from gill nets, traps, and if the gear type was not provided in the commercial logbook dataset.

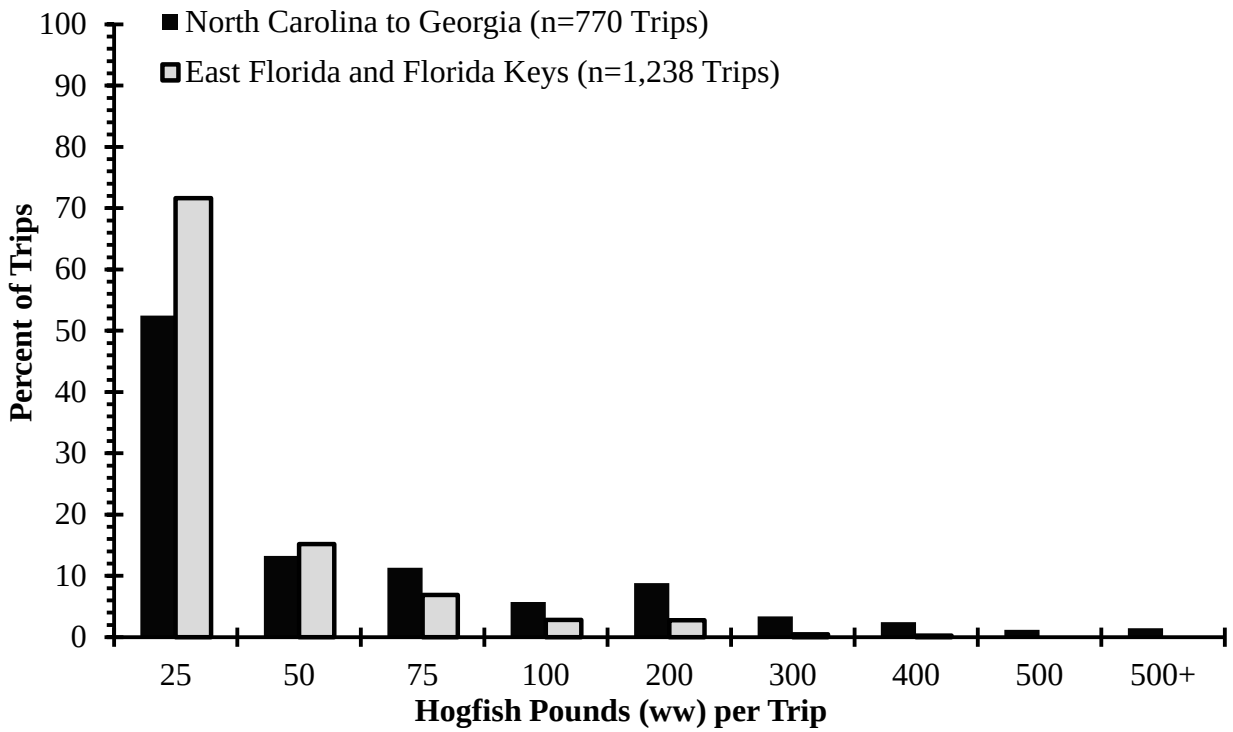


Figure 4.9.3. Distribution of hogfish harvested per trip (lbs ww) by area from the commercial logbook dataset from 2012 to 2014 the South Atlantic. The areas were defined as GA-NC and FLK/EFL.

More commercial trips (1,238) were observed on the Florida Keys/east Florida stock than in GA-NC (770) during 2012-2014, but GA-NC had higher pounds per trip (**Figure 4.9.3**). In the FLK/EFL area, 72% of the commercial trips landed 25 lbs ww or less per trip, 15% landed 50 lbs ww, 7% landed 75 lbs ww, 3% (each) landed 100 and 200 lbs ww, <1% landed 300 lbs ww or more (Figure 4.9.3). For GA-NC, 53% landed 25 lbs ww or less per trip, 13% landed 50 lbs ww, 11% landed 75 lbs ww, 6% landed 100 lbs ww, 9% landed 200 lbs ww, 3% each landed 300 and 400 lbs ww, and 1% landed 500 lbs ww or more (**Figure 4.9.3**).

Percent decrease in landings by gear expected from the different trip limits considered by the sub-alternatives under **Alternatives 2** and **3** are shown for GA-NC (**Table 4.9.1**) and FLK/EFL (**Table 4.9.2**).

Table 4.9.1. Percent decrease in landings by gear, for various commercial hogfish trip limits for GA-NC.

Alternative 2; Trip Limit (lbs ww)	**Hook and Line**	**Spear**	**All Gears (incl. hook-and-line, spear, gill nets, traps, etc.)**
Sub-alternative 2a - 250	0.1%	17.0%	17.4%
Sub-alternative 2b - 500	0.0%	5.0%	5.0%
Sub-alternative 2c - 750	0.0%	2.3%	2.3%

Alternative 2; Trip Limit (lbs ww)	Hook and Line	Spear	All Gears (incl. hook-and-line, spear, gill nets, traps, etc.)
Sub-alternative 2d - 1,000	0.0%	1.3%	1.3%

Source: South Atlantic commercial logbook data, 2012-2014.

Table 4.9.2. Percent decrease in landings by gear, for various commercial hogfish trip limits for FLK/EFL.

Alternative 3; Trip Limit (lbs ww)	Hook-and-Line	Spear	All Gears (incl. hook-and-line, spear, gill nets, traps, etc.)
Sub-alternative 3a - 25	7.7%	27.1%	42.1%
Sub-alternative 3b - 50	4.3%	13.1%	21.9%
Sub-alternative 3c - 100	2.0%	3.8%	8.1%
Sub-alternative 3d - 150	1.4%	1.6%	4.3%
Sub-alternative 3e - 200	0.8%	1.1%	2.6%

Source: South Atlantic commercial logbook data, 2012-2014.

Revise text below after new tables are ready

Alternative 2, **Sub-alternative 2a** (250 lbs ww) would have the largest percent decrease in commercial landings for GA-NC stock of hogfish, followed by **Sub-alternatives 2b** (500 lbs ww), **2c** (75 lbs ww), and **2d** (1000 lbs ww) (**Table 4.9.1**). This is logical, given that only 9% of the commercial trips during 2012-2014 landed 200 lbs ww, 3% each landed 300 and 400 lbs ww, and 1% landed 500 lbs ww or more (**Figure 4.9.3**).

Alternative 3, **Sub-alternative 3a** (25 lbs ww) would have the largest percent decrease in commercial landings for FLK/EFL stock of hogfish, followed by **Sub-alternatives 3b** (50 lbs ww), **3c** (100 lbs ww), **3d** (150 lbs ww) and **3e** (200 lbs ww) (**Table 4.9.2**). This reflects the data shown in **Figure 4.9.3**, which shows that most (72%) of the commercial trips landed 25 lbs ww or less per trip, 15% landed 50 lbs ww, and 3% (each) landed 100 and 200 lbs ww.

None of the alternatives under consideration for this action are expected to adversely impact species or critical habitat listed under the Endangered Species Act (ESA). Establishing commercial trip limits for hogfish as addressed in this action would not alter the way in which the snapper grouper fishery is prosecuted in terms of gear types used or areas fished; nor would any of the alternatives substantially increase or decrease fishing effort. Therefore, no impacts on ESA-listed species or designated critical habitat thereof are anticipated as a result of this action (see **Section 3.2.4** for a detailed description of ESA-listed species and critical habitat in the action area).

The proposed alternatives under this action would not alter the way the commercial portion of the snapper grouper fishery for hogfish is prosecuted. Furthermore, spear and hook-and-line gear (Blue Ocean 2010; Seafood Watch 2010), the gears predominantly used by hogfish commercial fishermen are known to have minimal to no bycatch issues, and do little damage to physical or biogenic habitats. Therefore, no adverse effects on EFH, EFH-HAPCs, or Coral HAPCs are anticipated (see **Section 3.1** and **Appendix H** for a detailed description of EFH in the South Atlantic Region).

4.9.2 Economic Effects

4.9.3 Social Effects

4.9.4 Administrative Effects

Currently, there is no trip limit for the hogfish commercial sector (**Alternative 1, No Action**). **Alternatives 2** and **3** (including their sub-alternatives) could add to the administrative burden in the form of cost, time, or law enforcement efforts because two new commercial trip limits would need to be monitored and enforced. However, even if the commercial ACLs are met under each of the proposed commercial trip limits under **Alternatives 2** and **3** (including their sub-alternatives), the administrative resources required to implement in-season closures would not be much different from what is currently in place under **Alternative 1 (No Action)**. Higher trip limits could have slightly greater administrative effects because they increase the likelihood that the commercial ACL or quota would be met and a commercial closure would occur. **Alternatives 2** and **3** (including their respective sub-alternatives) would require notifying the commercial snapper grouper fishery and law enforcement personnel of an impending trip limit change for hogfish. Therefore, **Alternative 1 (No Action)** would be the least burdensome alternative compared to **Alternatives 2** and **3** (including their respective sub-alternatives).

Action 10. Modify and or establish recreational bag limits for the GA-NC and the FLK/EFL stocks of hogfish

Alternatives
(preferred alternatives in bold)

1 (No Action). Do not modify and/or establish recreational bag limits for the GA-NC and FLK/EFL stocks of hogfish in the South Atlantic Region. Currently the recreational bag limit is 5 fish per person per day off Florida and there is no recreational bag limit off Georgia, South Carolina, and North Carolina.

2. Modify the recreational bag limit for the GA-NC stock of hogfish in the South Atlantic Region.

2a. 2 fish per person per day.
2b. 1 fish per person per day.
2c. 1 fish per vessel per day.

3. Modify the recreational bag limit for the Florida Keys/East Florida FLK/EFL stock of hogfish in the South Atlantic Region.

3a. 3 fish per person per day.
3b. 2 fish per person per day.
3c. 1 fish per person per day.
3d. 1 fish per vessel per day.

4.10.1 Biological Effects

During 2012-2014, recreational landings (lbs ww) of hogfish were predominantly from Monroe County, Florida and East Florida, followed by North Carolina, Georgia/East Florida, and South Carolina (**Table 4.10.1**). **Alternative 1 (No Action)** would maintain the 5 fish per person per day recreational bag limit for hogfish off Florida, with no recreational bag limit off Georgia, South Carolina, and North Carolina. Under **Alternative 2**, for the GA-NC stock of hogfish, **Sub-alternatives 2a** and **2b** would consider a 2 fish per person per day and 1 fish per person per day recreational bag limit, respectively. **Sub-alternative 2c** would consider a 1 fish per vessel per day recreational bag limit. Under **Alternative 3**, for the FLK/EFL stock of hogfish, **Sub-alternatives 3a** and **3b** would consider a 2 fish per person per day and 1 fish per person per day recreational bag limit, respectively. **Sub-alternative 3c** would consider a 1 fish per vessel per day recreational bag limit.

Table 4.10.1. Recreational landings (lbs ww) of hogfish by state in the South Atlantic during 2012-2014.

Year	North Carolina	South Carolina	Georgia/East FL	East Florida	Monroe County	Total
2012	4,178	3	178	84,042	281,172	369,573
2013	825	5	255	63,998	92,768	157,852
2014	8	16	368	111,410	154,087	265,889
Average 2012-2014	**1,670**	**8**	**267**	**86,483**	**176,009**	**264,438**

Marine Recreational Information Program (MRIP) catch and effort files from 2012 to 2014 were explored to determine recreational trips that harvested hogfish in the South Atlantic. Five hundred fifty-five recreational trips (194 MRIP and 361 Headboat trips) from North Carolina through Monroe County, Florida harvested hogfish. 100% of the headboats harvested no more than 1 hogfish per angler; among private recreational anglers 78% harvested 1-2 hogfish per angler, 14% harvested 3-4 hogfish, and 8% harvested 5 hogfish or more per angler (**Figure 4.10.1**).

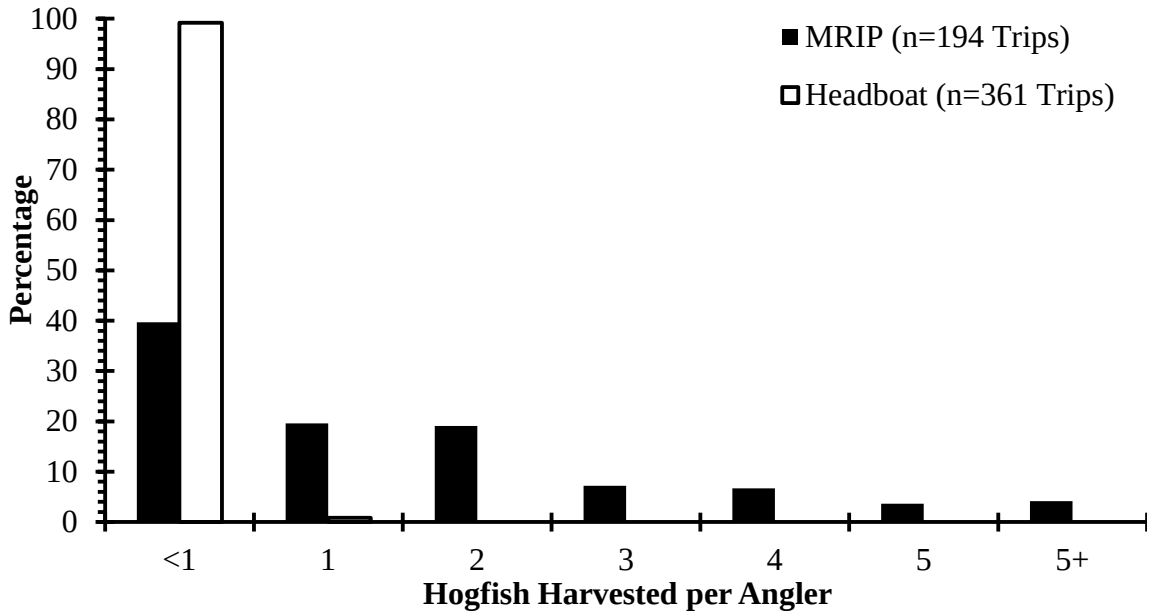


Figure 4.10.1. Distribution of hogfish harvested per angler from two recreational datasets (MRIP and Headboat) during 2012-2014, in the South Atlantic.

Figure 4.10.2 shows the distribution of hogfish harvested per vessel during 2012-2014. Among headboats, 87% harvested 1 hogfish per vessel, 10% harvested 2 hogfish, 1% harvested 3 hogfish, and 2% harvested more than 5 hogfish per vessel. For the private recreational anglers, 19% (each) harvested 1 and 4 hogfish per vessel, 34% harvested 2 hogfish per vessel, and 28% harvested more than 5 hogfish per vessel (**Figure 4.10.2**).

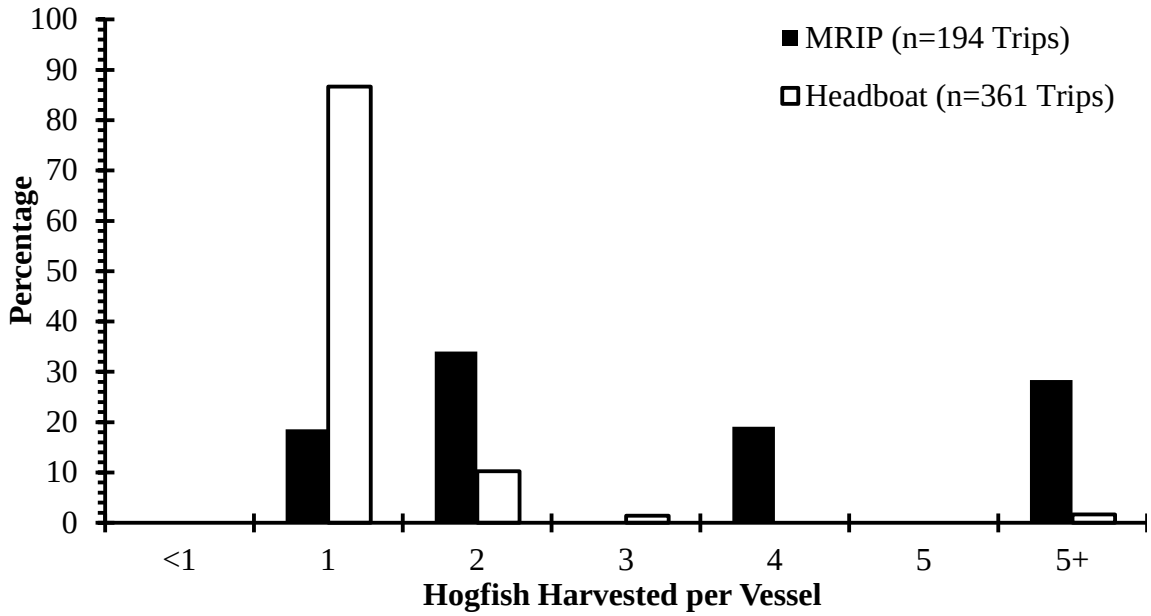


Figure 4.10.2. Distribution of hogfish harvested per vessel from two recreational datasets (MRIP and Headboat) during 2012-2014, in the South Atlantic.

Reduction in landings from the proposed bag limits in **Alternatives 2** and **3** (and their sub-alternatives) was analyzed. A discard mortality of 10% (SEDAR 37 2014) was applied to the bag limit analysis. The majority of the MRIP trips from 2012-2014 harvested hogfish while spearfishing (56%, n=109 trips). Discard mortality for spearfishing trips was assumed to be zero because spearfishing is very selective and any reduction in bag limit will result in the spearing of fewer fish. For example, if the bag limit is reduced from five to three fish then spear fishermen would focus their efforts to only spear three fish, and it's assumed the spearfisher would not spear five fish and then release two in the water.

The calculated percent decrease in landings by mode is shown in **Table 4.10.2**. There were no calculated reductions in landings for headboat because there were no trips in 2012 to 2014 that harvested more than one hogfish per person. The percent decrease in landings from North Carolina to Georgia was very small, because only 5% (n=9 trips) of the MRIP trips occurred from North Carolina to Georgia from 2012 to 2014.

Table 4.10.2. Percent decrease in recreational landings from decreasing the bag limit in the South Atlantic. Percent decrease in landings were calculated by mode, and applied the bag limit reduction to 3 areas: 1) All of South Atlantic region; 2) Only North Carolina to Georgia; and 3) only east Florida and the Florida Keys. Data used for this analysis were from 2012 through 2014.

Bag Limit	MRIP		Headboat
	Charter	Private	
All of South Atlantic Region			
5	0.0	0.0	0.0
4	0.0	4.9	0.0
3	3.1	12.9	0.0
2	7.8	25.4	0.0
1	20.3	49.3	0.0
Only North Carolina to Georgia Alternative 2			
5 (Sub-alternative 2a)	0.0	0.0	0.0
4 (Sub-alternative 2b)	0.0	0.0	0.0
3(Sub-alternative 2c)	0.0	0.0	0.0
2 (Sub-alternative 2d)	0.0	0.0	0.0
1 (Sub-alternative 2e)	0.0	0.4	0.0
Only east Florida and Florida Keys Alternative 3			
5 (Sub-alternative 3a)	0.0	0.0	0.0
4 (Sub-alternative 3b)	0.0	4.9	0.0
3(Sub-alternative 3c)	3.1	12.9	0.0
2 (Sub-alternative 3d)	7.8	25.4	0.0
1 (Sub-alternative 3e)	20.3	48.9	0.0

Source: NMFS SERO

Update after ACL decision(s).

For GA-NC, there would be no percent decrease in recreational landings under **Alternative 2** and its sub-alternatives for private, charterboat, and headboat (**Table 4.10.2**), because most of the hogfish are harvested in FLK/EFL (**Table 4.10.1**). For FLK/EFL, there would be no percent decrease for headboats under **Alternative 3** and its sub-alternatives (**Table 4.10.2**). For charterboats, **Sub-alternative 3e** would have the largest percent decrease, followed by **Sub-alternative 3d**, **3c**, and no decrease for Sub-alternatives **3b** and **3a**. (**Table 4.10.2**). For private recreational anglers, **Sub-alternative 3e** would have the largest percent decrease, followed by **Sub-alternative 3d**, **3c**, **3b**, and no decrease for **Sub-alternative 3a**. (**Table 4.10.2**). This is an expected outcome because private recreational anglers harvest more hogfish per vessel compared to headboats (**Figure 4.10.2**).

Alternatives 4 and **5** (including their sub-alternatives) consider two-month fishing seasons for GA-NC and FLK/EFL, respectively. **Sub-alternative 4a** would allow recreational harvest of hogfish during May-June, **Sub-alternative 4b** during July-August, and **Sub-alternative 4c**

during August-September. **Sub-alternative 5a** would allow recreational harvest of hogfish during May-June, and **Sub-alternative 5b** would allow recreational harvest during July-August.

Recreational landings are reported in two-month waves, with wave 1 covering January/February and wave 6 covering November/December. Average recreational landings during 2012-2014 show steady landings from January to April, a drop during May and June, a substantial increase in July and August and a drop off from September through December (**Figure 4.10.3**).

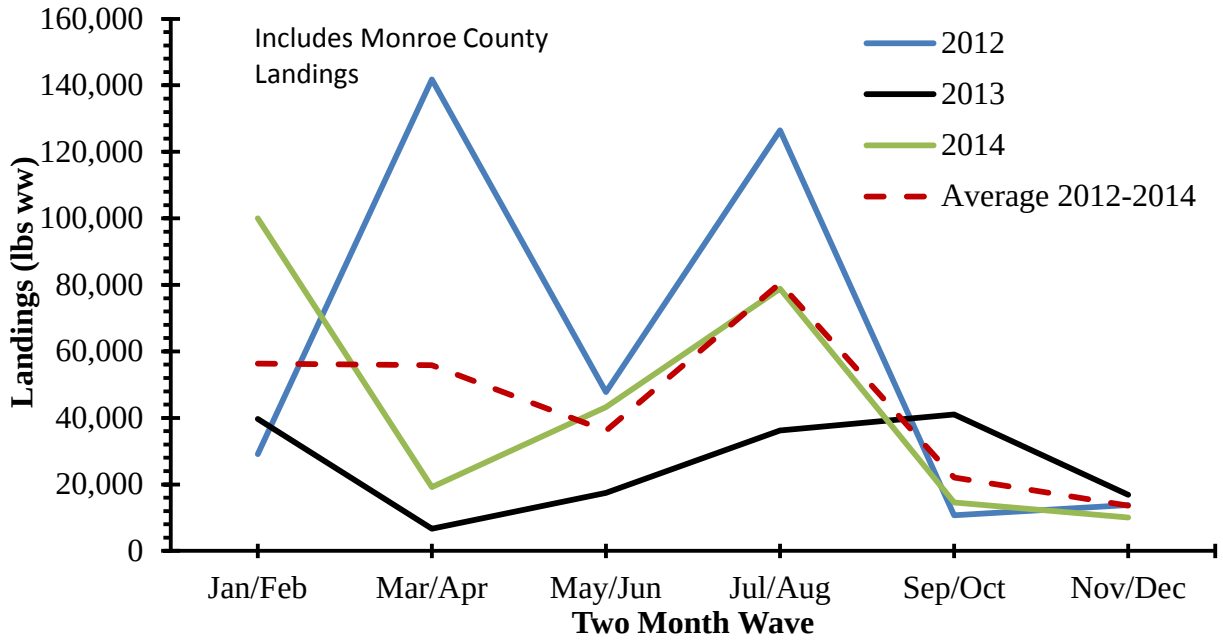


Figure 4.10.3. Recreational landings (lbs ww) by two month waves during 2012-2014 for the South Atlantic Region, including Monroe County, Florida.

4.10.2 Economic Effects

4.10.3 Social Effects

4.10.4 Administrative Effects

Under **Alternative 1 (No Action)**, there would be no recreational bag limit in three out of four states in the South Atlantic Region for hogfish. **Alternatives 2** through **5** (including their sub-alternatives) would add to the administrative burden in the form of cost, time, law enforcement efforts, and informing the public. However, consistent regulations help avoid

confusion with the public and aid law enforcement, which reduces the administrative burden in the long term.

Action 11. Establish a recreational season for the GA-NC and Florida Keys/East Florida (FLK/EFL) stocks of hogfish

4.11.1 Biological Effects

4.11.2 Economic Effects

4.11.3 Social Effects

4.11.4 Administrative Effects

Alternatives
(preferred alternatives in bold)

1 (No Action). There is no recreational season for hogfish in the South Atlantic.

2. Establish a season for the GA-NC stock of hogfish in the South Atlantic region.
- 2a. May-August
- 2b. July-August
- 2c. May-June

3. Keys/East Florida (FLK/EFL) stock of hogfish in the South Atlantic region.
- 3a. May-June
- 3b. July-August

Action 12. Establish commercial and recreational accountability measures (AMs) for the GA-NC and the FLK/EFL stocks of hogfish

Alternatives
(preferred alternatives in bold)

1 (No Action). Do not establish AMs for the GA-NC and FLK/EFL stocks of hogfish. Current commercial and recreational AMs apply to hogfish throughout the South Atlantic Fishery Management Council's area of jurisdiction.

2. If commercial landings reach or are projected to reach the commercial ACL, NMFS would close the commercial sector for the remainder of the fishing year. On and after the effective date of such a notification, all sale or purchase is prohibited and harvest or possession of hogfish in or from the EEZ would be limited to the recreational bag and possession limit. Additionally, if the commercial ACL is exceeded, NMFS would reduce the commercial ACL in the following fishing year by the amount of the commercial overage, only if hogfish is overfished and the total ACL (commercial ACL and recreational ACL) is exceeded.
Sub-alternative 2a: For the GA-NC stock of hogfish.
Sub-alternative 2b: For the FLK/EFL stock of hogfish.

3. If recreational landings reach or are projected to reach the recreational ACL, NMFS would close the recreational sector for the remainder of the fishing year, unless, using the best scientific information available, NMFS determines that a closure is unnecessary.
Sub-alternative 3a: For the GA-NC stock of hogfish if the stock is overfished.
Sub-alternative 3b: For the GA-NC stock of hogfish regardless of stock status.
Sub-alternative 3c: For the FLK/EFL stock of hogfish if the stock is overfished.
Sub-alternative 3d: For the FLK/EFL stock of hogfish regardless of stock status.

4. If recreational landings exceed the recreational ACL, then during the following fishing year, recreational landings will be monitored for a persistence in increased landings. If necessary, NMFS would reduce the length of fishing season and the recreational ACL in the following fishing year by the amount of the recreational overage, only if the species is overfished and the total ACL (commercial ACL and recreational ACL) is exceeded. The length of the recreational season and recreational ACL will not be reduced if NMFS determines, using the best scientific information available, that a reduction is unnecessary.
Sub-alternative 4a. For the GA-NC stock of hogfish.
Sub-alternative 4b. For the FLK/EFL stock of hogfish.

4.12.1 Biological Effects

Accountability Measures (AMs) for hogfish are being revised through Amendment 34 to the Snapper Grouper Fishery Management Plan (FMP; under review). A revision to the AMs for hogfish and many other snapper grouper species was necessary to create a consistent regulatory environment while preventing unnecessary negative socio-economic impacts, and prevent overfishing. Subsequent to the reauthorization of the Magnuson-Stevens Act in 2007, the South Atlantic Council established AMs for managed species over the next several years through various amendments to the Snapper Grouper FMP. Consequently, inconsistencies in the regulatory language arose creating some confusion. Through implementation of Amendment 34 (under review), however, the South Atlantic Council has brought consistency in the management response to meeting or exceeding established Annual Catch Limits (ACLs) for snapper grouper species.

As Amendment 34 was being developed, however, work was underway to determine the stock structure of hogfish (Seyoum et al. 2015). Since a splitting of the hogfish stock within the South Atlantic Council's area of jurisdiction is being proposed in this amendment (Action 1), action must be also taken to specify AMs for each of the two hogfish stocks.

(NOTE: Discussion below based on structuring of alts and sub-alts like those in Am 34. If Council chooses to re-structure based on IPTs suggestion, then the discussion will need to be updated accordingly).

For the commercial sector, **Preferred Sub-Alternative 2c** would be triggered the least frequently of all the sub-alternative payback AMs under consideration, because the payback would only be required if two criteria are met: (1) hogfish is overfished *and* the total ACL has been exceeded. At this time, the likelihood of both of these scenarios taking place at the same time for the GA-NC stock of hogfish is zero, since the status of the stock is unknown. As such, **Preferred Sub-alternative 2c** is the least biologically advantageous alternative for the GA-NC stock of hogfish because a commercial payback would never be triggered, even when it was biologically needed. For the FLK/EFL stock of hogfish, while the likelihood of both of these scenarios taking place at the same time is small, one of the two criteria to trigger a commercial payback has already been met as the stock is overfished. Hence, **Preferred Sub-alternative 2c** may impart biological benefits to the FLK/EFL stock. However, **Preferred Sub-alternative 2c**, would result in lower biological benefits compared to **Sub-alternatives 2a** and **2b**. However, since **Preferred Alternative 2** would prohibit harvest in-season if the commercial ACLs for the respective hogfish stock was met or was projected to be met, overages of the total ACL (commercial and recreational combined) would be unlikely to occur. Therefore, the biological benefits that would be expected under **Sub-Alternatives 2a**-**Preferred Sub-Alternative 2c** would likely be minor and would not result in significant direct or indirect biological effects.

Preferred Alternatives 3 and **4**would apply to the recreational sector. Under these alternatives, if the recreational ACL is exceeded, recreational landings during the following year would be monitored for persistence in increased landings. If increased landings persist through the following fishing year, one of the AMs provided in the sub-alternatives for **Preferred Alternative 3** would be triggered for the applicable recreational sector. The **Preferred Alternative 3** sub-alternatives are almost identical to those found for the commercial sector under **Preferred Alternative 2**; however, the Regional Administrator would determine, based upon the best scientific information available, whether a payback is actually needed. The Regional Administrator may determine that a payback is not needed in a case where the combined total ACL has been met and the species is overfished, but an ongoing stock assessment indicates the species, or a species in a species group, is no longer overfished; or if ACL overages are shown to be caused by increased rates of harvest due to increasing stock abundance rather than increased fishing effort. **Sub-alternatives 3a**, **3b**, and **3c** (**Preferred**), would maintain the ability of the Regional Administrator to interpret landings data to determine whether a payback is needed. However, these sub-alternatives would all allow the payback to take the form of a recreational ACL reduction *and* a season length reduction, compared to **Alternative 1 (No Action)**, which only allows for a season length reduction as a form of payback. **Preferred Alternative 4** of this action would allow the Regional Administrator to close the recreational sector when the recreational ACL for the respective hogfish stock is met or projected to be met. Therefore, if in-season closures are implemented when needed and prevent recreational ACLs from being exceeded, the need to initiate an ACL payback the following year would be greatly reduced.

Preferred Sub-alternative 3c would only trigger a recreational ACL payback (in the form of a reduced recreational ACL and season length following an ACL overage) if hogfish were overfished *and* the total ACL was exceeded. As discussed previously for the commercial sector, this AM is the least likely to be triggered considering the infrequently encountered scenario of a total ACL being exceeded and a species being overfished in the same fishing year. However, one of the two criteria has already been met for the FLK/EFL stock of hogfish as it has been declared overfished. Under **Preferred Sub-alternative 3c**, no action would be taken to correct for a recreational ACL overage unless both of those criteria are met. Therefore, **Preferred Sub-alternative 3c** may be the least biologically beneficial compared to the other **Preferred Alternative 3** sub-alternatives considered. However, **Preferred Alternatives 2** and **4** would prohibit commercial and recreational harvest in-season if the sector ACLs were met or were projected to be met. Thus, since overages of the total ACL (commercial and recreational combined) would be unlikely to occur, significant biological impacts, beneficial or adverse on the GA-NC and FLK/EFL stocks of hogfish are not expected under any of the sub-alternatives considered under **Preferred Alternative 3**.

None of the alternatives considered under this action would significantly alter the way in which the hogfish portion of the snapper grouper fishery is prosecuted in the South Atlantic EEZ. No adverse impacts on endangered or threatened species are anticipated because of this action; nor are any adverse impacts on essential fish habitats or habitat areas of particular concern including corals, sea grasses, or other habitat types expected because of this action.

4.12.2 Economic Effects

4.12.3 Social Effects

4.12.4 Administrative Effects

Under **Alternative 1 (No Action)**, AMs would not be separate for the GA-NC and FLK/EFL stocks. Therefore, any increase or decrease in administrative burden associated with **Alternatives 2-4** would be caused by more or less frequently implemented AMs. **Alternative 2** and its sub-alternatives would continue the in-season commercial sector closure AM with slight changes to the administrative environment based on the frequency with which each of the AM options would be triggered. **Sub-alternative 2b** is likely to be triggered the most often; and therefore, would be associated with the highest level of administrative impacts in the form of document preparation and notifications sent to the commercial sector participants informing them that the ACL the following year would be reduced. **Sub-alternative 2a** is likely to follow **Sub-alternative 2b** in frequency of implementation. However, if AMs are not implemented

when they are biologically necessary, the risk of overfishing increases and the administrative burden associated with having to curtail overfishing are much greater than those associated with implementing an effective AM. **Alternative 3** and its sub-alternatives would consider an in-season recreational sector closure AM with slight changes to the administrative environment based on the frequency with which each of the AM options would be triggered. **Sub-alternatives 3b** and **3d** are likely to be triggered more often than **Sub-alternatives 3a** and **3c**; and therefore, would be associated with a higher level of administrative impacts in the form of document preparation and notifications sent to the recreational sector participants informing them of the closure of the recreational sector for the remainder of the year. The administrative impacts associated with **Alternative 4** and its associated sub-alternatives are largely the same as those under **Alternative 3** for the recreational sector, with the addition of continued monitoring for persistence of increased landings when the recreational ACL has been exceeded. Because landings are already closely monitored and recreational AMs are in place, the addition of the payback provision of the recreational AM would not constitute an additional administrative burden. Payback provisions for the recreational sector under **Alternative 4** and its sub-alternatives are the least likely to have administrative burdens compared with **Alternatives 2** and **3**, because two conditions would have to be met, the species would have to be overfished *and* the total ACL (for both the commercial and recreational sectors) would have to be met.

Chapter 5. Council's Choice for the Preferred Alternatives

5.1

5.1.1 Snapper Grouper Advisory Panel (AP) Comments and Recommendations

5.1.3 Law Enforcement Advisory Panel Comments and Recommendations

5.1.4 Scientific and Statistical Committee Comments and Recommendations

5.1.5 Public Comments and Recommendations

5.1.6 South Atlantic Council Choice for Preferred Alternative

5.2

5.2.1 Snapper Grouper AP Comments and Recommendations

5.2.2 Law Enforcement AP Comments and Recommendations

5.2.3 Scientific and Statistical Committee Comments and Recommendations

5.2.4 Public Comments and Recommendations

5.2.5 South Atlantic Council Choice for Preferred Alternative

Chapter 6. Cumulative Effects

(UPDATE)

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 **Section 3.2**. The most measurable effects would be limited to the area off southern Florida within South Atlantic region. For this action, the cumulative effects analysis (CEA) includes an analysis of data dating back to 2004 and through what is expected to take place approximately before or within 2015-2017.

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

Past Actions

The reader is referred to **Appendix C** for a list of all past regulatory activity for species in the Snapper Grouper FMP. No relevant non-FMP related actions have occurred within the analysis CEA time frame outlined above.

Present Actions

Currently, there are several actions under development affecting the snapper grouper fishery. Amendment 29 to the Snapper Grouper FMP would update the South Atlantic Council's acceptable biological catch (ABC) control rule to incorporate methodology for determining the ABC of "Only Reliable Catch Species"; (2) adjust ABCs for the affected unassessed species; (3) specify ACLs for 3 species grouper and 4 species based on the updated ABCs; and (4) establish management measures for gray triggerfish in federal waters of the South Atlantic region.

Regulatory Amendment 14 to the Snapper Grouper FMP, which became effective on December 8, 2014, modified the (1) commercial and recreational fishing years for greater amberjack; (2) recreational fishing year for black sea bass; (3) recreational accountability measure (AM) for black sea bass; (4) commercial fishing year for black sea bass; (5) commercial fishing seasons for vermilion snapper; (6) trip limit for gag; and (7) recreational AM for vermilion snapper.

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 Gulf of Mexico and South

Atlantic Councils. This amendment is expected to improve fisheries data collection through more timely and accurate dealer reporting and streamlines the dealer permit system.

Reasonably Foreseeable Future Actions

Regulatory Amendment 20 to the Snapper Grouper FMP would update the sector annual catch limits (ACLs) for snowy grouper based on the outcome of a recent stock assessment.

Regulatory Amendment 22 to the Snapper Grouper FMP would update ACLs for gag and wreckfish based on a recent stock assessment.

The Generic AM and Dolphin Allocation Amendment would modify AMs for snapper-grouper species and golden crab to make them more consistent with AMs already implemented for other species and other fishery management plans (FMP). In the same amendment, South Atlantic Council is also considering alternatives to modify existing commercial and recreational sector allocations for dolphin.

Amendment 36 to the Snapper Grouper FMP would establish new special management zones to protect spawning areas for speckled hind and warsaw grouper.

The Comprehensive Ecosystem-Based Amendment 3 contains an action to improve bycatch reporting for the snapper grouper fishery.

A Joint Commercial Logbook Reporting Amendment would require electronic reporting of logbook information by federally-permitted vessels.

The Joint Charter Boat Reporting Amendment would require charter vessels to regularly report their landings information electronically. Including charter boats in the recreational harvest reporting system would further improve the agency's ability to monitor recreational catch rates in-season.

Expected Impacts from Past, Present, and Future Actions

The above listed past, present and future actions are expected to result in cumulative impacts on the human environment. The Comprehensive ACL Amendment (SAFMC 2011c) removed 13 snapper grouper species from the Snapper Grouper FMP. Amendment 35 would remove four more species, bringing the total removed over the past four years to 17. Removal of species from a FMP also removes them from essential fish habitat (EFH) consultation consideration. Reducing the number of federally-managed species utilizing a habitat type (or parcel) identified and described as EFH may reduce the strength of the EFH consultation for that EFH. Therefore, the action to remove four snapper grouper species from the Snapper Grouper FMP combined with the previous action to remove 13 snapper grouper species from the Snapper Grouper FMP

may result in an adverse cumulative impacts on EFH. However, as noted above, it is not possible to quantify the direct impact of **Preferred Alternatives 2-5** on future EFH consultations. If black snapper, dog snapper, mahogany snapper, and schoolmaster were removed from the Snapper Grouper FMP, there would still be 50 non-ecosystem component snapper grouper species left in the Snapper Grouper FMP. Those species and their designated EFH may continue to be used in the EFH consultation process. Therefore, the impacts of the action in Amendment 35 to remove four species from the Snapper Grouper FMP, in combination with the intended effects of the other action in this amendment to clarify the regulations for golden tilefish, and other actions affecting the resource and human environment, are not expected to result in significant adverse biological, social, or economic impacts.

The action to modify regulations governing the use of golden tilefish longline endorsements is also not expected to result in significant effects on the human environment when combined with past, present, and future actions discussed previously. Clarifying golden tilefish longline endorsement regulations would remove the potential for fishery participants to harvest golden tilefish under the longline quota and the hook-and-line quota within the same fishing year, consistent with the South Atlantic Council's intent when the longline endorsement was created. Anecdotal information indicates few fishery participants have engaged in activities that allowed them to fish under both quotas; however, clarifying the regulations would prevent future fishing under both quotas within the same fishing year. The action is largely administrative with some minor non-significant socioeconomic impacts that are not likely to result in significant cumulative impacts when combined with past, present, and future actions.

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

Climate Change

The Environmental Protection Agency's climate change webpage (http://www.epa.gov/climatechange/) provides basic background information on measured or anticipated effects from global climate change. A compilation of scientific information on climate change can be found in the United Nations Intergovernmental Panel on Climate Change's Fifth Assessment Report (November 2, 2014). Those findings are incorporated here by reference and are summarized. Global climate change can affect marine ecosystems through ocean warming by increased thermal stratification, reduced upwelling, sea level rise, and through increases in wave height and frequency, loss of sea ice, and increased risk of diseases in marine biota. Decreases in surface ocean pH due to absorption of anthropogenic carbon dioxide emissions may affect a wide range of organisms and ecosystems. These influences could negatively affect biological factors such as migration, range, larval and juvenile survival, prey availability, and susceptibility to predators.

In the southeast, general impacts of climate change have been predicted through modeling, with few studies on specific effects to species. 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). Higher water temperatures may

also allow invasive species to establish communities in areas they may not have been able to survive previously. Other potential impacts of climate change to the southeast include increases in hurricanes, decreases in salinity, altered circulation patterns, and sea level rise. 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). Actions from this amendment are not expected to contribute to climate change through the increase of carbon emissions associated with fishing activities.

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. 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. Indirect and inter-related effects on the biological and ecological environment of the snapper grouper, fishery, in concert with the Deepwater Horizon MC252 oil spill are not well understood at this time. Direct and indirect impacts on the food web from phytoplankton, to zooplankton, to mollusks, to top predators in the South Atlantic have not been significant and are not likely to be significant in the future.

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

The proposed management actions are summarized in **Section 2** of this document. Detailed discussions of the magnitude and significance of the impacts of the preferred alternatives on the human environment appear in **Section 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 including golden tilefish, black snapper, dog snapper, mahogany snapper, and schoolmaster; the additive effects, beneficial and adverse, are not expected to result in a significant level of cumulative impacts.

The proposed actions would not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places as these are not in the South Atlantic Exclusive Economic Zone (EEZ). This action is not likely to result in direct, indirect, or cumulative effects to unique areas, such as significant scientific, cultural, or historical resources, park land, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas as the proposed action is not expected to substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort within the South Atlantic region.

The U.S. Monitor, Gray's Reef, and Florida Keys National Marine Sanctuaries are within the boundaries of the South Atlantic EEZ. The proposed 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 action is not likely to change the way in which the snapper grouper, dolphin and wahoo, or golden crab fisheries are 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

The effects of the proposed action are, and will continue to be, monitored through collection of landings data by the Florida Fish and Wildlife Conservation Commission for black snapper, dog snapper, mahogany snapper, and schoolmaster. The National Marine Fisheries Service will continue to monitor and collect information on golden tilefish 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, this amendment does not propose any activity, such as increased ballast water discharge from foreign vessels, which is associated with the introduction or spread on non-indigenous species.

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

Name	Agency/Division	Title
Myra Brouwer	SAFMC	Interdisciplinary plan team (IPT) Lead/Fishery Biologist
Nikhil Mehta	SERO/SF	IPT Lead/Fishery Biologist
Jennifer Lee	SERO/PR	Fishery Biologist
Brian Cheuvront	SAFMC	Economist
Mike Errigo	SAFMC	Data analyst
Chip Collier	SAFMC	Biologist
Kate Siegfried	SEFSC	Research Fish Biologist
David Dale/Pace Wilber	SERO/HC	EFH Specialist
Adam Bailey	SERO	Technical Writer and Editor
Nick Farmer	SERO	Biologist
Mike Larkin	SERO	Biologist
David Records	SERO/SF	Economist
Mike Jepson	SERO/SF	Social Scientist
Heather Blough	NMFS/SER	Regional NEPA Coordinator
Monica Smit-Brunello	NOAA GC	General Counsel
Larry Perruso	SEFSC	Economist
Jack McGovern	SERO/SF	Fishery Scientist
Kari McLauchlin	SAFMC	Social Scientist
Gregg Waugh	SAFMC	Deputy Director

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
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NMFS, Southeast Region
263 13th Avenue South
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Environmental Assessment:

List of Agencies, Organizations, and Persons Consulted

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

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Appendix A. Considered But Rejected Alternatives

Action 5. Establish a rebuilding plan for the Florida Keys/East Florida (FLK/EFL) stock of hogfish

Alternative 2. Define a rebuilding plan where the rebuilding strategy for the Florida Keys/East Florida (FLK/EFL) stock of hogfish sets ABC equal to the yield at 75% F_{MSY} and rebuilds the stock in 11 years. The Overfishing Limit (OFL) is the yield at F_{MSY}. The Spawning Stock Biomass (SSB_{MSY})is 2,300,391 lbs ww. Year 1 = 2016.

Year	F	ABC (lbs ww)	ABC (numbers)	OFL* (lbs ww)	OFL* (numbers)	Spawning Stock Biomass (lbs ww)
2016	0.104	95,380	39,710	127,490	53,140	806,960
2017	0.104	113,180	45,900	146,850	59,930	965,140
2018	0.104	131,870	51,660	166,560	66,060	1,133,820
2019	0.104	150,840	57,520	185,930	72,140	1,306,580
2020	0.104	169,700	63,430	204,610	78,130	1,479,650
2021	0.104	188,110	69,190	222,310	83,830	1,649,810
2022	0.104	205,760	74,660	238,830	89,130	1,813,950
2023	0.104	222,410	79,750	253,990	93,950	1,969,510
2024	0.104	237,870	84,430	267,700	98,280	2,114,570
2025	0.104	252,030	88,670	279,930	102,120	2,247,960
2026	0.104	264,800	92,470	290,720	105,500	**2,368,780**

Source: Table 4, Appendix A (*) OFL values from Table 5, Appendix A.

Note: While the probably of rebuilding for this projection was not provided in the analysis, it is probably very close to 50% since the estimated Spawning Stock Biomass is very close to SSB_{MSY}. However, the probability of rebuilding would be lower over a 10-year timeframe.

Discussion: Alternative 2 would rebuild the stock in 10 years, but would do so with less than 50% probability of rebuilding success….

Action 8. Increase the commercial and recreational minimum size limit for the GA-NC and the Florida Keys/East Florida (FLK/EFL) stocks of hogfish

Alternative 2. Increase the commercial and recreational minimum size limit for the GA-NC stock of hogfish in the South Atlantic Region.

Sub-alternative 2a. 13 inches FL

Sub-alternative 2b. 14 inches FL

Sub-alternative 2c. 15 inches FL

Discussion:

Alternative 3. Increase the commercial and recreational minimum size limit for the Florida Keys/East Florida (FLK/EFL) stock of hogfish in the South Atlantic Region.

Sub-alternative 3a. 13 inches FL
Sub-alternative 3f. 18 inches FL
Sub-alternative 3g. 19 inches FL
Sub-alternative 3h. 20 inches FL

Discussion:

Action 9. Establish a commercial trip limit for the GA-NC and the Florida Keys/East Florida (FLK/EFL) stocks of hogfish

Alternative 2. Establish a commercial trip limit for the GA-NC stock of hogfish in the South Atlantic Region.

Sub-alternative 2d. 1,000 lbs per trip.

Discussion:

Action 10. Modify and/or establish recreational bag limits for the GA-NC and the Florida Keys/East Florida (FLK/EFL) stocks of hogfish

Alternative 2. Establish a recreational bag limit for the GA-NC stock of hogfish in the South Atlantic Region.

Sub-alternative 2a. 5 fish per person per day.
Sub-alternative 2b. 4 fish per person per day.
Sub-alternative 2c. 3 fish per person per day.

Discussion:

Alternative 3. Modify the recreational bag limit for the Florida Keys/East Florida (FLK/EFL) stock of hogfish in the South Atlantic Region.

Sub-alternative 3a. 5 fish per person per day.
Sub-alternative 3b. 4 fish per person per day.

Discussion:

Appendix B. Glossary

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

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

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

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

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

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

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

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

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

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

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

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

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

Discards: Fish captured, but released at sea.

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

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

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

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

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

F: Fishing mortality.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Head Boat: 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 Fisheries Statistics Survey (MRFSS): 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

Table B-1. Snapper Grouper History of Management

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
FMP (1983)	08/31/83	PR: 48 FR 26843 FR: 48 FR 39463	-12" total length (TL) limit – red snapper, yellowtail snapper, red grouper, Nassau grouper -8" limit – black sea bass -4" trawl mesh size -Gear limitations – poisons, explosives, fish traps, trawls -Designated modified habitats or artificial reefs as Special Management Zones (SMZs)
Regulatory Amendment #1 (1987)	03/27/87	PR: 51 FR 43937 FR: 52 FR 9864	-Prohibited fishing in SMZs except with hand-held hook-and-line and spearfishing gear. -Prohibited harvest of goliath grouper in SMZs.
Amendment #1 (1988a)	01/12/89	PR: 53 FR 42985 FR: 54 FR 1720	-Prohibited trawl gear to harvest fish south of Cape Hatteras, NC and north of Cape Canaveral, FL. -Directed fishery defined as vessel with trawl gear and ≥200 lb s-g on board. -Established rebuttable assumption that vessel with s-g on board had harvested such fish in the exclusive economic zone (EEZ).
Regulatory Amendment #2 (1988b)	03/30/89	PR: 53 FR 32412 FR: 54 FR 8342	-Established 2 artificial reefs off Ft. Pierce, FL as SMZs.
Notice of Control Date	09/24/90	55 FR 39039	-Anyone entering federal wreckfish fishery in the EEZ off S. Atlantic states after 09/24/90 was not assured of future access if limited entry program developed.
Regulatory Amendment #3 (1989)	11/02/90	PR: 55 FR 28066 FR: 55 FR 40394	-Established artificial reef at Key Biscayne, FL as SMZ. Fish trapping, bottom longlining, spear fishing, and harvesting of Goliath grouper prohibited in SMZ.
Amendment #2 (1990a)	10/30/90	PR: 55 FR 31406 FR: 55 FR 46213	-Prohibited harvest/possession of goliath grouper in or from the EEZ -Defined overfishing for goliath grouper and other species
Emergency Rule	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
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 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

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.
			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.

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 #4 (1991)	01/01/92	PR: 56 FR 29922 FR: 56 FR 56016	-Prohibited gear: fish traps except black sea bass traps north of Cape Canaveral, FL; entanglement nets; longline gear inside 50 fathoms; bottom longlines to harvest wreckfish; powerheads and bangsticks in designated SMZs off S. Carolina -defined overfishing/overfished and established rebuilding timeframe: red snapper and groupers ≤ 15 years (year 1 = 1991); other snappers, greater amberjack, black sea bass, red porgy ≤ 10 years (year 1 = 1991) -Required permits (commercial & for-hire) and specified data collection regulations -Established an assessment group and annual adjustment procedure (framework) -Permit, gear, and vessel id requirements specified for black sea bass traps -No retention of snapper grouper spp. caught in other fisheries with gear prohibited in snapper grouper fishery if captured snapper grouper had no bag limit or harvest was prohibited. If had a bag limit, could retain only the bag limit -8" TL limit – lane snapper -10" TL limit – vermilion snapper (recreational only) -12" TL limit – red porgy, vermilion snapper (commercial only), gray, yellowtail, mutton, schoolmaster, queen, blackfin, cubera, dog, mahogany, and silk snappers -20" TL limit – red snapper, gag, and red, black, scamp, yellowfin, and yellowmouth groupers. -28" fork length (FL) limit – greater amberjack (recreational only) -36" FL or 28" core length – greater amberjack (commercial only) -bag limits – 10 vermilion snapper, 3 greater amberjack -aggregate snapper bag limit – 10/person/day, excluding vermilion snapper and allowing no more than 2 red snappers -aggregate grouper bag limit – 5/person/day, excluding Nassau and goliath grouper, for which no retention (recreational & commercial) is allowed -spawning season closure – commercial harvest greater amberjack > 3 fish bag prohibited in April south of Cape Canaveral, FL -spawning season closure – commercial harvest mutton snapper >snapper aggregate prohibited during May and June -charter/headboats and excursion boat possession limits extended

Document	All Actions Effective By:	Proposed Rule 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 #5 (1992a)	04/06/92	PR: 56 FR 57302 FR: 57 FR 7886	-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	-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	-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	-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 S. Carolina, where only hand-held, hook-and-line gear and spearfishing (excluding powerheads) was allowed
Amendment #6 (1993)	07/27/94	PR: 59 FR 9721 FR: 59 FR 27242	-Set up separate commercial TAC levels for golden tilefish and snowy grouper -Established commercial trip limits for snowy grouper, golden tilefish, speckled hind, and warsaw grouper -Included golden tilefish in grouper recreational aggregate bag limits -Prohibited sale of warsaw grouper and speckled hind -100% logbook coverage upon renewal of permit -Creation of the *Oculina* Experimental Closed Area -Data collection needs specified for evaluation of possible future individual fishing quota system
Amendment #7 (1994a)	01/23/95	PR: 59 FR 47833 FR: 59 FR 66270	-12” FL – hogfish -16” TL – mutton snapper -Required dealer, charter and headboat federal permits -Allowed sale under specified conditions -Specified allowable gear and made allowance for experimental gear -Allowed multi-gear trips in NC -Added localized overfishing to list of problems and objectives -Adjusted bag limit and crew specs. for charter and head boats -Modified management unit for scup to apply south of Cape Hatteras, NC -Modified framework procedure
Regulatory Amendment #6 (1994b)	05/22/95	PR: 60 FR 8620 FR: 60 FR 19683	-Established actions which applied only to EEZ off Atlantic coast of FL: Bag limits – 5 hogfish/person/day (recreational only), 2 cubera snapper/person/day > 30” TL; 12” TL – gray triggerfish
Notice of Control Date	04/23/97	62 FR 22995	-Anyone entering federal bsb pot fishery off S. Atlantic states after 04/23/97 was not assured of future access if limited entry program developed

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 #8 (1997)	12/14/98	PR: 63 FR 1813 FR: 63 FR 38298	-Established program to limit initial eligibility for snapper grouper fishery: Must demonstrate landings of any species in the snapper grouper (SG) FMU in 1993, 1994, 1995 or 1996; and have held valid SG permit between 02/11/96 and 02/11/97 -Granted transferable permit with unlimited landings if vessel landed ≥ 1,000 pounds (lb) of snapper grouper species in any of the years -Granted non-transferable permit with 225 lb trip limit to all other vessels -Modified problems, objectives, optimum yield (OY), and overfishing definitions -Expanded 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.
Regulatory Amendment #7 (1998a)	01/29/99	PR: 63 FR 43656 FR: 63 FR 71793	-Established 10 SMZs at artificial reefs off South Carolina.
Interim Rule Request	1/16/98		-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
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

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Amendment #9 (1998b)	2/24/99	PR: 63 FR 63276 FR: 64 FR 3624	-Red porgy: 14" TL (recreational and commercial); 5 fish rec. bag limit; no harvest or possession > bag limit, and no purchase or sale, in March and April -Black sea bass: 10" TL (recreational and commercial); 20 fish rec. bag limit; required escape vents and escape panels with degradable fasteners in bsb pots -Greater amberjack: 1 fish rec. bag limit; no harvest or possession > bag limit, and no purchase or sale, during April; quota = 1,169,931 lb; began fishing year May 1; prohibited coring -Specified size limits for several snapper grouper species (indicated in parentheses in inches TL): including yellowtail snapper (12), mutton snapper (16), red snapper (20); red grouper, yellowfin grouper, yellowmouth grouper, and scamp (20) -Vermilion snapper: 11" TL (recreational), 12" TL commercial -Gag: 24" TL (recreational); no commercial harvest or possession > bag limit, and no purchase or sale, during March and April -Black grouper: 24" TL (recreational and commercial); no harvest or possession > bag limit, and no purchase or sale, during March and April -Gag and Black grouper: within 5 fish aggregate grouper bag limit, no more than 2 fish may be gag or black grouper (individually or in combination) -All snapper grouper without a bag limit: aggregate recreational bag limit 20 fish/person/day, excluding tomtate and blue runner -Vessels with longline gear aboard may only possess snowy, warsaw, yellowedge, and misty grouper, and golden, blueline and sand tilefish
Amendment #9 (1998b) resubmitted	10/13/00	PR: 63 FR 63276 FR: 65 FR 55203	-Commercial trip limit for greater amberjack
Emergency Interim Rule	09/08/99, expired 08/28/00	64 FR 48324 and 65 FR 10040	-Prohibited harvest or possession of red porgy
Emergency Action	9/3/99	64 FR 48326	-Reopened the Amendment 8 permit application process
Amendment #10 (1998c)	07/14/00	PR: 64 FR 37082 and 64 FR 59152 FR: 65 FR 37292	-Identified essential fish habitat (EFH) and established habitat areas of particular concern (HAPC) for species in the snapper grouper FMU

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Amendment #11 (1998d)	12/02/99	PR: 64 FR 27952 FR: 64 FR 59126	-Maximum sustainable yield (MSY) proxy: goliath and Nassau grouper = 40% static spawning potential ratio (SPR); all other species = 30% static SPR -OY: hermaphroditic groupers = 45% static SPR; goliath and Nassau grouper = 50% static SPR; all other species = 40% static SPR -Overfished/overfishing evaluations: 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}
Regulatory Amendment #8 (2000a)	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 #12 (2000b)	09/22/00	PR: 65 FR 35877 FR: 65 FR 51248	-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 comm. trip limit May-December; modified management options and list of possible framework actions
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 spp. within the *Oculina* Experimental Closed Area
Notice of Control Date	10/14/05	70 FR 60058	-The Council is considering 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.

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.
			1. Snowy Grouper Commercial: Quota = 151,000 lb gutted weight (gw) in year 1, 118,000 lb gw in year 2, and 84,000 lb gw in year 3 onwards. Trip limit = 275 lb gw in year 1, 175 lb gw in year 2, and 100 lb gw in year 3 onwards Recreational: Limit possession to one snowy grouper in 5 grouper per person/day aggregate bag limit. 2. Golden Tilefish Commercial: Quota of 295,000 lb gw, 4,000 lb gw trip limit until 75% of the quota is taken when the trip limit is reduced to 300 lb gw. Do not adjust the trip limit downwards unless 75% is captured on or before September 1. Recreational: Limit possession to 1 golden tilefish in 5 grouper per person/day aggregate bag limit. 3. Vermilion Snapper Commercial: Quota of 1,100,000 lb gw. Recreational: 12" TL size limit. 4. Black Sea Bass Commercial: Commercial quota of 477,000 lb gw in year 1, 423,000 lb gw in year 2, and 309,000 lb gw in year 3 onwards. Require 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. Require black sea bass pots be removed from the water when the quota is met. Change fishing year from calendar year to June 1 – May 31. Recreational: Recreational allocation of 633,000 lb gw in year 1, 560,000 lb gw in year 2, and 409,000 lb gw in year 3 onwards. Increase minimum size limit from 10" to 11" in year 1 and to 12" in year 2. Reduce recreational bag limit from 20 to 15 per person per day. Change fishing year from the calendar year to June 1 through May 31. 5. Red Porgy Commercial and recreational: 1. Retain 14" TL size limit and seasonal closure (retention limited to the bag limit); 2. Specify a commercial quota of 127,000 lb gw and prohibit sale/purchase and prohibit harvest and/or possession beyond the bag limit when quota is taken and/or during January through April; 3. Increase commercial trip limit from 50 lb ww to 120 red porgy (210 lb gw) during May through December; 4. Increase recreational bag limit from one to three red porgy per person per day.
Notice of Control Date	3/8/07	72 FR 60794	-The Council may consider 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	-Establish eight deepwater Type II marine protected areas (MPAs) to protect a portion of the population and habitat of long-lived deepwater snapper grouper species
Amendment #15A (2008a)	3/14/08	73 FR 14942	- Establish rebuilding plans and status determination criteria for snowy grouper, black sea bass, and red porgy
Amendment #15B (2008b)	2/15/10	PR: 74 FR 30569 FR: 74 FR 58902	-Prohibit the sale of bag-limit caught snapper grouper species -Reduce the effects of incidental hooking on sea turtles

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			and smalltooth sawfish -Adjust commercial renewal periods and transferability requirements -Implement plan to monitor and assess bycatch -Establish reference points for golden tilefish -Establish allocations for snowy grouper (95% com & 5% rec) and red porgy (50% com & 50% rec)
Amendment #16 (SAFMC 2009a)	7/29/09	PR: 74 FR 6297 FR: 74 FR 30964	-Specify status determination criteria for gag and vermilion snapper -For gag: Specify interim allocations 51% com & 49% rec; rec & com shallow water grouper spawning closure January through April; directed com quota= 352,940 lb gw; -reduce 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: Specify interim allocations 68% com & 32% rec; directed com quota split Jan-June=315,523 lb gw and 302,523 lb gw July-Dec; reduce bag limit from 10 to 5 and a rec closed season November through March -Require dehooking tools
Amendment #19 (Comprehensive Ecosystem-Based Amendment 1; SAFMC 2009b)	7/22/10	PR: 75 FR 14548 FR: 75 FR 35330	-Provide presentation of spatial information for EFH and EFH-HAPC designations under the Snapper Grouper FMP - Designation of deepwater coral HAPCs
Amendment #17A (SAFMC 2010a)	12/3/10 red snapper closure; circle hooks March 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 north of 28 deg. N latitude in the South Atlantic EEZ -Specify an ACL and an AM for red snapper with management measures to reduce the probability that catches will exceed the stocks' ACL -Specify a rebuilding plan for red snapper -Specify status determination criteria for red snapper -Specify a monitoring program for red snapper
Emergency Rule	12/3/10	75 FR 76890	- Delay the effective date of the area closure for snapper grouper species implemented through Amendment 17A
Amendment #17B (SAFMC 2010b)	January 31, 2011	PR: 75 FR 62488 FR: 75 FR 82280	-Specify ACLs, ACTs, and AMs, where necessary, for 9 species undergoing overfishing -Modify management measures as needed to limit harvest to the ACL or ACT -Update the framework procedure for specification of total allowable catch -Prohibited harvest of 6 deepwater species seaward of 240 feet to curb bycatch of speckled hind and warsaw grouper

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Notice of Control Date	12/4/08	74 FR 7849	-Establishes 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	-Establishes control date for black sea bass pot sector in the South Atlantic
Regulatory Amendment #10 (SAFMC 2010c)	5/31/11	PR: 76 FR 9530 FR: 76 FR 23728	-Eliminate closed area for snapper grouper species approved in Amendment 17A
Regulatory Amendment #9 (SAFMC 2011a)	Bag limit: 6/22/11 Trip limits: 7/15/11	PR: 76 FR 23930 FR: 76 FR 34892	- Establish trip limits for vermilion snapper and gag, increase trip limit for greater amberjack, and reduce bag limit for black sea bass
Regulatory Amendment #11 (2011b)	5/10/12	PR: 76 FR 78879 FR: 77 FR 27374	- Eliminate 240 ft harvest prohibition for six deepwater species
Amendment # 25 (Comprehensive ACL Amendment) (SAFMC 2011c)	4/16/12	PR: 76 FR 74757 Amended PR: 76 FR 82264 FR: 77 FR 15916	-Establish acceptable biological catch (ABC) control rules, establish ABCs, annual catch limits (ACLs), and accountability measures (AMs) for species not undergoing overfishing -Remove some species from South Atlantic FMU and designate others as ecosystem component species -Specify allocations between the commercial and, recreational sectors for species not undergoing overfishing -Limit the total mortality for federally managed species in the South Atlantic to the ACLs
Amendment #24 (SAFMC 2011d)	7/11/12	PR: 77 FR 19169 FR: 77 FR 34254	-Specify MSY, rebuilding plan (including ACLs, AMs, and OY), and allocations for red grouper
Amendment #23 (Comprehensive Ecosystem-based Amendment 2; SAFMC 2011e)	1/30/12	PR: 76 FR 69230 FR: 76 FR 82183	- Designate the Deepwater MPAs as EFH-HAPCs - Limit harvest of snapper grouper species in SC SMZs to the bag limit - Modify sea turtle release gear
Amendment #20B	TBD	TBD	-Update wreckfish ITQ according to reauthorized Magnuson-Stevens Act
Amendment #18A (SAFMC 2012a)	7/1/12	PR: 77 FR 16991 FR: 77FR3 2408	- Limit participation and effort in the black sea bass sector - Modifications to management of the black sea bass pot sector - Improve the accuracy, timing, and quantity of fisheries statistics
Amendment #20A (SAFMC 2012b)	10/26/12	PR: 77 FR 19165 FR: 77 FR 59129	-Redistribute latent shares for the wreckfish ITQ program.

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Regulatory Amendment #12 (SAFMC 2012c)	10/9/12	FR: 77 FR 61295	-Adjust the ACL and OY for golden tilefish -Consider specifying a commercial Annual Catch Target (ACT) -Revise recreational AMs for golden tilefish
Amendment #18B (SAFMC 2013a)	5/23/13	PR: 77 FR 75093 FR: 77 FR 23858	-Limit participation and effort in the golden tilefish commercial sector through establishment of a longline endorsement -Modify trip limits -Specify allocations for gear groups (longline and hook and line)
Amendment # 26 (Comprehensive Ecosystem-Based Amendment 3)	TBD	TBD	-Modify bycatch and discard reporting for commercial and for-hire vessels
Regulatory Amendment #13 (SAFMC 2013b)	7/17/13	PR: 78 FR 17336 FR: 78 FR 36113	-Revise the ABCs, ACLs (including sector ACLs), and ACTs implemented by the Comprehensive ACL Amendment (SAFMC 2011c). The revisions may prevent a disjunction between the established ACLs and the landings used to determine if AMs are triggered.
Regulatory Amendment #14	TBD	PR: 79 FR 22936 FR: 79 FR 66316	-Modify the fishing year for greater amberjack -Modify the fishing year for black sea bass -Revise the AMs for vermilion snapper and black sea bass -Modify the trip limit for gag
Regulatory Amendment #15 (SAFMC 2013c)	9/12/13	PR: 78 FR 31511 FR: 78 FR 49183	-Modify the existing specification of OY and ACL for yellowtail snapper in the South Atlantic -Modify the existing gag commercial ACL and AM for gag that requires a closure of all other shallow water groupers (black grouper, red grouper, scamp, red hind, rock hind, graysby, coney, yellowmouth grouper, and yellowfin grouper) in the South Atlantic when the gag commercial ACL is met or projected to be met
Regulatory Amendment #16	TBD	TBD	-Consider removal of the November-April prohibition on the use of black sea bass pots
Amendment #27	1/27/14	PR: 78 FR 78770 FR: 78 FR 57337	-Establish the South Atlantic Council as the responsible entity for managing Nassau grouper throughout its range including federal waters of the Gulf of Mexico -Modify the crew member limit on dual-permitted snapper grouper vessels -Modify the restriction on retention of bag limit quantities of some snapper grouper species by captain and crew of for-hire vessels -Minimize regulatory delay when adjustments to snapper

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			grouper species' ABC, ACLs, and ACTs are needed as a result of new stock assessments -Address harvest of blue runner by commercial fishermen who do not possess a South Atlantic Snapper Grouper Permit
Amendment #28 (SAFMC 2013d)	8/23/13	PR: 78 FR 25047 FR: 78 FR 44461	-Establish regulations to allow harvest of red snapper in the South Atlantic
Amendment # 29		PR: 79 FR 72567	Updates the South Atlantic Fishery Management Council's (Council) acceptable biological catch (ABC) control rule to incorporate methodology for determining the ABC of unassessed species, adjust ABCs for fourteen unassessed snapper-grouper species, adjust annual catch limits (ACLs) and recreational annual catch targets (ACTs) for three species complexes and four snapper-grouper species based on revised ABCs. The amendment also modifies and implement gray triggerfish minimum size limits and establish a commercial split season and commercial trip limits for gray triggerfish.
Amendment #32		PR:	-Adjust management measures and ACLs for blueline tilefish
Regulatory Amendment #18 (SAFMC 2013e)	9/5/13	PR: 78 FR 26740 FR: 78 FR 47574	-Adjust ACLs for vermilion snapper and red porgy, and remove the 4-month recreational closure for vermilion snapper
Regulatory Amendment #19 (SAFMC 2013f)	ACL: 9/23/13 Pot closure: 10/23/13	PR: 78 FR 39700 FR: 78 FR 58249	-Adjust the ACL for black sea bass and implement an annual closure on the use of black sea bass pots from November 1 to April 30
Regulatory Amendment #17	TBD	TBD	-Adjust or establish new MPAs to enhance protection of speckled hind and warsaw grouper
Regulatory Amendment #20	TBD	TBD	-Adjust management measures and ACLs for snowy grouper
Regulatory Amendment #22	TBD	TBD	-Adjust management measures and ACLs for gag and wreckfish

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Amendment #22	TBD	TBD	-Establish a recreational tagging program for snapper grouper species with small ACLs

Appendix D. Bycatch Practicability Analysis

(UPDATE)

1 Population Effects for the Bycatch Species

1.1 Background

This amendment evaluates whether or not black snapper, mahogany snapper, dog snapper, and schoolmaster are in need of federal management, and will consider alternatives removing from the Snapper Grouper FMP. The South Atlantic Council has indicated that these species might not be in need of federal management because landings are extremely small, and the majority of the landings occur in Florida state waters.

The final rule for Amendment 18B to the Snapper Grouper FMP established a longline endorsement program for the commercial golden tilefish component of the snapper grouper fishery. Currently, there are separate quotas and trip limits for the longline and hook-and-line sectors. An endorsement is required to fish with longline gear. Some fishermen believe they can transfer their golden tilefish longline endorsement to another vessel and then fish for golden tilefish using hook-and-line gear, or that they can renew their Federal commercial snapper grouper vessel permit at one time but wait to renew their golden tilefish longline endorsement and then fish for golden tilefish using hook-and-line gear while their endorsement is not valid. When Amendment 18B was developed, the South Atlantic Council did not intend for fishermen who qualified and obtained a golden tilefish longline endorsement to also be able to fish for golden tilefish using hook-and-line gear during the same fishing year. Amendment 35 would clarify regulations governing the use of Golden Tilefish Longline Endorsements to more closely reflect the South Atlantic Council's intent when the endorsement program was first implemented.

1.2 Finfish Bycatch Mortality

Snapper Grouper

Most of the species in the Snapper Grouper FMP are taken with hook and line gear (see **Chapter 3**) by both the commercial and recreational sectors. Regulations (50 C.F.R. § 622.176) require commercial fishermen in the South Atlantic snapper grouper fishery who are selected by the Science and Research Director (SRD) to maintain and submit a fishing record on forms provided by the SRD. Commercial fishermen in the snapper grouper fishery are also required to submit logbooks with trip and effort information. Currently, 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. 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. Actions that could help resolve some of these issues are currently being considered in an amendment being developed by the South Atlantic Fishery Management Council (South Atlantic Council) and the Gulf of Mexico Fishery Management Council (Gulf of Mexico Council), which would allow for commercial logbook data (including discard information) to be entered electronically.

For the recreational sector estimates of the number of recreational discards are available from Marine Recreational Information Program (MRIP) and the National Marine Fisheries Service (NMFS) Southeast Headboat Survey. Beginning in 2013, samples were drawn from a known universe of fishermen rather than randomly dialing coastal households. Other improvements have been and will be made that should result in better estimating recreational catches and the variances around those catch estimates. MRIP methods have been used to recalculate previous Marine Recreational Fisheries Statistical Survey (MRFSS) estimates dating back to 1986.

During 2008-2012, information for charter trips came from two sources. Charter vessels for the snapper grouper fishery were selected to report by the SRD to maintain a fishing record for each trip, or a portion of such trips as specified by the SRD, and on forms provided by the SRD. Harvest and bycatch information was monitored by MRFSS/MRIP. Since 2000, a 10% sample of charter vessel captains were called weekly to obtain trip level information, such as date, fishing location, target species, etc. In addition, the standard dockside intercept data were collected from charter vessels and charter vessel clients were sampled through the standard random digital dialing of coastal households.

Harvest from headboats is monitored by NMFS-Southeast Fisheries Science Center (SEFSC) Beaufort Laboratory. Collection of discard data began in 2004. Daily catch records (trip records) were filled out by the headboat operators, or in some cases by NMFS approved headboat samplers based on personal communication with the captain or crew. Beginning in 2014, new regulations require headboat vessels to submit fishing records to the SEFSC on a weekly basis, or at intervals shorter than a week if notified by the SRD. Headboat trips are subsampled for data on species lengths and weights. Biological samples (scales, otoliths, spines, reproductive tissues, and stomachs) are obtained as time allowed. Lengths of discarded fish are occasionally obtained but these data were not part of the headboat database.

Table 1 shows commercial and recreational landings and discards of snapper grouper species for the commercial and recreational sectors.

Commercial wreckfish landings are confidential, and are not included in **Table 1**. The commercial portion of the snapper grouper fishery for wreckfish occurs at water depths of 450-600 m. Thus, snapper grouper species listed in **Table 1** are not caught with wreckfish. Vertical hook-and-line gear consisting of 1/8 inch cable and a terminal rig (around 23 kg of weight), with 8-12 hooks baited with squid, is deployed from hydraulic reels to target wreckfish. Barrelfish

(*Hyperoglyphe perciformes*) and red bream (*Beryx decadactylus*) are caught incidental to wreckfish and are likely sold or used for personal consumption. Goldman and Sedberry (2010) reports other species caught by commercial wreckfish fishermen on vertical lines with baited hooks from 400 to 800 m depth, on and around Charleston Bump include splendid alfonsino (*Beryx splendens*), conger eel (*Conger oceanicus*), gulper shark (*Centrophorus granulosus*), roughskin dogfish (*Cirrhigaleus asper*), and shortspine dogfish (*Squalus mitsukurii*). It is unknown if all these species are retained by commercial wreckfish fishermen.

Table 1. Mean headboat, MRIP (charter and private), and commercial estimates of landings and discards of snapper grouper species in the South Atlantic (2008-2012). Headboat, MRIP (charter and private) landings are in numbers of fish (N); commercial landings are in pounds whole weight (lbs ww). Discards represent numbers of fish that were caught and released alive.

Species	HEADBOAT			MRIP CHARTER			MRIP PRIVATE			COMMERCIAL	
	Catch (N)	Landings (N)	Discards (N)	Catch (N)	Landings (N)	Discards (N)	Catch (N)	Landings (N)	Discards (N)	Landings (lbs ww)	Disca (N
Almaco jack	3,576	3,337	240	3,858	2,592	1,266	9,416	3,688	5,728	204,422	86
Atlantic spadefish	158	128	30	236	188	48	267,887	110,718	157,169	26,936	0
Banded rudderfish	19,008	16,651	2,357	5,634	3,159	2,475	13,703	6,847	6,855	60,615	14
Bank sea bass	5,788	5,788	0	2,913	691	2,222	10,413	2,393	8,020	387	4
Bar jack	290	230	59	261	76	186	11,222	2,805	8,417	4,111	17
Black grouper	1,622	315	1,307	9,755	1,422	8,334	31,487	7,760	23,727	50,001	2,0
Black sea bass	629,922	166,255	463,667	250,778	63,803	186,974	2,873,854	275,845	2,598,008	486,316	29,7
Black snapper	0	0	0	0	0	0	0	0	0	213	7
Blackfin snapper	119	51	68	101	101	0	1,843	1,843	0	1,616	1
Blue runner	22,821	17,484	5,337	25,885	11,601	14,284	1,325,020	610,399	714,621	227,946	85
Blueline tilefish	3,085	3,013	73	18,503	18,055	448	8,569	8,324	245	370,077	24
Coney	121	70	51	37	33	4	1,314	1,100	214	34	0
Cottonwick	17	17	0	0	0	0	148	148	0	0	0
Cubera snapper	377	359	17	4	4	0	2,907	2,631	275	5,060	0
Dog snapper	92	64	28	57	57	0	954	822	133	395	0
Gag	15,489	10,214	5,276	19,365	2,983	16,382	131,170	21,430	109,740	495,064	9,4
Golden tilefish	0	0	0	493	493	0	3,123	3,123	0	421,923	26
Gray snapper	46,371	40,624	5,747	5,220	5,024	196	1,434,333	229,482	1,204,852	113,992	40,3
Gray triggerfish*	67,258	55,192	12,066	39,155	32,706	6,449	226,603	110,045	116,558	400,273	2,0
Graysby	3,001	2,041	960	1,049	919	131	10,074	3,049	7,025	192	29
Greater amberjack	6,614	4,710	1,904	25,898	20,209	5,689	58,129	22,383	35,746	859,929	3,3
Hogfish	260	169	91	32	29	3	30,321	27,550	2,770	45,169	55
Jolthead porgy	7,050	6,913	137	2,232	2,232	0	12,594	11,869	725	3,853	11
Knobbed porgy	5,584	5,439	145	832	832	0	6,838	6,398	441	23,726	1
Lane snapper	23,340	20,227	3,112	11,993	8,882	3,111	166,037	42,246	123,791	3,526	21
Lesser amberjack	22	17	6	12	12	0	393	393	0	17,044	34

Species	HEADBOAT			MRIP CHARTER			MRIP PRIVATE			COMMERCIAL	
	Catch (N)	Landings (N)	Discards (N)	Catch (N)	Landings (N)	Discards (N)	Catch (N)	Landings (N)	Discards (N)	Landings (lbs ww)	Disca (N
Longspine porgy	3	3	0	0	0	0	460	290	170	0	0
Mahogany snapper	32	30	2	0	0	0	35	35	0	30	0
Margate	856	662	195	265	206	59	9,512	3,559	5,952	3,725	30
Misty grouper	0	0	0	0	0	0	0	0	0	971	1
Mutton snapper	17,683	13,996	3,687	31,630	18,609	13,021	294,792	111,060	183,732	74,212	1,63
Ocean triggerfish	473	473	0	363	285	77	7,366	3,454	3,912	0	0
Queen snapper	0	0	0	1	1	0	0	0	0	3,734	10
Red grouper	11,559	1,629	9,930	9,138	3,647	5,491	81,675	31,172	50,503	367,462	3,61
Red hind	383	313	70	86	86	0	2,588	928	1,660	9,865	88
Red porgy	41,064	23,659	17,405	20,579	12,733	7,845	38,282	24,793	13,489	169,468	27,8
Rock hind	2,150	1,509	642	132	92	40	4,087	908	3,179	15,839	14
Rock sea bass	0	0	0	415	177	238	11,477	4,287	7,190	453	49
Sailors choice	123	123	0	732	23	709	32,818	14,324	18,494	0	0
Sand tilefish	1,712	895	817	4,053	484	3,568	23,983	6,091	17,891	0	23
Saucereye porgy	228	228	1	0	0	0	1,034	1,034	0	0	0
Scamp	5,602	3,195	2,407	4,631	2,771	1,860	8,852	5,108	3,745	221,922	2,20
Schoolmaster	344	344	0	2	2	0	7,251	4,427	2,824	181	0
Scup	11,364	9,531	1,833	246	219	28	1,086	596	490	0	0
Silk Snapper	1,371	1,249	122	1,379	1,209	171	1,141	153	988	11,379	8
Snowy grouper	123	72	50	1,684	1,388	295	969	550	419	85,047	27
Tomtate	119,474	49,453	70,021	19,269	11,868	7,401	331,321	84,819	246,502	212	2,44
Vermilion snapper	282,092	176,802	105,290	63,968	41,150	22,818	169,085	70,051	99,034	1,010,587	38,1
White grunt*	179,271	144,826	34,445	42,015	34,665	7,349	419,442	193,338	226,104	126,477	34
Whitebone porgy	4,836	4,577	258	1,833	1,784	49	11,919	10,710	1,209	14	31
Yellowedge grouper	7	4	3	27	27	0	44	44	0	16,080	13
Yellowfin grouper	20	14	5	0	0	0	97	97	0	3,780	6
Yellowmouth grouper	22	17	5	15	15	0	0	0	0	290	0
Yellowtail snapper	134,179	100,724	33,454	199,283	134,871	64,412	967,208	362,141	605,067	1,123,532	90,6

Sources: MRIP data from SEFSC Recreational ACL Dataset (May 2013), Headboat data from SEFSC Headboat Logbook CRNF files (expanded; May 2013), Commercial landings data from SEFSC Commercial ACL Dataset (July 10, 2013) with discard estimates from expanded SEFSC Commercial Discard Logbook (Jun 2013).
Note: Estimates of commercial discards are highly uncertain and are for vertical line gear only.
*Commercial gray triggerfish includes "triggerfishes, unclassified" category; commercial white grunt includes "grunts, unclassified" category.
Goliath grouper, Nassau grouper, Warsaw grouper, Speckled hind, and Red snapper are excluded from Table 1 since they are prohibited species, and landings records are not available for all the years 2007-2011. Wreckfish landings are confidential.

Release mortality rates are unknown for most snapper grouper species. Recent Southeast Data, Assessment, and Review (SEDAR) assessments include estimates of release mortality rates based on published studies. Stock assessment reports can be found at http://www.sefsc.noaa.gov/sedar/. The recent stock assessment for yellowtail snapper chose a rate of 10% release mortality as an approximation for the lower bound on release mortality for yellowtail snapper (FWRI 2012). SEDAR 10 (2006) estimated release mortality rates of 40% and 25% for gag taken by commercial and recreational fishermen, respectively. Commercial and recreational release mortality rates were estimated as 20% for black grouper and red grouper in SEDAR 19 (2010). SEDAR 15 (2008) estimated a 20% release mortality rate for greater amberjack. Snowy grouper are primarily caught in water deeper than 300 feet and golden tilefish are taken at depths greater than 540 feet; therefore, release mortality of the species are probably near 100% (SEDAR 4 2004, SEDAR 25 2011). Commercial sector discard mortality for red porgy is 35%, and 8% for the recreational sector (2012 SEDAR 1 Update). Other release mortality rates are estimated as 12.5% for gray triggerfish (SEDAR-32, under development); 1% commercial and 7% recreational for black sea bass (SEDAR-25, 2011); and 41% commercial and 38% recreational for vermilion snapper (SEDAR-17, 2008b; SEDAR-17 Update, 2012b).

According to SEDAR 23 (2011), several data workshop participants observed that goliath grouper in the southeastern U.S. (i.e., South Atlantic and Gulf of Mexico waters) are subject to unknown but significant levels of release mortality, especially adult specimens brought up from depth. Fishing mortality due to release mortality also occurs when goliath grouper are caught as incidental catch (i.e., when other species are targeted) and when fishers target (some repeatedly) goliath grouper for catch-and release fishing. The mortality rate of any released wreckfish is likely to be 100%, because the fish are typically harvested in waters deeper than 300 m (Machias et al. 2003; SAFMC 1991).

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

Expected Impacts on Bycatch for the Subject Amendment Actions

None of the alternatives under either action in Amendment are likely to change the current level of bycatch of target or non-target species in the Atlantic. Removing black snapper, dog snapper, mahogany snapper, and schoolmaster from the FMP to create a consistent regulatory environment across jurisdictional boundaries is not likely to alter fishing effort or the amount or type of bycatch associated with directed harvest of those species. Clarifying the regulations governing the use of Golden Tilefish Longline Endorsements is largely an administrative action and is not likely to lead to increased or decreased fishing effort directed at harvest of golden tilefish. Therefore, no changes in the level of incidental capture of species commonly associated with golden tilefish are expected as a result of that action. Additionally, no increased risks to species listed under the Endangered Species Act (ESA) or highly migratory species beyond the status quo are anticipated as a result of the actions in Amendment 35.

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

Revised sea turtle release gear requirements for the snapper grouper fishery that were established in Amendment 15B to the Snapper Grouper FMP (SAFMC 2008); and designated new essential fish habitat (EFH) and EFH-Habitat Areas of Particular Concern in the South Atlantic. Comprehensive Ecosystem-Based Amendment 2 (SAFMC 2012) 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 could reduce bycatch of regulatory discards around SMZs by restricting commercial harvest in the area, but it would probably have very little 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 could reduce bycatch of and bycatch mortality of federally managed species in the South Atlantic. Amendment 13C to the FMP for Snapper Grouper in the South Atlantic Region (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 could still reduce handling time in removing hooks, 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 is expected to reduce bycatch mortality of snapper grouper species. Amendment 17B to the Snapper Grouper FMP (SAFMC 2010b) established ACLs and AMs and addressed overfishing for the following species in the snapper grouper management complex that were listed as undergoing overfishing: golden tilefish, snowy grouper, speckled hind, warsaw grouper, black sea bass, gag, red grouper, black grouper, and vermilion snapper. Golden tilefish, black sea bass, red grouper, black grouper, and vermilion snapper are no longer experiencing overfishing.

The Comprehensive ACL Amendment (SAFMC 2011a) implemented ACLs and AMs for species not undergoing overfishing in the FMPs 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 likely has reduced bycatch of target species and species complexes as well as incidentally caught species.

Amendment 18A to the Snapper grouper FMP (SAFMC 2012a), included actions that could reduce bycatch of black sea bass and the potential for interactions with protected species. Actions in Amendment 18A limits the number of participants in the black sea bass pot sector, requires fishermen bring pots back to port at the completion of a trip, and limits the number of pots a fishermen can deploy. Amendment 24 to the Snapper Grouper FMP (SAFMC 2011b) established a rebuilding plan for red grouper, which was overfished and undergoing overfishing. Red grouper is no longer overfished or undergoing overfishing. Amendment 24 (SAFMC 2011b) also established ACLs and AMs for red grouper, which could 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 2013a), 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) includes actions that could adjust management measures for a number of snapper grouper species, some of which could reduce the magnitude of discards. The final rule (78 FR 49183; September 12, 2013) for Regulatory Amendment 15 to the Snapper Grouper FMP (SAFMC 2013b) included actions for yellowtail snapper and gag that are expected to reduce bycatch of snapper grouper species. Regulatory Amendment 17 to the Snapper Grouper FMP includes actions that affect marine protected areas, and could reduce bycatch of many snapper grouper species, especially speckled hind and warsaw grouper.

The South Atlantic Council's For-Hire Reporting Amendment has changed the reporting frequency 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 a joint amendment with the Gulf of Mexico Council that requires that all federally permitted charter vessels report landings information weekly to the SEFSC electronically. Additionally, the Gulf of Mexico and South Atlantic Councils will also begin development of a joint amendment to require that all federally permitted commercial fishing vessels in the southeast also report their logbook landings information electronically. These future actions will help to improve estimates on the composition and magnitude of catch and bycatch of species affected by this amendment, 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 this Amendment.

1.5 Ecological Effects Due to Changes in the Bycatch

The ecological effects of bycatch mortality are the same as fishing mortality from directed fishing efforts. If not properly managed and accounted for, either form of mortality could potentially reduce stock biomass to an unsustainable level. As mentioned in the above section, the South Atlantic For-Hire Reporting Amendment included an action which required weekly electronic reporting to enhance landings data reporting in the headboat sector. Better bycatch and discard data will 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 will provide better data that can be used in multi-species assessments. These improvements in harvest monitoring efforts in the headboat sector, will also be extended to the charter and commercial sectors of all fisheries in the southeast region.

Removing black snapper, dog snapper, mahogany snapper, and schoolmaster from the FMP is unlikely to result in significant ecological effects, positive or negative, due to changes in bycatch. Clarifying Golden Tilefish Longline Endorsement regulations is also not expected to result in adverse impacts on the ecological environment due to changes in bycatch. Amendment

35 would not modify the gear types or fishing techniques in the snapper grouper fishery. Therefore, ecological effects due to changes in bycatch in this fishery are likely to be negligible if actions in this amendment are implemented. For more details on ecological effects, see **Chapters 3** and **4** of the Comprehensive AM and Dolphin Allocation Amendment.

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

Amendment 35 is not expected to result in major changes in bycatch of other fish species. The discard mortality rates of the assessed snapper grouper species addressed in this amendment are discussed in **Section 1.2** of this bycatch practicability analysis. Removing four rarely caught species from the FMP and modifying Golden Tilefish Longline Endorsement Regulations to align them with the South Atlantic Council's intent when the endorsement program was implemented are not expected to change bycatch of co-occurring species. Nor would these actions result in adverse population or ecosystem effects. If the four snapper grouper species are removed from the FMP is it expected that the state of Florida would extend their regulations for managing those species into federal waters. Therefore, no changes in bycatch are anticipated while fishermen continue to fish for or incidentally capture black snapper, dog snapper, mahogany snapper, or schoolmaster. Likewise, the regulatory clarification for golden tilefish is largely an administrative action to prevent fishermen holding a longline endorsement from fishing under the hook-and-line quota. Therefore, no change in bycatch of species co-occurring with golden tilefish is anticipated.

Effects on Marine Mammals and Birds

Under Section 118 of the Marine Mammal Protection Act (MMPA), the National Marine Fisheries Service (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, dolphin and wahoo, and golden crab fisheries, 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 2015 Final LOF classifies as a Category II (79 FR 77919, December 29, 2014). 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 Southeast Fisheries Science Center (SEFSC) Supplementary Discard Data Program (SDDP) initiated in July of 2000. The SDDP sub-samples 20% of the vessels with an active permit. The longline and hook-and-line gear components of the snapper grouper fishery in the South Atlantic are classified in the 2015 Final LOF as Category III fisheries.

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). There are no known interactions between the black sea bass pot sector and large

whales. NOAA Fisheries' biological opinion on the continued operation of the South Atlantic snapper grouper fishery determined the possible adverse effects resulting from the fishery are extremely unlikely. Thus, the continued operation of the snapper grouper fishery in the southeast U.S. Atlantic exclusive economic zone is not likely to adversely affect sperm, fin, sei, and blue whales (NMFS 2006).

North Atlantic right and humpback whales may overlap both spatially and temporally with the black sea bass pot sector. The 2007 revisions to the Atlantic Large Whale Take Reduction Plan folded the Atlantic mixed species trap/pot fisheries into the plan (72 FR 193; October 5, 2007). The new requirements (78 FR 58249; September 23, 2013) to prohibit the use of black sea bass pots during November through April each year will help further reduce the likelihood of North Atlantic right and humpback whale entanglement in black sea bass pot gear.

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 fisher is not likely to negatively affect the Bermuda petrel and the roseate tern.

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

Removing four rarely caught snapper grouper species from the FMP and clarifying Golden Tilefish Longline Endorsement regulation are not expected to significantly alter fishing practices, processing, disposal, or marketing costs in the near or short term. In the long term, it is more likely that current fishing, processing, disposal, and marketing costs would be maintained at or near their status quo levels. Consistent regulations for south Florida snapper grouper species would benefit the socioeconomic environment by making it easier for fishery participants to abide by a single set of regulations. Clarifying Golden Tilefish Endorsement Regulations to prevent endorsement holders from fishing under the golden tilefish hook-and-line quota will benefit the social environment by reinforcing the fair and equitable gear-specific quotas established through Amendment 18B to the FMP. This action, in the long term, could protect hook-and-line fishermen from early sector closures due to endorsement holders harvesting portions of the hook-and-line quota.

Changes in Fishing Practices and Behavior of Fishermen

The actions proposed in Amendment 35 are not expected to change fishing practices or fishing behavior, and are likely to have little effect on the overall magnitude of discards. As stated previously, any changes to fishing behavior and subsequent changes in the level of discards or discard mortality that may result from the actions in the amendment are expected to be small, and would not jeopardize the sustainability of any target or non-target species.

1.8 Social effects of the action proposed in Regulatory Amendment 21 are addressed in Chapter 4 of the amendment.

Social effects of the actions proposed in Amendment 35 are addressed in **Chapter 4** of the amendment.

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

The actions in Amendment 35 are not likely to change the current level of bycatch of target or non-target species in the Atlantic. Research and monitoring is ongoing to understand the effectiveness of implemented management measures from other snapper grouper amendments 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 from snapper grouper, dolphin wahoo, and Coastal Migratory Pelagics (CMP) fisheries 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. Recreational discards are obtained from the Marine Recreational Information Program and logbooks from the NMFS headboat program. The actions in Amendment 35 would not change any ongoing or require any new research, administrative, or enforcement costs.

Additional data collection activities for the recreational sector of the snapper grouper, dolphin wahoo, and CMP fisheries are being considered by the South Atlantic Council that could allow for a better monitoring of bycatch in the future. The South Atlantic Council is also developing an amendment to improve commercial logbook reporting for these fisheries. Some observer information for the snapper grouper fishery has been provided by the SEFSC, Marine Fisheries Initiative, and Cooperative Research Programs (CRP), but more is desired for the snapper grouper, dolphin wahoo, and CMP fisheries. Currently, snapper grouper fishermen (commercial and recreational) are required to carry observers, if selected. There is a very small amount of bycatch coverage of the commercial snapper-grouper fishery in the South Atlantic (<1%). An observer program was implemented from February 2014 to December 2014 that funded by MARFIN to observe 62 sea days in the bottom and vertical longline fishery. For headboats, which includes fisheries for snapper grouper and dolphin wahoo, observers are placed on 9.5% of trips out of North Carolina, 1.4% of trips out of South Carolina, 3.5% of trips out of Georgia, and 1.5% out of east Florida during 2013.

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. (Foundation) 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 Foundation, Marine Fisheries Initiative, Saltonstall-Kennedy program, and the CRP. Efforts are made to emphasize the need for observer and logbook data in requests for proposals issued by granting agencies. A condition of funding for these projects is that data are made available to the Councils and NMFS upon completion of a study.

Stranding networks have been established in the Southeast Region. The NMFS SEFSC is the base for the Southeast United States Marine Mammal Stranding Program (http://sero.nmfs.noaa.gov/pr/strandings.htm). NMFS authorizes organizations and volunteers under the MMPA to respond to marine mammal strandings throughout the United States. These organizations form the stranding network whose participants are trained to respond to, and collect samples from live and dead marine mammals that strand along southeastern United State beaches. The SEFSC is responsible for: coordinating stranding events; monitoring stranding rates; monitoring human caused mortalities; maintaining a stranding database for the southeast region; and conducting investigations to determine the cause of unusual stranding events including mass strandings and mass mortalities (http://www.sefsc.noaa.gov/species/mammals/strandings.htm).

The Southeast Regional Office and the SEFSC participate in a wide range of training and outreach activities to communicate bycatch related issues. The NOAA Fisheries Southeast Regional Office issues public announcements, Southeast Fishery Bulletins, or News Releases on different topics, including use of turtle exclusion devices, bycatch reduction devices, use of methods and devices to minimize harm to turtles and sawfish, information intended to reduce harm and interactions with marine mammals, and other methods to reduce bycatch for the convenience of constituents in the southern United States. These are mailed out to various organizations, government entities, commercial interests, and recreational groups. This information is also included in newsletters and publications that are produced by NOAA Fisheries and the various regional fishery management councils. Announcements and news releases are also available on the internet and broadcasted over NOAA weather radio.

NOAA Fisheries 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.

1.10 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 are discussed in **Chapter 4** of Amendment 35.

Changes in the Distribution of Benefits and Costs

The distribution of benefits and costs expected from actions in Amendment 35 are discussed in **Chapter 3**. Economic and social effects of the action proposed in the are addressed in **Chapter 4** of this document, and these effects are discussed in relation to the baseline conditions of the fishery and fishing communities outlined in **Chapter 3** of the document.

1.11 Social Effects

The baseline social environment and social effects of the proposed actions are described in **Chapter 4** of Amendment 35.

1.12 Conclusion

This section evaluates the practicability of taking additional action to minimize bycatch and bycatch mortality using the ten factors provided at 50 CFR section 600.350(d)(3)(i). In summary, the actions in Amendment 35 are not likely to significantly contribute or detract from the current level of bycatch in the snapper grouper fishery. The South Atlantic Council, NOAA Fisheries, and the SEFSC have implemented and plan to implement numerous management measures and reporting requirements that have improved, or are likely to improve monitoring efforts of discards and discard mortality.

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Appendix E. Regulatory Impact Review

Appendix F. Regulatory Flexibility Analysis

Appendix G. Other Applicable Law

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

Administrative Procedures Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (APA) (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the APA, NOAA Fisheries is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider, and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day waiting period from the time a final rule is published until it takes effect. This amendment is subject to all regulations under the APA and will undergo and requisite notice and comment periods before being implemented.

Coastal Zone Management Act

Section 307(c)(1) of the Federal Coastal Zone Management Act of 1972 (CZMA), as amended, requires federal activities that affect any land or water use or natural resource of a state's coastal zone be conducted in a manner consistent, to the maximum extent practicable, with approved state coastal management programs. The requirements for such a consistency determination are set forth in NOAA regulations at 15 C.F.R. part 930, subpart C. According to these regulations and CZMA Section 307(c)(1), when taking an action that affects any land or water use or natural resource of a state's coastal zone, NMFS is required to provide a consistency determination to the relevant state agency at least 90 days before taking final action.

Upon submission to the Secretary, NOAA Fisheries will determine if this plan amendment is consistent with the Coastal Zone Management programs of the Atlantic states from Florida to Maine, to the maximum extent possible. Their determination will then be submitted to the responsible state agencies under Section 307 of the CZMA administering approved Coastal Zone Management programs for these states.

Data Quality Act

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

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

Scientific information and data are key components of fishery management plans (FMPs) and amendments and the use of best available information is the second national standard under the Magnuson-Stevens Act. To be consistent with the DQA, FMPs and amendments must be based on the best information available. They should also properly reference all supporting materials and data, and be reviewed by technically competent individuals. With respect to original data generated for FMPs and amendments, it is important to ensure that the data are collected according to documented procedures or in a manner that reflects standard practices accepted by the relevant scientific and technical communities. Data will also undergo quality control prior to being used by the agency and a pre-dissemination review.

Endangered Species Act

The Endangered Species Act (ESA) of 1973, as amended, (16 U.S.C. Section 1531 et seq.) requires that federal agencies use their authorities to conserve endangered and threatened species. The ESA requires NMFS, when proposing a fishery action that "may affect" critical habitat or endangered or threatened species, to consult with the appropriate administrative agency (itself for most marine species, the U.S. Fish and Wildlife Service for all remaining species) to determine the potential impacts of the proposed action. Consultations are concluded informally when proposed actions may affect but are "not likely to adversely affect" endangered or threatened species or designated critical habitat. Formal consultations, including a biological opinion, are required when proposed actions may affect and are "likely to adversely affect" endangered or threatened species or adversely modify designated critical habitat. If jeopardy or adverse modification is found, the consulting agency is required to suggest reasonable and prudent alternatives. NOAA Fisheries, as part of the Secretarial review process, will make a determination regarding the potential impacts of the proposed actions.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas. 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; 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 2015 final List of Fisheries (79 FR 77919, December 29, 2014) classifies the snapper-grouper hook-and-line segment of the fishery as a a Category III fishery. Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities. 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 2015 Final LOF classifies as a Category II. Gear types used in these fisheries are determined to have occasional incidental mortality and serious injury of marine mammals.

Essential Fish Habitat

The amended Magnuson-Stevens Act included a new habitat conservation provision known as Essential Fish Habitat (EFH) that requires each existing and any new FMPs to describe and identify EFH for each federally managed species, minimize to the extent practicable impacts from fishing activities on EFH that are more than minimal and not temporary in nature, and identify other actions to encourage the conservation and enhancement of that EFH. To address these requirements the South Atlantic Fishery Management Council has, under separate action, approved an environmental impact statement (SAFMC 1998) to address the new EFH requirements contained within the Magnuson-Stevens Act. Section 305(b)(2) requires federal agencies to obtain a consultation for any action that may adversely affect EFH. An EFH consultation will be conducted for this action.

Executive Orders

E.O. 12630: Takings

The Executive Order on Government Actions and Interference with Constitutionally Protected Property Rights that became effective March 18, 1988, requires each federal agency prepare a Takings Implication Assessment for any of its administrative, regulatory, and

legislative policies and actions that affect, or may affect, the use of any real or personal property. Clearance of a regulatory action must include a takings statement and, if appropriate, a Takings Implication Assessment. The NOAA Office of General Counsel will determine whether a Taking Implication Assessment is necessary for this amendment.

E.O. 12866: Regulatory Planning and Review

Executive Order 12866: Regulatory Planning and Review, signed in 1993, requires federal agencies to assess the costs and benefits of their proposed regulations, including distributional impacts, and to select alternatives that maximize net benefits to society. To comply with E.O. 12866, NOAA Fisheries prepares a Regulatory Impact Review (RIR) for all fishery regulatory actions that either implement a new fishery management plan or significantly amend an existing plan. RIRs provide a comprehensive analysis of the costs and benefits to society of proposed regulatory actions, the problems and policy objectives prompting the regulatory proposals, and the major alternatives that could be used to solve the problems. The reviews also serve as the basis for the agency's determinations as to whether proposed regulations are a "significant regulatory action" under the criteria provided in E.O. 12866 and whether proposed regulations would have a significant economic impact on a substantial number of small entities in compliance with the Regulatory Flexibility Act.

On June 20, 2013, the Small Business Administration issued a final rule revising the small business size standards for several industries effective July 22, 2013 (78 FR 37398). The rule increased the size standard for Finfish Fishing from $4.0 to $19.0 million, Shellfish Fishing from $4.0 to $5.0 million, and Other Marine Fishing from $4.0 to $7.0 million. In light of these new standards, NOAA Fisheries has preliminarily determined that the proposed action would not have a significant economic impact on a substantial number of small entities.

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

This Executive Order mandates that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions. Federal agency responsibilities under this Executive Order include conducting their programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons from participation in, denying persons the benefit of, or subjecting persons to discrimination under, such, programs policies, and activities, because of their race, color, or national origin. Furthermore, each federal agency responsibility set forth under this Executive Order shall apply equally to Native American programs. Environmental justice considerations are discussed in detail in **Section 3.3.3**.

E.O. 12962: Recreational Fisheries

This Executive Order requires federal agencies, in cooperation with states and tribes, to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities through a variety of methods including, but not limited to, developing joint partnerships; promoting the restoration of recreational fishing

areas that are limited by water quality and habitat degradation; fostering sound aquatic conservation and restoration endeavors; and evaluating the effects of federally-funded, permitted, or authorized actions on aquatic systems and recreational fisheries, and documenting those effects. Additionally, it establishes a seven-member National Recreational Fisheries Coordination Council (Council) responsible for, among other things, ensuring that social and economic values of healthy aquatic systems that support recreational fisheries are considered by federal agencies in the course of their actions, sharing the latest resource information and management technologies, and reducing duplicative and cost-inefficient programs among federal agencies involved in conserving or managing recreational fisheries. The Council also is responsible for developing, in cooperation with federal agencies, states and tribes, a Recreational Fishery Resource Conservation Plan - to include a five-year agenda. Finally, the Order requires NMFS and the U.S. Fish and Wildlife Service to develop a joint agency policy for administering the ESA.

E.O. 13132: Federalism

The Executive Order on Federalism requires agencies in formulating and implementing policies, to be guided by the fundamental federalism principles. The Order serves to guarantee the division of governmental responsibilities between the national government and the states that was intended by the framers of the Constitution. Federalism is rooted in the belief that issues not national in scope or significance are most appropriately addressed by the level of government closest to the people. This Order is relevant to FMPs and amendments given the overlapping authorities of NMFS, the states, and local authorities in managing coastal resources, including fisheries, and the need for a clear definition of responsibilities. It is important to recognize those components of the ecosystem over which fishery managers have no direct control and to develop strategies to address them in conjunction with appropriate state, tribes and local entities (international too).

No federalism issues have been identified relative to the actions proposed in this amendment. Therefore, consultation with state officials under Executive Order 12612 is not necessary.

Appendix H. Essential Fish Habitat and Ecosystem-based Management

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

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

Moving to Ecosystem-Based Management

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

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

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

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

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

Ecosystem Approach to Deepwater Ecosystem Management

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Governor's South Atlantic Alliance (GSAA)

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

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

South Atlantic Landscape Conservation Cooperative

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

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

Building Tools to support EBM in the South Atlantic Region

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

South Atlantic Bight Ecopath Model

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

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

Essential Fish Habitat and Essential Fish Habitat Areas of Particular Concern

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

Snapper Grouper FMP

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

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

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

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

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

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

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

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

Shrimp FMP

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

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

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

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

Coastal Migratory Pelagics FMP

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

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

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

Areas which meet the criteria for EFH-HAPCs include sandy shoals of Capes Lookout, Cape Fear, and Cape Hatteras from shore to the ends of the respective shoals, but shoreward of the

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

Golden Crab FMP

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

Spiny Lobster FMP

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

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

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

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

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

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

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

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

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

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

Dolphin and Wahoo FMP

EFH for dolphin and wahoo is the Gulf Stream, Charleston Gyre, Florida Current, and pelagic *Sargassum*. This EFH definition for dolphin was approved by the Secretary of Commerce on June 3, 1999 as a part of the 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 deepwater Marine Protected Areas (MPAs) as designated in Snapper Grouper Amendment 14: Snowy Grouper Wreck MPA, Northern South Carolina MPA, Edisto MPA, Charleston Deep Artificial Reef MPA, Georgia MPA, North Florida MPA, St. Lucie Hump MPA, and East Hump MPA.

Shrimp FMP

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

***Pelagic Sargassum* Habitat FMP**

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

Coastal Migratory Pelagics FMP

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

Golden Crab FMP

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

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

Coral, Coral Reefs and Live/Hard Bottom FMP

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

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

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

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

SAFMC EFH Policy Statements

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

References:

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SAFMC (South Atlantic Fishery Management Council). 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.

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Appendix I. Fishery Impact Statement