DRAFT

Amendment 24

to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Draft Environmental Impact Statement, Initial Regulatory Flexibility Act Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement

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Abbreviations and Acronyms Used in the FMP

ABC	Acceptable Biological Catch
ACL	Annual Catch Limits
AM	Accountability Measure
ACT	Annual Catch Target
B	A measure of stock biomass in either weight or other appropriate unit
B_{MSY}	The stock biomass expected to exist under equilibrium conditions when fishing at F_{MSY}
B_{OY}	The stock biomass expected to exist under equilibrium conditions when fishing at F_{OY}
B_{CURR}	The current stock biomass
CEA	Cumulative Effects Analysis
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 of 1972
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 of 1969
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OFL	Overfishing Limit
OY	Optimum Yield
RIR	Regulatory Impact Review
SAMFC	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

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Proposed actions:	For red grouper, specify the following: MSY; rebuilding plan (including ACLs, AMs, and OY); and allocations.
Lead agency:	FMP Amendment – South Atlantic Fishery Management Council EIS - NOAA Fisheries Service
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Abstract

To Be Completed

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Chapter 1. Introduction

1.1 What Actions Are Being Proposed?

Actions are being proposed through Amendment 24 to the Snapper Grouper Fishery Management Plan. Several actions are being proposed, the most noteworthy being a rebuilding plan for the red grouper stock in the South Atlantic.

1.2 Who is Proposing Action?

The South Atlantic Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) are proposing the actions. The Council develops the regulations and submits them to NMFS; the Secretary of Commerce ultimately approves, disapproves, or partially approves the actions in the amendment. NMFS is an agency in the National Oceanic and Atmospheric Administration.

South Atlantic Fishery Management Council

- Responsible for conservation and management of fish stocks
- Consists of 13 voting members who are appointed by the Secretary of Commerce
- Management area is from 3 to 200 miles off the coasts of North Carolina, South Carolina, Georgia, and Florida
- Recommends regulations to NMFS and NOAA for implementation

1.3 Where is the Project Located?

Management of the Federal snapper grouper fishery located off the South Atlantic in the 3-200 nautical mile (nm) U.S. Exclusive Economic Zone (EEZ) is conducted under the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic Region (SAFMC 1983) (**Figure 1-1**).

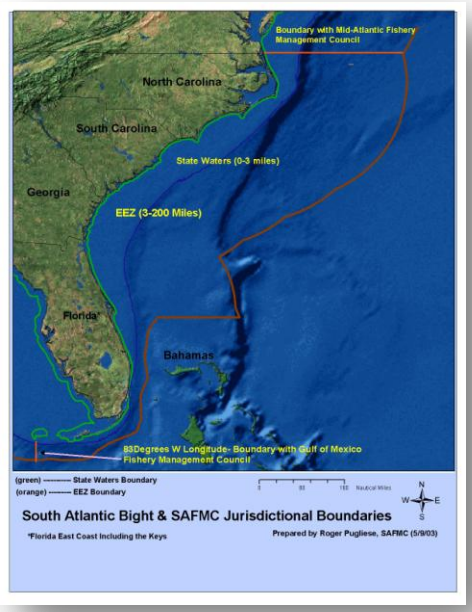


Figure 1-1. Jurisdictional boundaries of the South Atlantic

1.4 Why is the Council Considering Action?

The most recent assessment for the red grouper stock in the South Atlantic indicates that the stock is experiencing overfishing and is overfished (SEDAR 19 2010). When it is determined a stock is undergoing overfishing, measures must be implemented to end overfishing. In cases where stocks are overfished the Councils and NOAA Fisheries Service must implement rebuilding plans.

Project Purpose

To implement a rebuilding plan for red grouper in the South Atlantic that would specify annual catch targets and annual catch limits by sector.

Project Need

To end overfishing and rebuild the stock.

1.5 Why is the Council Required to Take Action?

The red grouper stock in the South Atlantic is undergoing overfishing **(Figure 1-2)** and is overfished **(Figure 1-3)**.

Figure 1-2. The overfishing ratio for red grouper over time. The stock is undergoing overfishing when the F/F_{MSY} is greater than one.

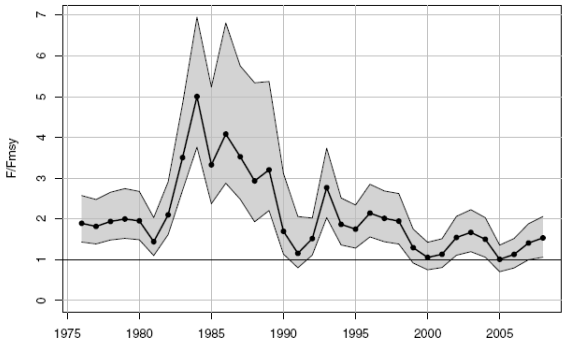
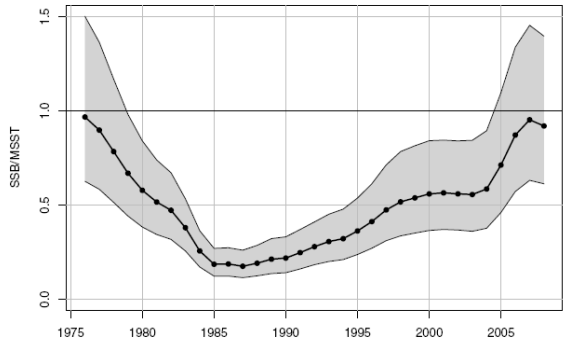


Figure 1-3. The overfished ratio for red grouper over time. The stock is overfished when the B/BMSY is less than one.



Overfishing is a condition when fishing pressure is beyond the agreed optimum level. Overfishing may lead to an overfished condition. A stock is overfished when the biomass is below an identified minimum stock size threshold. Due to low biomass levels, an overfished stock has increased vulnerability to environmental variables and cannot produce the maximum sustainable yield.

As directed by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the Council and NMFS must implement a rebuilding plan, through an FMP Amendment or proposed regulations, which ends overfishing immediately and provides for rebuilding the fishery. The intent of a rebuilding plan is to increase biomass of overfished stocks to a sustainable level within a specified period of time. A plan should achieve conservation goals, while minimizing to the extent practicable adverse socioeconomic impacts.

1.6 How Long Does the Council and NMFS Have to Implement Measures?

NMFS notified the Council of the stock status on June 9, 2010; the Magnuson-Stevens Act specifies that measures must be implemented within two years of notification.

1.7 What Are the Other Actions in the Amendment?

Besides establishing a rebuilding plan, the Council is proposing the implementation or revision of the following items through this amendment:

(1) annual catch limits (ACL)
(2) accountability measures (AM)
(3) allocations
(4) maximum sustainable yield (MSY)
(5) optimum yield (OY)

A reauthorization of the Magnuson-Stevens Act in 2007 introduced new tools that, when implemented, would end and prevent overfishing in order to achieve the optimum yield from a fishery. The requirements are referred to as annual catch limits (ACLs) and accountability measures (AMs). An ACL is the level of annual catch of a stock that, if met or exceeded, triggers some corrective action. AMs 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 approaches the ACL and reducing the ACL by an overage that occurred the previous fishing year. The EIS will include alternatives that would establish ACLs and AMs for red grouper in the South Atlantic region.

The Council and NMFS also intend to divide the red grouper ACL into sector-ACLs based upon allocation decisions. A "sector" means a distinct user group to which separate management strategies and separate catch quotas apply. Examples of sectors include commercial and recreational; the recreational sector may also be divided into for-hire and private recreational groups. The Council and NMFS believe sector-

ACLs and sector-AMs are important components of red grouper management as each sector differs in scientific and management uncertainty. A range of options will be evaluated in the EIS, including those that base allocation decisions on historical landings.

Definitions

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

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 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.

1.8 How Does the Council Determine the Annual Catch Limits?

The Council is utilizing several tools to end overfishing and rebuild the red snapper stock. These include utilizing two determinations from the Council's Scientific and Statistical Committee (SSC). These determinations are the overfishing limit (OFL) and acceptable biological catch (ABC). The OFL is an estimate of the catch level above which overfishing is occurring and comes from a stock assessment. 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, and should be specified based on the ABC control rule. Using the ABC as a start, the Council is proposing an annual catch limit (ACL) for the red grouper stock in the South Atlantic.

The Scientific and Statistical Committee (SSC) recommended an overfishing limit (OFL) equal to the yield at F_{MSY}. Since the stock was found to be overfished, the ABC was determined by applying the ABC Control Rule for rebuilding stocks. Under this control rule, the probability of rebuilding success equals 100% minus the risk of overfishing (also referred to as the P*). The acceptable risk of overfishing for red grouper, as determined by the control rule, is 30%; thus, the acceptable probability of rebuilding success is at least 70%. The probability rate was used to determine the ABC throughout the rebuilding timeframe

SSC Recommendations for Red Grouper for 2011

OFL
Yield at F_{MSY}
(669,000 pounds whole weight)

ABC
Projected yield stream with 70% rebuilding sucess
(665,000 pounds whole weight)

Maximum Overfishing Risk (P*)
30%

Minimum Probability of Rebuilding Success
70%

Chapter 2. Proposed Actions

This section contains the proposed actions being considered to meet the purposed and need. Each action contains a range of alternatives, including the no action (the current regulations). Alternatives the South Atlantic Fishery Management Council considered but eliminated from detailed study during the development of this amendment are described in **Appendix A**.

Actions in Amendment 24

- Maximum Sustainable Yield
- Rebuilding Schedule
- Rebuilding Strategy (Including Optimum Yield and Annual Catch Limit)
- Allocations and Sector Annual Catch Limits
- Accountability Measures/Management Measures

2.1 Maximum Sustainable Yield

The Council is proposing a change to the way the maximum sustainable yield (MSY) is defined for the red grouper stock in the South Atlantic **(Table 2-1)**. The MSY is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions.

Table 2-1. MSY alternatives for red grouper.

Alternatives	Equation	F_{MSY}	MSY Values (lbs whole weight)
Alternative 1 (No Action)	**MSY equals the yield produced by F_{MSY}. $F_{30\%SPR}$ is used as the F_{MSY} proxy.**	**$F_{30\%SPR}$= 0.28[1]**	**not specified**
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.**	**0.221[2]**	**1,110,000[3]**

[1]Potts and Brennan (2001)
[2,3]SEDAR 19 (2010)

What Does This Mean?

The current definition of the maximum sustainable yield (MSY) is the level of yield when fishing at a fishing rate equal to $F_{30\%SPR}$. The poundage has not been specified. The Council would like to modify the definition in order to remove the reference to a specific value ($F_{30\%SPR}$). By not having the reference, the MSY level may be modified with each new assessment without having to go through the amendment process

- Current MSY = yield produced by $F_{30\%SPR}$
- Proposed change to definition

The F_{MSY} value from the recent assessment changes from 0.28 to 0.221. This level is important, as it establishes the overfishing level (also called the OFL). The SSC's recommendation for the overfishing level is the level of yield when fishing at the F_{MSY}.

- Assessment indicates that F_{MSY} = 0.221

Table 2-2. Summary of effects of MSY alternatives for red grouper.

Alternatives	Biological Effects	Socioeconomic/Administrative Effects
Alternative 1 (No Action) MSY proxy = $F_{30\%SPR}$		
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.		

(-) overall negative impacts, (+) overall positive impacts, (- +) neutral impacts

MSST Alternatives

The following alternatives have been added by the IPT for the Council's consideration.

Alternatives	MSST Equation	M equals	MSST Values (lbs whole weight)
Alternative 1 (no action)	MSST equals SSB_{MSY} ((1-M) or 0.5, whichever is greater).	0.14*	4,914,053 *
Alternative 2	MSST equals 50% of SSB_{MSY}	n/a	2,857,162
Alternative 3	MSST equals 75% of SSB_{MSY}	n/a	4,285,742
Alternative 3	MSST equals 85% of SSB_{MSY}	n/a	4,857,175

*Source: Determination from SEDAR 19 (2010).

Rationale

Alternative 1 would retain the MSST definition established in the Snapper Grouper FMP Amendment 11. It requires MSST to be at least one half of SSBMSY, but allows for it to be greater than this value if M is suitably low. If (1-M) is less than or equal to 0.5, then the value obtained from this alternative would be the same as that obtained from Alternative 2. However, M is very low (0.14) for red grouper. Alternative 1 would result in MSST equal to 4,914,053 lbs whole weight if M=0.14. This MSST estimate is close to SS_{BMSY} (5,714,323 whole weight) defined by the Council's current MSST definition. Therefore, if this alternative were chosen, then MSST would be very close to SS_{BMSY}.

Because M is small, the current definition of MSST would trigger a rebuilding plan if biomass fell slightly below B_{MSY}. However, natural variation in recruitment could cause stock biomass to frequently alternate between an overfished and rebuilt condition, even if the fishing mortality rate applied to the stock was within the limits specified by the MFMT. Therefore, Alternative 1 could result in potential administrative complications associated with setting MSST close to B_{MSY}.

Alternatives 2 through 4 would establish a larger buffer between what is considered to be an overfished and rebuilt condition thereby reducing administrative complications. Furthermore, these alternatives would be less risky than Alternative 2, which would allow stock biomass to decrease to as little as 50% of the MSY level before an overfished determination was made, regardless of stock productivity.

2.2 Rebuilding Schedule

Alternative 1 (No Action). There currently is not a rebuilding plan for red grouper. Snapper Grouper Amendment 4 (regulations effective January 1992) implemented a 15-year rebuilding plan beginning in 1991 which expired in 2006.

Alternative 2. Define a rebuilding schedule as the shortest possible period to rebuild in the absence of fishing mortality (T_{MIN}). This would equal 3 years with the rebuilding time period ending in 2013. 2011 is Year 1.

Alternative 3. Define a rebuilding schedule as the mid-point between the shortest possible and maximum recommended period to rebuild. This would equal 6.5 years with the rebuilding time period ending in 2016. 2011 is Year 1.

Alternative 4 (Preferred). Define a rebuilding schedule as the maximum period allowed to rebuild (T_{MAX}). This would equal 10 years with the rebuilding time period ending in 2020. 2011 is Year 1.

The IPT recommends that the Council considers an 8 year rebuilding schedule alternative. Under the Frebuild scenario, there would be a 54% probability of stock recovery in 8 years.

What Does This Mean?

A rebuilding plan is required when a stock has been declared to be in an overfished state. A stock is overfished when the biomass is below an identified minimum stock size threshold. Red grouper is overfished as determined by the recent stock assessment. The Council must specify a rebuilding plan.

One component of the rebuilding plan is to determine the amount of years it will take to rebuild the stock. When a stock is rebuilt, it is no longer determined to be overfished. The Magnuson-Stevens Act mandates the maximum amount of time to rebuild a stock. The Council is considering a range of 3 to 10 years to rebuild red grouper.

- Current MSY = yield Rebuilding plan required
- Rebuilding schedule specifies the maximum number of years to rebuild
- Alternatives range from 3 to 10 years

Table 2-3. Summary of effects of rebuilding schedule alternatives for red grouper.

Alternatives	Biological Effects	Socioeconomic/Administrative Effects
Alternative 1 (No Action). Do not implement a rebuilding plan.	(- +)	
Alternative 2. 3 year rebuilding period	(+)	
Alternative 3. 6.5 year rebuilding period	(+)	
Alternative 4 (Preferred). 10 year rebuilding period	(+)	

(-) overall negative impacts, (+) overall positive impacts, (- +) neutral impacts

2.3 Rebuilding Strategy (Including Optimum Yield and Annual Catch Limits)

Alternatives	Rebuilding strategy (F_{OY} Equal To)		ACL in Year 1 of Rebuilding (2011)[1] (lbs whole weight) *Landings and Discards*	ACL in Year 1 of Rebuilding (2011)[1] (lbs whole weight) *Just Landings*	OY Values at Equilibrium (lbs whole weight)
	Scenario	F rate			
Alternative 1 (No Action)	$F_{45\%SPR}$		Not specified	Not specified	1,010,000
Alternative 2	$F_{REBUILD}$ (10 years)	0.181	665,000	622,000	1,126,000
Alternative 3	$85\%F_{MSY}$	0.188	668,000	643,000	1,103,000
Alternative 4	$75\%F_{MSY}$	0.166	613,000	573,000	1,089,000
Alternative 5	$65\%F_{MSY}$	0.144	535,000	501,000	1,064,000
Alternative 6	$F_{REBUILD}$ (7 years)	0.157	583,000	545,000	1,122,000

[1]For alternatives 2-6, the ACL specified for 2011 would remain in effect beyond 2011 until modified.

NOTE: Alternatives 2-5 are based on a 70% probability of rebuilding success in 10 years. Alternative 6 is based on a 70% probability of rebuilding success in 7 years.

	Alternatives					
	1 (no action)	**2** $F_{REBUILD}$ (10 years)	**3** $85\%F_{MSY}$	**4** $75\%F_{MSY}$	**5** $65\%F_{MSY}$	**6** $F_{REBUILD}$ (7 years)
Probability of rebuilding to SSB_{MSY} in 10 years (2020)	99%[1]	70%	64%	81%	92%	
Probability of rebuilding to SSB_{MSY} in 7 years (2020)						70%
Year in which 50% probability of rebuilding to SSB_{MSY} would be reached	2014	2017	2018	2016	2016	2015[2]

[1]Based upon a $F_{30\%SPR}$ proxy for F_{MSY}

[2]A 48% probability of rebuilding

NOTE: Alternatives 2-5 are based on a 70% probability of rebuilding success in 10 years.

Alternative 6 is based on a 70% probability of rebuilding success in 7 years.

What Does This Mean?

A rebuilding strategy species is the second component to the rebuilding plan (the rebuilding schedule is the first). The strategy defines the target fishing mortality rate (F rate) during the rebuilding timeframe. A lower fishing mortality rate means that less of the stock is allowed to be removed from fishing activities. A lower F rate means a lower OY and lower ACL however the probability of recovery is higher.

- Rebuilding strategy is a component of the rebuilding plan
- The target F rate = the rate of fishing mortality allowed on a stock
- Lower F rates = lower ACL but higher probability of recovery

Alternative 1 (No Action). Maintain a yield-based rebuilding strategy for red grouper where $F_{OY} = F_{45\%SPR}$. Under this strategy, the fishery would have a 57% chance of rebuilding to SSB_{MSY} by 2014 and a 99% chance of rebuilding to SSB_{MSY} by 2020 based on a $F_{30\%SPR}$ proxy for F_{MSY}.

- The Optimum Yield at equilibrium would be 1,010,000 lbs whole weight.
- The Overfishing Level is 669,000 lbs whole weight.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee for 2011 is 665,000 lbs whole weight.
- The Annual Catch Limit would not be specified.

Should the no action alternative be changed to "Do not specify a rebuilding strategy" as the plan expired in 2006?

The IPT recommends that the Council discuss whether setting ACL is a number of years (e.g., three years) is appropriate.

Alternative 2. Define a rebuilding strategy for red grouper that sets F_{OY} equal to $F_{REBUILD}$. $F_{REBUILD}$ is a fishing mortality rate that would have a 70% probability of rebuilding success to SSB_{MSY} in T_{MAX} (ten years for red grouper). Under this strategy, the fishery would have at least a 50% chance of rebuilding to SSB_{MSY} by 2017 and 70% chance of rebuilding to SSB_{MSY} by 2020.

- The Optimum Yield at equilibrium would be 1,126,000 lbs whole weight.
- The Overfishing Level is 669,000 lbs whole weight.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee for 2011 is 665,000 lbs whole weight.
- The Annual Catch Limit would be 665,000 lbs whole weight with dead discards and 622,000 lbs whole weight without dead discards.

Table X. Projection results if the fishing mortality rate is fixed at F = Rebuild with a 70% probability of rebuilding success in 10 years. The maximum red grouper kill under this projection is 665,000 lbs whole weight.

Year	F(per year)	Probability of Rebuilt Stock	Maximum Allowable Kill		
			Landings	Discards	Total
2009	0.298	0	1,098,000	61,000	1,159,000
2010	0.298	0	985,000	70,000	1,055,000
2011 (Year 1)	0.181	0.01	622,000	43,000	665,000
2012	0.181	0.06	693,000	44,000	737,000
2013	0.181	0.15	762,000	44,000	806,000
2014	0.181	0.26	822,000	44,000	866,000
2015	0.181	0.36	873,000	45,000	918,000
2016	0.181	0.46	915,000	45,000	960,000
2017	0.181	0.54	951,000	45,000	996,000
2018	0.181	0.61	980,000	45,000	1,025,000
2019	0.181	0.66	1,004,000	46,000	1,050,000
2020	0.181	0.7	1,023,000	46,000	1,069,000

Alternative 3. Define a rebuilding strategy for red grouper that sets F_{OY} equal to 85% F_{MSY}. Under this strategy, the fishery would have at least a 50% chance of rebuilding to SSB_{MSY} by 2018 and 64% chance of rebuilding to SSB_{MSY} by 2020.

- The Optimum Yield at equilibrium would be 1,103,000 lbs whole weight.
- The Overfishing Level is 669,000 lbs whole weight.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee for 2011 is 665,000 lbs whole weight.
- The Annual Catch Limit would be 668,000 lbs whole weight with dead discards and 643,000 lbs whole weight without dead discards.

Table X. Projection results if the fishing mortality rate is fixed at F = 85%F_{MSY}.
The maximum red grouper kill under this projection is 668,000 lbs whole weight.

Year	F(per year)	Probability of Rebuilt Stock	Maximum Allowable Kill		
			Landings	Discards	Total
2009	0.298	0	1,098,000	61,000	1,159,000
2010	0.298	0	985,000	70,000	1,055,000
2011 (Year 1)	0.188	0.01	643,000	45,000	688,000
2012	0.188	0.06	714,000	45,000	759,000
2013	0.188	0.14	781,000	46,000	827,000
2014	0.188	0.23	839,000	46,000	885,000
2015	0.188	0.33	888,000	46,000	934,000
2016	0.188	0.42	930,000	47,000	977,000
2017	0.188	0.49	964,000	47,000	1,011,000
2018	0.188	0.55	991,000	47,000	1,038,000
2019	0.188	0.6	1,014,000	47,000	1,061,000
2020	0.188	0.64	1,032,000	47,000	1,079,000

Alternative 4. Define a rebuilding strategy for red grouper that sets F_{OY} equal to 75% F_{MSY}. Under this strategy, the fishery would have at least a 50% chance of rebuilding to SSB_{MSY} by 2016 and 81% chance of rebuilding to SSB_{MSY} by 2020.

- The Optimum Yield at equilibrium would be 1,089,000 lbs whole weight.
- The Overfishing Level is 669,000 lbs whole weight.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee for 2011 is 665,000 lbs whole weight.
- The Annual Catch Limit would be 613,000 lbs whole weight with dead discards and 573,000 lbs whole weight without dead discards.

Table X. Projection results if the fishing mortality rate is fixed at F = 75%$F_{MSY.}$
The maximum red grouper kill under this projection is 613,000 lbs whole weight.

Year	F(per year)	Probability of Rebuilt Stock	Maximum Allowable Kill		
			Landings	Discards	Total
2009	0.298	0	1,098,000	61,000	1,159,000
2010	0.298	0	985,000	70,000	1,055,000
2011 (Year 1)	0.166	0.01	573,000	40,000	613,000
2012	0.166	0.07	647,000	40,000	687,000
2013	0.166	0.18	718,000	41,000	759,000
2014	0.166	0.31	780,000	41,000	821,000
2015	0.166	0.44	834,000	41,000	875,000
2016	0.166	0.55	880,000	42,000	922,000
2017	0.166	0.64	919,000	42,000	961,000
2018	0.166	0.72	951,000	42,000	993,000
2019	0.166	0.77	977,000	42,000	1,019,000
2020	0.166	0.81	999,000	42,000	1,041,000

Alternative 5. Define a rebuilding strategy for red grouper that sets F_{OY} equal to 65% F_{MSY}. Under this strategy, the fishery would have at least a 50% chance of rebuilding to SSB_{MSY} by 2016 and 92% chance of rebuilding to SSB_{MSY} by 2020.

- The Optimum Yield at equilibrium would be 1,064,000 lbs whole weight.
- The Overfishing Level is 669,000 lbs whole weight.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee for 2011 is 665,000 lbs whole weight.
- The Annual Catch Limit would be 535,000 lbs whole weight with dead discards and 501,000 lbs whole weight without dead discards.

Table X. Projection results if the fishing mortality rate is fixed at F = 65%F_{MSY}.
The maximum red grouper kill under this projection is 535,000 lbs whole weight.

Year	F(per year)	Probability of Rebuilt Stock	Maximum Allowable Kill		
			Landings	Discards	Total
2009	0.298	0	1,098,00	61,000	1,159,000
2010	0.298	0	985,000	70,000	1,055,000
2011 (Year 1)	0.144	0.01	501,000	34,000	535,000
2012	0.144	0.08	575,000	35,000	610,000
2013	0.144	0.23	648,000	35,000	683,000
2014	0.144	0.4	713,000	36,000	749,000
2015	0.144	0.56	770,000	36,000	806,000
2016	0.144	0.69	820,000	36,000	856,000
2017	0.144	0.78	863,000	37,000	900,000
2018	0.144	0.85	898,000	37,000	935,000
2019	0.144	0.89	928,000	37,000	965,000
2020	0.144	0.92	953,000	37,000	990,000

Alternative 6. Define a rebuilding strategy for red grouper that sets F_{OY} equal to $F_{REBUILD}$. Under this strategy, the fishery would have at least a 48% chance of rebuilding to SSB_{MSY} by 2015 and 70% chance of rebuilding to SSB_{MSY} by 2017.

- The Optimum Yield at equilibrium would be 1,122,000 lbs whole weight.
- The Overfishing Level is 669,000 lbs whole weight.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee for 2011 is 665,000 lbs whole weight.
- The Annual Catch Limit would be 583,000 lbs whole weight with dead discards and 545,000 lbs whole weight without dead discards.

Table X. Projection results if the fishing mortality rate is fixed at F = Rebuild with a 70% probability of rebuilding success in 7 years. The maximum red grouper kill under this projection is 583,000 lbs whole weight.

Year	F(per year)	Probability of Rebuilt Stock	Maximum Allowable Kill		
			Landings	Discards	Total
2009	0.298	0	1,098,000	61,000	1,159,000
2010	0.298	0	985,000	70,000	1,055,000
2011 (Year 1)	0.157	0.01	545,000	38,000	583,000
2012	0.157	0.07	619,000	38,000	657,000
2013	0.157	0.20	691,000	39,000	730,000
2014	0.157	0.34	755,000	39,000	794,000
2015	0.157	0.48	810,000	39,000	849,000
2016	0.157	0.60	858,000	40,000	898,000
2017	0.157	0.7	898,000	40,000	938,000

Table 2-6. Comparison of effects of rebuilding strategy alternatives for red grouper.

Alternatives	Biological Effects	Socioeconomic/Administrative Effects
Alternative 1 (No Action)		
Alternative 2. $F_{REBUILD}$ (70% prob. in 10 yrs)	(+) The stock would have a 70% chance of rebuilding by 2020.	
Alternative 3. 85%F_{MSY}	(+) The stock would have a 64% chance of rebuilding by 2020.	
Alternative 4. 75%F_{MSY}	(+) The stock would have a 81% chance of rebuilding by 2020.	
Alternative 5. 65%F_{MSY}	(+) The stock would have a 92% chance of rebuilding by 2020, with the greatest biological benefit.	
Alternative 6. $F_{REBUILD}$ (70% prob. in 7 yrs)	(+) The stock would have a 70% chance of rebuilding by 2017.	

(-) overall negative impacts, (+) overall positive impacts, (- +) neutral impacts

2.4 Allocations and Sector Annual Catch Limits

Alternative 1 (No action). Do not establish a sector allocation of the red grouper acceptable biological catch (ABC).

Alternative 2 (Preferred). Divide the acceptable biological catch (ABC) into commercial and recreational sector components based on criteria as outlined in one of the following options below.

Option a. Commercial = X% of ABC and recreational = X% of ABC (Established by using catch history from 1986-2008). This alternative would establish a commercial annual catch limit of X pounds whole weight and a recreational annual catch limit of X pounds whole weight. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified. *The IPT recommends to the Council that they consider the removal of the language in each of these alternatives that states what the ACL would be and recommends that the language be in the effects description instead. The IPT feels that the best process would be to state the percentage split in the alternatives and that when an updated assessment revises the ABC, the percentage will not change but poundage of the sector ACL would.*

Option b. Commercial = X% of ABC and recreational = X% of ABC (Established by using catch history from 1986-1998). This alternative would establish a commercial annual catch limit of X pounds whole weight and a recreational annual catch limit of X pounds whole weight. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Option c. Commercial = X% of ABC and recreational = X% of ABC (Established by using catch history from 1999-2008). This alternative would establish a commercial annual catch limit of X pounds whole weight and a recreational annual catch limit of X pounds whole weight. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Option d. Commercial = X% of ABC and recreational = X% of ABC (Established by using catch history from 2006-2008). This alternative would establish a commercial annual catch limit of X pounds whole weight and a recreational annual catch limit of X pounds whole weight. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Option e (Preferred). Commercial = 47% of ABC and recreational = 53% of ABC (Established by using 50% of catch history from 1991-2008 + 50% of catch history from 2006-2008). This alternative would establish a commercial annual catch limit of X pounds whole weight and a recreational annual catch limit of X pounds whole weight.

The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Alternative 3. Divide the acceptable biological catch (ABC) into commercial, recreational, and for-hire sector components based on criteria as outlined in one of the following options below.

Option a. Commercial = X% of ABC, for-hire = X%, and recreational = X% of ABC (Established by using catch history from 1986-2008). This alternative would establish a commercial annual catch limit of X pounds whole weight, a for-hire annual catch limit of X pounds whole weight, and a recreational annual catch limit of X pounds whole weight. The commercial, for-hire, and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Option b. Commercial = X% of ABC, for-hire = X%, and recreational = X% of ABC (Established by using catch history from 1986-1998). This alternative would establish a commercial annual catch limit of X pounds whole weight, a for-hire annual catch limit of X pounds whole weight, and a recreational annual catch limit of X pounds whole weight. The commercial, for-hire, and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Option c. Commercial = X% of ABC, for-hire = X%, and recreational = X% of ABC (Established by using catch history from 1999-2008). This alternative would establish a commercial annual catch limit of X pounds whole weight, a for-hire annual catch limit of X pounds whole weight, and a recreational annual catch limit of X pounds whole weight. The commercial, for-hire, and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Option d. Commercial = X% of ABC, for-hire = X%, and recreational = X% of ABC (Established by using catch history from 2006-2008). This alternative would establish a commercial annual catch limit of X pounds whole weight, a for-hire annual catch limit of X pounds whole weight, and a recreational annual catch limit of X pounds whole weight. The commercial, for-hire, and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Option e. Commercial = X% of ABC, for-hire = X%, and recreational = X% of ABC (Established by using 50% of catch history from 1991-2008 + 50% of catch history from 2006-2008). This alternative would establish a commercial annual catch limit of X pounds whole weight, a for-hire annual catch limit of X pounds whole weight, and a recreational annual catch limit of X pounds whole weight. The commercial, for-hire, and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

2.5 Accountability Measures/Management Measures

The IPT recommends that AMs be folded into the Comprehensive ACL Amendment as that amendment is proposing establish ACLs and AMs for a shallow water grouper unit (which includes red grouper). Also, 2009 landings (with January through April removed to account for the 4 month shallow water grouper closure) for red grouper is lower than all of the proposed ACLs for red grouper. Based upon this information, current management measures may be sufficient to limit the landings to below the ACL. See discussion below for more information.

Alternative 1 (No Action). Retain the existing regulations for red grouper (Table X).

Table 2-7. Existing regulations and those proposed in Amendment 17B for red grouper.

Current Regulations		
	Commercial	Recreational
Bag limit		Three grouper aggregate bag limit per person per day. Exclude the captain and crew on for-hire vessels from possessing a bag limit for groupers
In-season closures	Gag commercial ACL of 352,940 lbs gutted weight. After the commercial ACL is met, all purchase and sale of the following species is prohibited and harvest and/or possession is limited to the bag limit: gag; black grouper; red grouper; scamp; red hind; rock hind; yellowmouth grouper; tiger grouper; yellowfin grouper; graysby; and coney.	
Minimum size limit	20 inch	
Seasonal closure	No fishing for and/or possession of the following species is allowed January through April: black grouper; red grouper; scamp; red hind; rock hind; yellowmouth grouper; tiger grouper; yellowfin grouper; graysby, and coney.	
Regulations proposed by Amendment 17B		
	Commercial	Recreational
	In addition to the gag sector-ACLs, establish an ACL for gag, black grouper, and red grouper of 662,403 lbs gutted weight (commercial) and 648,663 lbs gutted weight (recreational). The table below shows how the	Establish a recreational ACL for gag, black grouper, and red grouper of 648,663 lbs gutted weight. If at least one of the species (gag, red grouper, or black grouper) *is overfished* and the sector ACL is projected to be met, prohibit the harvest and retention of the species or species

	aggregate ACL was calculated. Prohibit the commercial possession of shallow water groupers when the gag or the gag, black grouper, and red grouper when the ACL is projected to be met.	group. If the ACL is exceeded, independent of stock status, the Regional Administrator shall publish a notice to reduce the sector ACL in the following year by the amount of the overage. For black grouper, black sea bass, gag, red grouper, and vermilion snapper, compare the recreational ACL with recreational landings over a range of years. For 2010, use only 2010 landings. For 2011, use the average landings of 2010 and 2011. For 2012 and beyond, use the most recent three-year running average.

Commercial

Alternative 2 (Preferred). After the commercial ACL is met, all purchase and sale of red grouper is prohibited and harvest and/or possession is limited to the bag limit.

Alternative 3 (Preferred). If the commercial sector ACL is exceeded, the Regional Administrator shall publish a notice to reduce the commercial sector ACL in the following season by the amount of the overage.

Recreational

Alternative 4 (Preferred). For in-season and post-season accountability measures, compare recreational ACL with recreational landings over a range of years. For 2011, use only 2011 landings. For 2012, use the average landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running average.

Alternative 5 (Preferred). The Regional Administrator shall publish a notice to close the recreational fishery when the ACL is projected to be met.

Alternative 6 (Preferred). Take corrective action if the recreational ACL has been exceeded.

> **Option a (Preferred).** If the recreational sector ACL is exceeded, the Regional Administrator shall publish a notice to reduce the recreational sector ACL in the following season by the amount of the overage.
>
> **Option b.** If the recreational sector ACL is exceeded, the Regional Administrator shall publish a notice to reduce the length of the following fishing year by the amount necessary to ensure landings do not exceed the recreational sector ACL for the following fishing year.

Discussion

The required reduction (if one is needed) in red grouper removals to achieve ACL depends on the selected rebuilding strategy. The current range for red grouper ACL alternatives in the rebuilding strategy action is from 501,000 to 643,000 lbs whole weight (just landings) and 535,000 to 668,000 lbs whole weight (landings and discards).

In 2009, 714,424 lbs whole weight of red grouper was reported as landed (Table 1). However, NMFS and the Council implemented the following on July 29, 2009: (1) a 4 month shallow water grouper prohibition to occur for 4 months annually (January through April), (2) a gag commercial ACL and a closure of the shallow water grouper fish when projected to be reached, and (3) a reduction in the recreational aggregate bag limit from 5 to 3 fish). Tables 1 and 2 show what the 2009 landings would be if landings from January through April were zero. This analysis does not account for the change to the 3 fish bag limit; Amendment 16 estimated a reduction in red grouper removals of 2.5%.

Table 1. Red grouper landings for 2009 and landings with January through April set to zero to account for the 4 month grouper closure implemented through Amendment 16.

	Reported Landings lbs whole weight	
	2009	**2009 (landings in Jan. through April = 0)**
Commercial	430,859	330,771
For-hire	27,730	21,041
Private	255,836	83,486
Total	714,424	435,298

Table 2. Red grouper landings in 2009 by month.

Month	Commercial	For-Hire	Private
1	21,005	902	29,811
2	23,519	1,317	29,811
3	14,068	1,853	56,364
4	41,496	2,616	56,364
5	43,787	3,275	18,612
6	95,860	3,869	18,612
7	48,300	4,407	23,131
8	34,001	3,942	23,131
9	28,596	1,214	0
10	30,025	638	0
11	32,643	2,030	0
12	17,560	1,666	0
Total	430,859	27,730	255,836

	Commercial (lbs gw)	Recreational (lbs gw)	Total (lbs gw)
Gag ACL *(Amend 16)*	352,940 (gw)	340,060 (gw)	693,000
Gag, black, red aggregate ACL *(proposed in Amend 17B)*	662,403 (gw)	648,663 (gw)	

Chapter 3. Affected Environment

3.1 Habitat

3.1.1 Inshore/Estuarine Habitat

Many deepwater 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 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 diurnal feeding migrations or seasonal shifts in cross-shelf distributions. More detail on these habitat types is found in Sections 3.2.1 and 3.2.2 of the Council's Habitat Plan (SAFMC 1998b).

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 27 meters (54 to 90 feet) or greater for live-bottom habitats, 55 to 110 meters (180 to 360 feet) for the shelf-edge habitat, and from 110 to 183 meters (360 to 600 feet) for lower-shelf habitat areas.

The exact extent and distribution of productive snapper grouper habitat on the continental shelf north of Cape Canaveral 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 invertebrates, moderate relief reefs from 0.5 to 2 meters (1.6 to 6.6 feet), 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, Florida, but is most abundant offshore from northeastern Florida. South of Cape Canaveral, the continental shelf narrows from 56 to 16 kilometers (35 to 10 miles) wide, thence reducing 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 feet). Ledge systems formed by rock outcrops and piles of irregularly sized boulders are also common. Parker et al. (1983) estimated that 24% (9,443 km2) of the area between the 27 and 101 meters (89 and 331 feet) isobaths from Cape Hatteras, NC to Cape Canaveral, FL is reef habitat. Although the benthic communities found in water depths between 100 and 300 meters (328 and 984 feet) from Cape Hatteras, NC to Key West, FL 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 man-made 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.

The distribution of coral and live hard bottom habitat as presented in the 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 included in Appendix E of the Habitat Plan (SAFMC 1998b). These maps are also available on the Internet at the Council's following Internet Mapping System website: http://ocean.floridamarine.org/efh_coral/ims/viewer.htm.

The South Carolina Department of Natural Resources, NOAA/Biogeographic Characterization Branch, and the South Atlantic Fishery Management Council cooperatively generated additional information on managed species' use of offshore fish habitat. Plots of the spatial distribution of offshore species were generated from the Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP) data (Figures 35-41) in the Habitat Plan (SAFMC 1998b). The plots should be considered 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 presented in Appendix E of the Habitat Plan (SAFMC 1998b), 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 be generated through the Council's Internet Mapping System at the following web address: http://ocean.floridamarine.org/efh_coral/ims/viewer.htm.

3.1.3 Essential Fish Habitat

Essential fish habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management 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 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 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 meters (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 habitats.

3.1.3.1 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; and Council-designated Artificial Reef Special Management Zones (SMZs).

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 FMP regulations, the Council, in cooperation with NOAA Fisheries, actively comments on non-fishing projects or policies that may impact essential 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. With guidance from the Advisory Panel, the Council has developed and approved habitat 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; and alterations to riverine, estuarine and near shore flows (Appendix C of the Habitat Plan; SAFMC 1998b).

3.2 Biological and Ecological Environment

3.2.1 Species Most Impacted By This FMP Amendment

The species most likely to be impacted by Amendment 24 is red grouper, *Epinephelus morio*. Actions in Amendment 24 would implement harvest targets and limits for red grouper to ensure that overfishing does not occur and implement a plan to rebuild the stock so it may ultimately produce optimum yield (OY).

Red Grouper, *Epinephelus morio*

Red grouper, *Epinephelus morio,* is primarily a continental species, mostly found in broad shelf areas (Jory and Iversen 1989). Distributed in the Western Atlantic, from North Carolina to southeastern Brazil, including the eastern Gulf of Mexico and Bermuda, but can occasionally be found as far north as Massachusetts (Heemstra and Randall 1993). The red grouper is uncommon around coral reefs; it generally occurs over flat rock perforated with solution holes (Bullock and Smith 1991), and is commonly found in the caverns and crevices of limestone reef in the Gulf of Mexico (Moe 1969). It also occurs over rocky reef bottoms (Moe 1969).

Adult red grouper are sedentary fish that are usually found at depths of 5-300 m (16-984 ft). Fishermen off North Carolina commonly catch red grouper at depths of 27-76 m (88-249 ft) for an average of 34 m (111 ft). Fishermen off southeastern Florida also catch red grouper in depths ranging from 27-76 m (88-249 ft) with an average depth of 45 m (148 ft) (Burgos, 2001; McGovern et al., 2002). Moe (1969) reported that juveniles live in shallow water nearshore reefs until they are 40.0 cm (16 in) and 5 years of age, when they become sexually mature and move offshore. Spawning occurs during February-June, with a peak in April (Burgos 2001). In the eastern Gulf of Mexico, ripe females are found December through June, with a peak during April and May (Moe 1969). Based on the presence of ripe adults (Moe 1996) and larval red grouper (Johnson and Keener 1984) spawning probably occurs offshore. Coleman et al. (1996) found groups of spawning red grouper at depths between 21-110 m (70-360 feet). Red grouper do not appear to form spawning aggregation or spawn at specific sites (Coleman et al. 1996). They are reported to spawn in depths of 30-90 m (98-295 ft) off the Southeast Atlantic coast (Burgos 2001; McGovern et al. 2002).

Off North Carolina, red grouper first become males at 50.9 cm (20.1 in) TL and males dominate size classes greater than 70.0 cm (27.8 in) TL. Most females transform to males between ages 7 and 14. Burgos (2001) reported that 50% of the females caught off North Carolina are undergoing sexual transition at age 8. Maximum age reported by Heemstra and Randall (1993) was 25 years. Burgos (2001) and McGovern et al. (2002) indicated that red grouper live for at least 20 years in the Southeast Atlantic and a maximum age of 26 years has been reported for red grouper in the Gulf of Mexico (L. Lombardi, NMFS Panama City, personal communication). Natural mortality rate is estimated to be 0.20 (Potts and Brennan 2001). Maximum reported size is 125.0 cm (49.2 in) TL (male) and 23.0 kg (51.1 lb). For fish collected off North Carolina during the late 1990s, age at 50% maturity of females is 2.4 years and size at 50% maturity is 48.7 cm (19.3 in) TL. Off southeastern Florida, age at 50% maturity was 2.1 years and size at 50% maturity was 52.9 cm (21.0 in) TL (Burgos 2001; McGovern et al. 2002). These fish eat a wide variety of fishes, octopuses, and crustaceans, including shrimp, lobsters, and stomatopods (Bullock and Smith 1991; Heemstra and Randall 1993).

3.2.2 Science Underlying the Management of Snapper Grouper Species Most Impacted By this FMP Amendment

The status of red grouper has been assessed through the Southeast Data, Assessment, and Review (SEDAR) process.

The SEDAR process consists of a series of workshops aimed at ensuring that each assessment is based on the best available scientific information. First, representatives from NOAA Fisheries Service, state agencies, and the South Atlantic Council, as well as experts from non-governmental organizations and academia, participate in a data workshop. The purpose of a data workshop is to assemble and review available fishery-dependent and fishery-independent data and information on a stock, and to develop consensus about what constitutes the best available scientific information on the stock, how that information should be used in an assessment, and what type of stock assessment model should be employed.

Second, assessment biologists from these agencies and organizations participate in a stock assessment workshop, where data from the data workshop are input into one or more stock assessment models (e.g., production, age-structured, length structured, etc.) to generate estimates of stock status and fishery status. Generally, multiple runs of each model are conducted: base runs and a number of additional runs to examine sensitivity of results to various assumptions (e.g., different natural mortality rates, different data sets/catch periods, etc.).

Finally, a stock assessment review workshop is convened to provide representatives from the Center for Independent Experts the opportunity to peer review the results of the stock assessment workshop. Representatives from NOAA Fisheries Service, the South Atlantic Council, and constituent groups may attend and observe the review but the actual review is conducted by the Center for Independent Experts. The Council's Scientific and Statistical Committee (SSC) then reviews the report of the stock assessment review workshop.

The review portion of the SEDAR process has helped improve the acceptance of stock assessments. However, continued lack of basic fishery data has resulted in uncertainty in the assessment results. Each SEDAR Review Panel has identified significant shortcomings in data and research (see **Section 4.3** for a detailed list of research and data needs). In addition, not all of the reviews have been completed with 100% consensus.

Red Grouper Assessment and Stock Status

SEDAR Assessment

Red grouper had not been formally assessed prior to SEDAR 19. However, the stock had been examined in a trends report using catch curve analysis and catch-per-unit-effort, with data through 1999 (Potts and Brennan, 2001). That report examined several constant, natural mortality rates (M=0.15, 0.20, 0.25, and 0.30), but considered M=0.20 to be the base level. For M=0.20, the most recent static SPR value was estimated at 16%. Possible proxies for F_{MSY} were estimated at $F_{30\%}$SPR=0.28 and $F_{40\%}$SPR=0.17, whereas full F was estimated at F=0.56, which indicated that overfishing was occurring.

SEDAR 19 addressed stock assessments for South Atlantic and Gulf of Mexico black grouper and South Atlantic red grouper. The Data Workshop was held June 22-26, 2009 in Charleston, SC, the Assessment workshop was held October 5-9, 2009 in St. Petersburg, FL and the Review workshop was held January 25-29, 2010 in Savannah, GA.

The catch-age model used in the assessment included data from four fleets that caught southeastern U.S. red grouper: commercial lines (handline and longline), commercial other (pots, traps, trawl, diving, miscellaneous), recreational headboat, general recreational. The model was fit to data on annual landings (in units of 1000 lb whole weight for commercial fleets, 1000 fish for recreational fleets), annual discard mortalities (in units of 1000 fish for commercial lines and recreational fleets), annual length compositions of landings, annual age compositions of landings, annual length compositions of discards, three fishery dependent indices of abundance (commercial handline, general recreational, and headboat), and one fishery independent index of abundance (MARMAP chevron traps). Not all of these data sources were available for all fleets in all years. Annual discard mortalities, as fit by the model, were computed by multiplying total discards by the release mortality probability of 0.2.

Stock Status

Point estimates from the base model indicate that the U.S. southeast stock of red grouper, *Epinephelus morio*, is currently overfished and is experiencing overfishing.

For red grouper the most recent estimate of the fishing mortality rate is from 2008 and was = 0.298 and FMSY = 0.221 as the maximum fishing mortality threshold (MFMT). Comparing these two numbers:

- F2008/MFMT = 0.298/0.221 = 1.35

This comparison is referred to as the **overfishing ratio**. If the ratio is greater than 1, then overfishing is occurring.

The red grouper stock in the Atlantic is overfished. For red grouper, the estimated level of spawning stock biomass in 2008 was 2,051,000 pounds whole weight. The Minimum stock size threshold (MSST) = 2,229,000 pounds whole weight. Comparing these two numbers:

- SSB2008/MSST = 2,051,000/2,229,000 = 0.92

If the ratio is less than 1, then the stock is **overfished**.

3.2.3 Other Affected Council-Managed Species

3.2.4 Protected Species

There are 31 different species of marine mammals that may occur in the EEZ of the South Atlantic region. All 31 species are protected under the MMPA and six are also listed as endangered under the ESA (i.e., sperm, sei, fin, blue, humpback, and North Atlantic right whales). There are only three known interactions between the South Atlantic snapper grouper fishery and marine mammals. All three marine mammals were likely dolphins, all were caught in Florida on handline gear, and all three animals were released alive. Other species protected under the ESA occurring in the South Atlantic include five species of sea turtle (green, hawksbill, Kemp's ridley, leatherback, and loggerhead); the smalltooth sawfish; and two *Acropora* coral species (elkhorn [*Acropora palmata*] and staghorn [*A. cervicornis*]). A discussion of these species is included below. Designated critical habitat for the *Acropora* corals also occurs within the South Atlantic region.

The impacts of the South Atlantic snapper grouper fishery on ESA-listed species have been evaluated in a biological opinion on the continued authorization of snapper grouper fishing under the South Atlantic Snapper grouper Fishery Management Plan and Amendment 13C (NMFS 2006), and during subsequent informal ESA section 7 consultations. The biological opinion stated the fishery was not likely to adversely affect any critical habitat or marine mammals (see NMFS 2006 for discussion on these species). However, the opinion did state that the snapper grouper fishery would adversely affect sea turtles and smalltooth sawfish. A discussion of these species is included below.

NOAA Fisheries Service conducted an informal section 7 consultation on July 9, 2007, evaluating the impacts of the South Atlantic snapper grouper fishery on ESA-listed *Acropora* species. The consultation concluded that the continued operation of the snapper grouper fishery was not likely to adversely affect newly listed *Acropora* species. On November 26, 2008, a final rule designating *Acropora* critical habitat was published in the *Federal Register*. A memo dated December 2, 2008, evaluated the effects of the continued authorization of the South Atlantic snapper grouper fishery on *Acropora* critical habitat pursuant to section 7 of the ESA. The

evaluation concluded the proposed actions are not likely to adversely affect *Acropora* critical habitat.

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 50m) 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 a 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 1000 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 are known to eat a wide range of things 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).

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 resources (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).

ESA-Listed Marine Invertebrates

Elkhorn (*Acropora palmata)* and staghorn (*A. cervicornis*) coral were listed as threatened under the ESA on May 9, 2006. The Atlantic *Acropora* Status Review (*Acropora* Biological Review Team 2005) presents a summary of published literature and other currently available scientific information regarding the biology and status of both these species.

Elkhorn and **staghorn** corals are two of the major reef-building corals in the wider Caribbean. In the South Atlantic region, they are found most commonly in the Florida Keys; staghorn coral occurs the furthest north with colonies documented off Palm Beach, Florida (26º3'N). The depth range for these species ranges from <1 m to 60 m. The optimal depth range for elkhorn is considered to be 1 to 5 m depth (Goreau and Wells 1967), while staghorn corals are found slightly deeper, 5 to 15 m (Goreau and Goreau 1973).

All Atlantic *Acropora* species (including elkhorn and staghorn coral) are considered to be environmentally sensitive, requiring relatively clear, well-circulated water (Jaap *et al.* 1989). Optimal water temperatures for elkhorn and staghorn coral range from 25° to 29°C (Ghiold and Smith 1990, Williams and Bunkley-Williams 1990). Both species are almost entirely dependent upon sunlight for nourishment, contrasting the massive, boulder-shaped species in the region (Porter 1976, Lewis 1977) that are more dependent on zooplankton. Thus, Atlantic *Acropora* species are much more susceptible to increases in water turbidity than some other coral species.

Fertilization and development of elkhorn and staghorn corals is exclusively external. Embryonic development culminates with the development of planktonic larvae called planulae (Bak *et al.* 1977, Sammarco 1980, Rylaarsdam 1983). Unlike most other coral larvae, elkhorn and staghorn planulae appear to prefer to settle on upper, exposed surfaces, rather than in dark or cryptic ones (Szmant and Miller 2006), at least in a laboratory setting. Studies of elkhorn and staghorn corals indicated that larger colonies of both species had higher fertility rates than smaller colonies (Soong and Lang 1992).

South Atlantic Snapper Grouper Fishery Interactions with ESA-Listed Species

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 (**Table 3-Xa**). The effort reported 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-Xb**).

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-Xb**).

Smalltooth sawfish are also considered vulnerable to capture by bottom longline and vertical hook-and-line gear based on their capture in other southeast fisheries using such gear (Poulakis and Seitz 2004; Simpfendorfer and Wiley 2004). SDDP data does not include any reports of smalltooth sawfish being caught in the South Atlantic commercial snapper grouper fishery. There are no other documented interactions between smalltooth sawfish and the South Atlantic commercial snapper grouper fishery. However, the potential for interaction, led NOAA Fisheries Service to estimate future interactions between smalltooth sawfish and the snapper grouper fishery in the 2006 biological opinion (**Table 3-Xb**).

Regulations implemented through Snapper Grouper Amendment 15B (74 FR 31225; June 30, 2009) 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. These regulations are thought to decrease the mortality associated with accidental interactions with sea turtles and smalltooth sawfish.

Table 3-Xa. Sea turtle incidental take data from the supplementary discard data program (SDDP) for the Southeast U.S. Atlantic.

Reporting Period	Month	Logbook Statistical Grid	Species Caught	Number Caught	Discard Condition
Vertical Hook-and-Line Sea Turtle Catch Data					
8/1/01-7/31/02	April	2482	Unidentified	1	Alive
8/1/01-7/31/02	November	3377	Loggerhead	1	Alive
8/1/02-7/31/03	February	2780	Loggerhead	1	Alive
8/1/02-7/31/03	November	3474	Loggerhead	1	Alive
8/1/02-7/31/03	November	3476	Unknown	1	Alive
8/1/02-7/31/03	December	3476	Unknown	1	Alive
Bottom Longline Sea Turtle Catch Data					
8/1/01-7/31/02	August	3674	Leatherback	1	Alive
8/1/03-7/31/04	January	3575	Loggerhead	1	Unknown

Source: SEFSC Supplementary Discard Data Program

Table 3-Xb. Three year South Atlantic anticipated takes of ESA-Listed species for snapper grouper gear.

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
Smalltooth sawfish	Total Take	8
	Lethal Take	0

Source: NMFS 2006

3.3 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 U.S. Exclusive Economic Zone (EEZ), an area extending 200 nautical miles from the seaward boundary of each of the coastal states, and authority over U.S. anadromous species and continental shelf resources that occur beyond the U.S. EEZ.

Responsibility for Federal fishery management decision-making is divided between the U.S. Secretary of Commerce 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 of Commerce (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 M-Magnuson-Stevens Act and with other applicable laws summarized in **Appendix ___** . In most cases, the Secretary has delegated this authority to NOAA Fisheries Service.

The South Atlantic Fishery Management Council is responsible for conservation and management of fishery resources in Federal waters of the U.S. South Atlantic. These waters extend from 3 to 200 miles offshore from the seaward boundary of the States of North Carolina, South Carolina, Georgia, and east Florida to Key West. The Council has thirteen voting members: one from NOAA Fisheries Service; 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 Council Committees have full voting rights at the Committee level but not at the full Council level. Council members serve three-year terms and are recommended by State Governors and appointed by the Secretary of Commerce 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 matters, are open to the public. The Council uses a Scientific and Statistical Committee 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 Procedures Act, in the form of "notice and comment" rulemaking.

3.4 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 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 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 also is represented at the Council level, but does not have voting authority at the Council level.

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

3.5 Enforcement

Both the National Oceanic and Atmospheric Administration (NOAA) Fisheries Office for 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.

NOAA General Counsel issued a revised Southeast Region Magnuson-Stevens Act Penalty Schedule in June 2003, which addresses all Magnuson-Stevens Act violations in the Southeast Region. In general, this Penalty Schedule increases the amount of civil administrative penalties that a violator may be subject to up to the current statutory maximum of $120,000 per violation.

3.7 Human Environment

Environmental Effects

Cumulative Effects

4.6 Biological

As directed by the National Environmental Policy Act (NEPA), federal agencies are mandated to assess not only the indirect and direct impacts, but the cumulative impacts of proposed actions as well. NEPA defines a cumulative impact as *"the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time"* (40 C.F.R. 1508.7). Cumulative effects can either be additive or synergistic. A synergistic effect is when the combined effects are greater than the sum of the individual effects.

Various approaches for assessing cumulative effects have been identified, including checklists, matrices, indices, and detailed models (MacDonald 2000). The Council on Environmental Quality (CEQ) offers guidance on conducting a Cumulative Effects Analysis (CEA) in a report titled "Considering Cumulative Effects under the National Environmental Policy Act". The report outlines 11 items for consideration in drafting a CEA for a proposed action.

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.
2. Establish the geographic scope of the analysis.
3. Establish the timeframe for the analysis.
4. Identify the other actions affecting the resources, ecosystems, and human communities of concern.
5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stress.
6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.
7. Define a baseline condition for the resources, ecosystems, and human communities.
8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.
9. Determine the magnitude and significance of cumulative effects.
10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.
11. Monitor the cumulative effects of the selected alternative and adapt management.

This CEA for the biophysical environment will follow a modified version of the 11 steps. Cumulative effects for the socio-economic environment will be analyzed separately.

5.1 Biological

SCOPING FOR CUMULATIVE EFFECTS

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.

The Council on Environmental Quality (CEQ) cumulative effects guidance states that this step is done through three activities. The three activities and the location in the document are as follows:

I. The direct and indirect effects of the proposed actions **(Section 4.0)**;

II. Which resources, ecosystems, and human communities are affected **(Section 3.0)**; and

III. Which effects are important from a cumulative effects perspective **(information revealed in this Cumulative Effects Analysis (CEA)**?

2. Establish the geographic scope of the analysis.

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 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. Therefore, the proper geographical boundary to consider effects on the biophysical environment is larger than the entire South Atlantic exclusive economic zone. The ranges of affected species are described in **Section 3.2.1**. The most measurable and substantial effects would be limited to the South Atlantic region.

3. Establish the timeframe for the analysis.

Establishing a timeframe for the CEA is important when the past, present, and reasonably foreseeable future actions are discussed. It would be advantageous to go back to a time when there was a natural, or some modified (but ecologically sustainable) condition. However, data collection for many fisheries began when species were already fully exploited. Therefore, the timeframe for analyses should be initiated when data collection began for the various fisheries. In determining how far into the future to analyze cumulative effects, the length of the effects will depend on the species and the alternatives chosen. Long-term evaluation is needed to determine if management measures have the intended effect of improving stock status. Therefore, analyses of effects should extend beyond the time when these overfished stocks are rebuilt.

4. Identify the other actions affecting the resources, ecosystems, and human communities of concern (the cumulative effects to the human communities are discussed in Section 4).

Listed are other past, present, and reasonably foreseeable actions occurring in the South Atlantic region. These actions, when added to the proposed management measures, may result in cumulative effects on the biophysical environment.

I. Fishery-related actions affecting speckled hind, warsaw grouper, golden tilefish, snowy grouper, and red snapper.

A. Past

The reader is referred to **Section 1.3 History of Management** for past regulatory activity for the fish species. These include bag and size limits, spawning season closures, commercial quotas, gear prohibitions and limitations, area closures, and a commercial limited access system.

Amendment 13C to the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic Region became effective October 23, 2006. The amendment addresses overfishing for snowy grouper, golden tilefish, black sea bass and vermilion snapper. The amendment also allows for a moderate increase in the harvest of red porgy as stocks continue to rebuild. Amendment 13C 2006 is hereby incorporated by reference. Analysis found in **Appendix E** show minimal reductions (less than 2%) in commercial red snapper removals resulting from Amendment 13C. Therefore, ancillary effort reductions in the red snapper fishery due to management measures in Amendment 13C would not result in any significant reduction in harvest of red snapper that could be counted toward the overall harvest reductions needed to end overfishing of the specie.

Amendment 14 to the FMP for the Snapper Grouper Fishery of the South Atlantic Region was implemented on February 12, 2009. Implementing regulations for Amendment 14 established eight Type 2 Marine Protected Areas (MPAs) (see Figure 5-1) within which, all fishing for snapper grouper species is prohibited as is the use of shark bottom longline gear. Within the MPAs trolling for pelagic species is permitted. The MPAs range in area from 50 to 506 square nautical miles and are located off of North Carolina, South Carolina, Georgia, and Florida. The MPAs are expected to enhance the optimum size, age, and genetic structure of slow-growing, long-lived, deepwater snapper grouper species. A Type 2 MPA is an area within which fishing for or retention of snapper grouper species is prohibited but other types of legal fishing, such as trolling, are allowed. The prohibition on possession does not apply to a person aboard a vessel that is in transit with fishing gear appropriately stowed. MPAs are being used as a management tool to promote the optimum size, age, and genetic structure of slow growing, long-lived deepwater snapper grouper species (speckled hind, snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish). Because of the small sizes of the MPAs, it is unlikely that any significant reductions in overall mortality of species also affected by Amendment 17A would occur. Therefore, biological effects of the MPAs would not significantly add to or reduce the anticipated biological benefits of management actions in Amendment 17A.

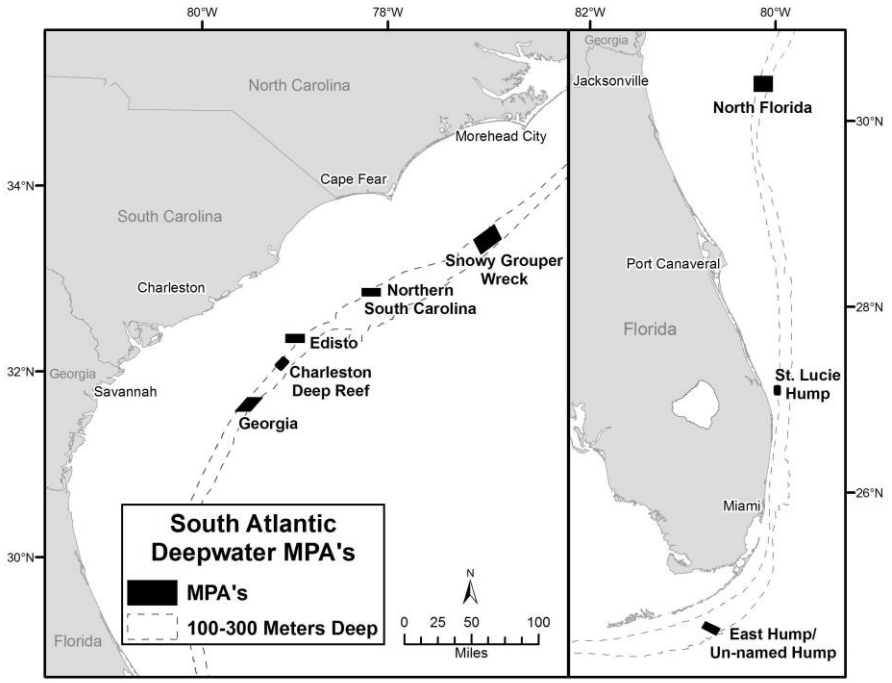


Figure 5-1. Marine protected areas implemented under Snapper Grouper Amendment 14 (SAFMC 2007).

B. Present

In addition to snapper grouper fishery management issues being addressed in this amendment, several other snapper grouper amendments have been developed concurrently and are in the process of approval and implementation. Current closures, including quota closures, seasonal closures, and area closures are outlined in **Appendix I.** of this document.

Most recently, Amendment 16 to the FMP for the Snapper Grouper Fishery of the South Atlantic Region (SAFMC 2008c) was partially approved by the Secretary of Commerce. Amendment 16 includes provisions to extend the shallow water grouper spawning season closure, create a five month seasonal closure for vermilion snapper, require the use of dehooking gear if needed, reduce the aggregate bag limit from five to three grouper, and reduce the bag limit for black grouper and gag to one gag or black grouper combined within the aggregate bag limit. The expected effects of these measures include significant reductions in landings and overall mortality of several shallow water snapper grouper species including, gag, black grouper, red grouper, and vermilion snapper. Specifically, the use of dehooking tools may reduce the release mortality of red snapper that are incidentally caught while fishing for other snapper grouper species. Model output in **Appendix E** shows that Amendment 16 could contribute up to a 16% reduction in commercial red snapper harvest, which has been included in the

baseline conditions upon which the needed red snapper reductions have been derived.

On September 1, 2009, Amendment 15B to the FMP for the Snapper Grouper Fishery of the South Atlantic Region was approved by the Secretary. Management measures in Amendment 15B that affect red snapper in Amendment 17A include prohibition of the sale of bag limit caught snapper grouper species for fishermen not holding a Federal commercial permit for South Atlantic snapper grouper, an action to adopt, when implemented, the Atlantic Coastal Cooperative Statistics Program (ACCSP) release, discard and protected species module to assess and monitor bycatch, allocations for snowy grouper, and management reference points for golden tilefish.

Since some recreational fishermen may intentionally catch more fish than they can consume with the intent to sell, prohibiting the sale of those fish by recreational fishermen could decrease fishing effort; and therefore, may have small biological benefits. Adopting a bycatch monitoring method would not yield immediate biological benefits, but may help to inform future fishery management decisions with increased certainty using data collected from the ACCSP. Biological benefits from Amendment 15B are not expected to result in a significant cumulative biological effect when added to anticipated biological impacts under Amendment 17A.

The Comprehensive Ecosystem-Based Amendment 1 (CE-BA 1) was implemented on July 22, 2010. CE-BA 1 consists of regulatory actions that focus on deepwater coral ecosystem conservation and non-regulatory actions that update existing essential fish habitat information. Management actions proposed in the CE-BA 1 include the establishment of deepwater Coral Habitat of Particular Concern(CHAPCs) to protect what is currently thought to be the largest distribution (greater than 23,000 square miles) of pristine deepwater coral ecosystems in the world. Actions in the amendment would prohibit the use of bottom damaging fishing gear and allow for the creation of allowable fishing zones within the CHAPCs in the historical fishing grounds of the golden crab and deepwater shrimp fisheries. The CE-BA 1 would also provide spatial information on designated essential fish habitat (EFH) in the Council's Habitat Plan (SAFMC 1998a). Actions in CE-BA 1 would: 1) Amend the Fishery Management Plan (FMP) for Coral, Coral Reefs, Live/Hard Bottom Habitats of the South Atlantic Region (Coral FMP) to establish Deepwater Coral Habitat Areas of Particular Concern (CHAPCs) and prohibit the use of bottom damaging fishing gear; 2) create a ―Shrimp Fishery Access Area within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace (Stetson-Miami Terrace) CHAPC boundaries; 3) create allowable Golden Crab Fishing Areas within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace (Stetson-Miami Terrace) CHAPC and Pourtales Terrace CHAPC boundaries; 4) amend the Golden Crab FMP to require vessel monitoring; and 5)

amend the following FMPs to present spatial information of Council-designated Essential Fish Habitat and Essential Fish Habitat-Habitat Areas of Particular Concern: Coral FMP; FMP for the Golden Crab Fishery of the South Atlantic Region (Golden Crab FMP), FMP for the Shrimp Fishery of the South Atlantic Region (Shrimp FMP), FMP Coastal Migratory Pelagics Resources in the Atlantic and Gulf of Mexico (Coastal Migratory Pelagics FMP), FMP for Spiny Lobster in the Gulf of Mexico and South Atlantic (Spiny Lobster FMP), FMP for the Dolphin Wahoo Fishery of the Atlantic (Dolphin Wahoo FMP), and FMP for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP).

Amendment 17B to the FMP for the Snapper Grouper Fishery of the South Atlantic Region has been approved by the Council and has been submitted for Secretarial review. It includes a deepwater snapper grouper closure seaward of 240 ft in addition to establishing annual catch limits (ACLs) and accountability measures (AMs) for species experiencing overfishing. The closures proposed in Amendment 17A, if implemented through rulemaking, would enhance the expected biological benefits of the spawning season closure for shallow water grouper in Amendment 16, and the proposed deepwater snapper grouper closure in Amendment 17B.

The Council received notification, in a letter dated July 8, 2008, that the South Atlantic red snapper stock is undergoing overfishing and is overfished. While the Council developed an amendment, they requested NOAA Fisheries Service, in March 2009, to establish interim measures to reduce overfishing and fishing pressure on the red snapper stock. Interim measures became effective on January 4, 2010. The interim rule was effective until June 2, 2010, but was extended for an additional 186 days since the Council is proposing long-term management measures in Snapper Grouper FMP Amendment 17A to end overfishing of red snapper and rebuild the stock. Regulations implemented by the interim rule will expire on December 5, 2010.

The map below represents the closed areas, MPAs, and CHAPCs, established and proposed in various amendments already implemented or currently under development.

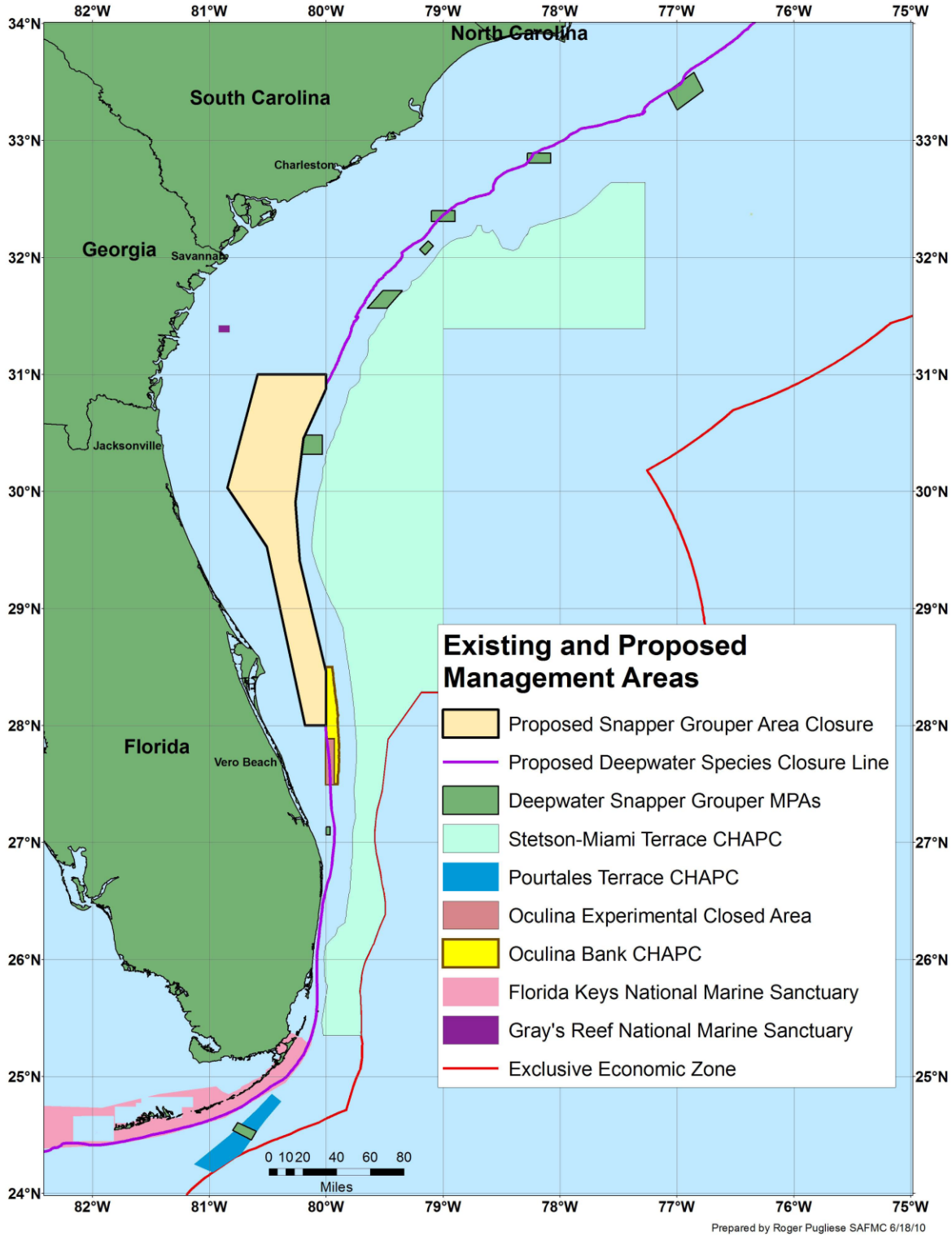


Figure 5-2. South Atlantic closed areas, CHAPCs, National Marine Sanctuaries, and MPAs currently in effect and proposed.

C. Reasonably Foreseeable Future

Amendment 18 to the FMP for the Snapper Grouper Fishery of the South Atlantic Region is currently under development. Measures in Amendment 18 would extend the Snapper Grouper FMP northward, limit effort in the black sea bass and golden tilefish fisheries, change the golden tilefish fishing year, improve the accuracy and timing of fisheries statistics, and designate essential fish habitat in the proposed snapper grouper northern area. The actions currently contained in Amendment 18, which affect red snapper, are intended to prevent overcapitalization while allowing fishery participants to achieve optimum yield benefits for those species. The actions to limit participation in the black sea bass and golden tilefish fisheries in Amendment 18 could hedge against any foreseeable effort shifts to those fisheries that might result from an area closure in Amendment 17A.

The Comprehensive Annual Catch Limit (ACL) Amendment would consider ACLs and Annual Catch Targets (ACTs) for other Federally managed South Atlantic species not experiencing overfishing in other FMPs including Snapper Grouper. Other actions contained within the ACL Amendment may include: (1) choosing ecosystem component species; (2) allocations; (3) management measures to limit recreational and commercial sectors to their ACLs and ACTs; (4) AMs; and (5) any necessary modifications to the range of regulations. It is unlikely any of the management measures for the species being addressed in the Comprehensive ACL Amendment would directly affect red snapper in Amendment 17A. However, several species are co-occurring, and are included in species groupings e.g., the shallow water snapper grouper complex and the deepwater snapper grouper complex. Therefore, if regulations are implemented in the future that may biologically benefit one species in a species complex, it is likely others in the same complex may also realize biological benefits.

At their March 2010 meeting, the Council requested the development of an FMP amendment to establish a catch share program for several snapper grouper species (Amendment 21 to the FMP for the Snapper Grouper Fishery of the South Atlantic Region). The establishment of a catch share program may eliminate derby-style fisheries that have formed for some snapper grouper species, but could also eliminate some small vessel operators from the fishery depending upon the initial share allocation criteria chosen by the Council. Additionally, the Council has requested an amendment to explore alternate management methods specifically for red snapper for long-term implementation (Amendment 22 to the FMP for the Snapper Grouper Fishery of the South Atlantic Region), which could include management options such as a tagging program or some form of a catch share program.

Finally, the space industry in Florida centered on Cape Canaveral is experiencing severe difficulties due to the ramping down and cancellation of the Space Shuttle Program. This program's loss coupled with additional fishery closures will negatively impact this region. However, declining economic conditions due to decline in the space industry may lessen the pace of waterfront development and associated adverse social and economic pressures on fishery infrastructure.

II. Non-Council and other non-fishery related actions, including natural events affecting red snapper.

A. Past
B. Present
C. Reasonably foreseeable future

In terms of natural disturbances, it is difficult to determine the effect of non-Council and non-fishery related actions on stocks of snapper grouper species. Annual variability in natural conditions such as water temperature, currents, food availability, predator abundance, etc. can affect the abundance of young fish, which survive the egg and larval stages each year to become juveniles (i.e., recruitment). This natural variability in year class strength is difficult to predict as it is a function of many interactive and synergistic factors that cannot all be measured (Rothschild 1986). Furthermore, natural factors such as storms, red tide, cold water upwelling, etc. can affect the survival of juvenile and adult fishes; however, it is very difficult to quantify the magnitude of mortality these factors may have on a stock. Alteration of preferred habitats for snapper grouper species could affect survival of fish at any stage in their life cycles. However, estimates of the abundance of fish, which utilize any number of preferred habitats, as well as, determining the impact habitat alteration may have on snapper grouper species, is problematic.

The snapper grouper ecosystem includes many species, which occupy the same habitat at the same time. For example, red snapper co-occur with vermilion snapper, tomtate, scup, red porgy, white grunt, black sea bass, red grouper, scamp, gag, and others. Therefore, red snapper are likely to be caught and suffer some mortality when regulated since they will be incidentally caught when fishermen target other co-occurring species. Red snapper recruitment has been measured from the 1950's to the present time and shows a decline from the earliest years to a low in the mid-1900s. Since then there have been several moderately good year classes in 1998, 1999, and 2000, and then another decline through 2003, with an apparent strong year class occurring in 2006. These moderately good year classes have grown and entered the fishery over the past couple years and are likely responsible for the higher catches being reported by recreational and commercial fishermen. Other natural events such as spawning seasons, and aggregations of fish in spawning condition can make some species especially vulnerable to targeted fishing pressure. Such natural behaviors are discussed in further detail in **Section 3.2** of this document, and is hereby incorporated by reference.

AFFECTED ENVIRONMENT

5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stress.

In terms of the biophysical environment, the resources/ecosystems identified in earlier steps of the CEA are the fish populations directly or indirectly affected by the regulations. This step should identify the trends, existing conditions, and the ability to withstand stresses of the environmental components.

The trends in condition of gag, vermilion snapper, black sea bass, snowy grouper, golden tilefish, and red snapper are documented through the Southeast Data, Assessment and Review (SEDAR) process. Warsaw grouper, and speckled hind have not been recently assessed. Assessments for red grouper and black grouper were completed in 2010. However, given the best available science, each of these stocks, with the exception of black grouper, has been determined to be undergoing overfishing, meaning that fishing related mortality is greater than the maximum fishing mortality threshold. The status of each of these stocks is described in detail in **Section 3.3** of this document.

6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.

This step is important in outlining the current and probable stress factors on snapper grouper species identified in the previous steps. The goal is to determine whether these species are approaching conditions where additional stresses could have an important cumulative effect beyond any current plan, regulatory, or sustainability threshold (CEQ 1997). Sustainability thresholds can be identified for some resources, which are levels of impact beyond which the resources cannot be sustained in a stable state. Other thresholds are established through numerical standards, qualitative standards, or management goals. The CEA should address whether thresholds could be exceeded because of the contribution of the proposed action to other cumulative activities affecting resources.

Fish populations

Numeric values of overfishing and overfished thresholds are being updated in this amendment for red snapper. These values includes maximum sustainable yield (MSY), the fishing mortality rate that produces MSY (F_{MSY}), the biomass or biomass proxy that supports MSY (B_{MSY}), the minimum stock size threshold below which a stock is considered to be overfished (MSST), the maximum fishing mortality threshold above which a stock is considered to be undergoing overfishing (MFMT), and optimum yield (OY).

The definitions of overfishing and overfished for red snapper can be found in the most recent stock assessment (SEDAR 15 2008). Detailed discussions of the science and processes used to determine the stock status is contained in the previously mentioned information sources and are hereby incorporated by reference.

Climate change

Global climate changes could have significant effects on South Atlantic fisheries. However, the extent of these effects is not known at this time. Possible impacts include temperature changes in coastal and marine ecosystems that can influence organism metabolism and alter ecological processes such as productivity and species interactions; changes in precipitation patterns and a rise in sea level which could change the water balance of coastal ecosystems; altering patterns of wind and water circulation in the ocean environment; and influencing the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs (Kennedy et al. 2002).

Actions from this amendment could decrease the carbon footprint from fishing if some fishermen stop or reduce their number and duration of trips due to the proposed area closure. It is unclear how climate change would affect snapper grouper species in the South Atlantic. Climate change can affect factors such as migration, range, larval and juvenile survival, prey availability, and susceptibility to predators. In addition, the distribution of native and exotic species may change with increased water temperature, as may the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms. Climate change may significantly impact snapper grouper species in the future, but the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts will occur. Actions in this amendment are expected to reduce harvest of red snapper and may also decrease fishing mortality of other co-occurring species; thus these actions may partially mitigate the negative impacts of global climate change on snapper grouper species.

7. Define a baseline condition for the resources, ecosystems, and human communities.

The purpose of defining a baseline condition for the resource and ecosystems in the area of the proposed action is to establish a point of reference for evaluating the extent and significance of expected cumulative effects. The SEDAR assessments show trends in biomass, fishing mortality, fish weight, and fish length going back to the earliest periods of data collection. For some species such as gag and snowy grouper, assessments reflect initial periods when the stocks were above B_{MSY} and fishing mortality was fairly low. However, some species such as red snapper. vermilion snapper, and black sea bass were heavily exploited or possibly overfished when data were first collected. As a result, the assessment must make an assumption of the biomass at the start of the assessment period thus modeling the baseline reference points for the species. For red snapper, estimates of annual biomass have been well below the biomass at maximum sustainable yield (B_{MSY}) since the mid-1960s, with possibly some small amount of recovery since implementation of current size limits in 1992 (Figure 5-2).

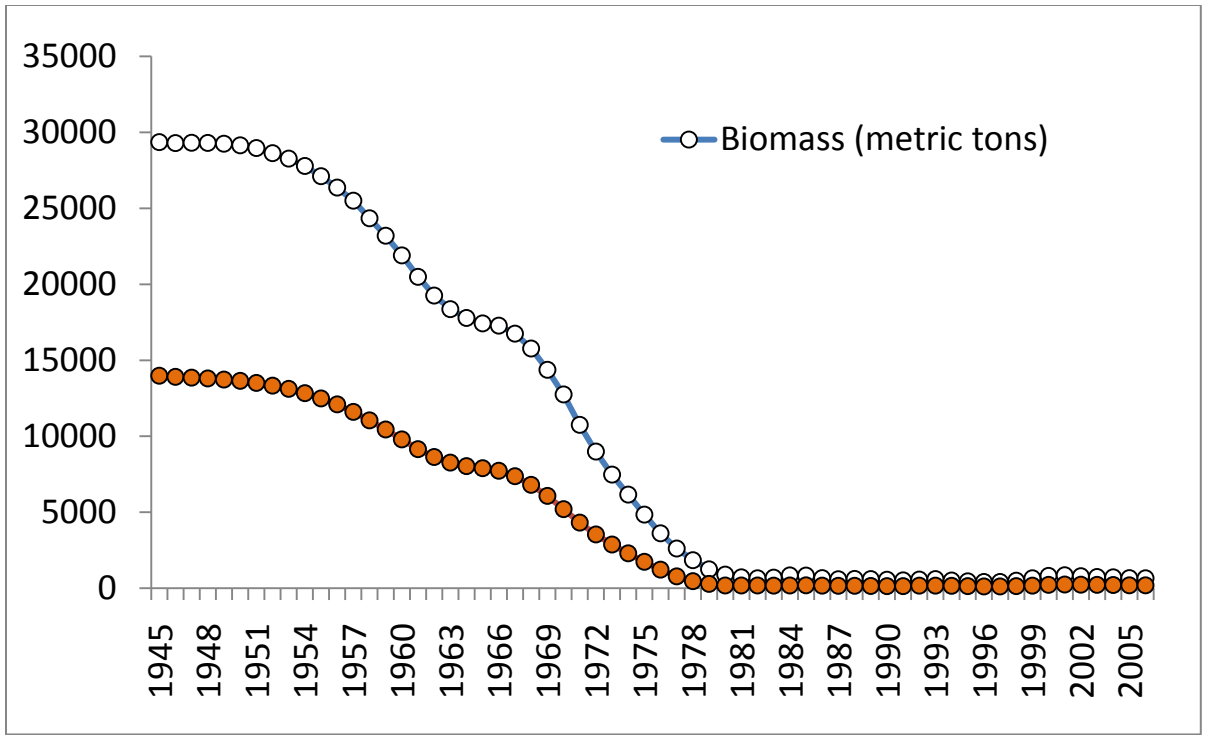


Figure 5-2. Biomass and Spawning Stock Biomass (pounds).

For a detailed discussion of the baseline conditions of each of the species addressed in this amendment the reader is referred to those stock assessment and stock information sources referenced in **Item Number 6** of this CEA.

DETERMINING THE ENVIRONMENTAL CONSEQUENCES OF CUMULATIVE EFFECTS

8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.

Table 5-1. The cause and effect relationship of fishing and regulatory actions within the time period of the Cumulative Effects Analysis (CEA).

Time period/dates	Cause	Observed and/or Expected Effects
1960s-1983	Growth overfishing of many reef fish species.	Declines in mean size and weight of many species including black sea bass.
August 1983	4" trawl mesh size to achieve a 12" TL commercial vermilion snapper minimum size limit (SAFMC 1983).	Protected youngest spawning age classes.
Pre-January 12, 1989	Habitat destruction, growth overfishing of vermilion snapper.	Damage to snapper grouper habitat, decreased yield per recruit of vermilion snapper.
January 1989	Trawl prohibition to harvest fish (SAFMC 1988).	Increase yield per recruit of vermilion snapper; eliminate trawl damage to live bottom habitat.
Pre-January 1, 1992	Overfishing of many reef species including vermilion snapper, and gag.	Spawning stock ratio of these species is estimated to be less than 30% indicating that they are overfished.
January 1992	Prohibited gear: fish traps south of Cape Canaveral, FL; entanglement nets; longline gear inside of 50 fathoms; powerheads and bangsticks in designated SMZs off SC. Size/Bag limits: 10" TL vermilion snapper (recreational only); 12" TL vermilion snapper (commercial only); 10 vermilion snapper/person/day; aggregate grouper bag limit of 5/person/day; and 20" TL gag, red, black, scamp, yellowfin, and yellowmouth grouper size limit (SAFMC 1991).	Protected smaller spawning age classes of vermilion snapper.
Pre-June 27, 1994	Damage to *Oculina* habitat.	Noticeable decrease in numbers and species diversity in areas of *Oculina* off FL
July 1994	Prohibition of fishing for and retention of snapper grouper species (HAPC renamed OECA; SAFMC 1993)	Initiated the recovery of snapper grouper species in OECA.
1992-1999	Declining trends in biomass and overfishing	Spawning potential ratio for vermilion snapper and gag is less than 30% indicating

Time period/dates	Cause	Observed and/or Expected Effects
	continue for a number of snapper grouper species including vermilion snapper and gag.	that they are overfished.
February 24, 1999	Gag and black: 24" total length (recreational and commercial); 2 gag or black grouper bag limit within 5 grouper aggregate; March-April commercial closure. Vermilion snapper: 11" total length (recreational). Aggregate bag limit of no more than 20 fish/person/day for all snapper grouper species without a bag limit (1998c).	F for gag vermilion snapper remains declines but is still above F_{MSY}.
October 23, 2006	Snapper grouper FMP Amendment 13C (SAFMC 2006)	Commercial vermilion snapper quota set at 1.1 million lbs gutted weight; recreational vermilion snapper size limit increased to 12" TL to prevent vermilion snapper overfishing
Effective February 12, 2009	Snapper grouper FMP Amendment 14 (SAFMC 2007)	Use marine protected areas (MPAs) as a management tool to promote the optimum size, age, and genetic structure of slow growing, long-lived deepwater snapper grouper species (e.g., speckled hind, snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish). Gag and vermilion snapper occur in some of these areas.
Effective March 20, 2008	Snapper grouper FMP Amendment 15A (SAFMC 2008a)	Establish rebuilding plans and SFA parameters for snowy grouper, black sea bass, and red porgy.
Effective Dates Dec 16, 2009, to Feb 16, 2010.	Snapper grouper FMP Amendment 15B (SAFMC 2008b)	End double counting in the commercial and recreational reporting systems by prohibiting the sale of bag-limit caught snapper grouper, and minimize impacts on sea turtles and smalltooth sawfish.
Effective Date July 29, 2009	Snapper grouper FMP Amendment 16 (SAFMC 2008c)	Protect spawning aggregations and snapper grouper in spawning condition by increasing the length of the spawning season closure, decrease discard mortality by requiring the use of dehooking tools, reduce overall harvest of gag and vermilion snapper to end overfishing.

Time period/dates	Cause	Observed and/or Expected Effects
Effective Date January 4, 2010	Red Snapper Interim Rule	Prohibit commercial and recreational harvest of red snapper from January 4, 2010, to June 2, 2010 with a possible 186-day extension. Regulations were extended until December 5, 2010. Reduce overfishing of red snapper while long-term measures to end overfishing are addressed in Amendment 17A.
Target 2010	Snapper Grouper FMP Amendment 17A	SFA parameters for red snapper; ACLs and ACTs; management measures to limit recreational and commercial sectors to their ACTs; accountability measures. Establish rebuilding plan for red snapper.
Target 2010	Snapper Grouper Amendment 17B	ACLs and ACTs; management measures to limit recreational and commercial sectors to their ACTs; AMs, for species undergoing overfishing.
Target 2010	Snapper Grouper FMP Amendment 18	Extend the snapper grouper FMU northward, review and update wreckfish ITQ system, prevent overexploitation in the black sea bass and golden tilefish fisheries, improve data collection timeliness and data quality.
Effective July 22, 2010	Snapper Grouper FMP Amendment 19 (Comprehensive Ecosystem-Based Amendment 1)	Amend the FMP to present spatial information of Council-designated Essential Fish Habitat and Essential Fish Habitat-Habitat Areas of Particular Concern.
Target 2011	Comprehensive ACL Amendment.	ACLs, ACTs, and AMs for species not experiencing overfishing; accountability measures; an action to remove species from the fishery management unit as appropriate; and management measures to limit recreational and commercial sectors to their ACTs.
Target 2011	Amendment 20 (Wreckfish)	Review the current ITQ program and update the ITQ program as necessary to comply with MSA LAPP requirements.

9. Determine the magnitude and significance of cumulative effects.

Proposed management actions, as summarized in **Section 2** of this document, would establish annual catch limits (ACLs) and accountability measures (AMs) and establish management measures to end red snapper overfishing and are expected to have a beneficial, cumulative effect on the biophysical environment. These management actions are expected to protect and increase stock biomass, which may affect other stocks. Detailed discussions of the magnitude and significance of the preferred alternatives appear in **Section 4** of this consolidated document. Below is a short summary of the biological significance and magnitude of each of the preferred alternatives chosen, and a brief discussion of their combined effect on the snapper grouper fishery management unit (FMU) and the ecosystem.

The red snapper rebuilding plan and management measures in this amendment would result in a slow rebuilding of the stock over the course of many years. One ancillary benefit of restricting red snapper harvest are reductions in fishing related mortality of other species associated with red snapper. It is not possible to eliminate incidental mortality of red snapper, since it is part of a multi-species complex, without prohibiting fishermen from targeting all associated species wherever red snapper occur. Therefore, biological benefits are expected for all species associated with red snapper, especially in the specific areas of regulatory implementation.

When viewed in totality, the actions in this amendment would benefit shallow water species currently undergoing overfishing as well as the ecosystem in which they reside. Since the snapper grouper FMU and species complexes therein include a host of co-occurring species, proposed management measures may also benefit those associated species in addition to red snapper. Predator prey relationships would likely approach balanced conditions over time, and the protections put in place under this amendment may enhance the natural sex ratio and protect easily targeted fish that may aggregate to spawn. Although it is difficult to quantify the cumulative effects of the proposed actions, it is expected that the effects will be positive and synergistic.

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.

The cumulative effects on the biophysical environment are expected to be positive. Avoidance, minimization, and mitigation are not applicable.

11. Monitor the cumulative effects of the selected alternative and adopt management.

The effects of the proposed action are, and will continue to be, monitored through collection of data by NOAA Fisheries Service, states, stock assessments and stock assessment updates, life history studies, and other scientific observations. **Section 4.5** of this document contains a full discussion and analysis of monitoring program alternatives for red snapper.

4.7 Socioeconomic

Other Things to Consider

5.6 Unavoidable Adverse Effects

5.7 Effects of the Fishery on Essential Fish Habitat

The biological impacts of the proposed actions are described in Section 4.0, including impacts on habitat. No actions proposed in this amendment are anticipated to have any adverse impact on essential fish habitat (EFH) or EFH-Habitat of Particular Concern (EFH-HAPC) for managed species including species in the snapper grouper complex. Any additional impacts of fishing on EFH identified during the public hearing process will be considered, therefore the Council has determined no new measures to address impacts on EFH are necessary at this time. The Council's adopted habitat policies, which may directly affect the area of concern, are available for download through the Habitat/Ecosystem section of the Council's website: http://map.mapwise.com/safmc/Default.aspx?tabid=56.

NOTE: The Final EFH Rule, published on January 17, 2002, (67 FR 2343) replaced the interim Final Rule of December 19, 1997 on which the original EFH and EFH-HAPC designations were made. The Final Rule directs the Councils to periodically update EFH and EFH-HAPC information and designations within fishery management plans. As was done with the original Habitat Plan, a series of technical workshops were conducted by Council habitat staff and a draft plan that includes new information has been completed pursuant to the Final EFH Rule.

5.8 Damage to Ocean and Coastal Habitats

The alternatives and proposed actions are not expected to have any adverse effect on the ocean and coastal habitat.

Management measures implemented in the original Snapper Grouper Fishery Management Plan through Amendment 7 combined have significantly reduced the impact of the snapper grouper fishery on essential fish habitat (EFH). The Council has reduced the impact of the fishery and protected EFH by prohibiting the use of poisons and explosives; prohibiting use of fish traps and entanglement nets in the exclusive economic zone; banning use of bottom trawls on live/hard bottom habitat north of Cape Canaveral, Florida; restricting use of bottom longline to depths greater than 50 fathoms north of St. Lucie Inlet; and prohibiting use of black sea bass pots south of Cape Canaveral, Florida. These gear restrictions have significantly reduced the impact of the fishery on coral and live/hard bottom habitat in the South Atlantic Region.

Additional management measures in Amendment 8 (SAFMC 1997), including specifying allowable bait nets and capping effort, have protected habitat by making existing regulations

more enforceable. Establishing a controlled effort program limited overall fishing effort and to the extent there is damage to the habitat from the fishery (e.g. black sea bass pots, anchors from fishing vessels, impacts of weights used on fishing lines and bottom longlines), limited such impacts.

In addition, measures in Amendment 9 (SAFMC 1998b), that include further restricting longlines to retention of only deepwater species and requiring that black sea bass pot have escape panels with degradable fasteners, reduce the catch of undersized fish and bycatch and ensure that the pot, if lost, will not continues to "ghost" fish. Amendment 13C (SAFMC 2006) increased mesh size in the back panel of pots, which has reduced bycatch and retention of undersized fish. Amendment 15B (SAFMC 2008b) implemented sea turtle bycatch release equipment requirements, and sea turtle and smalltooth sawfish handling protocols and/or guidelines in the permitted commercial and for-hire snapper grouper fishery.

Amendment 16 (SAFMC 2008c), implemented an action to reduce bycatch by requiring fishermen use dehooking devices. Limiting the overall fishing mortality reduces the likelihood of over-harvesting of species with the resulting loss in genetic diversity, ecosystem diversity, and sustainability.

Measures adopted in the Coral and Shrimp FMPs have further restricted access by fishermen that had potential adverse impacts on essential snapper grouper habitat. These measures include the designation of the *Oculina* Bank HAPC and the rock shrimp closed area (see the Shrimp and Coral FMP/Amendment documents for additional information).

The Council's Comprehensive Habitat Amendment (SAFMC 1998b) contains measures that expanded the *Oculina* Bank Habitat of Particular Concern (HAPC) and added two additional satellite HAPCs. Amendment 14 (SAFMC 2007), established marine protected areas where fishing for or retention of snapper grouper species would be prohibited.

5.9 Relationship of Short-Term Uses and Long-Term Productivity

5.10 Irreversible and Irretrievable Commitments of Resources

5.11 Unavailable or Incomplete Information

List of Preparers

Table 6-1. List of Regulatory Amendment 10 preparers.

Name	Agency/Division	Area of Amendment Responsibility	Education	Years of Experience
Myra Brouwer	SAFMC	IPT Lead/Fishery Biologist		
Rick DeVictor	NMFS/SF	IPT Lead/Fishery Biologist		
David Dale	NMFS/HC	EFH Specialist		
Amanda Frick	NMFS/PR	Geographer		
Andy Herndon	NMFS/PR	Biologist		
Stephen Holiman	NMFS/SF	Economist		
Tony Lamberte	NMFS/SF	Economist		
Jack McGovern	NMFS/SF	Fishery Scientist		
Kate Michie	NMFS/SF	Fishery Management Plan Coordinator		
Kate Quigley	SAFMC	Economist		
Monica Smit-Brunello	NOAA/GC	Attorney Advisor		
Jim Waters	NMFS/EC	Economist		

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

Table 6-2. List of Interdisciplinary Team Members.

Name	SAFMC	Title
Myra Brouwer	SAFMC	IPT Lead/Fishery Biologist
John Carmichael	SAFMC	SAFMC Data Program Managers
Anik Clemens	NMFS/SF	Technical Writer Editor
David Dale	NMFS/HC	EFH Specialist
Rick DeVictor	NMFS/SF	IPT Lead/Fishery Biologist
Otha Easley	NMFS/LE	Supervisory Criminal Investigator
Nick Farmer	NMFS/SF	Data Analyst
Amanda Frick	NMFS/PR	Geographer
Andy Herndon	NMFS/PR	Fishery Biologist (Protected Resources)
Stephen Holiman	NMFS/SF	Economist
David Keys	NMFS	Regional NEPA Cooridnator
Tony Lamberte	NMFS/SF	Economist
Jennifer Lee	NMFS/PR	Fishery Biologist (Protected Resources)
Anna Martin	SAFMC	Coral Biologist
Jack McGovern	NMFS/SF	Fishery Biologist
Kate Michie	NMFS/SF	Fishery Biologist
Janet Miller	NMFS/SF	Program Specialist (Permits)
Kate Quigley	SAFMC	Economist
Noah Silverman	NMFS/SF	NEPA Specialist
Monica Smit-Brunello	NOAA/GC	Attorney
Andy Strelcheck	NMFS/SF	Fishery Biologist
Jim Waters	NMFS/EC	Economist

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

List of Agencies, Organizations, and Persons To Whom Copies of the Statement are Sent

Responsible Agency

Amendment 24:
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Toll Free: 866-SAFMC-10
(843) 769-4520 (FAX)
safmc@safmc.net

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

List of Agencies, Organizations, and Persons Consulted

SAFMCLaw Enforcement Advisory Panel
SAFMC Snapper Grouper Advisory Panel
SAFMC Marine Protected Areas Advisory Panel
SAFMC Scientific and Statistical Committee
SAFMC Education and Outreach Advisory Panel
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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