
# Amendment 24

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

## Red Grouper Rebuilding Plan

**Draft Environmental Impact Statement** | **Initial Regulatory Flexibility Act Analysis** | **Regulatory Impact Review**

**Social Impact Assessment/Fishery Impact Statement**

**AUGUST 2011**

# Abbreviations and Acronyms Used in the FMP

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

# 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

| | |
|---|---|
| **Proposed actions:** | For red grouper, specify the following: MSY; MSST; rebuilding plan (including ACLs, AMs, and OY); and allocations. |
| **Lead agency:** | FMP Amendment – South Atlantic Fishery Management Council<br>EIS - NOAA Fisheries Service |
| **For Further Information Contact:** | Robert K. Mahood<br>South Atlantic Fishery Management Council<br>4055 Faber Place, Suite 201<br>North Charleston, SC 29405<br>843-571-4366<br>866-SAFMC-10<br>Robert.mahood@safmc.net<br><br>Roy E. Crabtree<br>NOAA Fisheries, Southeast Region<br>263 13th Avenue South<br>St. Petersburg, FL 33701<br>727-824-5301 |
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# Abstract

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 a stock is undergoing overfishing, fishery managers must implement management measures implemented to end overfishing. In cases where stocks are overfished, the Councils and NOAA Fisheries Service must implement rebuilding plans. NOAA Fisheries Service notified the South Atlantic Fishery Management Council (South Atlantic Council) of the stock status on June 9, 2010; the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires the implementation of measures within two years of notification. Therefore, a rebuilding plan for red grouper in the South Atlantic must be in place by June 2012 in order to end overfishing and rebuild the stock. Besides establishing a rebuilding plan, the South Atlantic 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.

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# SUMMARY

## of
## AMENDMENT 24
## to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region

**The red grouper stock of the South Atlantic was assessed in 2008. The assessment showed red grouper to be overfished (population too low) and undergoing overfishing (rate of removal too high).**

**The South Atlantic Fishery Management Council (South Atlantic Council) and National Marine Fisheries Service (NOAA Fisheries Service) are required by law to implement a rebuilding plan. The primary purpose of Amendment 24 to the Fishery Management Plan for the Snapper Grouper Fishery (Amendment 24) is to implement the rebuilding plan. However, the South Atlantic Council is also requiring the specification of management benchmarks (called 'maximum sustainable yield' and 'minimum stock size threshold').**

**On July 29, 2009, the NOAA Fisheries Service implemented a four- month spawning season closure for red grouper. Based on 2010 data, management measures may be sufficient to limit the landings to below the ACLs proposed in this amendment.**

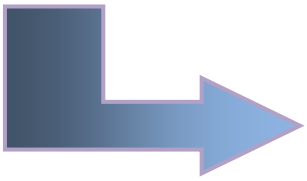
**This document is intended to serve as a SUMMARY for all the actions and alternatives in Amendment 24. It also provides background information and includes a summary of the expected biological and socio-economic effects from the management measures.**

# Why is the South Atlantic Council taking Action?

The red grouper stock of the South Atlantic was assessed in 2008. The assessment showed red grouper to be overfished (population too low) and undergoing overfishing (rate of removal too high). The South Atlantic Fishery Management Council (South Atlantic Council) and National Marine Fisheries Service (NOAA Fisheries Service) are required by law to implement a rebuilding plan.

# What Are the Proposed Actions?

There are eight actions in Amendment 24. Each *action* has a range of *alternatives*, including a 'no action alternative' and a 'preferred alternative'.



***Proposed Actions in Amendment 24***

1. Maximum Sustainable Yield
2. Minimum Stock Size Threshold
3. Rebuilding Schedule
4. Rebuilding Strategy and Acceptable Biological Catch Levels
5. Allocations
6. Annual Catch Limits and Optimum Yield
7. Accountability Measures for the Commercial Sector
8. Accountability Measures for the Recreational Sector

# What Are the Alternatives?

**1. Maximum Sustainable Yield**

***Proposed Actions in Amendment 24***

1. Maximum Sustainable Yield
2. Minimum Stock Size Threshold
3. Rebuilding Schedule
4. Rebuilding Strategy and Acceptable Biological Catch Levels
5. Allocations
6. Annual Catch Limits and Optimum Yield
7. Accountability Measures for the Commercial Sector
8. Accountability Measures for the Recreational Sector

| 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. | $F_{30\%SPR}$=0.178[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]Estimate from the Beaufort catch-age model
[2,3]SEDAR 19 (2010)

## 2. Minimum Stock Size Threshold

***Proposed Actions in Amendment 24***

1. Maximum Sustainable Yield
2. Minimum Stock Size Threshold
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4. Rebuilding Strategy and Acceptable Biological Catch Levels
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6. Annual Catch Limits and Optimum Yield
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| 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[1] | 4,914,053[1] |
| **Alternative 2** | MSST equals 50% of $SSB_{MSY}$ | n/a | 2,857,162 |
| **Alternative 3 (Preferred)** | MSST equals 75% of $SSB_{MSY}$ | n/a | 4,285,742 |
| **Alternative 4** | MSST equals 85% of $SSB_{MSY}$ | n/a | 4,857,175 |
| **Alternative 5** | MSST at which rebuilding to the MSY level would be expected to occur within 10 years at the MFMT level.[2] | | |

## 3. Rebuilding Schedule

***Proposed Actions in Amendment 24***

1. Maximum Sustainable Yield
2. Minimum Stock Size Threshold
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4. Rebuilding Strategy and Acceptable Biological Catch Levels
5. Allocations
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8. Accountability Measures for the Recreational Sector

| Alternatives | Definition |
|---|---|
| **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 7 years with the rebuilding time period ending in 2017. 2011 is Year 1. |
| **Alternative 4** | Define a rebuilding schedule as the mid-point between the shortest possible and maximum recommended period to rebuild. This would equal 8 years with the rebuilding time period ending in 2018. 2011 is Year 1. |
| **Alternative 5 (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. |

## 4. Rebuilding Strategy and Acceptable Biological Catch Levels

***Proposed Actions in Amendment 24***

1. Maximum Sustainable Yield
2. Minimum Stock Size Threshold
3. Rebuilding Schedule
4. Rebuilding Strategy and Acceptable Biological Catch Levels
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8. Accountability Measures for the Recreational Sector

| Alternatives | Rebuilding strategy ($F_{OY}$ Equal To) | | ABC (lbs whole weight) *Landings and Discards* | ABC (lbs whole weight) *Landings* |
|---|---|---|---|---|
| | **Scenario** | **F rate** | | |
| **Alternative 1 (No Action)** | $F_{45\%SPR}$ | 0.1055 | 399,000 (2011)<br>468,000 (2012)<br>537,000 (2013)<br>602,000 (2014) | 374,000 (2011)<br>442,000 (2012)<br>511,000 (2013)<br>575,000 (2014) |
| **Alternative 2** | $F_{REBUILD}$ (10 years) | 0.181 | 665,000 (2011)<br>737,000 (2012)<br>806,000 (2013)<br>866,000 (2014) | 622,000 (2011)<br>693,000 (2012)<br>762,000 (2013)<br>822,000 (2014) |
| **Alternative 3 (Preferred)** | $75\%F_{MSY}$ | 0.166 | 613,000 (2011)<br>687,000 (2012)<br>759,000 (2013)<br>821,000 (2014) | 573,000 (2011)<br>647,000 (2012)<br>718,000 (2013)<br>780,000 (2014) |
| **Alternative 4** | $65\%F_{MSY}$ | 0.144 | 535,000 (2011)<br>610,000 (2012)<br>683,000 (2013)<br>749,000 (2014) | 501,000 (2011)<br>575,000 (2012)<br>648,000 (2013)<br>713,000 (2014) |
| **Alternative 5** | $F_{REBUILD}$ (7 years) | 0.157 | 583,000 (2011)<br>657,000 (2012)<br>730,000 (2013)<br>794,000 (2014) | 545,000 (2011)<br>619,000 (2012)<br>691,000 (2013)<br>755,000 (2014) |
| **Alternative 6** | $F_{REBUILD}$ (8 years) | 0.168 | 620,000 (2011)<br>695,000 (2012)<br>765,000 (2013)<br>828,000 (2014) | 580,000 (2011)<br>654,000 (2012)<br>724,000 (2013)<br>787,000 (2014) |

## 5. Allocations

*Proposed Actions in Amendment 24*

1. Maximum Sustainable Yield
2. Minimum Stock Size Threshold
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**Alternative 1 (No Action).** Do not establish sector allocations for red grouper.

**Alternative 2 (Preferred).** Specify allocations for the commercial and recreational sectors based on criteria as outlined in one of the following options below.

**Subalternative 2a**. Commercial = 60% and recreational = 40% (Established by using catch history from 1986-2008).

**Subalternative 2b**. Commercial = 67% and recreational = 33% (Established by using catch history from 1986-1998).

**Subalternative 2c**. Commercial = 55% and recreational = 45% (Established by using catch history from 1999-2008).

**Subalternative 2d**. Commercial = 43% and recreational = 57% (Established by using catch history from 2006-2008).

**Subalternative 2e (Preferred)**. Commercial = 45% and recreational = 55% (Established by using 50% of catch history from 1991-2008 + 50% of catch history from 2006-2008).

**Alternative 3.** Specify allocations for the commercial, for-hire, and recreational sectors based on criteria as outlined in one of the following options below.

**Subalternative 3a**. Commercial = 60%, for-hire = 28%, and recreational = 12% (Established by using catch history from 1986-2008).

**Subalternative 3b**. Commercial = 67%, for-hire = 20%, and recreational = 13% (Established by using catch history from 1986-1998).

**Subalternative 3c**. Commercial = 55%, for-hire = 34%, and recreational = 11% (Established by using catch history from 1999-2008).

**Subalternative 3d**. Commercial = 43%, for-hire = 49%, and recreational = 8% (Established by using catch history from 2006-2008).

**Subalternative 3e**. Commercial = 45%, for-hire = 28%, and recreational = 27% (Established by using 50% of catch history from 1991-2008 + 50% of catch history from 2006-2008).

*Proposed Actions in Amendment 24*

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## 6. Annual Catch Limits and Optimum Yield

Note: More than one preferred alternative may be chosen.

**Alternative 1 (No Action).** An individual ACL is currently not in place for red grouper. Retain aggregate recreational and commercial ACLs for black grouper, red grouper, and gag. The commercial sector ACL for gag, black grouper, and red grouper is 662,403 gw (781,636 ww) and 648,663 gw (765,422 ww) for the recreational sector. The total group ACL is 1,311,066 gw (1,547,058 ww). These values are equivalent to the expected catch resulting from the implementation of management measures for red grouper in Amendment 16 and specified in Amendment 17B.

**Alternative 2 (Preferred)**. ACL = OY = ABC. Specify commercial and recreational ACLs for red grouper as indicated in the table below (Table 2-15). ACLs will not increase in a subsequent year if present year projected catch has exceeded the ACL

**Alternative 3.** ACL = OY = 90% of the ABC. Specify commercial and recreational ACLs for red grouper as indicated in the table below (Table 2-16). ACLs will not increase in a subsequent year if present year projected catch has exceeded the ACL.

**Alternative 4.** ACL = OY = 80% of the ABC. Specify commercial and recreational ACLs for red grouper as indicated in the table below (Table 2-17). ACLs will not increase in a subsequent year if present year projected catch has exceeded the ACL.

**Alternative 5 (Preferred).** Eliminate the commercial sector aggregate ACL of 662,403 lbs gw for black grouper, gag, and red grouper. Eliminate the in-season AM that specifies a prohibition on possession of all shallow water groupers once the commercial aggregate ACL is projected to be met.

**Alternative 6 (Preferred).** Eliminate the recreational sector aggregate ACL of 648,663 lbs gw for black grouper, gag, and red grouper. Eliminate the in-season AM that specifies a prohibition on possession of black grouper, gag, and red grouper once the ACL is projected to be met if any one of the three species is listed as overfished. Eliminate the post-season AM that specifies a reduction in a subsequent year's ACL by the amount of an overage if landings exceed the aggregate ACL. Eliminate the regulation that states that the recreational landings are evaluated relative to the ACL as follows: For

2010, only 2010 recreational landings will be compared to the ACL; in 2011, the average of 2010 and 2011 recreational landings will be compared to the ACL; and in 2012 and subsequent fishing years, the most recent 3-year running average recreational landings will be compared to the ACL.

**Table S-1.** The ACL values (lbs whole weight) for red grouper in Alternative 2 (ACL=ABC). ACL values are based on preferred allocation alternative (45% commercial/55% recreational).

| **Alt. 2 ACL=ABC** | | | | | | |
|---|---|---|---|---|---|---|
| **Commercial** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| | 2012 | 311,850 | 291,150 | 258,750 | 278,550 | 294,300 |
| | 2013 | 342,900 | 323,100 | 291,600 | 310,950 | 325,800 |
| landings | 2014 | 369,900 | 351,000 | 320,850 | 339,750 | 354,150 |
| | | | | | | |
| | 2012 | 331,650 | 309,150 | 274,500 | 295,650 | 312,750 |
| landings and | 2013 | 362,700 | 341,550 | 307,350 | 328,500 | 344,250 |
| discards | 2014 | 389,700 | 369,450 | 337,050 | 357,300 | 372,600 |
| | | | | | | |
| **Recreational** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| | 2012 | 405,350 | 377,850 | 335,500 | 361,350 | 382,250 |
| | 2013 | 443,300 | 417,450 | 375,650 | 401,500 | 420,750 |
| landings | 2014 | 476,300 | 451,550 | 411,950 | 436,700 | 455,400 |
| | | | | | | |
| | 2012 | 405,350 | 377,850 | 335,500 | 361,350 | 382,250 |
| landings and | 2013 | 443,300 | 417,450 | 375,650 | 401,500 | 420,750 |
| discards | 2014 | 476,300 | 451,550 | 411,950 | 436,700 | 455,400 |

**Table S-2.** The ACL values (lbs whole weight) for red grouper in Alternative 3 (ACL=90%ABC). ACL values are based on preferred allocation alternative (45% commercial/55% recreational).

| **Alt. 3 ACL=90%ABC** | | | | | | |
|---|---|---|---|---|---|---|
| **Commercial** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| | 2012 | 280,665 | 262,035 | 232,875 | 250,695 | 264,870 |
| | 2013 | 308,610 | 290,790 | 262,440 | 279,855 | 293,220 |
| landings | 2014 | 332,910 | 315,900 | 288,765 | 305,775 | 318,735 |
| | | | | | | |
| | 2012 | 298,485 | 278,235 | 247,050 | 266,085 | 281,475 |
| landings and | 2013 | 326,430 | 307,395 | 276,615 | 295,650 | 309,825 |
| discards | 2014 | 350,730 | 332,505 | 303,345 | 321,570 | 335,340 |
| | | | | | | |
| **Recreational** | | | | | | |
| | **Year** | **Frebuild (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **Frebuild (7 years)** | **Frebuild (8 years)** |
| | 2012 | 343,035 | 320,265 | 284,625 | 306,405 | 323,730 |
| | 2013 | 377,190 | 355,410 | 320,760 | 342,045 | 358,380 |
| landings | 2014 | 406,890 | 386,100 | 352,935 | 373,725 | 389,565 |
| | | | | | | |
| | 2012 | 364,815 | 340,065 | 301,950 | 325,215 | 344,025 |
| landings and | 2013 | 398,970 | 375,705 | 338,085 | 361,350 | 378,675 |
| discards | 2014 | 428,670 | 406,395 | 370,755 | 393,030 | 409,860 |

**Table S-3.** The ACL values (lbs whole weight) for red grouper in Alternative 3 (ACL=80%ABC). ACL values are based on preferred allocation alternative (45% commercial/55% recreational).

| **Alt. 4 ACL=80%ABC** | | | | | | |
|---|---|---|---|---|---|---|
| **Commercial** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| | 2012 | 249,480 | 232,920 | 207,000 | 222,840 | 235,440 |
| | 2013 | 274,320 | 258,480 | 233,280 | 248,760 | 260,640 |
| landings | 2014 | 295,920 | 280,800 | 256,680 | 271,800 | 283,320 |
| | | | | | | |
| | 2012 | 265,320 | 247,320 | 219,600 | 236,520 | 250,200 |
| landings and | 2013 | 290,160 | 273,240 | 245,880 | 262,800 | 151,470 |
| discards | 2014 | 311,760 | 295,560 | 269,640 | 285,840 | 298,080 |
| | | | | | | |
| **Recreational** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| | 2012 | 304,920 | 284,680 | 253,000 | 272,360 | 287,760 |
| | 2013 | 335,280 | 315,920 | 285,120 | 304,040 | 318,560 |
| landings | 2014 | 361,680 | 343,200 | 313,720 | 332,200 | 346,280 |
| | | | | | | |
| | 2012 | 324,280 | 302,280 | 268,400 | 289,080 | 305,800 |
| landings and | 2013 | 354,640 | 333,960 | 300,520 | 321,200 | 336,600 |
| discards | 2014 | 381,040 | 361,240 | 329,560 | 349,360 | 364,320 |

*Proposed Actions in Amendment 24*

1. Maximum Sustainable Yield
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8. Accountability Measures for the Recreational Sector

## 7. Accountability Measures - Commercial

**Alternative 1 (No Action).** Do not specify new commercial AMs for red grouper.

**Alternative 2**. Specify individual Annual Catch Targets (ACT) for red grouper.

**Subalternative 2a (Preferred).** Do not establish a commercial sector ACT.
**Subalternative 2b.** The ACT equals 90% of the ACL.
**Subalternative 2c.** The ACT equals 80% of the ACL.

**Alternative 3 (Preferred).** If the ACL is met or is projected to be met, all subsequent purchase and sale of red grouper is prohibited and harvest and/or possession is limited to the bag limit.

**Alternative 4 (Preferred).** If the ACL is exceeded, the Regional Administrator shall publish a notice to reduce the ACL in the following season by the amount of the overage.

*Proposed Actions in Amendment 24*

1. Maximum Sustainable Yield
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8. Accountability Measures for the Recreational Sector

## 8. Accountability Measures – Recreational

**Alternative 1 (No Action).** Do not specify new recreational AMs for red grouper.

**Decision 1. Specify an ACT?**

**Alternative 2**. Specify an ACT.
**Subalternative 2a**. Do not specify an ACT.
**Subalternative 2b.** The ACT equals 85% of the ACL.
**Subalternative 2c.** The ACT equals 75% of the ACL.
**Subalternative 2d (Preferred).** The ACT equals ACL*(1-PSE) or ACL*0.5, whichever is greater.

**Decision 2. What is the AM trigger?**

**Alternative 3**. Specify the AM trigger.
**Subalternative 3a**. Do not specify an AM trigger.
**Subalternative 3b (Preferred)**. If the *annual landings* exceed the ACL in a given year.
**Subalternative 3c.** If the *mean landings* for the past three years exceed the ACL.[1, 2]
**Subalternative 3d.** If the *modified mean landings* exceeds the ACL. The modified mean is the most recent 5 years of available landings data with highest and lowest landings estimates from consideration removed.[1,2]
**Subalternative 3e.** If the lower bound of the 90% *confidence interval* estimate of the MRFSS landings' population mean plus headboat landings is greater than the ACL.

Notes:
[1] *Start the clock over.* In any year the ACL is reduced or increased, the sequence of future ACLs will begin again starting with a single year of landings compared to the ACL for that year, followed by a 2-year average of landings compared to the 2-year average annual catch limits in the next year, followed by a 3-year average of landings compared to the 3-year average of ACLs for the third year, and so on.
[2] For 2011, use only 2011 landings. For 2012, use the mean landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running mean.

**Decision 3. Is there an in-season AM?**

**Alternative 4**. Specify the in-season AM.
**Subalternative 4a**. Do not specify an in-season AM.
**Subalternative 4b (Preferred).** The Regional Administrator shall publish a notice to close the recreational sector when the ACL is projected to be met.

**Decision 4. Is there a post-season AM?**

**Alternative 5**. Specify the post-season AM.
**Subalternative 5a**. Do not specify a post-season AM.
**Subalternative 5b.** For post-season accountability measures, compare ACL with landings over a range of years. For 2011, use only 2011 landings. For 2012, use the mean landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running mean.[1]
**Subalternative 5c.** *Monitor following year.* If the ACL is exceeded, the following year's landings would be monitored for persistence in increased landings. The Regional Administrator would take action as necessary.
**Subalternative 5d.** *Monitor following year and shorten season as necessary.* If the ACL is exceeded, the following year's landings would be monitored in-season for

persistence in increased landings. The Regional Administrator will publish a notice to reduce the length of the fishing season as necessary.

**Subalternative 5e.** *Monitor following year and reduce bag limit as necessary.* If the ACL is exceeded, the following year's landings would be monitored for persistence in increased landings. The Regional Administrator will publish a notice to reduce the bag limit as necessary.

**Subalternative 5f.** *Shorten following season.* If the 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 ACL for the following fishing season.

**Subalternative 5g (Preferred).** *Payback.* If the ACL is exceeded, the Regional Administrator shall publish a notice to reduce the ACL in the following season by the amount of the overage.

# What Are the Expected Effects?

## Biological Impacts

**Action 1:** The preferred alternative (**Alternative 2**) would have beneficial effects to the red grouper stock as it provides a reference point to monitor the long-term performance of the stock.

**Action 2:** Taking no action could result in the red grouper stock's biomass fluctuating frequently between an overfished and rebuilt status because the current MSST is set too close to SSBmsy (the stock biomass expected to exist under equilibrium conditions when fishing at $F_{MSY}$). **Alternatives 2-4** would establish a larger buffer between what is considered to be an overfished and rebuilt condition. The benefits of the preferred alternative (**Alternative 3**) are intermediate between **Alternatives 2 and 4**.

**Action 3:** The Council is proposing the longest time period to rebuild the red grouper stock (**Alternative 5**). A longer rebuilding schedule would, in general: 1) offer lower beneficial impacts to the biological environment, 2) allow stocks to be harvested at higher rates as they rebuild, and 3) increase the risk that environmental or other factors could prevent the stock from recovering.

**Action 4:** This action determines the target level of fishing mortality during the rebuilding time frame. The greatest biological benefit would be provided by **Alternative 3 (Preferred)**, which would specify an ABC equal to the yield 75%$F_{MSY}$. A larger sustainable biomass associated with the preferred fishing mortality rate would be beneficial for the stock.

**Action 5:** The biological effects of options that allocate more of the ABC to the commercial sector could have a greater biological benefit because there is less of a change than a commercial ACL is exceeded than a recreational ACL. Commercial data can be more closely monitored as they are based on dealer reports; whereas much of the recreational data (except headboat data) are based on survey information. The preferred allocation alternative (**Subalterantive 2e**), however, divides the ABC more or less evenly between the commercial and recreational sectors.

**Action 6:** This action establishes the ACL for red grouper. Alternatives 3 and 4 would have a greater positive biological effect than the preferred alternative (**Alternative 2**) because they would create a buffer between the ACL and ABC. Creating a buffer between the ACL and ABC would provide greater assurance overfishing would not occur. **Alternatives 5 and 6 (Preferreds)** would eliminate the aggregate commercial and recreational ACLs and accountability measures (AMs)

currently in place for red grouper, black grouper, and gag. An ACL for black grouper is being established through the Comprehensive ACL Amendment.

**Action 7:** By prohibiting harvest, sale and possession of red grouper after the ACL is met or projected to be met, **Alternative 3** would benefit the biological environment by providing a disincentive to target red grouper once the ACL has been reached. **Alternative 4 (Preferred)** would complement **Alternative 3 (Preferred)** because it would implement a payback provision to correct for any ACL overages post-season. A reduced ACL due to paying back an overage could result in a shortened season the following fishing year which could in turn increase regulatory discards. However, **Alternative 3 (Preferred)** would alleviate the discards problem by allowing commercial fishermen to retain the bag limit after the ACL has been met. Overall, the effects of the two preferred alternatives on the biological environment would be positive.

**Action 8:** The combination of preferred subalternatives under this action constitutes the Accountability Measure for the recreational sector. An ACT would be set under **Subalternative 2d (Preferred)**, since timely monitoring of recreational landings is more difficult than tracking commercial harvest. Then, landings would be monitored on an annual basis to determine if the ACL has been exceeded (**Subalternative 3b**). If an overage is projected to occur, then the recreational fishery would be closed (**Subalternative 4b**) and the following year's ACL would be reduced by the amount of the overage (**Subalternative 5g**). This series of steps is expected to impart positive effects on the biological environment.

## Economic Impacts

**Action 1: Alternative 2 (Preferred)**, which is recommended in the most recent SEDAR and by the SSC, has a better scientific basis. Hence, it provides a more solid ground for management actions that have economic implications.

**Action 2:** Like MSY, MSST does not alter the current harvest or use of the resource, and thus would have no direct economic effects on fishery participants and associated industries or communities. However, A low MSST level would be associated with lower probability of enacting rebuilding actions that would alter the economic environment. The economic effects of the preferred alternative (**Alternative 3**, MSST = 75% SSBmsy) fall in between those of taking no action (**Alternative 1**) and setting the MSST at 50% of the SSBmsy (**Alternative 2**).

**Action 3:** The preferred alternative (**Alternative 5)** would provide the longest rebuilding period (10 years) and hence possibly the least restrictive management measures over the rebuilding timeframe. The degree of short-term adverse economic consequences would vary according to the restrictiveness of management measures. It can be expected that more future benefits would accrue soonest under **Alternative 1 (No Action)** and latest under the preferred alternative.

**Action 4:** This action determines the target level of fishing mortality during the rebuilding time frame. The preferred alternative (**Alternative 3**) would provide the third highest economic benefits (after **Alternatives 2 and 6**). From a regional perspective, **Alternative 2** is economically superior in that it makes all constituents better off without making anybody worse off.

**Action 5:** Since **Subalternative 2e (Preferred)** equals the historical sector allocation rate from 2005-2009, the economic model does not predict any effects by adopting a 45% commercial/55% recreational allocation ratio.

**Action 6: Preferred Alternative 2** would provide the largest ACL, and would also result in the largest positive economic impacts. The dissolution of the aggregate quota for red, gag, and black (**Preferred Alternative 5**) is not expected to have any economic effects based on the analysis and it.

**Action 7: Alternative 3 (Preferred)** would provide greater short-term economic benefits to the commercial sector compared to **Alternative 4 (Preferred)** but less than **Alternative 1 (No Action). Alternative 4 (Preferred)** would provide the greatest long-term economic benefits to the commercial sector compared to **Alternatives 1 (No Action)** and **Alternative 3 (Preferred)**.

**Action 8:** The suite of preferred alternatives under this action may result in short-term negative economic effects but positive long-term effects since the setting of Accountability Measures would help prevent overfishing and allow for a sustainable fishery.

## Social Impacts

**Action 1: Alternative 2 (Preferred)** will likely have few negative social effects if the threshold is above the mean landings and not substantially reduced by other management action.

**Action 2:** The preferred alternative (**Alternative 3**) is expected to result in greater short-term social impacts than **Alternative 2** from closures and other regulations that limit harvest due to MSST being reached, but less long-term social impacts than **Alternative 4**.

**Action 3:** Generally, the shorter the rebuilding schedule, the more severe the necessary harvest restrictions. The more severe the harvest restrictions, the greater the short-term adverse effects associated with business failure, job or living dislocations, and overall adjustments for the social environment. **Alternative 5 (Preferred)** would allow the longest possible rebuilding timeframe would be expected to allow the greatest flexibility to recover red grouper and minimize the adverse social and economic effects on associated fisheries.

**Action 4:** The rebuilding strategy decision will result in the establishment of the ABC for red grouper, which will be used by the Council to select the ACL for the species, a number that can be set at but not higher than the ABC. Although a more conservative F rate would likely result in a higher probability of rebuilding over a shorter period of time, the strategy proposed under the preferred alternative (**Alternative 3**) will provide more long-term social benefits than **Alternatives 2 or 6**.

**Action 5:** The preferred allocation alternative (**Subalternative 2e**) reflects a more recent distribution between the commercial and recreational sector than other alternatives and provides the highest recreational allocation among the alternatives considered. This would benefit the recreational sector by allowing continued fishing opportunities. However, the allocation scenario could impact the commercial sector by limiting growth.

**Action 6: Alternative 2 (Preferred)** sets the ACL equal to the ABC, the highest possible ACL, and would result in fewer short-term social impacts than under alternatives that set the ACL at a percentage of the ABC. **Alternatives 5 and 6 (Preferreds)** eliminate the previously established aggregate ACL and AMs for gag, black and red grouper. Any social effects would be expected to result from a species-specific limit that could impact fishermen by limiting harvest of red grouper.

**Action 7: Alternatives 3 (Preferred)** and **4 (Preferred)** would provide sufficient protection with some beneficial social effects through the payback provision. While payback does incur short-term negative social impacts, the long-term benefits of stock protection should contribute to the overall benefits as stock status should remain at sustainable levels.

**Action 8:** The setting of AMs, including ACTs, can have significant direct and indirect effects on the social environment as they usually impose some restriction on harvest, either during the current season or the next. The long-term effects should be beneficial as they provide protection from further negative impacts on the stock. While the negative effects are usually short-term, they may at times induce other indirect effects through changes in fishing behavior or business operations that could have long-term social effects.

# Chapter 1.
# Introduction

## 1.1 What Actions Are Being Proposed?

Fishery managers are proposing changes to regulations through Amendment 24 to the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic Region (Amendment 24). 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 the Actions?

The South Atlantic Fishery Management Council (South Atlantic Council) is proposing the actions. The South Atlantic Council develops the regulations and submits them to the National Marine Fisheries Service (NOAA Fisheries Service) who ultimately approves, disapproves, or partially approves the actions in the amendment on behalf of the Secretary of Commerce. NOAA Fisheries Service 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
- Develops management plans and recommends regulations to NOAA Fisheries Service 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 FMP for the Snapper Grouper Fishery of the South Atlantic Region (SAFMC 1983) (**Figure 1-1**).

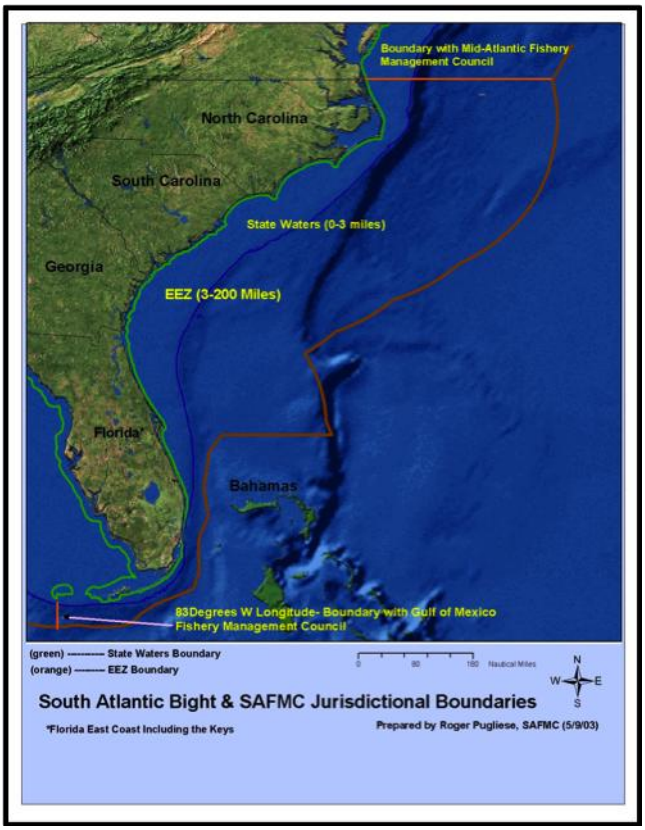



**Figure 1-1.** Jurisdictional boundaries of the South Atlantic.

## 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). As directed by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the South Atlantic Council and NOAA Fisheries Service 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.

### *Purpose for Action*

Specify annual mortality limits in a rebuilding plan that ultimately provides a blueprint to increase red grouper biomass to a sustainable levels within a specified time period.

### *Need for Action*

To end overfishing and rebuild the stock while minimizing, to the extent practicable, adverse social and economic effects.

## 1.5 What are Problems with An Overfished Stock Undergoing Overfishing?

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

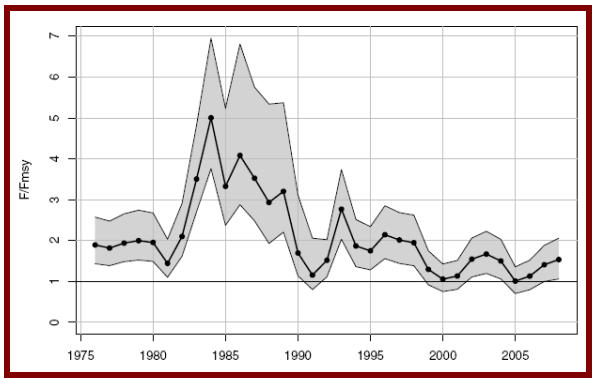



**Figure 1-2.** The overfishing ratio for red grouper over time. The stock is undergoing overfishing when the $F/F_{MSY}$ is greater than one.

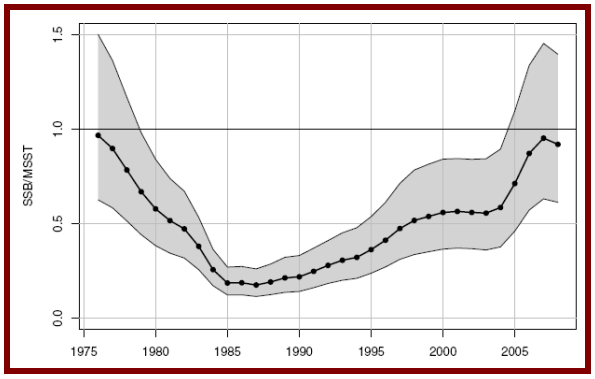



**Figure 1-3.** The overfished ratio for red grouper over time. The stock is overfished when the $B/B_{MSY}$ is less than one.

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 (MSY). Further problems associated with overfishing and overfished stocks may include reduced population stability; lower or more unpredictable yields and difficulty sustaining viable commercial fishing and charterboat operations; reduced availability to recreational anglers; higher costs to consumers; economic losses to related businesses (e.g., marinas, tackle shops, restaurants); and possibly, shifts in ecosystem dynamics.

## 1.6 How Long Does the South Atlantic Council and NOAA Fisheries Service Have to Implement Measures?

NOAA Fisheries Service notified the South Atlantic 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 South Atlantic 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. The 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 Environmental Impact Statement (EIS) contained within Amendment 24 includes alternatives that would establish ACLs and AMs for red grouper in the South Atlantic region.

The South Atlantic Council and NOAA Fisheries Service 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 South Atlantic Council and NOAA Fisheries Service believe 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 (lbs 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 South Atlantic Council Determine the Annual Catch Limits?

The South Atlantic Council is utilizing several tools to end overfishing and rebuild the red grouper stock. These include utilizing two determinations from the South Atlantic 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 South Atlantic Council is proposing an annual catch limit (ACL) for the red grouper stock in the South Atlantic.

The SSC recommended an 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% within the SSC's recommended rebuilding timeframe of 10 years. The probability rate was used to determine the ABC throughout the rebuilding timeframe.

***SSC Recommendations for Red Grouper for 2011***

**OFL**
Yield at $F_{MSY}$

**ABC**
Projected yield stream with a 70% rebuilding success

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

***Proposed Actions in Amendment 24***

1. Maximum Sustainable Yield
2. Minimum Stock Size Threshold
3. Rebuilding Schedule
4. Rebuilding Strategy and Acceptable Biological Catch Levels
5. Allocations
6. Annual Catch Limits and Optimum Yield
7. Accountability Measures for the Commercial Sector
8. Accountability Measures for the Recreational Sector

## 2.1 Action 1. Re-define Maximum Sustainable Yield

### 2.1.1 Alternatives

The South Atlantic 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. | $F_{30\%SPR}$=0.178[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]Estimate from the Beaufort catch-age model
[2,3]SEDAR 19 (2010)

### *What Does This Table Mean?*

The current definition of the MSY is the level of yield produced by $F_{MSY}$ when the stock is rebuilt (at equilibrium) where $F_{30\%SPR}$ is used as a proxy for $F_{MSY}$. SEDAR 19 (2010) specifies the value for $F_{30\%SPR}$ equal to 0.178, however, the poundage for MSY has not been specified. The South Atlantic Council would like to modify the definition of MSY in order to remove the reference to a specific value ($F_{30\%SPR}$). By not specifying the value for the $F_{MSY}$ proxy, the MSY level may be modified with each new assessment without having to go through the amendment process.

- Current MSY = yield produced by $F_{MSY}$ where $F_{30\%SPR}$ is the $F_{MSY}$ proxy
- Proposed change to definition
- Assessment indicates that $F_{MSY}$ = 0.2

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

## 2.1.2 Comparison of Alternatives

**Table 2-2.** Summary of effects under **Action 1**.

| Alternatives | Biological Effects | Socioeconomic/Administrative Effects |
|---|---|---|
| **Alternative 1 (No Action).** MSY=yield of $F_{MSY}$ | - | - |
| **Alternative 2 (Preferred).** MSY and $F_{MSY}$ are recommended by the most recent SEDAR/SSC. | + | + |

In **Alternative 1**, $F_{MSY}$ is estimated to equal from the $F_{30\%SPR}$ proxy; however, MSY is not specified. MSY is a function of certain characteristics of the current fish population, such as its age and size structure. **Alternative 2** offers the best estimate of the true $F_{MSY}$ and the only estimate of MSY. As **Preferred Alternative 2** provides a better estimate of MSY, it affords greater probability for long-term protection of the stock and consequently higher probability for the long-term viability of both commercial and recreational fisheries.

Specifying MSY, however, establishes the platform for future management, specifically from the perspective of bounding allowable harvest levels. In this sense, MSY may be considered to have indirect effects on fishery participants. **Alternative 2 (Preferred)**, which is recommended in the most recent SEDAR and by the SSC, has a better scientific basis. Hence, it provides a more solid ground for management actions that have economic implications. **Alternative 1 (No Action)** would likely have few social impacts as it uses the present value for $F_{MSY}$. **Alternative 2 (Preferred),** which uses the MSY proxy recommended by their SSC, will likely have few negative social effects if the threshold is above the mean landings and not substantially reduced by other management action.

## 2.2 Action 2. Re-define Minimum Stock Size Threshold

### 2.2.1 Alternatives

The South Atlantic Council is proposing a change to the current definition of MSST (**Table 2-3**).

**Table 2-3.** MSST alternatives added 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[1] | 4,914,053[1] |
| **Alternative 2** | MSST equals 50% of $SSB_{MSY}$ | n/a | 2,857,162 |
| **Alternative 3 (Preferred)** | MSST equals 75% of $SSB_{MSY}$ | n/a | 4,285,742 |
| **Alternative 4** | MSST equals 85% of $SSB_{MSY}$ | n/a | 4,857,175 |
| **Alternative 5** | MSST at which rebuilding to the MSY level would be expected to occur within 10 years at the MFMT level.[2] | | |

[1]Source: Determination from SEDAR 19 (2010).
[2]At the December 2010 meeting, the South Atlantic Council requested the Southeast Fisheries Science Center (SEFSC) provide an estimate of the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years when fishing mortality is at the minimum fishing mortality threshold (MFMT) level and that

***Why is the Council Considering a Change to MSST?***

**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 $SSB_{MSY}$, but allows for it to be greater than this value if natural mortality (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 $SSB_{MSY}$ (5,714,323 whole weight) as defined by the South Atlantic Council's current MSST definition. Therefore, if this definition is maintained, then MSST would be very close to $SSB_{MSY}$, which is the stock biomass expected to exist under equilibrium conditions when fishing at $F_{MSY}$.

Because M is small, the current definition of MSST would trigger a rebuilding plan if biomass fell slightly below $SSB_{MSY}$. 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 $SSB_{MSY}$.

**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 1**, 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.

## 2.2.2 Comparison of Alternatives

**Table 2-4.** Summary of effects under **Action 2**.

| Alternatives | Biological Effects | Socioeconomic/Administrative Effects |
|---|---|---|
| **Alternative 1 (No Action)** | + | - |
| **Alternative 2.** MSST equals 50% of $SSB_{MSY}$ | -- | + |
| **Alternative 3 (Preferred).** MSST equals 75% of $SSB_{MSY}$ | - | The economic implications of the other alternatives may be characterized as falling between those of **Alternatives 1 (No Action) and 2**. |
| **Alternative 4.** MSST equals 85% of $SSB_{MSY}$ | + | |
| **Alternative 5.** MSST at which rebuilding to the MSY level would be expected to occur within 10 years at the MFMT level | Not estimated | |

**Alternatives 2** through **4** would establish a larger buffer than **Alternative 1 (No Action)** between what is considered to be an overfished and rebuilt condition. **Alternative 2** would allow stock biomass to decrease to as little as 50% of the MSY level before an overfished determination was made. As **Alternative 2** would allow for the greatest decrease in biomass before an overfishing determination is made, it would have the least amount of biological benefit among **Alternatives 1-4**. The biological effect of **Alternative 3 (Preferred)** would be intermediate between **Alternatives 2** and **4**. The impacts of **Alternative 4** would be similar to **Alternative 1** as the difference in the MSST value between the two alternatives is 56,878 pounds. The biological impacts of **Alternative 5** have not been estimated as the Southeast Regional Science Center stated that the computation of MSST as recommended by **Alternative 5** would need to be completed through projection methods usually done during the stock assessment process. The computation of MSST through projection methods raises several practical and technical issues as documented in **Appendix D**.

**Alternative 2** would appear to be best from an economics standpoint, because it is unlikely to trigger restrictive rebuilding actions in the short term. One possible downside of this alternative is that once the stock is considered overfished, the required rebuilding actions could be very restrictive and potentially remain for quite some time. **Alternative 1 (No Action)** lies on the opposite end because it has the highest probability of triggering restrictive rebuilding actions. The economic implications of the other alternatives may be characterized as falling between those of **Alternatives 1 (No Action) and 2**.

## 2.3 Action 3. Establish a Rebuilding Schedule

### 2.3.1 Alternatives

**Table 2-5.** Rebuilding schedule alternatives for red grouper.

| Alternatives | Definition |
|---|---|
| **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 7 years with the rebuilding time period ending in 2017. 2011 is Year 1. |
| **Alternative 4** | Define a rebuilding schedule as the mid-point between the shortest possible and maximum recommended period to rebuild. This would equal 8 years with the rebuilding time period ending in 2018. 2011 is Year 1. |
| **Alternative 5 (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. |

***What Does This Table 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 South Atlantic Council must specify a rebuilding plan.

One component of the rebuilding plan is to determine the number 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 as 10 years. If the stock cannot be rebuilt in 10 years then the maximum allowable rebuilding time is 10 years plus one generation. The South Atlantic Council is considering a range of 3 to 10 years to rebuild red grouper.

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

## 2.3.2 Comparison of Alternatives

**Table 2-6.** Summary of effects under **Action 3**.

| Alternatives | Biological Effects | Socioeconomic/Administrative Effects |
|---|---|---|
| **Alternative 1 (No Action)** | - | |
| **Alternative 2** | ++++ | Most restrictive |
| **Alternative 3** | +++ | The restrictiveness of management measures for **Alternative 3** (7 years) and **Alternative 4** (8 years) would fall between that of **Alternatives 1 (No Action) and 5**. |
| **Alternative 4** | ++ | |
| **Alternative 5 (Preferred)** | + | Least restrictive |

**Alternative 2, 3, 4,** and **5 (Preferred)** would establish schedules that would achieve rebuilding within time periods allowed by the Magnuson-Stevens Act, and therefore, **Alternative 2, 3, 4,** and **5 (Preferred)** would be expected to benefit the ecological environment by restoring a crucial link within the trophic structure of the ecosystem. See the text box above for a comparison between alternatives. **Alternative 2** would have the greatest biological benefits as it would rebuild the stock in the shortest amount of time, with **Alternative 5** (**Preferred**) the least of all the action alternatives.

**Alternative 1 (No Action)** would not be a viable alternative because the most recent stock assessment determined red grouper to be overfished, thereby requiring a rebuilding plan. **Alternative 2** would provide the shortest rebuilding period of 3 years and very likely the most restrictive management measures over the rebuilding timeframe. **Alternative 5 (Preferred)** would provide the longest rebuilding period of 10 years and hence possibly the least restrictive management measures over the rebuilding timeframe. The restrictiveness of management measures for **Alternative 3** (7 years) and **Alternative 4** (8 years) would fall between that of **Alternatives 1 (No Action) and 5**. The degree of short-term adverse economic consequences would directly vary with the restrictiveness of management measures implied under the various alternatives. It can be expected that more future benefits would accrue soonest under **Alternative 1 (No Action)** and latest under **Alternative 5**.

**Alternatives 2-5 (Preferred)** specify rebuilding schedules of different length. Red grouper would be closed during the initial years under each rebuilding schedule and would likely be closed for longer periods within the years for rebuilding schedules of shorter length, which require more restrictive management measures. Faster recovery conceptually allows faster receipt of the benefits of a recovered resource -- a long-term positive effect on fishermen and fishing communities -- but it is less likely that the resource could recover under the shortest

schedule (**Alternative 2**) and the restrictions would likely be more severe, increasing immediate social impacts on fishermen. Regardless of duration, severe restrictions on red grouper harvest could result in loss of the jobs in commercial and for-hire fleets, and after even just a few years, the commercial and for-hire sectors may not recover. Under the intermediate rebuilding schedules in **Alternative 3** and **Alternative 4**, recovery of the red grouper stock is realistic and likely would not require reduced harvest to meet the rebuilding strategy, resulting in less short-term social impacts in **Alternative 2. Alternative 5 (Preferred)** would allow the longest possible rebuilding timeframe would be expected to allow the greatest flexibility to recover red grouper and minimize the adverse social and economic effects on associated fisheries.

4.3.4 Administrative

## 2.4 Action 4. Establish a Rebuilding Strategy and Acceptable Biological Catch Levels

### 2.4.1 Alternatives

The South Atlantic Council is proposing the implementation of a rebuilding plan for red grouper as the stock is overfished. The South Atlantic Council is considering a range of rebuilding strategy alternatives that define the maximum fishing mortality rate throughout the rebuilding timeframe. The alternatives are listed following **Tables 2-7 and 2-8** that summarize the alternatives.

## Summary Table

**Table 2-7.** A summary of the rebuilding strategy alternatives for red grouper

| Alternatives | Rebuilding strategy ($F_{OY}$ Equal To) | | ABC (lbs whole weight) *Landings and Discards* | ABC (lbs whole weight) *Landings* |
|---|---|---|---|---|
| | Scenario | F rate | | |
| **Alternative 1 (No Action)** | $F_{45\%SPR}$ | 0.1055 | 399,000 (2011)<br>468,000 (2012)<br>537,000 (2013)<br>602,000 (2014) | 374,000 (2011)<br>442,000 (2012)<br>511,000 (2013)<br>575,000 (2014) |
| **Alternative 2** | $F_{REBUILD}$ (10 years) | 0.181 | 665,000 (2011)<br>737,000 (2012)<br>806,000 (2013)<br>866,000 (2014) | 622,000 (2011)<br>693,000 (2012)<br>762,000 (2013)<br>822,000 (2014) |
| **Alternative 3 (Preferred)** | $75\%F_{MSY}$ | 0.166 | 613,000 (2011)<br>687,000 (2012)<br>759,000 (2013)<br>821,000 (2014) | 573,000 (2011)<br>647,000 (2012)<br>718,000 (2013)<br>780,000 (2014) |
| **Alternative 4** | $65\%F_{MSY}$ | 0.144 | 535,000 (2011)<br>610,000 (2012)<br>683,000 (2013)<br>749,000 (2014) | 501,000 (2011)<br>575,000 (2012)<br>648,000 (2013)<br>713,000 (2014) |
| **Alternative 5** | $F_{REBUILD}$ (7 years) | 0.157 | 583,000 (2011)<br>657,000 (2012)<br>730,000 (2013)<br>794,000 (2014) | 545,000 (2011)<br>619,000 (2012)<br>691,000 (2013)<br>755,000 (2014) |
| **Alternative 6** | $F_{REBUILD}$ (8 years) | 0.168 | 620,000 (2011)<br>695,000 (2012)<br>765,000 (2013)<br>828,000 (2014) | 580,000 (2011)<br>654,000 (2012)<br>724,000 (2013)<br>787,000 (2014) |

NOTE: Alternatives 2-4 are based on a 70% probability of rebuilding success in 10 years. Alternative 5 is based on a 70% probability of rebuilding success in 7 years. Alternative 6 is based on a 70% probability of rebuilding success in 8 years.

**Table 2-8.** A comparison of rebuilding strategy alternatives for red grouper in terms of probability of stock recovery.

| | Alternatives | | | | | |
|---|---|---|---|---|---|---|
| | **1** (No Action) | **2** $F_{REBUILD}$ (10 years) | **3** $75\%F_{MSY}$ | **4** $65\%F_{MSY}$ | **5** $F_{REBUILD}$ (7 years) | **6** $F_{REBUILD}$ (8 years) |
| **Probability of rebuilding to $SSB_{MSY}$ in 10 years (2020)** | n/a | 70% | 81% | 92% | n/a | n/a |
| **Probability of rebuilding to $SSB_{MSY}$ in 7 years (2017)** | n/a | 54% | 64% | 78% | 70% | n/a |
| **Probability of rebuilding to $SSB_{MSY}$ in 8 years (2018)** | n/a | 61% | 72% | 85% | n/a | 70% |
| **Year in which 50% probability of rebuilding to $SSB_{MSY}$ would be reached** | 2014[1] | 2017 | 2016 | 2016 | 2015[2] | 2016[3] |

[1]Based upon a $F_{30\%SPR}$ proxy for $F_{MSY}$
[2]A 48% probability of rebuilding
[2]A 54% probability of rebuilding
NOTE: Alternatives 2-4 are based on a 70% probability of rebuilding success in 10 years. Alternative 5 is based on a 70% probability of rebuilding success in 7 years. Alternative 6 is based on a 70% probability of rebuilding success in 8 years.

## Alternatives

**Alternative 1 (No Action).** Do not specify a rebuilding strategy.

**Alternative 2.** Define a rebuilding strategy for red grouper that sets ABC equal to the yield at $F_{REBUILD}$. $F_{REBUILD}$ 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 Overfishing Limit is the yield at $F_{MSY}$.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee is the projected yield stream with a 70% probability of rebuilding success.
- The Acceptable Biological Catch values with dead discards would be 665,000 lbs whole weight (2011), 737,000 lbs whole weight (2012), 806,000 lbs whole weight (2013), and 866,000 lbs whole weight (2014).
- The Acceptable Biological Catch values without dead discards would be 622,000 lbs whole weight (2011), 693,000 lbs whole weight (2012), 762,000 lbs whole weight (2013), and 822,000 lbs whole weight (2014).

**Table 2-9.** Projection results if the fishing mortality rate is fixed at F = Rebuild with a 70% probability of rebuilding success in 10 years.

| Year | F(per year) | Probability of Rebuilt Stock | Projections | | |
|---|---|---|---|---|---|
| | | | 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 |

***Where Does a 70% Probability of Rebuilding Success Come From?***

The SSC is recommending a P* of .30. A P* is the risk that overfishing is occurring. The probability of rebuilding success = 100 – P*. So in the case of red grouper, the SSC is recommending that the Council chooses a rebuilding plan that would be expected to have a 70% chance or better of rebuilding to the target within the specified rebuilding timeframe.

**Alternative 3 (Preferred).** Define a rebuilding strategy for red grouper that sets ABC equal to the yield at 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 Overfishing Limit is the yield at $F_{MSY}$.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee is the projected yield stream with a 70% probability of rebuilding success.
- The Acceptable Biological Catch values with dead discards would be 613,000 lbs whole weight (2011), 687,000 lbs whole weight (2012), 759,000 lbs whole weight (2013), and 821,000 lbs whole weight (2014).
- The Acceptable Biological Catch values without dead discards would be 573,000 lbs whole weight (2011), 647,000 lbs whole weight (2012), 718,000 lbs whole weight (2013), and 780,000 lbs whole weight (2014).

**Table 2-10.** Projection results if the fishing mortality rate is fixed at F = 75%$F_{MSY}$.

| Year | F (per year) | Probability of Rebuilt Stock | Projections | | |
|---|---|---|---|---|---|
| | | | 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 4.** Define a rebuilding strategy for red grouper that sets ABC equal to the yield at 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 Overfishing Limit is the yield at $F_{MSY}$.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee is the projected yield stream with a 70% probability of rebuilding success.
- The Acceptable Biological Catch values with dead discards would be 535,000 lbs whole weight (2011), 610,000 lbs whole weight (2012), 683,000 lbs whole weight (2013), and 749,000 (2014).
- The Acceptable Biological Catch values without dead discards would be 501,000 lbs whole weight (2011), 575,000 lbs whole weight (2012), and 648,000 lbs whole weight (2013), and 713,000 lbs whole weight (2014).

**Table 2-11.** Projection results if the fishing mortality rate is fixed at F = 65%$F_{MSY}$.

| Year | F (per year) | Probability of Rebuilt Stock | Projections | | |
|---|---|---|---|---|---|
| | | | 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 5.** Define a rebuilding strategy for red grouper that sets ABC equal to the yield at $F_{REBUILD}$. $F_{REBUILD}$ is a fishing mortality rate that would have a 70% probability of rebuilding success to $SSB_{MSY}$ in 7 years. 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 Overfishing Limit is the yield at $F_{MSY}$.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee is the projected yield stream with a 70% probability of rebuilding success.
- The Acceptable Biological Catch values with dead discards would be 583,000 lbs whole weight (2011), 657,000 lbs whole weight (2012), 730,000 lbs whole weight (2013), and 794,000 lbs whole weight (2014).
- The Acceptable Biological Catch values without dead discards would be 545,000 lbs whole weight (2011), 619,000 lbs whole weight (2012), 691,000 lbs whole weight (2013), and 755,000 lbs whole weight (2014).

**Table 2-12.** Projection results if the fishing mortality rate is fixed at F = Rebuild with a 70% probability of rebuilding success in 7 years.

| Year | F (per year) | Probability of Rebuilt Stock | Projections | | |
|---|---|---|---|---|---|
| | | | 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 |

**Alternative 6.** Define a rebuilding strategy for red grouper that sets ABC equal to the yield at $F_{REBUILD}$. $F_{REBUILD}$ is a fishing mortality rate that would have a 70% probability of rebuilding success to $SSB_{MSY}$ in 8 years. Under this strategy, the fishery would have at least a 54% chance of rebuilding to $SSB_{MSY}$ by 2016 and 70% chance of rebuilding to $SSB_{MSY}$ by 2018.

- The Overfishing Limit is the yield at $F_{MSY}$.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee is the projected yield stream with a 70% probability of rebuilding success.
- The Acceptable Biological Catch values with dead discards would be 620,000 lbs whole weight (2011), 695,000 lbs whole weight (2012), 765,000 lbs whole weight (2013), and 828,000 lbs whole weight (2014).
- The Acceptable Biological Catch values dead discards would be 580,000 lbs whole weight (2011), 654,000 lbs whole weight (2012), 724,000 lbs whole weight (2013), and 787,000 lbs whole weight (2014).

**Table 2-13.** Projection results if the fishing mortality rate is fixed at F = Rebuild with a 70% probability of rebuilding success in 8 years.

| Year | F (per year) | Probability of Rebuilt Stock | Projections | | |
|---|---|---|---|---|---|
| | | | 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) | 0.168 | 0.01 | 580,000 | 40,000 | 620,000 |
| 2012 | 0.168 | 0.07 | 654,000 | 41,000 | 695,000 |
| 2013 | 0.168 | 0.17 | 724,000 | 41,000 | 765,000 |
| 2014 | 0.168 | 0.3 | 787,000 | 41,000 | 828,000 |
| 2015 | 0.168 | 0.42 | 840,000 | 42,000 | 882,000 |
| 2016 | 0.168 | 0.54 | 886,000 | 42,000 | 928,000 |
| 2017 | 0.168 | 0.63 | 924,000 | 42,000 | 966,000 |
| 2018 | 0.168 | 0.70 | 956,000 | 42,000 | 998,000 |

## *What Do These Tables Mean?*

A rebuilding strategy is the second component to a 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 rebuilding is higher.

## 2.4.2 Comparison of Alternatives

**Table 2-14.** Summary of effects under **Action 4**.

| Alternatives | Biological Effects | Socioeconomic/Administrative Effects |
|---|---|---|
| **Alternative 1 (No Action)** | - | |
| **Alternative 2** | + | **Alternative 2** is economically superior to the other alternatives due to the amount of additional NOR that is expected to be generated in a particular time horizon. **Alternatives 3 (Preferred) and 6** are the next best alternatives, followed by **Alternative 5**. **Alternative 4** accrues the least benefits. Negative effects on business activity for all states would result from **Alternatives 5 and 6**. |
| **Alternative 3 (Preferred)** | ++ | |
| **Alternative 4** | ++++ | |
| **Alternative 5** | +++ | |
| **Alternative 6** | ++ | |

There are negative consequences with retaining **Alternative 1 (No Action).** Although the rebuilding strategy is specified ($F_{45\%SPR}$), the ABC, ACL, and OY levels are not explicitly stated. The specification of targets and limits are a crucial component of any management program involving natural resources. Without the designation of these components, regulations may not be sufficient to prevent overfishing.

ABC, ACL, and OY values at equilibrium in the alternatives are distinguished from each another by the level of risk (and associated tradeoffs) each would assume. The more conservative the estimates, the larger the sustainable biomass when the stock is rebuilt.

**Alternatives 2-6** would have positive biological effects to the stock as a biological benchmark, in the form of an Acceptable Biological Catch level, would be established for management. The alternatives may be ranked by the allowable, maximum fishing mortality rate of each rebuilding strategy. Beginning with the least amount of expected beneficial effects, the ranking of alternatives are as follows: **Alternative 2** (0.181), **Alternative 6** (0.168), **Alternative 3 (Preferred)** (0.166), **Alternative 5** (0.157), **Alternative 4** (0.144). The effects of **Alternatives 3 and 6** would be expected to be similar as difference in the allowable fishing mortality rate is only 0.002.

**Alternative 2** is economically superior to the other alternatives due to the amount of additional NOR that is expected to be generated in a particular time horizon. **Preferred Alternative 3**

ranks third behind **Alternatives 2 and 6**. Finally, fishers in Georgia and Florida are predicted to only receive relatively minor benefits from the proposed rebuilding plans. The most generated by these fishers would be $40,000 by central south Florida boats under **Alternatives 2 and 6**. **Alternative 2** would generate the largest positive impacts on employment, income, and output for all states combined. On a state-by-state basis, **Alternative 2** would dominate the other alternatives for all states, except Florida for which **Preferred Alternative 3** would be best. While the overall effects of **Preferred Alternative 3** would be positive for all states combined, Georgia/Northeast Florida would experience some reductions in business activities. Negative effects on business activity for all states would result from **Alternatives 5 and 6**.

## 2.5 Action 5. Specify Sector Allocations

### 2.5.1 Alternatives

The South Atlantic Council and NOAA Fisheries Service 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 South Atlantic Council and NOAA Fisheries Service have determined 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 Environmental Impact Statement (EIS), including those that base allocation decisions on historical landings.

**Alternative 1 (No Action).** Do not establish a sector allocation of the red grouper annual catch limit (ACL).

**Alternative 2 (Preferred).** Specify allocations for the commercial and recreational sectors based on criteria as outlined in one of the following options:

**Subalternative 2a**. Commercial = 60% and recreational = 40% (Established by using catch history from 1986-2008).

**Subalternative 2b**. Commercial = 67% and recreational = 33% (Established by using catch history from 1986-1998).

**Subalternative 2c**. Commercial = 55% and recreational = 45% (Established by using catch history from 1999-2008).

**Subalternative 2d**. Commercial = 43% and recreational = 57% (Established by using catch history from 2006-2008).

**Subalternative 2e (Preferred)**. Commercial = 45% and recreational = 55% (Established by using 50% of catch history from 1991-2008 + 50% of catch history from 2006-2008).

**Alternative 3.** Specify allocations for the commercial, for-hire, and recreational sectors based on criteria as outlined in one of the following options:

**Subalternative 3a**. Commercial = 60%, for-hire = 28%, and recreational = 12% (Established by using catch history from 1986-2008).

**Subalternative 3b**. Commercial = 67%, for-hire = 20%, and recreational = 13% (Established by using catch history from 1986-1998).

**Subalternative 3c**. Commercial = 55%, for-hire = 34%, and recreational = 11% (Established by using catch history from 1999-2008).

**Subalternative 3d**. Commercial = 43%, for-hire = 49%, and recreational = 8% (Established by using catch history from 2006-2008).

**Subalternative 3e**. Commercial = 45%, for-hire = 28%, and recreational = 27% (Established by using 50% of catch history from 1991-2008 + 50% of catch history from 2006-2008).

Add table (Table 2-15) that shows the ACLs under all these alternatives once there is preferred rebuilding strategy and ACL.

## 2.5.2 Comparison of Alternatives

**Table 2-16.** Summary of effects under **Action 5**.

| Alternatives | Biological Effects | Socioeconomic/Administrative Effects |
|---|---|---|
| **Alternative 1 (No Action)** | - | See text below for explanation as socio-economic effects vary by state and sector |
| **Subalternative 2a** | ++ | |
| **Subalternative 2b** | ++ | |
| **Subalternative 2c** | ++ | |
| **Subalternative 2d** | ++ | |
| **Subalternative 2e (Preferred)** | ++ | |
| **Subalternative 3a** | + | |
| **Subalternative 3b** | + | |
| **Subalternative 3c** | + | |

| Alternatives | Biological Effects | Socioeconomic/Administrative Effects |
|---|---|---|
| **Subalternative 3d** | + | |
| **Subalternative 3e** | + | |

**Alternatives 2 and 3**, including the associated sub-alternatives, would have positive effects to the stock allocation decisions allow managers to separate the stock ACL into sector-ACLs. As such, the specification of allocations is a often a necessary component of the fishery management system that specifies catch limits and accountability measures. The biological effects of the different allocation alternatives would be similar if landings in various sectors could be closely monitored. Given that recreational data can be less certain when recreational data are divided into sectors, the chance of an ACL being exceeded could be greatest for options under **Alternative 3**. Further, the biological effects of options that allocate more of the ABC to the commercial sector could have a greater biological effect because there is a greater chance a recreational ACL would be exceeded than a commercial ACL. Commercial data can often be more closely monitored as they are based on dealer reports; whereas, much of the recreational data (except headboat data) are based on survey information.

In terms of the commercial sector, **Subalternative 2b**, which would assign the largest allocation to the commercial sector, would also result in the largest positive effects for all states combined. A slightly different scenario is depicted when state-by-state effects are considered. **Subalternative 2b** would result in larger impacts than **Subalternative 2a** for North Carolina but not for the other states. In addition, the effects of the alternatives are not unidirectional. **Subalternatives 2a, 2b, and 2c** would have negative impacts on Georgia/Northeast Florida and positive for all other states. **Preferred Subalternative 2e** would not result in any changes to business activity, because the allocation ratio under this subalternative would be the same as that of the no action alternative. One more issue to consider in the tabulated results is that the effects of the various subalternatives under **Alternative 3** would be the same as those of the corresponding subalternatives under **Alternative 2**.

In terms of the recreational fishery, the alternatives may be ranked in descending order as follows: **Subalternative 2d**, **Subalternative 2e (Preferred)**, **Subalternative 2c**, **Subalternative 2a**, and **Subalternative 2b**. This ranking is mainly driven by the size of the recreational allocation, with the highest allocation under **Subalternative 2e (Preferred)** and the lowest under **Subalternative 2a**. Worth noting in the results is that the effects of **Subalternative 2a** would turn from negative to positive when moving from a 4-year to a 10-year horizon.

## 2.6 Action 6. Specify Annual Catch Limits and Optimum Yield

### 2.6.1 Alternatives

Note: More than one preferred alternative may be chosen.

**Alternative 1 (No Action).** An individual ACL is currently not in place for red grouper. Retain aggregate recreational and commercial ACLs for black grouper, red grouper, and gag. The commercial sector ACL for gag, black grouper, and red grouper is 662,403 lbs gw (781,636 lbs ww) and 648,663 lbs gw (765,422 lbs ww) for the recreational sector. The total group ACL is 1,311,066 lbs gw (1,547,058 lbs ww). These values are equivalent to the expected catch resulting from the implementation of management measures for red grouper in Amendment 16 and specified in Amendment 17B.

**Alternative 2 (Preferred)**. ACL = OY = ABC. Specify commercial and recreational ACLs for red grouper for 2012, 2013, and 2014 and beyond as indicated in the table below (**Table 2-17**). The ACL for 2014 would remain in effect until modified. ACLs will not increase in a subsequent year if present year projected catch has exceeded the ACL.

**Alternative 3.** ACL = OY = 90% of the ABC. Specify commercial and recreational ACLs for red grouper for 2012, 2013, and 2014 and beyond as indicated in the table below (**Table 2-18**). The ACL for 2014 would remain in effect until modified. ACLs will not increase in a subsequent year if present year projected catch has exceeded the ACL.

**Alternative 4.** ACL = OY = 80% of the ABC. Specify commercial and recreational ACLs for red grouper for 2012, 2013, and 2014 and beyond as indicated in the table below (**Table 2-19**). The ACL for 2014 would remain in effect until modified. ACLs will not increase in a subsequent year if present year projected catch has exceeded the ACL.

**Alternative 5 (Preferred).** Eliminate the commercial sector aggregate ACL of 662,403 lbs gw for black grouper, gag, and red grouper. Eliminate the in-season AM that specifies a prohibition on possession of all shallow water groupers once the commercial aggregate ACL is projected to be met.

**Alternative 6 (Preferred).** Eliminate the recreational sector aggregate ACL of 648,663 lbs gw for black grouper, gag, and red grouper. Eliminate the in-season AM that specifies a prohibition on possession of black grouper, gag, and red grouper once the ACL is projected to be met if any one of the three species is listed as overfished. Eliminate the post-season AM that specifies a reduction in a subsequent year's ACL by the amount of an overage if landings exceed the aggregate ACL. Eliminate the regulation that states that the recreational landings are evaluated relative to the ACL as follows: For 2010, only 2010 recreational landings will be compared to

the ACL; in 2011, the average of 2010 and 2011 recreational landings will be compared to the ACL; and in 2012 and subsequent fishing years, the most recent 3-year running average recreational landings will be compared to the ACL.

**Table 2-17.** The ACL values (lbs whole weight) for red grouper in Alternative 2 (ACL=ABC). ACL values are based on preferred allocation alternative (45% commercial/55% recreational).

| **Alt. 2 ACL=ABC (Preferred)** | | | | | | |
|---|---|---|---|---|---|---|
| **Commercial** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| | 2012 | 311,850 | 291,150 | 258,750 | 278,550 | 294,300 |
| | 2013 | 342,900 | 323,100 | 291,600 | 310,950 | 325,800 |
| landings | 2014 | 369,900 | 351,000 | 320,850 | 339,750 | 354,150 |
| | | | | | | |
| | 2012 | 331,650 | 309,150 | 274,500 | 295,650 | 312,750 |
| landings and | 2013 | 362,700 | 341,550 | 307,350 | 328,500 | 344,250 |
| discards | 2014 | 389,700 | 369,450 | 337,050 | 357,300 | 372,600 |
| | | | | | | |
| **Recreational** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| | 2012 | 381,150 | 355,850 | 316,250 | 340,450 | 359,700 |
| | 2013 | 419,100 | 394,900 | 356,400 | 380,050 | 398,200 |
| landings | 2014 | 452,100 | 429,000 | 392,150 | 415,250 | 432,850 |
| | | | | | | |
| | 2012 | 405,350 | 377,850 | 335,500 | 361,350 | 382,250 |
| landings and | 2013 | 443,300 | 417,450 | 375,650 | 401,500 | 420,750 |
| discards | 2014 | 476,300 | 451,550 | 411,950 | 436,700 | 455,400 |

**Table 2-18.** The ACL values (lbs whole weight) for red grouper in Alternative 3 (ACL=90%ABC). ACL values are based on preferred allocation alternative (45% commercial/55% recreational).

| **Alt. 3 ACL=90%ABC** | | | | | | |
|---|---|---|---|---|---|---|
| **Commercial** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| | 2012 | 280,665 | 262,035 | 232,875 | 250,695 | 264,870 |
| | 2013 | 308,610 | 290,790 | 262,440 | 279,855 | 293,220 |
| landings | 2014 | 332,910 | 315,900 | 288,765 | 305,775 | 318,735 |
| | | | | | | |
| | 2012 | 298,485 | 278,235 | 247,050 | 266,085 | 281,475 |
| landings and | 2013 | 326,430 | 307,395 | 276,615 | 295,650 | 309,825 |
| discards | 2014 | 350,730 | 332,505 | 303,345 | 321,570 | 335,340 |
| | | | | | | |
| **Recreational** | | | | | | |
| | **Year** | **Frebuild (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **Frebuild (7 years)** | **Frebuild (8 years)** |
| | 2012 | 343,035 | 320,265 | 284,625 | 306,405 | 323,730 |
| | 2013 | 377,190 | 355,410 | 320,760 | 342,045 | 358,380 |
| landings | 2014 | 406,890 | 386,100 | 352,935 | 373,725 | 389,565 |
| | | | | | | |
| | 2012 | 364,815 | 340,065 | 301,950 | 325,215 | 344,025 |
| landings and | 2013 | 398,970 | 375,705 | 338,085 | 361,350 | 378,675 |
| discards | 2014 | 428,670 | 406,395 | 370,755 | 393,030 | 409,860 |

**Table 2-19.** The ACL values (lbs whole weight) for red grouper in Alternative 3 (ACL=80%ABC). ACL values are based on preferred allocation alternative (45% commercial/55% recreational).

| **Alt. 4 ACL=80%ABC** | | | | | | |
|---|---|---|---|---|---|---|
| **Commercial** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| | 2012 | 249,480 | 232,920 | 207,000 | 222,840 | 235,440 |
| | 2013 | 274,320 | 258,480 | 233,280 | 248,760 | 260,640 |
| landings | 2014 | 295,920 | 280,800 | 256,680 | 271,800 | 283,320 |
| | | | | | | |
| | 2012 | 265,320 | 247,320 | 219,600 | 236,520 | 250,200 |
| landings and | 2013 | 290,160 | 273,240 | 245,880 | 262,800 | 275,400 |
| discards | 2014 | 311,760 | 295,560 | 269,640 | 285,840 | 298,080 |
| | | | | | | |
| **Recreational** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| | 2012 | 304,920 | 284,680 | 253,000 | 272,360 | 287,760 |
| | 2013 | 335,280 | 315,920 | 285,120 | 304,040 | 318,560 |
| landings | 2014 | 361,680 | 343,200 | 313,720 | 332,200 | 346,280 |
| | | | | | | |
| | 2012 | 324,280 | 302,280 | 268,400 | 289,080 | 305,800 |
| landings and | 2013 | 354,640 | 333,960 | 300,520 | 321,200 | 336,600 |
| discards | 2014 | 381,040 | 361,240 | 329,560 | 349,360 | 364,320 |

## 2.6.2 Comparison of Alternatives

**Table 2-20.** Summary of effects under **Action 6**.

| **Alternatives** | **Biological Effects** | **Socioeconomic/Administrative Effects** |
|---|---|---|
| **Alternative 1 (No Action)** | - | $90.65 in millions of 2009 dollars. |
| **Alternative 2 (Preferred)** | + | (+/-)Greatest beneficial effects |
| **Alternative 3** | ++ | (+/-) Effects vary by state |
| **Alternative 4** | +++ | (+/-) Effects vary by state |
| **Alternative 5 (Preferred)** | Potentially - | (+/-) |
| **Alternative 6 (Preferred)** | Potentially - | (+/-)Same as alt. 2 |

**Alternative 1** could have adverse effects to the red grouper stock as an ACL aids in the avoidance of overfishing conditions. However, the adverse biological effects are mitigated by the fact a three species aggregate is in place. **Alternative 2 (Preferred)** would set the ACL equal to the ABC. The National Standard 1 guidelines indicate the ACL may typically be very

close to the ABC. **Alternatives 3** and **4** would have a greater positive biological effect to the stock than **Alternative 2 (Preferred)** because they would create a buffer between the ACL and ABC, with **Alternative 4** setting the most conservative ACL at 80% of the ABC. **Alternative 4** would have the greatest positive effect. Creating a buffer between the ACL and ABC would provide greater assurance overfishing would not occur. Setting a buffer between the ACL and ABC would be appropriate in situations where there is uncertainty in whether or not management measures are constraining fishing mortality to target levels. Annual catch targets, which are not required, can also be set below the ACLs to account for management uncertainty and provide greater assurance overfishing does not occur.

**Alternatives 5 and 6 (Preferreds)** would eliminate the aggregate commercial and recreational ACLs and accountability measures (AMs) currently in place for red grouper, black grouper, and gag. The ACL for red grouper would be based on **Alternative 2 (Preferred)** in this action. **Actions 7 and 8** of this amendment would specify commercial and recreational AMs for red grouper, respectively.

The removal of the three species aggregate ACL and AM could biologically affect the stock adversely as the ACL and AM offers an additional method to prohibit harvest. However, this action would implement a red grouper individual ACL/AM, gag ACLs/AMs are in place, and the Comprehensive ACL Amendment proposes the implementation of black grouper ACLs/AMs. All three ACLs are based upon the Scientific and Statistical Committee's catch recommendation that in turn is based upon SEDAR stock assessments. These ACLs are based upon the best scientific information where the three species aggregate ACL used catch history for black grouper and red grouper to determine the aggregate ACL.

The magnitude of effects of the ACL/OY alternatives on business activity would directly correlate with the level of ACL. **Preferred Alternative 2** would provide the largest ACL, and would also result in the largest positive impacts on business activity for all states combined . Under **Preferred Alternative 2,** all states except South Carolina would experience positive impacts on business activity. **Alternatives 3 and 4** would result in positive impacts for Georgia/Northeast Florida and Florida, and negative impacts for North and South Carolina. **Preferred Alternative 5** would have the same impacts as **Preferred Alternative 2**. The impacts of these two preferred alternatives on business activity should not be added, because one alternative practically assumed the other. In particular, **Preferred Alternative 2** was evaluated by closing the fishery during the first four months of the year, resulting in the commercial aggregate ACL not to be reached.

The estimated economic effects of the various ACL/OY alternatives would directly correlate with the level of ACL as a percent of ABC. That is, the closer the ACL would be to ABC, the higher would be the consequent effects on the recreational sector. Thus, the ranking of alternatives is rather straightforward, with **Alternative 2 (Preferred)** being first and **Alternative 4**, last. Under **Alternative 2 (Preferred)**, CS increases to the recreational sector would range from $0.78 million to $3.58 million over four years, or from $2.18 million to $10 million over

ten years. Again, these results are the same as those of the preferred alternatives for the previous actions.

As noted earlier, the estimates of economic effects were generated assuming the recreational sector aggregate ACL for black grouper, gag, and red grouper would not be reached in any year during the rebuilding period. In this sense, the economic effects of **Alternative 6 (Preferred)** would be the same as those for Alternative 2.

## 2.7 Action 7. Establish Accountability Measures for the Commercial Sector

### 2.7.1 Alternatives

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 OY from a fishery. One such tool is the Annual Catch Limit or ACL; an ACL must be specified for each fishery managed by the South Atlantic Council. An ACL is the level of annual catch of a stock that, if met or exceeded, triggers some corrective action. Accountability Measures, are actions triggered when an ACL is met or projected to be met.

Management action could be necessary if future landings are projected to exceed the ACL. The ACLs in Amendment 24 vary according to the selected rebuilding strategy. The current range for red grouper commercial ACL alternatives is presented in **Table 2-21**. Even though 2010 commercial landings are above the range of proposed ACLs for the commercial sector, total landings are below the range of proposed ACLs (**Table 2-21)**.

**Table 2-21.** Commercial and total (commercial and recreational) red grouper landings in 2010 compared to the proposed ACLs.

| | Reported 2010 Landings (lbs whole weight) | Range of Proposed ACLs (lbs whole weight) | Proposed ACLs in Year 1 (2012) for Preferred Alternatives (lbs whole weight) |
|---|---|---|---|
| **Commercial**[1] | 322,730 lbs ww | 207,000 - 311,850 (landings)<br>219,600 - 331,650 (landings and discards) | 291,150 (landings)<br>309,150 (landings and discards) |
| **Total** | 425,464 lbs ww | 460,000 – 693,000 (landings)<br>488,000 – 737,000 (landings and discards) | 647,000 (landings)<br>687,000 (landings and discards) |

[1]Source: Commercial ACL data set (June 16, 2011 version)

**Alternative 1 (No Action).** Do not specify new commercial AMs for red grouper.

**Alternative 2**. Specify individual Annual Catch Targets (ACT) for red grouper.

**Subalternative 2a (Preferred).** Do not establish a commercial sector ACT.

**Subalternative 2b.** The ACT equals 90% of the ACL.
**Subalternative 2c.** The ACT equals 80% of the ACL.

**Alternative 3 (Preferred).** If the ACL is met or is projected to be met, all subsequent purchase and sale of red grouper is prohibited and harvest and/or possession is limited to the bag limit.

**Alternative 4 (Preferred).** If the ACL is exceeded, the Regional Administrator shall publish a notice to reduce the ACL in the following season by the amount of the overage.

## 2.7.2 Comparison of Alternatives

**Table 2-22.** Summary of effects under **Action 7**.

| Alternatives | Biological Effects | Socioeconomic/Administrative Effects |
|---|---|---|
| **Alternative 1 (No Action)** | - | (+/-) |
| **Alternative 2a (Preferred)** | neither | (+-)Benefit the commercial sector the most in the short-term but the least in the long-term |
| **Alternative 2b** | + | (+-) Benefits in-between **Subalternatives 2a** and **2c**. |
| **Alternative 2c** | + | (+-) Possible smaller short-term and long-term benefits. |
| **Alternative 3 (Preferred)** | + | (+-) Greater short-term benefits compared to **Alternative 4 (Preferred)**, but less than **Alternative 1 (No Action)**. |
| **Alternative 4 (Preferred)** | + | (+-) Greatest long-term benefits |

**Alternative 1 (No Action)** would not establish new Accountability Measures for the commercial sector of the red grouper fishery. **Alternative 1 (No Action)** would no establish an individual commercial ACL for red grouper and therefore would not benefit the biological environment.

**Alternative 2** invokes the concept of establishing a commercial sector ACT, which would presumably be set lower than the commercial sector ACL, except under **Subalternative 2a (Preferred)**. **Subalternative 2a (Preferred)** would not set a commercial sector ACT. **Subalternatives 2b** and **2c** would establish ACTs at reduced harvest levels (90% and 80% of the ACL, respectively) designed to hedge against an ACL overage and therefore, provide a buffer between the ACT and ACL, and account for management uncertainty. Establishing an ACT that is 90% or 80% of the commercial ACL would also reduce the probability that post-season AMs that are meant to correct for an ACL overage would be needed.

**Alternative 3 (Preferred)** would prevent the commercial sector from profiting from the harvest of red grouper in quantities exceeding the ACL, and thus provides a disincentive to target red grouper once the ACL has been reached.

**Alternative 3 (Preferred)** could serve as a complement to **Alternative 4 (Preferred)** in that it would correct for an ACL overage post-season if one were to occur during the fishing season. Because the ACL for red grouper would be set equal to the ABC (**Action 6**), it is possible the fishing season could be shortened under **Alternative 3 (Preferred)** since the ACL could be projected to be met earlier in the season than under the status quo conditions. The biological benefits of a shortened fishing season for red grouper would depend on the exact reduction of the season length, and subsequent changes to fishing behavior. If a commercial fishing season is shortened due to triggering the **Alternative 3 (Preferred)** AM regulatory discards may not necessarily increase since fishermen would still be allowed to retain the bag limit.

**Alternative 4 (Preferred)** could complement **Alternative 3 (Preferred)** because it would correct for an ACL overage post-season if such an event were to occur. **Alternative 4 (Preferred)** would reduce the commercial sector ACL in the following season by the amount of the overage. The ACL can be reduced by the approximate amount as that taken in excess the year before, and may shorten the season if the lower ACL is met earlier in the year. A shortened season may result in increased regulatory discards if no level of harvest is permitted after the ACL is reached. However, under **Alternative 3 (Preferred)**, fishermen would still be able to retain bag limit quantities of red grouper, which may reduce the number of regulatory discards that would otherwise result from a shortened season. Under this scenario **Alternative 4 (Preferred)** could be expected to provide a moderate biological benefit.

**Alternative 1 (No Action)** would economically benefit the commercial sector the most in the short-term but the least in the long-term since lack of an AM could result in further overfishing. **Alternative 3 (Preferred)** would provide greater short-term economic benefits to the commercial sector compared to **Alternative 4 (Preferred)** but less than **Alternative 1 (No Action)**. **Alternative 4 (Preferred)** would provide the greatest long-term economic benefits to the commercial sector compared to **Alternatives 1 (No Action)** and **Alternative 3 (Preferred)**.

## 2.8 Action 8. Establish Accountability Measures for the Recreational Sector

### 2.8.1 Alternatives

As mentioned previously, Accountability Measures are actions triggered when an ACL is met or projected to be met. The South Atlantic Council is proposing the implementation of Annual Catch Targets as part of the system of accountability measures for the recreational sector. *Annual Catch Target (ACT)* is an amount of annual catch of a stock or stock complex

that is the management target of the fishery, and accounts for management uncertainty in maintaining the actual catch at or below the ACL. ACTs are recommended in the system of accountability measures so that ACL is not exceeded. ACTs may be considered "soft targets" (do not trigger action).

Management action could be necessary if future landings are projected to exceed the ACL. As for the commercial sector the ACLs in Amendment 24 vary according to the selected rebuilding strategy. Recreational landings in 2010 are below the proposed recreational ACL range (**Table 2-23**); therefore, management measures currently in place may be sufficient to limit landings to the below the ACL.

**Table 2-23.** Red grouper recreational and total (commercial and recreational) landings in 2010 compared to the proposed recreational ACL.

| | Reported 2010 Landings (lbs whole weight) | Range of Proposed ACLs (lbs whole weight) | Proposed ACLs in Year 1 (2012) for Preferred Alternatives (lbs whole weight) |
|---|---|---|---|
| **Recreational**[1,2] | 102,734 lbs ww | 253,000 - 381,150 (landings)<br>268,400 - 405,350 (landings and discards) | 355,850 (landings)<br>377,850 (landings and discards) |
| **Total** | 425,464 lbs ww | 460,000 – 693,000 (landings)<br>488,000 – 737,000 (landings and discards) | 647,000 (landings)<br>687,000 (landings and discards) |

[1]Source: Recreational ACL dataset (May 16, 2011 version).
[2]Private recreational, charterboat, and headboat landings are 84,361 lbs, 8,864 lbs, and 9,509 lbs, respectively.

**Alternative 1 (No Action).** Do not specify new recreational AMs for red grouper.

**Decision 1. Specify an ACT?**

**Alternative 2**. Specify an ACT.

**Subalternative 2a**. Do not specify an ACT.

**Subalternative 2b.** The ACT equals 85% of the ACL.

**Subalternative 2c.** The ACT equals 75% of the ACL.

**Subalternative 2d (Preferred).** The ACT equals ACL*(1-PSE) or ACL*0.5, whichever is greater.

**Decision 2. What is the AM trigger?**

**Alternative 3**. Specify the AM trigger.

**Subalternative 3a**. Do not specify an AM trigger.

**Subalternative 3b (Preferred)**. If the *annual landings* exceed the ACL in a given year.

**Subalternative 3c.** If the *mean landings* for the past three years exceed the ACL.[1, 2]

**Subalternative 3d.** If the *modified mean landings* exceeds the ACL. The modified mean is the most recent 5 years of available landings data with highest and lowest landings estimates from consideration removed.[1,2]

**Subalternative 3e.** If the lower bound of the 90% *confidence interval* estimate of the MRFSS landings' population mean plus headboat landings is greater than the ACL.

Notes:

[1] *Start the clock over.* In any year the ACL is reduced or increased, the sequence of future ACLs will begin again starting with a single year of landings compared to the ACL for that year, followed by a 2-year average of landings compared to the 2-year average annual catch limits in the next year, followed by a 3-year average of landings compared to the 3-year average of ACLs for the third year, and so on.

[2] For 2011, use only 2011 landings. For 2012, use the mean landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running mean.

**Decision 3. Is there an in-season AM?**

**Alternative 4**. Specify the in-season AM.

**Subalternative 4a**. Do not specify an in-season AM.

**Subalternative 4b (Preferred).** The Regional Administrator shall publish a notice to close the recreational sector when the ACL is projected to be met.

**Decision 4. Is there a post-season AM?**

**Alternative 5**. Specify the post-season AM.

**Subalternative 5a**. Do not specify a post-season AM.

**Subalternative 5b.** For post-season accountability measures, compare ACL with landings over a range of years. For 2011, use only 2011 landings. For 2012, use the mean landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running mean.[1]

**Subalternative 5c.** *Monitor following year.* If the ACL is exceeded, the following year's landings would be monitored for persistence in increased landings. The Regional Administrator would take action as necessary.

**Subalternative 5d.** *Monitor following year and shorten season as necessary.* If the ACL is exceeded, the following year's landings would be monitored in-season for persistence in increased landings. The Regional Administrator will publish a notice to reduce the length of the fishing season as necessary.

**Subalternative 5e.** *Monitor following year and reduce bag limit as necessary.* If the ACL is exceeded, the following year's landings would be monitored for persistence in increased landings. The Regional Administrator will publish a notice to reduce the bag limit as necessary.

**Subalternative 5f.** *Shorten following season.* If the 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 ACL for the following fishing season.

**Subalternative 5g (Preferred).** *Payback.* If the ACL is exceeded, the Regional Administrator shall publish a notice to reduce the ACL in the following season by the amount of the overage.

## 2.1.1 Comparison of Alternatives

**Table 2-24.** Summary of effects under **Action 8**.

| Alternatives | Biological Effects | Socioeconomic/Administrative Effects |
|---|---|---|
| **Alternative 1 (No Action)** | - | +- |
| **Alternative 2a** | Likely no measurable effect | +- |
| **Alternative 2b** | The biological benefits would increase in order from **Subalternatives 2b** to **2d (Preferred).** | +- |
| **Alternative 2c** | | - |
| **Alternative 2d (Preferred)** | | +- |
| **Alternative 3a** | Likely no measurable effect | No indirect economic effects. |
| **Alternative 3b (Preferred)** | The biological benefits would increase in order from **Subalternatives 3e** to **3b (Preferred).** | +- |
| **Alternative 3c** | | +- |
| **Alternative 3d** | | +- |
| **Alternative 3e** | | +- |
| **Alternative 4a** | May have negligible effects | No indirect economic effects. |
| **Alternative 4b (Preferred)** | + | +- |
| **Alternative 5a** | - | No indirect economic effects. |
| **Alternative 5b** | (+-) Addresses anomalous spikes in landings, but spikes would affect the average for three years and could prescribe AMs when not necessary. | No indirect economic effects. |

| Alternatives | Biological Effects | Socioeconomic/Administrative Effects |
|---|---|---|
| **Alternative 5c** | + | +- |
| **Alternative 5d** | + | +- |
| **Alternative 5e** | + | +- |
| **Alternative 5f** | + No monitoring component, not as beneficial as **Subalternatives 5c-5e**. | +- |
| **Alternative 5g (Preferred)** | + | +- |

**Alternative 1 (No Action)** would perpetuate the current level of fishing with no mechanism to maintain harvest levels at or below the ACLs established in the previous section. Therefore, taking no action to establish AMs would not benefit the biological environment.

With the exception of **Subalternative 2a, Alternative 2** and its subalternatives would specify a recreational sector ACT, which would be set lower than the recreational sector ACL**. Subalternative 2a** would not set a recreational sector ACT at all. **Subalternatives 2b** and **2c** would establish an ACT as an actual harvest level that presumably once exceeded, would trigger an AM . **Subalternatives 2b** and **2c** would establish reduced harvest levels (85% and 75% of the ACL, respectively) designed to hedge against an ACL overage and therefore, provide a buffer between the ACT and ACL, and account for management uncertainty. **Subalternative 2d (Preferred)** would have the greatest biological benefit of the three subalternatives by reducing the ACL by 50% or by one minus the percent standard error (PSE) from the recreational fishery, whichever is greater.

With the exception of **Subalternative 3a**, **Alternative 3** and its subalternatives would specify the AM trigger under different scenarios. Under **Subalternative 3b (Preferred)**, AMs would be triggered if the annual landings exceeded the ACL in a given year. **Subalternative 3c** would examine the trend in the past three years of landings data to determine if AMs would be triggered. **Subalternatives 3d** is similar to **Subalternative 3c**, except that a review of the most recent 5-year time series of landings data would be conducted to determine which of the five years were associated with the highest and lowest harvest levels. After the years of highest and lowest landings were determined, those two years' landings would be removed from the time series leaving three years of landings to be averaged. **Subalternative 3e** would trigger AMs if the lower 90% confidence interval estimate of MRFSS landings' population mean plus headboat landings is greater than the ACL. The application of the 90% confidence interval could be considered a more conservative parameter to use when estimating overage amounts.

One of the benefits of employing the approaches in **Subalternatives 3c-3e** to implementing AMs is that it provides an opportunity for fishery managers to use a data set uninfluenced by anomalous highs and lows, which could be caused by statistical variability. Alternatively, it may be difficult to decide if such differences in recreational landings are due to statistical or sampling

variances, or if they can be attributed to actual increased harvest. In the case of the latter, the modified mean approach (**Subalternative 3d**) may not be the most biologically advantageous compared to other alternatives considered that would retain high and low landings years. In cases where it cannot be determined whether one year's high landings are definitively caused by statistical variation, it may be difficult to justify removing that year's landings from the time series of data, especially if there is a strong year class known to have entered the fishery at that time or if regulations have been implemented that cause an extreme effort shift.

Since management uncertainty is already accounted for in the choice of an ACT (**Subalternative 2d**, **Preferred**), and scientific uncertainty is accounted for in the choice of the South Atlantic Council SSC's ABC control rule for unassessed species (and its corresponding ACL), the biological benefits would increase in order from **Subalternatives 3e** to **3b (Preferred).**

**Alternative 4** examines the need for an in-season AM; the South Atlantic Council chose not to have an in-season AM as defined in **Subalternative 4a (Preferred)**. **Subalternative 4b** would allow the RA to publish a notice to close the recreational sector when the ACL is projected to be met. In-season monitoring of recreational landings is difficult. Currently, there is a time lag in when recreational data become available. There would likely be considerable uncertainty in imposing in season AMs for species in the recreational sector, particularly for species which are infrequently taken. Therefore, post-season AMs may be more appropriate for the recreational sector. Biological effects may not be adverse by not having an in-season AM due to the current preferred alternatives for an ACT and AM trigger.

With the exception of **Subalternative 5a**, which would not specify a post-season AM, **Alternative 5** and its subalternatives specify methodologies for specifying post-season AM actions that would be taken if the ACL is exceeded. Under **Subalternative 5b**, ACLs would be compared with landings over a range of three years to determine the magnitude of the ACL overage for imposing post-season AMs. If **Subalternative 5b** is not selected as a preferred alternative, the magnitude of the ACL overage would simply compare the landings from a particular fishing year to the ACL. If the ACL is exceeded, **Subalternatives 5c – 5e** would monitor the following year's landings for persistence in increased landings. Under **Subalternative 5c**, the RA would take action as necessary to ensure an ACL was not exceeded in a year subsequent to an ACL overage. Under **Subalternative 5f**, if the ACL is exceeded, the RA would 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 season. In contrast, under **Subalternative 5g (Preferred)**, there would be a payback provision for exceeding an ACL, whereby, the RA would publish a notice to reduce the recreational sector ACL in the following season by the amount of the overage. This is consistent with the approach the South Atlantic Council has taken in previous amendments to address species that are overfished and/or experiencing overfishing.

**Subalternatives 5d** and **5f** would ensure that the amount of the previous year's ACL overage would be accounted for in the subsequent year's protection via a shortened season, and thus would be biologically beneficial. The monitoring component of **Subalternatives 5c-5e** would

allow for any anomalies or data reporting irregularities to be taken into account before the AMs would be effective, hence possibly adding a socio-economic benefit to the biological benefit of any management measures such as reducing the length of the following fishing season (**Subalternative 5f)**.

**Alternative 1 (No Action)** would economically benefit the recreational sector the most in the short-term but the least in the long-term since lack of an AM could result in further overfishing. **Alternative 2** offers the option to create a buffer between the ACT and ACL. This increases the chances of avoiding overfishing with **Subalternative 2d** being potentially the most conservative and **Subalternative 2a** the least conservative of the **Alternative 2** subalternatives. **Subalternative 3a**, which does not specify an AM trigger, would economically benefit the recreational sector the most in the short-term but the least in the long-term when more restrictive measures become necessary to meet the rebuilding target. The short-term economic effects of the other subalternatives would vary according to the likelihood of triggering the AM. Under **Subalternatives 3c and 3d**, the AM would less likely be triggered than under **Subalternatives 3b (Preferred) and 3e** as a result of taking into account landings over a number of years. In this sense, **Subalternatives 3c and 3d** would likely provide less adverse short-term economic effects than the other subalternatives. **Subalternative 3d** would be particularly noteworthy because it would eliminate the highest and lowest landings. Under **Subalternative 3c**, one year of very high landings would have a strong influence in triggering the AM. Between the two subalternatives of **Alternative 4**, **Subalternative 4a** would economically benefit the recreational sector better in the short-term since no further restrictions would be imposed on the recreational sector. However, it would result in worse long-term economic situation, since lack of an AM could result in further overfishing of the stock that, in turn, would require more restrictive regulations. **Alternative 5** addresses the issue of implementing post-season AM. **Subalternative 5a** would economically benefit the recreational sector best in the short-term since no further restrictions would be imposed on the recreational sector. However, it would result in the worst long-term economic situation, since lack of an AM could result in moving further away from the rebuilding trajectory that, in turn, would require more restrictive regulations. The short-term economic effects of the other subalternatives would depend on the nature and extent of the restrictions imposed on the harvest of the species and/or on the opportunities to fish for the resource. **Subalternative 5a** has similar economic implications as the corresponding subalternatives of **Alternative 4**. Of the remaining subalternatives, **Subalternative 5c** would likely result in the least adverse economic effects on the recreational sector in the short term, although the actual effects would depend on the type of restrictions that would be imposed by the RA. **Subalternatives 5d and 5e** would likely result in less adverse economic effects in the short term than **Subalternatives 5f and 5g (Preferred)** to the extent that post-season AM may not be imposed depending on how persistent the upward trend in landings would be.

**Subalternative 5d** may yield larger adverse economic impacts than **Subalternative 5e** because it would totally eliminate fishing opportunities during part of the fishing year rather than mainly

reduce the fishing experience for part of the fishing year. There is a good possibility that **Subalternatives 5f and 5g (Preferred)** would result in the same fishing season length, although some other measures, like bag limit reduction, may be employed under **Subalternative 5g (Preferred)** to effect a longer season that would provide more fishing opportunities. Whichever of these two subalternatives can provide for more fishing opportunities may be considered better than the other for economic reasons.

As shown in **Table 4-31**, the 2010 recreational landings, which already accounted for newly implemented measures affecting the recreational red grouper sector, are far below the currently preferred ACL alternative. Therefore, applications of AMs on the red grouper recreational sector would unlikely occur in the near future.

# Chapter 3. Affected Environment

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

- **Habitat environment** (Section 3.1)

  Examples include coral reefs and sea grass beds

- **Biological environment** (Section 3.2)

  Examples include populations of red grouper, corals, turtles

- **Human environment** (Section 3.3)

  Examples include fishing communities and economic descriptions of the fisheries

- **Administrative environment** (Section 3.4)

  Examples include the fishery management process and enforcement activities

## 3.1 Habitat Environment

### 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 (bottom dwellers) and associate with hard structures on the continental shelf that have moderate to high relief (e.g., coral reef systems and artificial reef structures, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings). Juvenile stages of some snapper grouper species also utilize inshore seagrass beds, mangrove estuaries, lagoons, oyster reefs, and embayment systems. In many species, various combinations of these habitats may be utilized during daytime feeding migrations or seasonal shifts in cross-shelf distributions. More detail on these habitat types is found in Volume II of the Fishery Ecosystem Plan (SAFMC 2009b).

### 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 (permanently attached) 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 $km^2$) of the area between the 27 and 101 meters (89 and 331 feet) depth contours from Cape Hatteras, North Carolina to Cape Canaveral, Florida is reef habitat. Although the bottom communities found in water depths between 100 and 300 meters (328 and 984 feet) from Cape Hatteras, North Carolina to Key West, Florida is relatively small compared to the whole shelf, this area, based upon landing information of fishers, constitutes prime reef fish

habitat and probably significantly contributes to the total amount of reef habitat in this region.

Artificial reef structures are also utilized to attract fish and increase fish harvests; however, research on artificial reefs is limited and opinions differ as to whether or not these structures promote an increase of ecological biomass or merely concentrate fishes by attracting them from nearby, natural un-vegetated areas of little or no relief.

The distribution of coral and live hard bottom habitat as presented in the Southeast Marine Assessment and Prediction (SEAMAP) Bottom Mapping Project is a proxy for the distribution of the species within the snapper grouper complex. The method used to determine hard bottom habitat relied on the identification of reef obligate species including members of the snapper grouper complex. The Florida Fish and Wildlife Research Institute (FWRI), using the best available information on the distribution of hard bottom habitat in the south Atlantic region, prepared ArcView maps for the four-state project. These maps, which consolidate known distribution of coral, hard/live bottom, and artificial reefs as hard bottom, are available on the South Atlantic Fishery Management Council's (South Atlantic Council) Internet Mapping System website: http://ocean.floridamarine.org/efh_coral/ims/viewer.htm.

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

### 3.1.3 Essential Fish Habitat

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

EFH utilized by snapper grouper species in this region includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs and medium to high profile outcroppings on and around the shelf break zone from shore to at least 183 meters [600 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 meter (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).

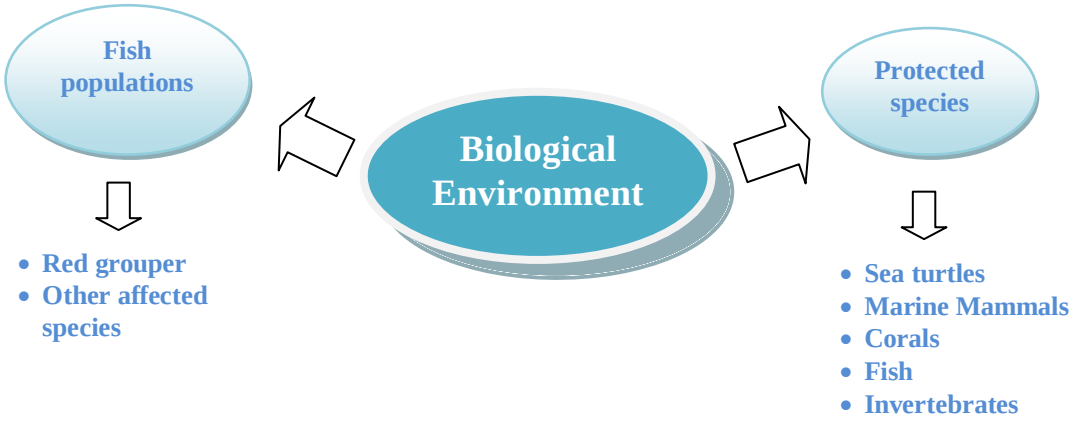
Areas that meet the criteria for EFH-HAPCs include habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages).

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

## 3.2 Biological and Ecological Environment

The reef environment in the South Atlantic management area affected by actions in this amendment is defined by two components (**Figure 3-1**). Each component will be described in detail in the following sections.

**Figure 3-1.** Two components of the biological environment described in this amendment.



## 3.2.1 Fish Populations

The waters off the South Atlantic coast are home to a diverse population of fish. The snapper grouper fishery management unit contains 73 species of fish **(Appendix F)**, many of them neither "snappers" nor "groupers". These species live in depths from a few feet (typically as juveniles) to hundreds of feet. As far as north/south distribution, the more temperate species tend to live in the upper reaches of the South Atlantic management area (black sea bass, red grouper) while the tropical variety's core residence is in the waters off south Florida waters, Caribbean Islands, and northern South America (black grouper, mutton snapper).

These are reef-dwelling species that live amongst each other. These species rely on the reef environment for protection and food. There are several reef tracts that follow the southeastern coast. The fact that these fish populations congregate together dictates the nature of the fishery (multi-species) and further forms the type of management regulations proposed in this amendment.

Snapper grouper species commonly taken with red grouper could be affected by actions in this amendment. Snapper grouper species most likely to be affected by the proposed actions include many species that occupy the same habitat at the same time. Therefore, snapper grouper species are likely to be caught when regulated since they will be incidentally caught when fishermen target other co-occurring species.

### 3.2.1.1 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

**Red Grouper Life History**
***An Overview***

- From North Carolina to southeastern Brazil, including the eastern Gulf of Mexico and Bermuda
- Spawning occurs during February-June, with a peak in April
- Adult red grouper are sedentary fish that are usually found at depths of 5-300 meters (16-984 feet).
- Red grouper do not appear to form spawning aggregation or spawn at specific sites

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 meters (16-984 feet). Fishermen off North Carolina commonly catch red grouper at depths of 27-76 meters (88-249 feet) for an average of 34 meters (111 feet). Fishermen off southeastern Florida also catch red grouper in depths ranging from 27-76 meters (88-249 feet) with an average depth of 45 meters (148 feet) (Burgos 2001; McGovern et al., 2002). Moe (1969) reported that juveniles live in shallow water nearshore reefs until they are 40.0 centimeters (16 inches) 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 meters (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 meters (98-295 feet) off the Southeast Atlantic coast (Burgos 2001; McGovern et al. 2002).

Off North Carolina, red grouper first become males at 50.9 centimeters (20.1 inches) TL and males dominate size classes greater than 70.0 centimeters (27.8 inches) 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 centimeters (49.2 inches) TL (male) and 23.0 kilograms (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 centimeters (19.3 inches) TL. Off southeastern Florida, age at 50% maturity was 2.1 years and size at 50% maturity was 52.9 centimeters (21.0 inches) 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).

#### 3.2.1.2 Stock Status of Red Grouper

Stock assessments, through the evaluation of biological and statistical information, provide an evaluation of stock health under the current management regime and other potential future harvest conditions. More specifically, the assessments provide an estimation of maximum sustainable yield (MSY) and a determination of stock status (whether *overfishing* is occurring and whether the stock is *overfished*).

In 2002, a process was initiated called the SouthEast, Data, Assessment, and Review (SEDAR). SEDAR is a cooperative Fishery Management Council process initiated to improve the quality and reliability of fishery stock assessments in the

South Atlantic, Gulf of Mexico, and US Caribbean. SEDAR is managed by the Caribbean, Gulf of Mexico, and South Atlantic Regional Fishery Management Councils in coordination with NOAA Fisheries and the Atlantic and Gulf States Marine Fisheries Commissions. SEDAR seeks improvements in the scientific quality of stock assessments, constituent and stakeholder participation in assessment development, transparency in the assessment process, and a rigorous and independent scientific review of completed stock assessments.

Following the assessment, the South Atlantic Council's Scientific and Statistical Committee (SSC) reviews the stock assessment information and advises the Council on whether the best available data were utilized and whether the outcome of the assessment is suitable for management purposes.

The following sections describe the results of the two most recent stock assessments for red grouper in the South Atlantic, in addition to the recommendations from the SSC.

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 (2010) 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, South Carolina, the Assessment workshop was held October 5-9, 2009 in St. Petersburg, Florida and the Review workshop was held January 25-29, 2010 in Savannah, Georgia.

The catch-age model used in the assessment included data from four fleets that caught South Atlantic 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 lbs 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 South Atlantic 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 F = 0.221 as the maximum fishing mortality threshold (MFMT). Comparing these two numbers:

- $F_{2008}$/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 lbs whole weight. The minimum stock size threshold (MSST) = 2,229,000 lbs whole weight. Comparing these two numbers:

- $SSB_{2008}$/MSST = 2,051,000/2,229,000 = 0.92

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

SSC Recommendation

The SSC recommends an Overfishing Limit (OFL) equal to the yield at $F_{MSY}$ and an Acceptable Biological Catch (ABC) equal to the projected yield stream with a 70% chance of rebuilding success as per the SSC Control rule.

### 3.2.1.3 Other Fish Species Affected

In addition to red grouper, snapper grouper species most likely to be affected by the proposed actions includes many species that occupy the same habitat at the same time. Therefore, snapper grouper species are likely to be caught when regulated since they will be incidentally caught when fishermen target other co-occurring species. The following species are ones that are most likely to be affected. Amendment 17A (SAFMC 2010a), **Section 3.2.1**, describes their life history characteristics in detail:

**gag**
(*Mycteroperca microlepis*)
**golden tilefish**
(*Lopholatilus chamaeleonticeps*)
**gray triggerfish**
(*Balistes capriscus*)
**greater amberjack**
(*Seriola dumerili*)
**red snapper**
(*Lutjanus campechanus*)
**scamp**
(*Mycteroperca phenax*)
**snowy grouper**
(*Epinephelus niveatus*)
**vermilion snapper**
(*Rhomboplites aurorubens*)

## 3.2.2 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 Marine Mammal Protection Act (MMPA) and six are also listed as endangered under the ESA (i.e., sperm, sei, fin, blue, humpback, and North Atlantic right whales). In addition to those six marine mammals, 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*]) are protected under the ESA. Portions of designated critical habitat for North Atlantic right whales and Acropora corals also occur within the South Atlantic Council's jurisdiction. **Section 3.5** in the Comprehensive ACL Amendment, describes the life history characteristics of these species and discusses the features

essential for conservation found in each critical habitat area.

## 3.3 Human Environment

### 3.3.1 Economic Environment: Commercial Sector

Additional information on the commercial sector of the snapper grouper fishery is contained in previous or concurrent amendments [Amendment 13C (SAFMC 2006), Amendment 15A (SAFMC 2008a), Amendment 15B (SAFMC 2008b), Amendment 16 (SAFMC 2009a), Amendment 17A (SAFMC 2010a), Amendment 17B (SAFMC 2010b), Regulatory Amendment 9 (SAFMC 2011b), Regulatory Amendment 10 (SAFMC 2011a), and Comprehensive ACL Amendment for the South Atlantic Region (under development)] and is incorporated herein by reference.

The major sources of data summarized in this sub-section include the Federal Logbook System (FLS) and Accumulated Landings System (ALS), with price indices taken from the Bureau of Labor Statistics. Inflation adjusted revenues and prices are reported in 2009 constant dollars. Average prices are calculated from ALS data.

The three major snapper grouper species in this amendment are red grouper, black grouper, and gag, although the specification of reference points and ACL pertains only to red grouper.

#### 3.3.1.1 Gear and Fishing Behavior

The commercial snapper grouper fishery utilizes vertical lines, longlines, black sea bass pots/traps, spears, and powerheads (i.e., spears with spring-loaded firearms). Vertical lines are used from the North Carolina/Virginia border to the Atlantic side of Key West, Florida. The majority of hook and line fishermen use either electric or hydraulic reels (bandit gear) and generally have 2-4 bandit reels per boat. Historically, the majority of the bandit fleet fished year round for snapper grouper with the only seasonal differences in catch associated with the regulatory spawning season closures in March and April for gag. Recently, Snapper Grouper FMP Amendment 16 implemented a closed season from January through April for shallow water grouper, a commercial quota for vermilion snapper that could result in closures if the spring and/or fall sub-quotas are filled, and established a separate commercial ACL for gag. Snapper Grouper FMP Amendment 17B implemented a ban on possession of several deep-water species in depths of 240 feet. This amendment also established an aggregate ACL for red grouper, black grouper, and gag, with a ban on the commercial possession of shallow water groupers when either the aggregate ACL or gag ACL is projected to be met. Most fluctuations in fishing effort during the open seasons in this fishery are a result of the weather. Trips can be limited during hurricane season and during the winter months from December through March. Some fishermen stop bandit fishing to target king mackerel when they are running.

The Council allows the use of bottom longlines north of St. Lucie Inlet, Florida, in depths greater than 50 fathoms. Bottom longline gear is used to target golden tilefish

primarily. Longline boats are typically bigger than bandit boats, their trips are longer, and they cost more to operate because they operate farther offshore. A longline spool generally holds about 15 miles of cable. Longlines are fished from daylight to dark because sea lice eat the flesh of hooked fish at night. Historically, the fishery is operated year long with little or no seasonal fluctuation barring hurricane disruption. However, recent increases in participation have resulted in shorter seasons that close the fishery before summer.

Spears or powerheads are most commonly used off Florida and are illegal for killing snapper grouper species in South Carolina and in Special Management Zones.

Black sea bass pots are used exclusively to target black sea bass, though bycatch of other snapper grouper species is allowed. The pots have mesh size, material, and construction restrictions to facilitate bycatch reduction. All sea bass pots must have a valid identification tag attached and more than 87% of tags in April 2003 were for vessels with homeports in North Carolina. Fishing practices vary by buoy practices, setting/pulling strategies, number of pots set, and length of set, with seasonal variations. The South Carolina pot fishery is mainly a winter fishery with short soak times (in some cases about an hour) and relatively few pots per boat. Most trips are day trips with pots being retrieved before heading to port. The North Carolina pot fishery also is primarily a winter fishery with some fishermen continuing to pot through the summer. North Carolina fishermen tend to use more pots than those in South Carolina. Although most North Carolina trips with sea bass pots last one day, more pots are left to soak for several days than in South Carolina. Many participants in the black sea bass fishery are active in other fisheries, including the recreational charter fishery during the summer months. Many snapper grouper permit holders maintain pot endorsements but are not active in the pot fishery.

### 3.3.1.2 Economic Activity

Estimates of the average annual economic activity (impacts) associated with the commercial harvest of all snapper grouper species and of the three major species in this Amendment were derived using the model developed for and applied in NMFS (2009c) and are provided in **Table 3-1**. Business activity for the commercial sector is characterized in the form of full-time equivalent jobs, income impacts (wages, salaries, and self-employed income), and output (sales) impacts (gross business sales). Income impacts should not be added to output (sales) impacts because this would result in double counting.

The estimates of economic activity include the direct effects (effects in the sector where an expenditure is actually made), indirect effects (effects in sectors providing goods and services to directly affected sectors), and induced effects (effects induced by the personal consumption expenditures of employees in the direct and indirectly affected sectors). Estimates are provided for the economic activity associated with the 2005-2009 average commercial ex-vessel (dockside) revenues for all snapper grouper species and for each of the three major species in this amendment. All dollar values are in 2008 dollars in order to be consistent with the economic impact model. As a result, the estimates of average annual ex-vessel revenues may be slightly different than those provided in previous tables

depicting commercial revenues, which are in 2009 dollars. Row values should not be added, because the total for snapper grouper already includes red grouper, black grouper and gag.

With ex-vessel revenues being the driving force for modeled economic activities, the results are as expected in terms of the magnitude of activities being directly correlated with the size of the ex-vessel revenues. Among the three species, gag is estimated to result in the largest level of economic activities and black grouper, the smallest.

**Table 3-1.** Average annual economic activity associated with the harvest of the respective species. All dollar values are in 2008 dollars.

| Species | Average Ex-vessel Value (millions) | Total Jobs | Harvester Jobs | Output (Sales) Impacts (millions)[1] | Income Impacts (millions)[1] |
|---|---|---|---|---|---|
| All Snapper Grouper | $13.44 | 2,526 | 336 | $176.91 | $75.39 |
| Black Grouper | $0.26 | 20 | 5 | $1.03 | $0.55 |
| Gag | $2.13 | 400 | 53 | $28.01 | $11.94 |
| Red Grouper | $1.18 | 221 | 29 | $15.51 | $6.61 |

[1]2008 dollars.

### 3.3.1.3 Landings, Vessels, Dealers, Effort (Trips), Ex-vessel Price, and Ex-vessel Revenue

The landings of snapper grouper declined 24% from a high of 8.6 million pounds in 1997 to 6.5 million pounds (gutted) in 2009, while effort declined by 26% from 19,860 trips to 14,702. The number of boats fell from a high of 1,301 in 1998 to a low of 856 in 2006, but increased again to 929 by 2009. From 2005 to 2009 (**Table 3-2**), the average inflation-adjusted (2009 dollars) dockside (ex-vessel) price received per gutted pound of snapper grouper landings increased from $2.60 in 2005 to $2.84 in 2007 before returning to $2.61 by 2009, averaging $2.70 over the five year period. From 2005 to 2009, the inflation-adjusted (2009 dollars) annual dockside (ex-vessel) revenues received for snapper grouper landings increased from $12.1 million in 2005 to $15 million in 2007 before declining a bit to $14.8 million by 2009, averaging $13.8 million per year. The recession of 2007-2008 does not appear to have stopped steady growth in snapper grouper landings or in participating vessels, although it may have moderately reduced effort/trips for one year (2008) and likely contributed to lower ex-vessel prices and revenues in 2008 and 2009.

**Table 3-2.** Snapper grouper landings, vessels, dealers, effort (trips by species), price, and revenue, 2005-2009.

| | Year Landed | | | | | Average 2005-2009 |
|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 | |
| **Pounds (Gutted)** | 5,453,614 | 5,217,993 | 5,636,077 | 6,101,203 | 6,472,263 | 5,776,230 |
| **Vessels**[1] | 865 | 856 | 897 | 912 | 929 | 892 |
| **Dealers** | 263 | 306 | 323 | 304 | 309 | 301 |
| **Effort (Trips)**[2] | 12,809 | 12,317 | 13,937 | 13,881 | 14,702 | 13,529 |
| **Hook & Line (Trips)**[3] | 12,207 | 11,749 | 13,226 | 13,390 | 14,116 | 12,938 |
| **Longline (Trips)**[3] | 117 | 143 | 248 | 199 | 257 | 193 |
| **Trap (Trips)**[3] | 601 | 755 | 612 | 555 | 747 | 654 |
| **Other (Trips)**[3] | 1,668 | 1,570 | 1,658 | 1,557 | 1,747 | 1,640 |
| **Ex-Vessel Price (2009 $) per Pound Gutted** | 2.60 | 2.75 | 2.84 | 2.70 | 2.61 | 2.70 |
| **Ex-Vessel Revenue (2009 $)** | 12,125,282 | 12,581,212 | 15,008,354 | 14,567,472 | 14,803,406 | 13,817,145 |

[1] May include double-counting of vessels that land snapper grouper in more than one state in a given year.
[2] A single trip using multiple gears is counted only once.
[3] A single trip using multiple gears counted in multiple categories, once for each gear.

### 3.3.1.4 Fishery Performance by State

The apparent trend in snapper grouper landings across the various areas is not uniform (**Table 3-3**). Snapper grouper landings in the east coast of Florida and Georgia fell from 2005 to 2006 but steadily rose thereafter. In the west coast of Florida, snapper grouper landings fell each year from 2005 through 2007 but rose in the subsequent years. North Carolina experienced an increase in snapper grouper landings from 2005 through 2008 but a decline in 2009. In South Carolina, snapper grouper landings rose from 2005 through 2007 but fell since then.

The movement in the number of trips landing snapper grouper over the period 2005-2009 matched well with the movement in landings for each state, except the east coast of Florida and Georgia (**Table 3-4**). For these two latter states, the number of trips fluctuated from year to year whereas landings fell or rose for a consecutive number of years.

The 2005-2009 average price for snapper grouper is highest in South Carolina at $3.14 per pound and lowest in the east coast of Florida and Georgia at $2.39 per pound (**Table 3-5**). In terms of total ex-vessel revenues from snapper grouper, North Carolina ranks first, followed by South Carolina. Note, however, that Florida has been split into the east and west coast for presentation of landings and ex-vessel revenues.

**Table 3-3.** Landings (gutted pounds) of snapper grouper by state and year, 2005-2009.

| | Year Landed | | | | | Average |
|---|---|---|---|---|---|---|
| State Landed: | 2005 | 2006 | 2007 | 2008 | 2009 | 2005-2009 |
| FL (east coast) and GA | 1,282,145 | 1,133,110 | 1,491,152 | 1,606,513 | 1,998,482 | 1,502,280 |
| FL (west coast) | 1,402,262 | 1,117,701 | 1,000,608 | 1,148,555 | 1,424,174 | 1,218,660 |
| NC | 1,444,859 | 1,595,626 | 1,709,500 | 2,118,081 | 1,941,698 | 1,761,953 |
| SC | 1,324,348 | 1,371,556 | 1,434,817 | 1,228,053 | 1,107,909 | 1,293,337 |
| Total All States | 5,453,614 | 5,217,993 | 5,636,077 | 6,101,203 | 6,472,263 | 5,776,230 |

**Table 3-4.** Number of trips landing snapper grouper by state, 2005-2009.

| State Landed: | Year Landed | | | | | Average |
|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2005-2009 |
| FL (east coast) and GA | 4,309 | 4,066 | 5,347 | 5,195 | 5,957 | 4,975 |
| FL (west coast) | 5,397 | 4,815 | 4,830 | 4,886 | 4,885 | 4,963 |
| NC | 2,288 | 2,550 | 2,749 | 2,886 | 2,938 | 2,682 |
| SC | 814 | 886 | 1,011 | 914 | 922 | 909 |
| Total All States | 12,809 | 12,317 | 13,937 | 13,881 | 14,702 | 13,529 |

**Table 3-5.** Average annual price and ex-vessel revenues of snapper grouper by state, 2005-2009.

| State Landed: | | Year Landed | | | | | Average 2005-2009 |
|---|---|---|---|---|---|---|---|
| | | 2005 | 2006 | 2007 | 2008 | 2009 | |
| FL (east coast) and GA | Deflated Price (2009 $) per Pound Gutted | 2.39 | 2.40 | 2.50 | 2.32 | 2.32 | 2.39 |
| | Deflated Ex-Vessel Revenue (2009 $) | 2,362,648 | 2,383,784 | 3,751,787 | 3,406,498 | 4,189,472 | 3,218,838 |
| FL (west coast) | Deflated Price (2009 $) per Pound Gutted | 2.49 | 2.65 | 2.78 | 2.56 | 2.43 | 2.58 |
| | Deflated Ex-Vessel Revenue (2009 $) | 2,988,509 | 2,704,610 | 2,422,232 | 2,627,941 | 3,208,701 | 2,790,399 |
| NC | Deflated Price (2009 $) per Pound Gutted | 2.66 | 2.75 | 2.95 | 2.87 | 2.83 | 2.81 |
| | Deflated Ex-Vessel Revenue (2009 $) | 3,320,179 | 3,786,195 | 4,559,345 | 4,988,849 | 4,324,496 | 4,195,813 |
| SC | Deflated Price (2009 $) per Pound Gutted | 3.08 | 3.29 | 3.23 | 3.13 | 2.98 | 3.14 |
| | Deflated Ex-Vessel Revenue (2009 $) | 3,453,946 | 3,706,623 | 4,274,990 | 3,544,184 | 3,080,737 | 3,612,096 |
| Total All States | Deflated Price (2009 $) per Pound Gutted | 2.60 | 2.75 | 2.84 | 2.70 | 2.61 | 2.70 |
| | Deflated Ex-Vessel Revenue (2009 $) | 12,125,282 | 12,581,211 | 15,008,354 | 14,567,472 | 14,803,406 | 13,817,145 |

### 3.3.1.5 Fishery Performance by Gear

The hook and line gear is by far the dominant gear type in the harvest of snapper grouper (**Table 3-6**). Traps and longline are the other more important gear types in the snapper grouper fishery. One must note, though, that traps are mainly used in the harvest of black sea bass. Most of the trips landing snapper grouper have been accounted for by hook and line (**Table 3-7**). In addition, hook and line gear accounted for approximately 87 percent of the total ex-vessel revenues from snapper grouper (**Table 3-8**).

**Table 3-6.** Average annual landings (gutted pounds) of snapper grouper by major gear type, 2005-2009.

| Gear Type: | Year Landed | | | | | Average 2005-2009 |
|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 | |
| **Hook & Line** | 4,795,175 | 4,405,848 | 5,003,711 | 5,429,731 | 5,638,439 | 5,054,581 |
| **Longline** | 233,020 | 331,461 | 245,624 | 279,312 | 290,667 | 276,017 |
| **Trap** | 338,057 | 398,380 | 311,153 | 332,159 | 475,943 | 371,138 |
| **Other** | 87,362 | 82,305 | 75,590 | 60,002 | 67,214 | 74,495 |
| **Total All Gears** | 5,453,614 | 5,217,994 | 5,636,078 | 6,101,204 | 6,472,263 | 5,776,230 |

**Table 3-7.** Number of trips landing snapper grouper by gear, 2005-2009.

| Gear Type: | Year Landed | | | | | Average 2005-2009 |
|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 | |
| **Hook & Line**[1] | 12,207 | 11,749 | 13,226 | 13,390 | 14,116 | 12,938 |
| **Longline**[1] | 117 | 143 | 248 | 199 | 257 | 193 |
| **Trap**[1] | 601 | 755 | 612 | 555 | 747 | 654 |
| **Other**[1] | 1,668 | 1,570 | 1,658 | 1,557 | 1,747 | 1,640 |
| **All Gears**[2] | 12,809 | 12,317 | 13,937 | 13,881 | 14,702 | 13,529 |

[1] A single trip using multiple gears is counted in multiple categories, once for each gear. As a result, adding trips across the individual gears gives a value larger than the "All Gears" value for the year.

[2] A single trip using multiple gears is counted only once in the "All Gears" results.

**Table 3-8.** Average annual price and ex-vessel revenue of snapper grouper by gear and year, 2005-2009.

| Gear Type: | | Year Landed | | | | | Average 2005-2009 |
|---|---|---|---|---|---|---|---|
| | | 2005 | 2006 | 2007 | 2008 | 2009 | |
| Hook & Line | Deflated Price (2009 $) per Pound Gutted | 2.61 | 2.75 | 2.84 | 2.71 | 2.61 | 2.70 |
| | Deflated Ex-Vessel Revenue (2009 $) | 10,631,128 | 10,691,781 | 13,274,715 | 12,877,740 | 12,731,912 | 12,041,455 |
| Longline | Deflated Price (2009 $) per Pound Gutted | 2.72 | 2.69 | 2.83 | 2.58 | 2.49 | 2.66 |
| | Deflated Ex-Vessel Revenue (2009 $) | 477,042 | 607,076 | 626,441 | 675,840 | 666,470 | 610,574 |
| Trap | Deflated Price (2009 $) per Pound Gutted | 2.41 | 2.72 | 2.92 | 2.63 | 2.61 | 2.66 |
| | Deflated Ex-Vessel Revenue (2009 $) | 805,346 | 1,080,289 | 898,018 | 868,121 | 1,235,720 | 977,499 |
| Other | Deflated Price (2009 $) per Pound Gutted | 2.39 | 2.64 | 2.82 | 2.55 | 2.55 | 2.59 |
| | Deflated Ex-Vessel Revenue (2009 $) | 211,766 | 202,065 | 209,180 | 145,771 | 169,304 | 187,617 |
| Total All Gears | Deflated Price (2009 $) per Pound Gutted | 2.60 | 2.75 | 2.84 | 2.70 | 2.61 | 2.70 |
| | Deflated Ex-Vessel Revenue (2009 $) | 12,125,282 | 12,581,211 | 15,008,354 | 14,567,472 | 14,803,406 | 13,817,145 |

### 3.1.1.6 Fishery Performance by Species

The discussion below focuses mainly on the three key species of this Amendment: black grouper, gag, and red grouper.

*Black Grouper*

Black grouper landings are broadly distributed from North Carolina to Florida, including the west coast of Florida. From 2005 to 2009, black grouper landings averaged 127,000 gutted pounds per year but have been declining since 2007. Approximately 281 vessels landed black grouper, and effort averaged 1,283 trips per year. From 2005 to 2009, the ex-vessel price (2009 dollars) per gutted pound of black grouper has been generally increasing, averaging $3.80. From 2005 to 2009, the ex-vessel revenues (2009 dollars) received for black grouper varied around an average value of $196,000 with higher prices in some years offset by lower landings (**see Tables 3-9 and 3-10**).

**Table 3-9.** Number of vessels, dealers, and trips landing black grouper, by state, 2005-2009.

| **Vessels** | | | | | | **Average** |
|---|---|---|---|---|---|---|
| | **2005** | **2006** | **2007** | **2008** | **2009** | **2005-2009** |
| **FL(east) and GA** | 72 | 68 | 68 | 53 | 55 | 63 |
| **FL(west)** | 186 | 163 | 162 | 151 | 115 | 155 |
| **NC** | 49 | 50 | 42 | 44 | 51 | 47 |
| **SC** | 10 | 12 | 19 | 16 | 21 | 16 |
| **Dealers** | | | | | | **Average** |
| | **2005** | **2006** | **2007** | **2008** | **2009** | **2005-2009** |
| **FL(east) and GA** | 39 | 46 | 43 | 40 | 37 | 41 |
| **FL(west)** | 39 | 52 | 47 | 48 | 45 | 46 |
| **NC** | 28 | 34 | 26 | 25 | 35 | 30 |
| **SC** | 3 | 5 | 8 | 7 | 9 | 6 |
| **Trips** | | | | | | **Average** |
| | **2005** | **2006** | **2007** | **2008** | **2009** | **2005-2009** |
| **FL(east) and GA** | 200 | 177 | 198 | 152 | 167 | 179 |
| **FL(west)** | 1,128 | 762 | 875 | 581 | 446 | 758 |
| **NC** | 327 | 282 | 206 | 217 | 195 | 245 |
| **SC** | 68 | 107 | 137 | 105 | 85 | 100 |
| **Total All States** | 1,723 | 1,328 | 1,416 | 1,055 | 893 | 1,283 |

**Table 3-10.** Landings (gutted pounds), average annual ex-vessel prices, and ex-vessel revenues for black grouper, 2005-2009.

| | | | Year Landed | | | | | Average 2005-2009 |
|---|---|---|---|---|---|---|---|---|
| | | | 2005 | 2006 | 2007 | 2008 | 2009 | |
| **State Landed:** | | | 20,089 | 14,516 | 26,301 | 14,260 | 11,684 | 17,370 |
| **FL (east coast) and GA** | **Pounds Gutted Weight** | | | | | | | |
| | **Deflated Price (2009 $) per Gutted Pound** | | 3.70 | 3.87 | 4.18 | 4.24 | 4.30 | 4.06 |
| | **Deflated Ex-Vessel Revenue (2009 $)** | | 37,406 | 34,797 | 47,564 | 42,297 | 33,339 | 39,081 |
| **FL (west coast)** | **Pounds Gutted Weight** | | 70,163 | 35,434 | 45,898 | 21,374 | 15,568 | 37,687 |
| | **Deflated Price (2009 $) per Gutted Pound** | | 3.39 | 3.65 | 3.89 | 3.78 | 3.89 | 3.72 |
| | **Deflated Ex-Vessel Revenue (2009 $)** | | 237,558 | 129,426 | 178,499 | 80,899 | 60,575 | 137,391 |
| **NC** | **Pounds Gutted Weight** | | 49,479 | 52,108 | 25,546 | 25,325 | 18,038 | 34,099 |
| | **Deflated Price (2009 $) per Gutted Pound** | | --- | --- | --- | --- | --- | --- |
| | **Deflated Ex-Vessel Revenue (2009 $)** | | --- | --- | --- | --- | --- | --- |
| **SC** | **Pounds Gutted Weight** | | 26,190 | 41,799 | 63,278 | 35,525 | 20,244 | 37,407 |
| | **Deflated Price (2009 $) per Gutted Pound** | | --- | --- | --- | --- | 4.78 | 4.78 |
| | **Deflated Ex-Vessel Revenue (2009 $)** | | --- | --- | --- | --- | 96,833 | 96,833 |

**Table 3-10.** Landings (gutted pounds), average annual ex-vessel prices, and ex-vessel revenues for black grouper, 2005-2009.

| | | | Year Landed | | | | | Average 2005-2009 |
|---|---|---|---|---|---|---|---|---|
| | | | 2005 | 2006 | 2007 | 2008 | 2009 | |
| All States Combined | Pounds Gutted Weight | | 165,921 | 143,857 | 161,023 | 96,484 | 65,533 | 126,563 |
| | Deflated Price (2009 $) per Gutted Pound | | 3.43 | 3.69 | 3.94 | 3.86 | 4.09 | 3.80 |
| | Deflated Ex-Vessel Revenue (2009 $) | | 274,964 | 164,223 | 226,063 | 123,197 | 190,747 | 195,839 |

*Gag*

Gag landings are broadly distributed from North Carolina to Florida. Gag landings peaked in 2007 at 516,000 pounds gutted weight but declined to about 380,000 pounds in 2008 and 2009. Landings averaged 433,000 annually over the period 2005-2009. Approximately 395 vessels landed gag, and effort averaged 2,270 trips per year. From 2005 to 2009, the ex-vessel price (2009 dollars) per gutted pound of gag landings increased from $3.82 in 2005 to $4.25 in 2009, averaging $4.13 over the period. From 2005 to 2009, the ex-vessel revenues (2009 dollars) received for gag peaked at $2.28 million in 2007 and declined thereafter, averaging $1.79 million per year over the five-year period (**see Tables 3-11 and 3-12**).

**Table 3-11.** Number of vessels, dealers, and trips landing gag, by state, 2005-2009.

| | | | | | | |
|---|---|---|---|---|---|---|
| **Vessels** | | | | | | **Average** |
| | **2005** | **2006** | **2007** | **2008** | **2009** | **2005-2009** |
| **FL(east) and GA** | 138 | 108 | 123 | 111 | 119 | 120 |
| **FL(west)** | 36 | 18 | 34 | 21 | 13 | 24 |
| **NC** | 87 | 90 | 102 | 114 | 118 | 102 |
| **SC** | 47 | 48 | 53 | 49 | 47 | 49 |
| | | | | | | |
| **Dealers** | | | | | | **Average** |
| | **2005** | **2006** | **2007** | **2008** | **2009** | **2005-2009** |
| **FL(east) and GA** | 57 | 56 | 62 | 51 | 52 | 56 |
| **FL(west)** | 18 | 14 | 24 | 16 | 11 | 17 |
| **NC** | 39 | 45 | 47 | 51 | 50 | 46 |
| **SC** | 17 | 18 | 24 | 20 | 19 | 20 |
| | | | | | | |
| **Trips** | | | | | | **Average** |
| | **2005** | **2006** | **2007** | **2008** | **2009** | **2005-2009** |
| **FL(east) and GA** | 730 | 601 | 865 | 701 | 808 | 741 |
| **FL(west)** | 51 | 26 | 59 | 25 | 19 | 36 |
| **NC** | 954 | 962 | 1,045 | 1,001 | 1,041 | 1,001 |
| **SC** | 464 | 492 | 534 | 494 | 493 | 495 |
| **Total All States** | 2,199 | 2,081 | 2,503 | 2,221 | 2,361 | 2,273 |

**Table 3-12.** Landings (gutted pounds), average annual ex-vessel prices, and ex-vessel revenues for gag, 2005-2009.

| | | Year Landed | | | | | Average 2005-2009 |
|---|---|---|---|---|---|---|---|
| | | 2005 | 2006 | 2007 | 2008 | 2009 | |
| State Landed: | | 125,743 | 115,501 | 185,408 | 126,514 | 121,066 | 134,846 |
| FL (east coast) and GA | Pounds Gutted Weight | | | | | | |
| | Deflated Price (2009 $) per Gutted Pound | 3.82 | 4.13 | 4.22 | 4.28 | 4.29 | 4.15 |
| | Deflated Ex-Vessel Revenue (2009 $) | 399,567 | 400,699 | 775,527 | 490,663 | 478,048 | 508,901 |
| FL (west coast) | Pounds Gutted Weight | 1,068 | 1,006 | 3,593 | 499 | 320 | 1,297 |
| | Deflated Price (2009 $) per Gutted Pound | 3.41 | 3.63 | 3.96 | 3.91 | 3.94 | 3.77 |
| | Deflated Ex-Vessel Revenue (2009 $) | 3,646 | 3,652 | 14,245 | 1,951 | 1,261 | 4,951 |
| NC | Pounds Gutted Weight | 148,033 | 130,634 | 122,322 | 110,926 | 143,708 | 131,125 |
| | Deflated Price (2009 $) per Gutted Pound | 3.59 | 3.69 | 3.97 | 4.03 | 3.91 | 3.84 |
| | Deflated Ex-Vessel Revenue (2009 $) | 531,713 | 481,684 | 485,119 | 447,052 | 562,597 | 501,633 |
| SC | Pounds Gutted Weight | 183,257 | 173,208 | 204,511 | 148,845 | 116,502 | 165,265 |
| | Deflated Price (2009 $) per Gutted Pound | 4.34 | 4.57 | 4.89 | 4.94 | 4.89 | 4.73 |
| | Deflated Ex-Vessel Revenue (2009 $) | 795,140 | 791,156 | 1,000,489 | 735,146 | 569,992 | 778,385 |
| All States Combined | Pounds Gutted Weight | 458,100 | 420,350 | 515,834 | 386,784 | 381,597 | 432,533 |
| | Deflated Price (2009 $) per Gutted Pound | 3.82 | 4.02 | 4.25 | 4.31 | 4.25 | 4.13 |
| | Deflated Ex-Vessel Revenue (2009 $) | 1,730,068 | 1,677,191 | 2,275,380 | 1,674,812 | 1,611,898 | 1,793,870 |

*Red Grouper*

Red grouper landings are broadly distributed from North Carolina to Florida, with North Carolina consistently showing the largest landings. Red grouper landings peaked in 2007 at 499,202 pounds gutted weight and troughed in 2005 at 169,994 pounds gutted weight. Landings averaged 346,000 annually over the period 2005-2009. Approximately 369 vessels landed red grouper, and effort averaged 2,650 trips per year. From 2005 to 2009, the ex-vessel price (2009 dollars) per gutted pound of red grouper landings increased from $2.85 in 2005 to $3.21 in 2009, averaging $3.18 over the period. From 2005 to 2009, the ex-vessel revenues (2009 dollars) received for red grouper peaked at $1.62 million in 2007 and declined thereafter, averaging $1.10 million per year over the five-year period (**see Tables 3-13 and 3-14**).

**Table 3-13**. Number of vessels, dealers, and trips landing red grouper, by state, 2005-2009.

| | | | | | | |
|---|---|---|---|---|---|---|
| **Vessels** | | | | | | **Average** |
| | **2005** | **2006** | **2007** | **2008** | **2009** | **2005-2009** |
| **FL(east) and GA** | 114 | 87 | 96 | 91 | 66 | 91 |
| **FL(west)** | 153 | 122 | 122 | 107 | 91 | 119 |
| **NC** | 88 | 95 | 128 | 127 | 124 | 112 |
| **SC** | 42 | 49 | 54 | 46 | 44 | 47 |
| | | | | | | |
| **Dealers** | | | | | | **Average** |
| | **2005** | **2006** | **2007** | **2008** | **2009** | **2005-2009** |
| **FL(east) and GA** | 57 | 49 | 45 | 46 | 28 | 45 |
| **FL(west)** | 36 | 35 | 39 | 35 | 33 | 36 |
| **NC** | 39 | 45 | 53 | 57 | 54 | 50 |
| **SC** | 11 | 16 | 20 | 17 | 17 | 16 |
| | | | | | | |
| **Trips** | | | | | | **Average** |
| | **2005** | **2006** | **2007** | **2008** | **2009** | **2005-2009** |
| **FL(east) and GA** | 445 | 370 | 451 | 359 | 317 | 390 |
| **FL(west)** | 683 | 420 | 455 | 350 | 325 | 447 |
| **NC** | 1,020 | 1,172 | 1,484 | 1,512 | 1,131 | 1,264 |
| **SC** | 404 | 551 | 652 | 604 | 533 | 549 |
| **Total All States** | 2,552 | 2,513 | 3,052 | 2,825 | 2,306 | 2,650 |

**Table 3-14.** Landings (gutted pounds), average annual ex-vessel prices, and ex-vessel revenues for red grouper, 2005-2009.

| | | Year Landed | | | | | Average 2005-2009 |
|---|---|---|---|---|---|---|---|
| | | 2005 | 2006 | 2007 | 2008 | 2009 | |
| State Landed: | | | | | | | |
| FL (east coast) and GA | Pounds Gutted Weight | 13,410 | 11,725 | 15,510 | 11,943 | 15,503 | 13,618 |
| | Deflated Price (2009 $) per Gutted Pound | 3.04 | 3.27 | 3.35 | 3.24 | 3.22 | 3.22 |
| | Deflated Ex-Vessel Revenue (2009 $) | 31,671 | 31,108 | 42,075 | 24,249 | 25,166 | 30,854 |
| FL (west coast) | Pounds Gutted Weight | 20,615 | 12,443 | 12,982 | 8,618 | 7,377 | 12,407 |
| | Deflated Price (2009 $) per Gutted Pound | 2.71 | 2.98 | 3.09 | 2.84 | 2.82 | 2.89 |
| | Deflated Ex-Vessel Revenue (2009 $) | 55,950 | 37,070 | 40,165 | 24,459 | 20,808 | 35,690 |
| NC | Pounds Gutted Weight | 101,644 | 170,921 | 319,375 | 339,597 | 207,086 | 227,725 |
| | Deflated Price (2009 $) per Gutted Pound | 2.87 | 3.06 | 3.21 | 3.06 | 3.08 | 3.06 |
| | Deflated Ex-Vessel Revenue (2009 $) | 291,333 | 523,564 | 1,025,492 | 1,038,127 | 638,433 | 703,390 |
| SC | Pounds Gutted Weight | 34,325 | 72,234 | 124,559 | 139,044 | 90,059 | 92,044 |
| | Deflated Price (2009 $) per Gutted Pound | --- | 3.85 | 4.11 | 3.76 | 3.71 | 3.86 |
| | Deflated Ex-Vessel Revenue (2009 $) | --- | 277,760 | 512,309 | 522,817 | 334,328 | 411,804 |
| All States Combined | Pounds Gutted Weight | 169,994 | 267,323 | 472,427 | 499,202 | 320,025 | 345,794 |
| | Deflated Price (2009 $) per Gutted Pound | 2.85 | 3.25 | 3.41 | 3.20 | 3.21 | 3.18 |
| | Deflated Ex-Vessel Revenue (2009 $) | 378,954 | 869,501 | 1,620,040 | 1,609,652 | 1,018,735 | 1,099,376 |

### 3.3.1.7 Imports

The National Marine Fisheries Service purchases fisheries trade data from the Foreign Trade Division of the U.S. Census Bureau. Data are available for download at http://www.st.nmfs.noaa.gov/st1/trade/index.html. The list of product codes relevant to this data request includes fresh and frozen snappers, fresh and frozen groupers, frozen sea basses and frozen dolphin fillets. Wreckfish and golden crab do not appear in the list of product codes in the imports database (see the drop-down menu for products at http://www.st.nmfs.noaa.gov/st1/trade/build_a_database/TradeSelectDateProduct.html).

Data are summarized from 1991-2009. Imports are tabulated in thousands of pounds, product weight. Import values are tabulated in thousands of current year dollars and constant 2009 dollars.

Imported products relevant to the Snapper Grouper Fishery Management Plan (FMP) include fresh and frozen snappers, fresh and frozen groupers, and frozen sea basses. Data are available from 1991-present.

Imports of fresh snappers increased from approximately 10.8 million pounds (product weight) worth $16.0 million (current dollars) in 1991 to 21.5 million pounds worth $49.4 million in 2009 (**Figure 3-2**). Imports peaked at 29.0 million pounds worth $60.2 million in 2007 before declining in 2008 and 2009. The recent decline in imports probably is linked to the general slow-down of economic activity in the U.S. Imports of fresh snapper primarily originated in Mexico, Central America, or South America, and entered the U.S. through the port of Miami. On average from 2006-2009, imports were above average during the months of March, April and May, and below average in November, December and January.

Imports of frozen snappers were relatively minor from 1991 through 1999, and ranged from 1.4 million pounds (product weight) worth $1.9 million (current dollars) in 1995 to 2.9 million pounds worth $4.0 million in 1998 (**Figure 3-2**). However, imports doubled from 1999 to 2000 and increased to a peak of 12.7 million pounds worth $19.4 million in 2005. Imports remained relatively steady through 2007 and then declined to 8.1 million pounds worth $15.9 million in 2009. Imports of frozen snappers primarily originated in Brazil and entered the U.S. through the port of Miami, or originated from Indonesia and entered the U.S. through New York or Los Angeles. Imports of frozen snappers tend to be greatest during December and January and lowest in March, April and May.

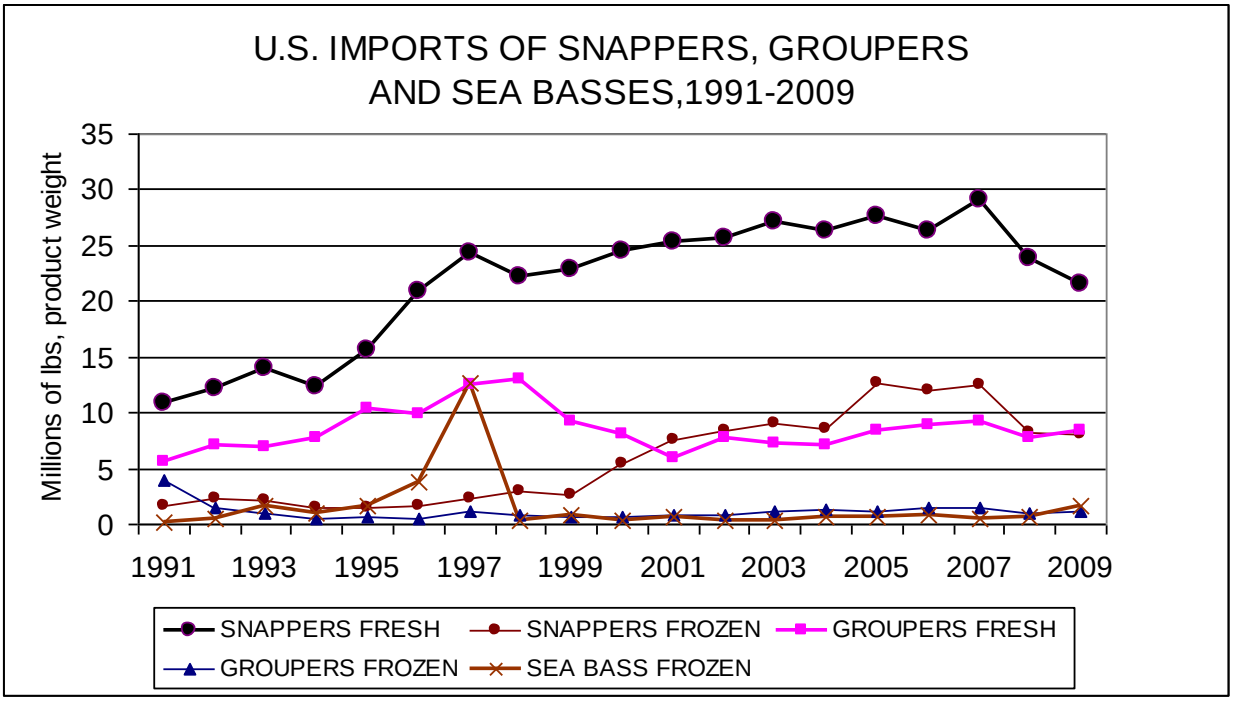



**Figure 3-2.** Imports relevant to the South Atlantic Snapper Grouper Fishery Management Plan.

Imports of fresh groupers increased from 5.6 million pounds (product weight) worth $6.1 million (current dollars) in 1991 to a peak of 12.9 million pounds worth $18.6 million in 1998 (**Figure 3-2**). Imports have remained relatively steady since 1999, with an annual average of 8.0 million pounds worth $18.1 million. Imports generally originated in Mexico, and in Panama to a much lesser extent, and entered the U.S. in Miami. Prior to 2006, imports of fresh groupers were above average in March and April and below average in October and November. However, imports in March have declined significantly since 2006.

Imports of frozen grouper were relatively minor, and averaged 1.0 million pounds worth $1.6 million since 2006 (**Figure 3-2**). Imports generally originated in Mexico or Asia, and entered the U.S. in Miami, Tampa or San Juan. On average from 2006-2009, imports of frozen groupers were above average from December through April and below average from June through August.

Imports of frozen sea basses were relatively minor except in 1997 with 12.6 million pounds (product weight) worth $28.7 million (current year dollars) (**Figure 3-2**). Imports averaged 0.6 million pounds worth $1.8 million from 1998-2008. However, imports of frozen sea bass increased to 1.7 million pounds worth $4.3 million in 2009, with nearly 0.8 million pounds imported in January 2009. Frozen sea bass most commonly were imported from Taiwan and entered the U.S. in Los Angeles. Since 2006, imports were greatest between January and March and lowest from August through December.

## 3.3.2 Economic Environment: Recreational Sector

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

### 3.3.2.1 Harvest

More detailed recreational harvest information on snapper grouper species in the South Atlantic is provided in the Comprehensive ACL Amendment and is incorporated herein by reference. A summary of the three major species in this Amendment is presented below. Average recreational harvests of black grouper, gag, and red grouper for the period 2005-2009 are presented in **Table 3-15** through **Table 3-20**.

Only Florida and South Carolina recorded harvests of black grouper but all states recorded landings of gag and red grouper (**Table 3-15**). Florida is the dominant state in the harvest of black grouper and gag. North Carolina, on the other hand, registered the largest harvest of red grouper. Total recreational harvests of gag and red grouper are close to each other, and harvests of each of these two species far exceed those of black grouper.

**Table 3-15.** Average annual recreational harvest of selected snapper grouper species in the South Atlantic, across all modes, 2005-2009.

| | State | | | | |
|---|---|---|---|---|---|
| **Species** | **Florida** | **Georgia** | **North Carolina** | **South Carolina** | **Total** |
| Black Grouper | 71,083 | 0 | 0 | 108 | 71,191 |
| Gag | 311,615 | 12,788 | 180,131 | 30,493 | 535,027 |
| Red Grouper | 96,288 | 64 | 433,222 | 11,126 | 540,700 |

Source: MRFSS, Headboat Survey, NOAA Fisheries, NMFS, SERO.

Harvests through the private mode exceeded the combined harvests of the other modes for all three species (**Table 3-16**). The headboat mode recorded the second largest harvest of black grouper while the charter mode recorded the second largest harvests of gag and red grouper. Harvests of the three species through the shore mode are relatively small.

**Table 3-16.** Average annual recreational harvest of selected snapper grouper species in the South Atlantic, across all states, 2005-2009.

| | Mode | | | | |
|---|---|---|---|---|---|
| **Species** | **Shore** | **Headboat** | **Charter** | **Private** | **Total** |
| Black Grouper | 0 | 12,378 | 2,667 | 56,147 | 71,191 |
| Gag | 9,708 | 57,806 | 95,734 | 371,778 | 535,027 |
| Red Grouper | 1,567 | 37,765 | 51,067 | 473,814 | 564,213 |

Source: MRFSS, Headboat Survey, NOAA Fisheries, NMFS, SERO.

In Florida, the private mode dominated all other modes in the harvests of the three species (**Table 3-17**). The charter and headboat modes are nonetheless important in the harvests of gag, with the headboat mode being relatively important in the harvest of red grouper.

In Georgia, all fishing modes recorded no harvests of black grouper and only the headboat mode recorded very small harvest of red grouper (**Table 3-18**). The shore mode also recorded no harvest of gag while all the other three modes recorded very small harvest of gag.

North Carolina recorded no harvest of black grouper but is relatively important in the harvest of gag and red grouper (**Table 3-19**). The private mode recorded most of the harvests of gag and red grouper in the state. The headboat mode recorded the second largest harvest of gag but the charter mode is second in the harvest of red grouper.

In South Carolina, the headboat mode recorded the largest harvest of gag and the private mode, the largest harvest of red grouper (**Table 3-20**). Harvests of black grouper in the state have been very minimal, with only the charter mode recording harvest of this species.

**Table 3-17.** Average annual recreational harvest of selected snapper grouper species, Florida, 2005-2009.

| | Mode | | | | |
|---|---|---|---|---|---|
| **Species** | **Shore** | **Headboat** | **Charter** | **Private** | **Total** |
| Black Grouper | 0 | 12,378 | 2,559 | 56,147 | 71,083 |
| Gag | 8,305 | 29,095 | 69,086 | 205,130 | 311,615 |
| Red Grouper | 1,567 | 21,461 | 7,434 | 89,340 | 119,801 |

Source: MRFSS, Headboat Survey, NOAA Fisheries, NMFS, SERO.

**Table 3-18.** Average annual recreational harvest of selected snapper grouper species, Georgia, 2005-2009.

| | Mode | | | | |
|---|---|---|---|---|---|
| **Species** | **Shore** | **Headboat** | **Charter** | **Private** | **Total** |
| Black Grouper | 0 | 0 | 0 | 0 | 0 |
| Gag | 0 | 801 | 4,589 | 7,398 | 12,788 |
| Red Grouper | 0 | 64 | 0 | 0 | 64 |

Source: MRFSS, Headboat Survey, NOAA Fisheries, NMFS, SERO.

**Table 3-19.** Average annual recreational harvest of selected snapper grouper species, North Carolina, 2005-2009.

| | Mode | | | | |
|---|---|---|---|---|---|
| **Species** | **Shore** | **Headboat** | **Charter** | **Private** | **Total** |
| Black Grouper | 0 | 0 | 0 | 0 | 0 |
| Gag | 1,404 | 15,829 | 13,594 | 149,304 | 180,131 |
| Red Grouper | 0 | 13,131 | 42,810 | 377,281 | 433,222 |

Source: MRFSS, Headboat Survey, NOAA Fisheries, NMFS, SERO.

**Table 3-20.** Average annual recreational harvest of selected snapper grouper species, South Carolina, 2005-2009.

| | Mode | | | | |
|---|---|---|---|---|---|
| **Species** | **Shore** | **Headboat** | **Charter** | **Private** | **Total** |
| Black Grouper | 0 | 0 | 108 | 0 | 108 |
| Gag | 0 | 12,080 | 8,466 | 9,947 | 30,493 |
| Red Grouper | 0 | 3,109 | 823 | 7,193 | 11,126 |

Source: MRFSS, Headboat Survey, NOAA Fisheries, NMFS, SERO.

### 3.3.2.2 Effort

Recreational effort derived from the MRFSS database can be characterized in terms of the number of trips as follows:

1. Target effort - The number of individual angler trips, regardless of trip duration, where the intercepted angler indicated that the snapper grouper species was targeted as either the first or the second primary target for the trip. The snapper grouper species did not have to be caught.
2. Catch effort - The number of individual angler trips, regardless of trip duration and target intent, where the individual snapper grouper species was caught. The fish caught did not have to be kept.
3. All recreational trips - The total estimated number of recreational trips taken, regardless of target intent or catch success.

Estimates of average annual recreational effort, 2005-2009, for the snapper grouper species addressed in this amendment are provided in **Table 3-21** through **Table 3-28**. In each table, where appropriate, the "total" refers to the total number of target or catch trips, as appropriate, while "all trips" refers to the total number of trips across all snapper grouper species regardless of target intent or catch success.

As might be expected, Florida dominates by far the other South Atlantic states in terms of the number of target or catch trips for each of the three species and for all snapper grouper species combined (**Tables 3-21** and **3-22**). This perfectly correlates with the dominance of Florida in the harvest of snapper grouper species. In terms of catch trips, North Carolina places second to Florida for all snapper grouper species and for each of the three subject species. However, South Carolina places second to Florida in terms of target trips for all snapper grouper species and comes close to North Carolina in terms of target trips for gag. Among the three subject species, gag displays a fair amount of target and catch trips in all states. Both target and catch trips are relatively small for red grouper and black grouper in all states, except perhaps Florida.

**Table 3-21.** Average annual snapper grouper recreational target effort in the South Atlantic, across all modes, 2005-2009.

| | State | | | | | |
|---|---|---|---|---|---|---|
| **Species** | **Florida** | **Georgia** | **North Carolina** | **South Carolina** | **Total** | **All Trips** |
| All Snapper Grouper | 733,902 | 30,527 | 92,356 | 109,565 | 966,350 | 22,418,779 |
| Black Grouper | 1,136 | 0 | 0 | 0 | 1,136 | |
| Gag | 35,577 | 33 | 1,145 | 1,133 | 38,088 | |
| Red Grouper | 3,355 | 0 | 503 | 0 | 3,858 | |

Source: MRFSS, NOAA Fisheries, NMFS, SERO.

**Table 3-22.** Average annual snapper grouper recreational catch effort in the South Atlantic, across all modes, 2005-2009.

| | State | | | | | |
|---|---|---|---|---|---|---|
| **Species** | **Florida** | **Georgia** | **North Carolina** | **South Carolina** | **Total** | **All Trips** |
| All Snapper Grouper | 3,152,035 | 123,122 | 461,860 | 221,684 | 3,958,701 | 22,418,779 |
| Black Grouper | 16,624 | 0 | 0 | 0 | 16,624 | |
| Gag | 90,937 | 3,046 | 18,146 | 5,179 | 117,309 | |
| Red Grouper | 58,740 | 5 | 19,355 | 1,108 | 79,207 | |

Source: MRFSS, NOAA Fisheries, NMFS, SERO.

The private mode is the dominant fishing mode for snapper grouper target or catch trips as well as for each of the three subject species (**Tables 3-23** and **3-24**). Catch and target trips for the private mode exceeded the combined trips for the other modes. The shore mode recorded higher target and catch trips than the charter mode for all snapper grouper species and for black grouper and gag. Charter target and catch trips, however, were not so far behind those of the shore mode. For red grouper, charter target and catch trips substantially exceed those of the shore mode.

**Table 3-23.** Average annual snapper grouper recreational target effort by mode in the South Atlantic, across all states, 2005-2009.

| | Mode | | | | |
|---|---|---|---|---|---|
| **Species** | **Shore** | **Charter** | **Private** | **Total** | **All Trips** |
| All Snapper Grouper | 269,576 | 39,122 | 657,652 | 966,350 | 22,418,779 |
| Black Grouper | 177 | 0 | 959 | 1,136 | |
| Gag | 1,571 | 1,220 | 35,297 | 38,088 | |
| Red Grouper | 177 | 503 | 3,178 | 3,858 | |

Source: MRFSS, NOAA Fisheries, NMFS, SERO.

**Table 3-24.** Average annual snapper grouper recreational catch effort by mode in the South Atlantic, across all states, 2005-2009.

| | Mode | | | | |
|---|---|---|---|---|---|
| **Species** | **Shore** | **Charter** | **Private** | **Total** | **All Trips** |
| All Snapper Grouper | 1,231,647 | 134,665 | 2,592,389 | 3,958,701 | 22,418,779 |
| Black Grouper | 1,461 | 642 | 14,546 | 16,649 | |
| Gag | 10,921 | 7,764 | 98,624 | 117,309 | |
| Red Grouper | 1,175 | 10,891 | 67,141 | 79,207 | |

Source: MRFSS, NOAA Fisheries, NMFS, SERO.

In all states in the South Atlantic, the private mode dominates all other modes in both target and catch trips (**Tables 3-25 to 3-28**). The charter mode in Florida registered catch trips for all three subject species, but had no target trips for black grouper and red grouper (**Table 3-25**). The other two modes recorded both target and catch trips for all three subject species.

There are no target and catch trips recorded for black grouper in Georgia (**Table 3-26**). This absence of either target or catch trips is also practically true for red grouper (only the charter mode recorded very minimal catch trips). Target and catch trips for gag are relatively small compared to those of the other states.

As with Georgia, North Carolina recorded no target or catch trips for black grouper (**Table 3-27**). Catch trips for gag and red grouper are relatively important in North Carolina, but target trips for these two species are relatively small. In fact, there are no recorded target trips for red grouper by all modes. Also, there is an absence of recorded shore or charter target trips for gag as well as shore or private target trips for red grouper.

As with Georgia and North Carolina, South Carolina recorded no target or catch trips for black grouper (**Table 3-28**). There are also no recorded target trips for red grouper in the state, and catch trips for red grouper are relatively small.

**Table 3-25.** Average annual snapper grouper recreational effort, Florida, 2005-2009.

| | Shore | | Charter | | Private | | Total | |
|---|---|---|---|---|---|---|---|---|
| **Species** | **Target** | **Catch** | **Target** | **Catch** | **Target** | **Catch** | **Target** | **Catch** |
| All Snapper Grouper | 225,948 | 1,056,735 | 32,165 | 76,089 | 475,789 | 2,019,211 | 733,902 | 3,152,035 |
| Black Grouper | 177 | 1,461 | 0 | 617 | 958 | 14,546 | 1,136 | 16,624 |
| Gag | 1,571 | 9,702 | 1,112 | 3,799 | 32,893 | 77,436 | 35,577 | 49,078 |
| Red Grouper | 177 | 1,175 | 0 | 5,777 | 3,178 | 51,787 | 3,355 | 58,740 |

Source: MRFSS, NOAA Fisheries, NMFS, SERO.

**Table 3-26.** Average annual snapper grouper recreational effort, Georgia, 2005-2009.

| | Shore | | Charter | | Private | | Total | |
|---|---|---|---|---|---|---|---|---|
| **Species** | **Target** | **Catch** | **Target** | **Catch** | **Target** | **Catch** | **Target** | **Catch** |
| All Snapper Grouper | 7,361 | 33,213 | 920 | 8,746 | 22,246 | 81,163 | 30,527 | 123,122 |
| Black Grouper | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gag | 0 | 100 | 33 | 750 | 0 | 2,197 | 33 | 3,047 |
| Red Grouper | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 |

Source: MRFSS, NOAA Fisheries, NMFS, SERO.

**Table 3-27.** Average annual snapper grouper recreational effort, North Carolina, 2005-2009.

| | Shore | | Charter | | Private | | Total | |
|---|---|---|---|---|---|---|---|---|
| Species | Target | Catch | Target | Catch | Target | Catch | Target | Catch |
| All Snapper Grouper | 25,429 | 114,539 | 1,660 | 32,234 | 65,266 | 315,087 | 92,356 | 461,860 |
| Black Grouper | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gag | 0 | 922 | 0 | 1,824 | 1,145 | 15,400 | 1,145 | 18,146 |
| Red Grouper | 0 | 0 | 503 | 5,035 | 0 | 14,320 | 503 | 19,355 |

Source: MRFSS, NOAA Fisheries, NMFS, SERO.

**Table 3-28.** Average annual snapper grouper recreational effort, South Carolina, 2005-2009.

| | Shore | | Charter | | Private | | Total | |
|---|---|---|---|---|---|---|---|---|
| Species | Target | Catch | Target | Catch | Target | Catch | Target | Catch |
| All Snapper Grouper | 10,837 | 27,160 | 4,377 | 17,596 | 94,351 | 176,928 | 109,565 | 221,684 |
| Black Grouper | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gag | 0 | 196 | 74 | 1,392 | 1,259 | 3,592 | 1,333 | 5,180 |
| Red Grouper | 0 | 0 | 0 | 75 | 0 | 1,034 | 0 | 1,108 |

Source: MRFSS, NOAA Fisheries, NMFS, SERO.

Analysis of recreational effort at the individual species or species group level is not possible for the headboat sector because the headboat data are not collected at the angler level. Estimates of effort in the headboat sector are provided in terms of angler days, or the number of standardized 12-hour fishing days that account for the different half-, three-quarter-, and full-day fishing trips by headboats. The average annual (2005-2009) number of headboat angler days is presented in **Table 3-29**. Due to confidentiality issues, Georgia estimates are combined with those of Florida. As shown in **Table 3-29**, the total (across all states) average number of headboat angler days has been variable but generally declining since 2005.

**Table 3-29.** Southeast headboat angler days, 2005-2009.

| | South Atlantic | | | |
|---|---|---|---|---|
| | Florida/ Georgia | North Carolina | South Carolina | Total |
| 2005 | 171,078 | 31,573 | 34,036 | 236,687 |
| 2006 | 175,522 | 25,736 | 56,074 | 257,332 |
| 2007 | 157,150 | 29,002 | 60,729 | 246,881 |
| 2008 | 124,119 | 16,982 | 47,287 | 188,388 |
| 2009 | 136,420 | 19,468 | 40,919 | 196,807 |
| Average | 152,858 | 24,552 | 47,809 | 225,219 |

Source: The Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab.

### 3.3.2.3 Permits

For-hire vessels are required to have a for-hire snapper grouper permit to fish for or possess snapper grouper species in the South Atlantic EEZ. The number of vessels with for-hire snapper grouper permits for the period 2005-2009 is provided in **Table 3-30**. This sector operates as an open access fishery and not all permitted vessels are necessarily active in the fishery. Some vessel owners obtain open access permits as insurance for uncertainties in the fisheries in which they currently operate.

The number of for-hire permits issued for the South Atlantic snapper grouper fishery increased from 1,904 permits in 2005 to 2,104 permits in 2008, but decreased slightly to 2,091 in 2009. The majority of snapper grouper for-hire permitted vessels were home-ported in Florida; a relatively high proportion of these permitted vessels were also home-ported in North Carolina and South Carolina. Many vessels with South Atlantic for-hire snapper grouper permits were homeported in states outside of SAFMC's area of jurisdiction, particularly in Alabama and Texas. Although the number of vessels with South Atlantic for-hire snapper grouper permits homeported in states outside of SAFMC's area of jurisdiction increased from 2005 to 2009, they still account for approximately the same proportion (9-10%) of the total number of permits.

**Table 3-30**. Number of South Atlantic for-hire snapper grouper vessel permits

| HomePort State | 2005 | 2006 | 2007 | 2008 | 2009 | Avg. |
|---|---|---|---|---|---|---|
| Florida | 1,267 | 1,304 | 1,312 | 1,310 | 1,280 | 1,295 |
| North Carolina | 294 | 317 | 353 | 399 | 391 | 351 |
| South Carolina | 136 | 142 | 152 | 160 | 167 | 151 |
| Alabama | 52 | 42 | 37 | 39 | 42 | 42 |
| Georgia | 37 | 36 | 37 | 39 | 42 | 38 |
| Texas | 36 | 30 | 31 | 33 | 30 | 32 |
| Other States | 82 | 96 | 104 | 124 | 139 | 109 |
| Total | 1,904 | 1,967 | 2,026 | 2,104 | 2,091 | 2,018 |

For-hire permits do not distinguish charterboats from headboats. Based on a 1997 survey, Holland *et al.* (1999) estimated that a total of 1,080 charter vessels and 96 headboats supplied for-hire services in all South Atlantic fisheries during 1997. By 2010, the estimated number of headboats supplying for-hire services in all South Atlantic fisheries had fallen to 85, indicating a decrease in fleet size of approximately 11% between 1997 and 2010 (K. Brennan, Beaufort Laboratory, SEFSC, personal communication, Feb. 2011).

### 3.3.2.4 Economic Value, Expenditures, and Economic Activity

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

Estimates of the economic value of a day of saltwater recreational fishing in the South Atlantic indicate that the mean value of access per marine recreational fishing trip is $109.31 for the South Atlantic (Haab *et al.* 2001). While this estimate is not specific to snapper grouper fishing trips, it may shed light on the magnitude of an angler's willingness to pay for this type of recreational experience.

Willingness to pay for an incremental increase in catch and keep rates per trip was also estimated to be $3.01 for bottom fish snapper grouper species by Haab *et al.* (2001). Whitehead *et al.* (2001) estimated the marginal willingness to pay to avoid a one fish red snapper bag limit decrease to be $1.06 to $2.20. Finally, Haab *et al.* (2001) provided a compensating variation (the amount of money a person would have to receive to be no worse off after a reduction of the bag limit) estimate of $2.49 per fish when calculated across all private boat anglers that targeted snapper grouper snapper grouper species in the South Atlantic.

In their study of the North Carolina for-hire fishery, Dumas *et al.* (2009) estimated several measures of consumer surplus for anglers fishing through the for-hire mode. Anglers were distinguished as to whether fishing was their primary or secondary purpose for taking the trip to the coasts. An additional snapper grouper caught and kept would generate consumer surplus of $93.51 per trip for primary purpose anglers and $60.79 per trip for secondary purpose anglers. Consumer surplus per site per trip for primary purpose anglers ranged from $4.88 to $27.03 in charter trips taken in Federal waters, or from $0.35 to $9.55 in charter trips taken in state waters. The corresponding range of values for secondary purpose anglers was $0.24 to $16.62 for charter trips in Federal waters, or $0.12 to $16.54 for charter trips in state waters. On headboat trips in both state and Federal waters, consumer surplus per site per trip ranged from $0.59 to $4.12 for primary purpose anglers and from $0.48 to $4.76 for secondary purpose anglers. Consumer surplus for the opportunity to take a for-hire fishing trip was estimated at $624.02 per angler per trip on charterboats and $101.64 per anger per trip on headboats.

In addition to the above economic values, there are estimates of the economic value of a red snapper and a red snapper trip provided in the red snapper interim rule for the South Atlantic (NMFS 2008). Although these values are derived for the Gulf of Mexico recreational fishery, they can be used as proxy values for the South Atlantic fishery. However, red snapper is a significantly more important recreational target fishery in the Gulf of Mexico than in the South Atlantic. As a result, the estimates of economic value may overstate the true values for the South Atlantic. The estimated CS to a recreational angler of one red snapper is $6.04, while the estimated CS of a red snapper fishing trip is $53.53.

Most recently, the NMFS Southeast Science Center (NMFS 2009b) developed estimates of consumer surplus per angler trip based on various studies and data in the last ten years. These estimates were culled from various studies – Haab *et al.* (2009), Dumas *et al.* (2009), and NOAA SEFSC SSRG (2009). The values/ranges of consumer surplus estimates are (in 2009 dollars) $112 to $128 for red snapper, $123 to

$128 for grouper, $11 for other snappers, and $80 for snapper grouper. These values were deemed directly applicable in assessing the changes in consumer surplus due to management measures in Amendment 17B (SAFMC 2010b).

While anglers receive economic value as measured by the consumer surplus associated with fishing, for-hire businesses receive value from the services they provide. Producer surplus (PS) is the measure of the economic value these operations receive. PS is the difference between the revenue a business receives for a good or service, such as a charter or headboat trip, and the cost the business incurs to provide that good or service. Estimates of the PS associated with for-hire trips are not available. However, proxy values in the form of net operating revenues are also provided in NMFS (2008). These values are not PS estimates because they are not net of crew costs and returns to the owner. The estimated net operating revenues per angler trip for the for-hire sector are $162 for a charterboat trip and $78 for a headboat trip.

The NOAA Fisheries Service Southeast Science Center recently provided estimates of charterboat and headboat net operating revenues for various areas in the Southeast (NMFS 2009). These estimates were culled from several studies – Liese *et al.* (2009), Dumas *et al.* (2009), Holland *et al.* (1999), and Sutton *et al.* (1999). Estimates of net operating revenue per angler trip (2009 dollars) on representative charter trips are $135 for east Florida, $146 for Louisiana through east Florida, $156 for northeast Florida, and $128 for North Carolina. For charter trips into the EEZ only, net operating revenues are $141 in east Florida and $148 in northeast Florida. For full day and overnight trips only, net operating revenues are $155-160 in North Carolina.

Net operating revenues per angler trip are lower for headboats than for charterboats. Net operating revenue estimates for a representative headboat trip are $48 in the Gulf of Mexico (All States and all of Florida), $63-$68 in North Carolina. For full day and overnight headboat trips, net operating revenues are $74-$77 in North Carolina. Comparable estimates are not available for Georgia and South Carolina.

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

Estimates of the economic activity (impacts) associated with the recreational snapper grouper fishery were derived using average coefficients for recreational angling across all fisheries (snapper grouper species), as derived by an economic add-on to the MRFSS, and described and utilized in NMFS (2009a). Business activity is characterized in the form of FTE jobs, income impacts (wages, salaries, and self-employed income), output (sales) impacts (gross business sales), and value-added impacts (difference between the value of goods and the cost of materials or supplies). Job and output (sales) impacts are equivalent metrics across both the commercial and recreational sectors. Income and value-added impacts are not equivalent, though similarity in the magnitude of multipliers may result in roughly equivalent values. Neither income nor value-added impacts should be added to output (sales) impacts because this would result in double counting. Job and output (sales) impacts, however, may be added across sectors.

Estimates of the average expenditures by recreational anglers are provided in NMFS (2009a) and are incorporated herein by reference. Estimates of the average recreational effort (2005-2009) and associated

economic impacts (2008 dollars) are provided in **Table 3-31**. Target trips were used as the measure of recreational effort. As previously discussed, more trips may catch a snapper grouper species than target the snapper grouper species. Where such occurs, estimates of the economic activity associated with the average number of catch trips can be calculated based on the ratio of catch trips to target trips because the average output impact and jobs per trip cannot be differentiated by trip intent. This is not done in the current analysis.

It should be noted that output impacts and value added impacts are not additive and the impacts for individual snapper grouper species should not be added because of possible duplication (some trips may target multiple snapper grouper species). Also, the estimates of economic activity should not be added across states to generate a regional total because state-level impacts reflect the economic activity expected to occur within the state before the revenues or expenditures "leak" outside the state, possibly to another state within the region. Under a regional model, economic activity that "leaks" from, for example, Florida into Georgia would still occur within the region and continue to be tabulated. As a result, regional totals would be expected to be greater than the sum of the individual state totals. Regional estimates of the economic activity associated with the fisheries for these snapper grouper species are unavailable at this time.

The distribution of the estimates of economic activity by state and mode are consistent with the effort distribution with the exception that charter anglers, on average, spend considerably more money per trip than anglers in other modes. As a result, the number of charter trips can be a fraction of the number of private trips, yet generate similar estimates of the amount of economic activity. For example, as derived from **Table 3-31**, the average number of charter snapper grouper target trips in Florida (32,165 trips) was only approximately 7% of the number of private trips (475,789), whereas the estimated output (sales) impacts by the charter anglers (approximately $12.6 million) was approximately 70% of the output impacts of the private trips (approximately $18.0 million).

**Table 3-31.** Summary of snapper grouper target trips (2005-2009 average) and associated economic activity (2008 dollars) by state and mode. Output and value added impacts are not additive.

| | North Carolina | South Carolina | Georgia | Florida |
|---|---|---|---|---|
| | **Shore Mode** | | | |
| Target Trips | 25,429 | 10,837 | 7,361 | 225,948 |
| Output Impact | $6,369,109 | $1,103,510 | $118,570 | $6,454,791 |
| Value Added Impact | $3,546,665 | $614,461 | $71,098 | $3,747,360 |
| Jobs | 77 | 14 | 1 | 68 |
| | **Private/Rental Mode** | | | |
| Target Trips | 65,266 | 94,351 | 22,246 | 475,789 |
| Output Impact | $3,562,445 | $4,151,262 | $347,565 | $17,992,032 |
| Value Added Impact | $2,008,752 | $2,422,205 | $210,827 | $10,751,195 |
| Jobs | 38 | 47 | 3 | 189 |
| | **Charter Mode** | | | |
| Target Trips | 1,660 | 4,377 | 920 | 32,165 |
| Output Impact | $646,211 | $1,476,045 | $57,835 | $12,605,516 |
| Value Added Impact | $362,655 | $833,905 | $33,755 | $7,421,221 |
| Jobs | 8 | 19 | 1 | 130 |

| | North Carolina | South Carolina | Georgia | Florida |
|---|---|---|---|---|
| | All Modes | | | |
| Target Trips | 92,355 | 109,565 | 30,527 | 733,902 |
| Output Impact | $10,577,764 | $6,730,817 | $523,970 | $37,052,338 |
| Value Added Impact | $5,918,072 | $3,870,571 | $315,679 | $21,919,776 |
| Jobs | 123 | 80 | 5 | 387 |

Source: effort data from the MRFSS, economic activity results calculated by NMFS SERO using the model developed for NMFS (2009a).

As previously noted, the values provided in **Table 3-31** only reflect effort derived from the MRFSS. Because the headboat sector in the Southeast is not covered by the MRFSS, the results in **Table 3-31** do not include estimates of the economic activity associated with headboat anglers. While estimates of headboat effort are available (see **Table 3-29**), species target information is not collected in the Headboat Survey, which prevents the generation of estimates of the number of headboat target trips for snapper grouper. Further, because the model developed for NMFS (2009a) was based on expenditure data collected through the MRFSS, expenditure data from headboat anglers was not available and appropriate economic expenditure coefficients have not been estimated. As a result, estimates of the economic activity associated with the headboat sector comparable to those of the other recreational sector modes cannot be provided.

## 3.4 Social and Cultural Environment

Additional information on the social and cultural environment of the snapper grouper fishery is contained in previous or concurrent amendments [Amendment 13C (SAFMC 2006), Amendment 15A (SAFMC 2008a), Amendment 15B (SAFMC 2008b), Amendment 16 (SAFMC 2009a), Amendment 17A (SAFMC 2010a), Amendment 17B (SAFMC 2010b), Regulatory Amendment 9 (SAFMC 2011b), Regulatory Amendment 10 (SAFMC 2011a), and Comprehensive ACL Amendment for the South Atlantic Region (under development)] and is incorporated herein by reference.

Permit requirements for the commercial snapper grouper fishery were established in 1998 by Amendment 8 (SAFMC 1997). The amendment created a limited entry system for the fishery and established two types of permits based on the historic landings associated with a particular permit. Those who could demonstrate a certain amount of landings over a certain time period received transferable permits that did not limit the number of pounds of snapper grouper that could be landed from federal waters (hereafter referred to as "unlimited commercial permits"). Vessels with verified landings, but did not meet the threshold were issued permits that allowed them to land 225 pounds of snapper grouper species from federal waters each trip (hereafter referred to as "limited commercial permits"). These permits were not transferable. New entry into the fishery required the purchase of two unlimited permits from existing permit holders for exchange for a new permit. This "two for one" system was intended to gradually decrease the number of permits in the fishery. These restrictions only applied to the commercial snapper grouper permit.

Over time the limited entry system has reduced capacity in the commercial fishery as evidenced by the reduction in the number of permits over the period beginning in 2001 through 2008. During this period, there was a 34% decrease in the number of unlimited permits and a 54% decrease in the number of limited. This downward trend in permits is also reflected in other measures of effort that also show a steady decline, i.e. number of trips, landings, etc. (see SAFMC Amendment 16). While the limited entry program has contributed to the reduced capacity, other factors have also contributed to this downward trend. Economic factors like increased imports, decreasing prices and rising prices for diesel fuel have had a widespread affect on commercial fishing throughout many regions of the U.S. In addition, the loss of working waterfronts has contributed to a growing loss of fishing infrastructure that may play a role in the decline in many different fisheries.

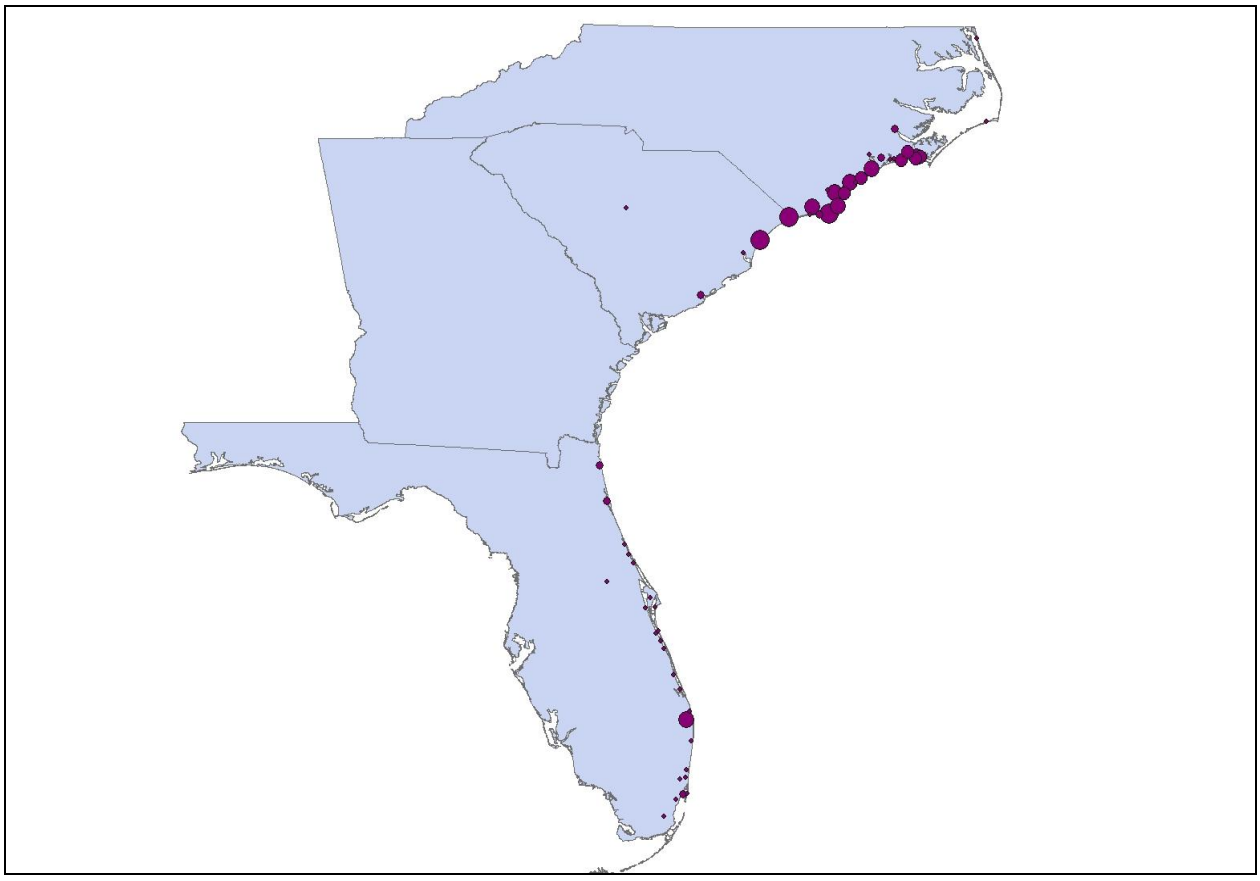
The following description primarily addresses the red grouper fishery which is the focus of this amendment.

### 3.4.1 Commercial and Recreational Fishing Communities

While studies on the general identification of fishing communities have been undertaken in the past few years, little social or cultural investigation into the nature of the snapper grouper fishery itself has occurred. A socioeconomic study by Waters et al. (1997) covered the general characteristics of the fishery in the South Atlantic, but those data are now over 10 years old and do not capture more recent important changes in the fishery. Cheuvront and Neal (2004) conducted survey work of the North

Carolina commercial snapper grouper fishery south of Cape Hatteras, but did not include ethnographic examination of communities dependent upon fishing.

The majority of the commercial red grouper landings are concentrated on the northeast coast of South Carolina (Murrells Inlet and Little River), throughout the mid to southern coast of North Carolina (clustered in Brunswick, Carteret, Onslow, Pender, and New Hanover counties), and in the community of Palm Beach Gardens, Florida as seen in **Figure 3-3**. Other areas of the South Atlantic with less concentrated landings include various communities along the remainder of the Florida coast (and the inland community of Lake Mary), communities in several additional North Carolina counties (Craven, Currituck, and Dare counties), and a few additional communities in South Carolina (Charleston, Georgetown, and Columbia).

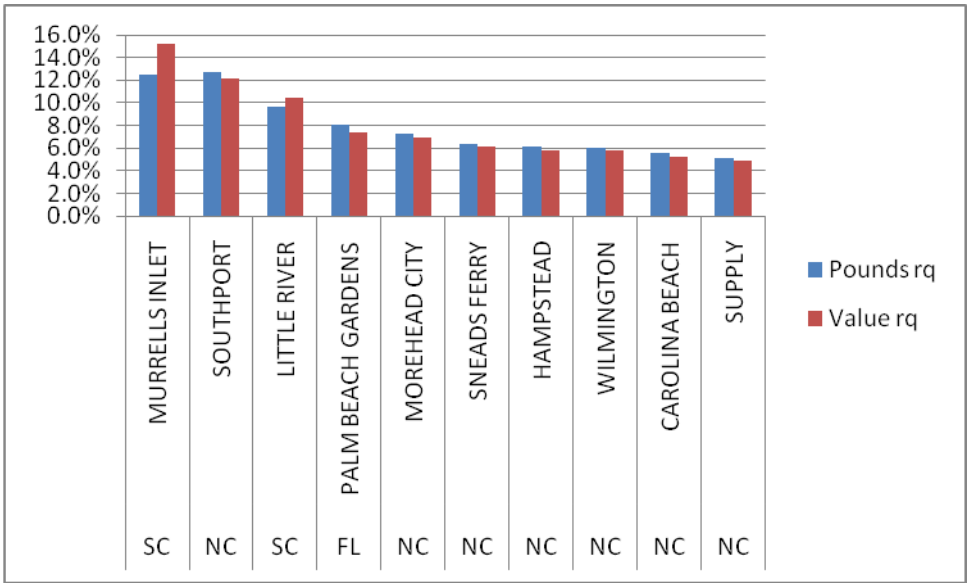


Source: ALS 2008

**Figure 3-3.** Red grouper 2008 landings by vessel homeport.

The communities most involved in the red grouper component of the commercial snapper grouper fishery include in order of percent of value: Murrells Inlet, South Carolina; Southport, North Carolina; Little River, South Carolina; Palm Beach Gardens, Florida; Morehead City, North Carolina; Sneads Ferry, North Carolina; Hampstead, North Carolina; Wilmington, North Carolina; Carolina Beach, North Carolina; and Supply, North Carolina (see **Figure 3-4**).

These data represent a categorization of communities based upon their overall pounds and value of local commercial landings divided by the overall value of regional commercial landings or regional quotient (rq). These data were assembled from the accumulated landings system which includes all species from both state and federal waters landed in 2008 and does not include the Florida Keys. All communities were ranked on this "rq" and the top ten are displayed here as they have at least 5% of red grouper regional pounds or value. These communities have thus been selected to receive more in-depth descriptions of their fishing involvement.




Source: ALS 2008

**Figure 3-4.** Proportion (lq) of landings and value for top ten South Atlantic communities out of total landings and value of red grouper.

Recreational fishing communities in the South Atlantic are listed in **Table 3-32**. These communities were selected by their ranking on a number of criteria including number of charter permits per thousand population and recreational fishing infrastructure identified within each community as listed within the MRIP site survey.

**Table 3-32.** South Atlantic recreational fishing communities.

| Community | State | Community | State |
|---|---|---|---|
| Jekyll Island | GA | Cape Carteret | NC |
| Hatteras | NC | Kill Devil Hill | NC |
| Manns Harbor | NC | Murrells Inlet | SC |
| Manteo | NC | Little River | SC |
| Atlantic Beach | NC | Georgetown | SC |
| Wanchese | NC | Islandmorada | FL |
| Salter Path | NC | Cudjoe Key | FL |
| Holden Beach | NC | Key West | FL |
| Ocean Isle | NC | Tavernier | FL |
| Southport | NC | Little Torch Key | FL |

| | | | |
|---|---|---|---|
| Wrightsville Beach | NC | Ponce Inlet | FL |
| Marshallberg | NC | Marathon | FL |
| Carolina Beach | NC | Sugarloaf Key | FL |
| Oriental | NC | Palm Beach Shores | FL |
| Topsail Beach | NC | Big Pine Key | FL |
| Swansboro | NC | Saint Augustine | FL |
| Nags Head | NC | Key Largo | FL |
| Harkers Island | NC | Summerland Key | FL |
| Calabash | NC | Sebastian | FL |
| Morehead City | NC | Cape Canaveral | FL |

Several of the communities identified as general South Atlantic recreational fishing communities are also the most involved in commercial fishing for red grouper (as shown above in **Figure 3-4**) . These overlapping communities have been highlighted in gray in **Table 3-32**.

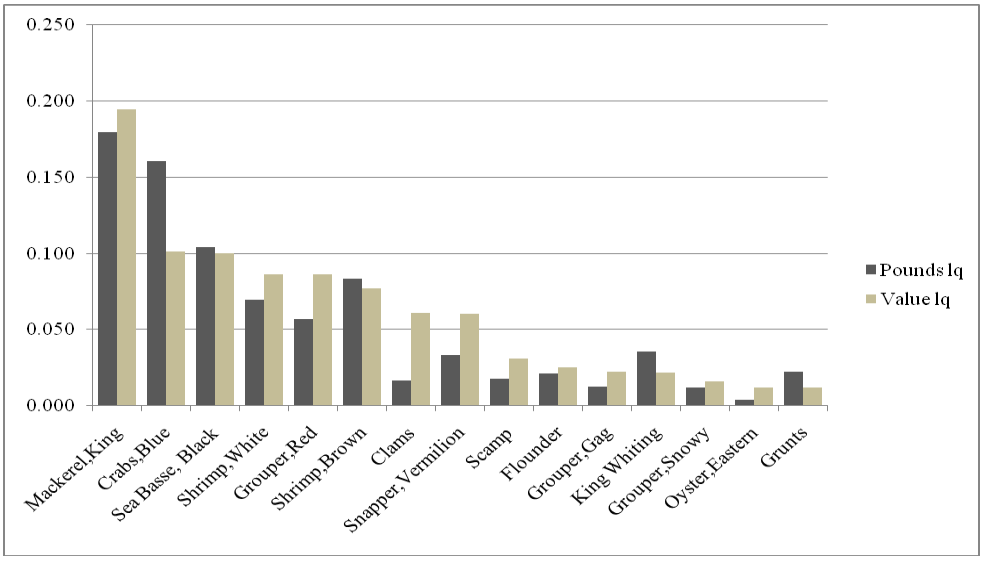
Since recreational catch information by species is not available at the community level, it has been assumed that the top ten communities with the most involvement in the red grouper component of the commercial snapper grouper fishery are also the most involved in the recreational sector for red grouper. The following is a description of these communities by state and follows alphabetical order for each state. More in-depth descriptions of fishing communities along the South Atlantic are contained in Jepson et al. (2005) and incorporated herein by reference.

### 3.4.1.1 Fishing Communities by State

**North Carolina**

Carolina Beach

Carolina Beach was ranked ninth in terms of commercial red grouper landings in 2008 with 5.5% of the total pounds and 5.3% of the total value of the South Atlantic red grouper fishery (**Figure 3-4**). As shown below in **Figure 3-5**, the top species with a high local quotient landed in Carolina Beach include king mackerel, blue crabs, black sea bass, and white shrimp. Red grouper was the number five species for Carolina Beach in terms of pounds (5.7%) and value (8.6%).



Source: ALS 2008

**Figure 3-5.** Proportion (lq) of landings and value for top fifteen species out of total landings and value for Carolina Beach, North Carolina.

As shown in **Table 3-33** the participation of residents of Carolina Beach in the snapper grouper charter fishery has decreased over the last ten years with a high of 30 vessel permits assigned to the homeport of Carolina Beach in the year 2003. In the year 2010, 16 charter permits were registered to vessels homeported in Carolina Beach. The number of snapper grouper commercial class 1 permits attributed to the homeport has also decreased over time from a high of 10 class 1 permits held in 2000 to 6 permits held in 2010. In the early 2000s, several commercial snapper grouper class 2 permits were attributed to Carolina Beach; however in recent years no class 2 permits were held.

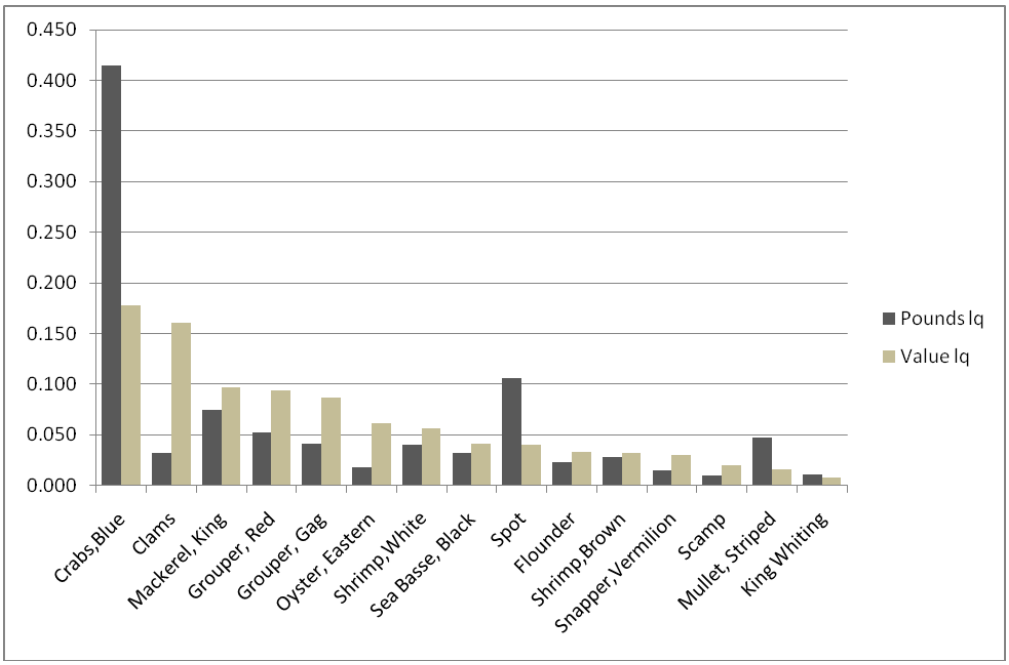
**Table 3-33.** Snapper grouper charter, class 1, and class 2 permits aggregated by vessel homeport of Carolina Beach, North Carolina 2000-2010.

| Year | Snapper Grouper Charter | Snapper Grouper Class 1 | Snapper Grouper Class 2 |
|---|---|---|---|
| 2000 | 28 | 10 | 2 |
| 2001 | 28 | 9 | 2 |
| 2002 | 25 | 7 | 3 |
| 2003 | 30 | 8 | . |
| 2004 | 27 | 7 | . |
| 2005 | 21 | 4 | . |
| 2006 | 22 | 5 | . |
| 2007 | 13 | 4 | . |
| 2008 | 15 | 5 | . |
| 2009 | 15 | 5 | . |
| 2010 | 16 | 6 | . |

Source: NMFS
Note: These data are presented for trend analysis only as some data anomalies exist.

Hampstead

Hampstead was ranked seventh in terms of red grouper landings in 2008 with 6.1% of the total pounds and 5.8% of the total value of the South Atlantic red grouper fishery (**Figure 3-4**). The top species with a high local quotient landed in Hampstead include blue crabs, clams, king mackerel, red grouper at (9.4% of value and 5.2% of pounds), and gag grouper (**Figure 3-6**).




Source: ALS 2008

**Figure 3-6.** Proportion (lq) of landings and value for top fifteen species out of total landings and value for Hampstead, North Carolina.

As shown in **Table 3-34** the participation of residents of Hampstead in the snapper grouper charter fishery has fluctuated over the last ten years with no permits attributed to the homeport of Hampstead some years and a high of 10 permits held in the year 2006. In the year 2010, 3 charter permits were registered to the homeport. The number of snapper grouper commercial class 1 permits held has also fluctuated over the last ten years, but has remained relatively stable with a high of 11 permits held in the years of 2000 and 2006, but with a low of six permits held in the years of 2007-2009. In the early 2000s, no commercial snapper grouper class 2 permits were attributed to the homeport of Hampstead; however in recent years one to three class 2 permits were registered to the community.

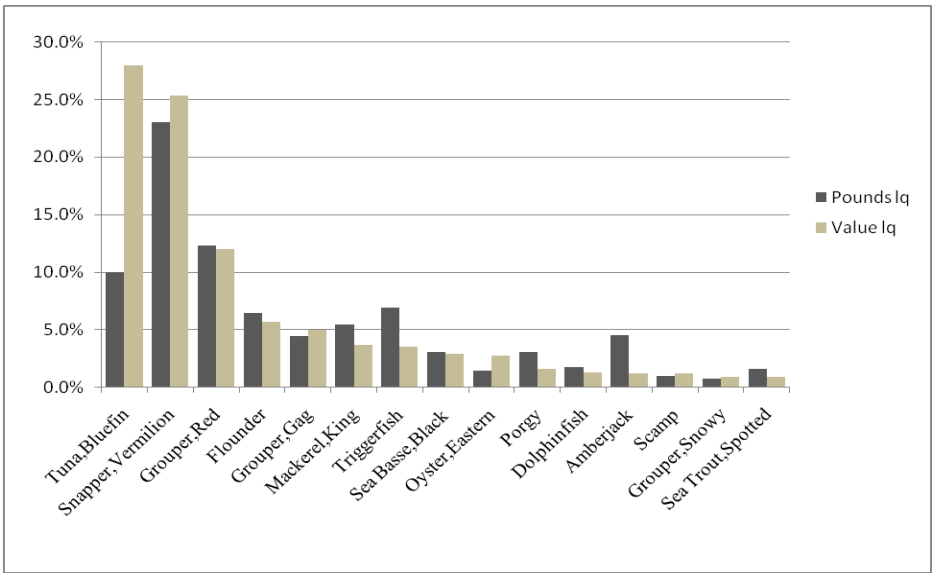
**Table 3-34.** Snapper grouper charter, class 1, and class 2 permits aggregated by vessel homeport of Hampstead, North Carolina 2000-2010.

| Year | Snapper Grouper Charter | Snapper Grouper Class 1 | Snapper Grouper Class 2 |
|---|---|---|---|
| 2000 | . | 11 | . |
| 2001 | . | 8 | . |
| 2002 | 1 | 8 | . |
| 2003 | . | 9 | . |
| 2004 | 1 | 7 | . |
| 2005 | 2 | 7 | 1 |
| 2006 | 10 | 11 | 3 |
| 2007 | 4 | 6 | 1 |
| 2008 | 4 | 6 | 1 |
| 2009 | 4 | 6 | 1 |
| 2010 | 3 | 7 | 1 |

Source: NMFS
Note: These data are presented for trend analysis only as some data anomalies exist.

Morehead City

Morehead City was ranked fifth in terms of red grouper landings in 2008 with 7.3% of the total pounds and 6.9% of the total value of the South Atlantic red grouper fishery (**Figure 3-4**). The top species with a high local quotient landed in Morehead City include bluefin tuna, vermilion snapper, red grouper (12% of value and 12.3% of pounds), gag grouper, and king mackerel (**Figure 3-7**).




Source: ALS 2008

**Figure 3-7.** Proportion (lq) of landings and value for top fifteen species out of total landings and value for Morehead City, North Carolina.

As shown in **Table 3-35** the participation of residents of Morehead City in the snapper grouper charter fishery has fluctuated over the last ten years with a low of nine permits attributed to the homeport the year 2002 and a high of 32 permits held in the year 2006. In the year 2010, 26 charter permits were registered to vessels homeported in Morehead City. The number of snapper grouper commercial class 1 permits attributed to the homeport also fluctuated over the last ten years, but has remained relatively stable with a high of 17 permits held in the year 2009. In 2010, 11 class 1 snapper grouper permits were registered to Morehead City. In the early 2000s, between one to two commercial snapper grouper class 2 permits were held by vessel owners with the registered homeport of Morehead City; however in recent years no class 2 permits were registered.

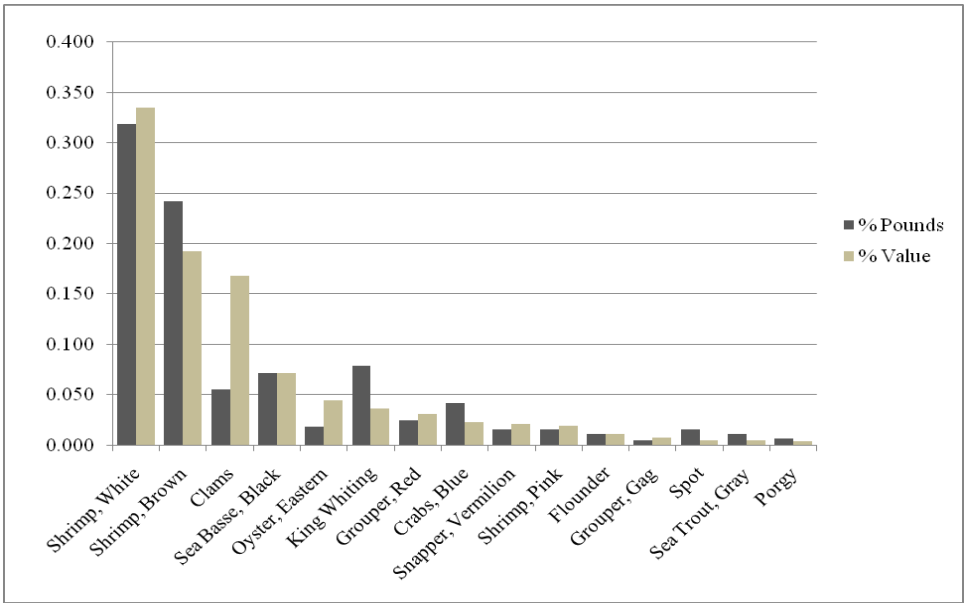
**Table 3-35.** Snapper grouper charter, class 1, and class 2 permits aggregated by vessel homeport of Morehead City, North Carolina 2000-2010.

| Year | Snapper Grouper Charter | Snapper Grouper Class 1 | Snapper Grouper Class 2 |
|---|---|---|---|
| 2000 | 15 | 15 | 2 |
| 2001 | 15 | 15 | 1 |
| 2002 | 9 | 15 | 1 |
| 2003 | 10 | 16 | 1 |
| 2004 | 13 | 15 | . |
| 2005 | 19 | 14 | . |
| 2006 | 32 | 14 | . |
| 2007 | 14 | 9 | . |
| 2008 | 20 | 10 | . |
| 2009 | 27 | 17 | . |
| 2010 | 26 | 11 | . |

Source: NMFS
Note: These data are presented for trend analysis only as some data anomalies exist.

Sneads Ferry

Sneads Ferry was ranked sixth in terms of red grouper landings in 2008 with 6.4% of the total pounds and 6.1% of the total value of the South Atlantic red grouper fishery (**Figure 3-4**). The top species with a high local quotient landed in Sneads Ferry include white shrimp, brown shrimp, clams, black sea bass, and eastern oyster. Red grouper is the number seven top species in terms of the local quotient landed in Sneads Ferry and comprised 3.1% of value and 2.4% of pounds (**Figure 3-8**).




Source: ALS 2008

**Figure 3-8.** Proportion (lq) of landings and value for top fifteen species out of total landings and value for Sneads Ferry, North Carolina.

As shown in **Table 3-36** the participation of residents of Sneads Ferry in the snapper grouper charter fishery has fluctuated over the last ten years with a high of 11 permits registered to vessels homeported in the community in the years 2002 and 2004 and a low of four and five permits held in the years of 2007 and 2006 respectively. In the year 2010, 9 snapper grouper charter permits were attributed to Sneads Ferry vessels. The number of snapper grouper commercial class 1 permits held has also fluctuated over the last ten years, but has remained relatively stable with a high of 20 permits held in the years 2001 and 2002. In 2010, 12 class 1 commercial snapper grouper permits were attributed to vessels homeported in the community. The number of snapper group class 2 commercial permits has remained relatively stable over the last ten years with between zero to 2 permits held by Sneads Ferry vessels.

**Table 3-36.** Snapper grouper charter, class 1, and class 2 permits aggregated by vessel homeport of Sneads Ferry, North Carolina 2000-2010.

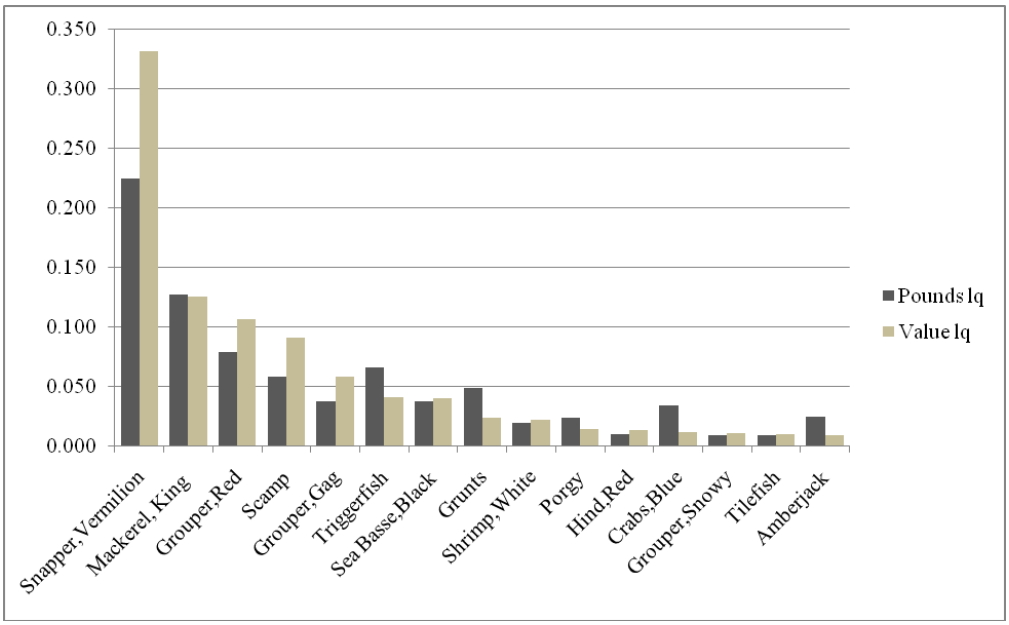
| Year | Snapper Grouper Charter | Snapper Grouper Class 1 | Snapper Grouper Class 2 |
|---|---|---|---|
| 2000 | 10 | 18 | 1 |
| 2001 | 10 | 20 | 1 |
| 2002 | 11 | 20 | 1 |
| 2003 | 8 | 16 | 1 |
| 2004 | 11 | 16 | 1 |
| 2005 | 8 | 12 | 2 |
| 2006 | 5 | 13 | 1 |
| 2007 | 4 | 8 | 1 |
| 2008 | 6 | 12 | . |

| | | | |
|---|---|---|---|
| 2009 | 7 | 14 | . |
| 2010 | 9 | 12 | 1 |

Source: NMFS
Note: These data are presented for trend analysis only as some data anomalies exist.

Southport

Southport was ranked second in terms of red grouper landings in 2008 with 12.7% of the total pounds and 12.1% of the total value of the South Atlantic red grouper fishery (**Figure 3-4**). The top species with a high local quotient landed in Southport include vermilion snapper, king mackerel, red grouper (10.6% of value and 7.9% of pounds), scamp, and gag grouper (**Figure 3-9**).




Source: ALS 2008

**Figure 3-9.** Proportion (lq) of landings and value for top fifteen species out of total landings and value for Southport, North Carolina.

As shown in **Table 3-37** the participation of residents of Southport in the snapper grouper charter fishery has fluctuated extensively over the last ten years with a high of 33 permits attributed to Southport vessels in the year 2009 and a low seven permits in the year 2000. A total of 26 permits were held in the year 2010. The number of snapper grouper commercial class 1 permits has also fluctuated extensively over the last ten years with a high of 33 permits held in the year 2006 and a low of 17 held in the year 2004. A total of 30 class 1 permits were held by vessels homeported in Southport in the year 2010. The number of snapper group class 2 commercial permits has remained relatively stable over the last ten years, fluctuating between two and four permits.

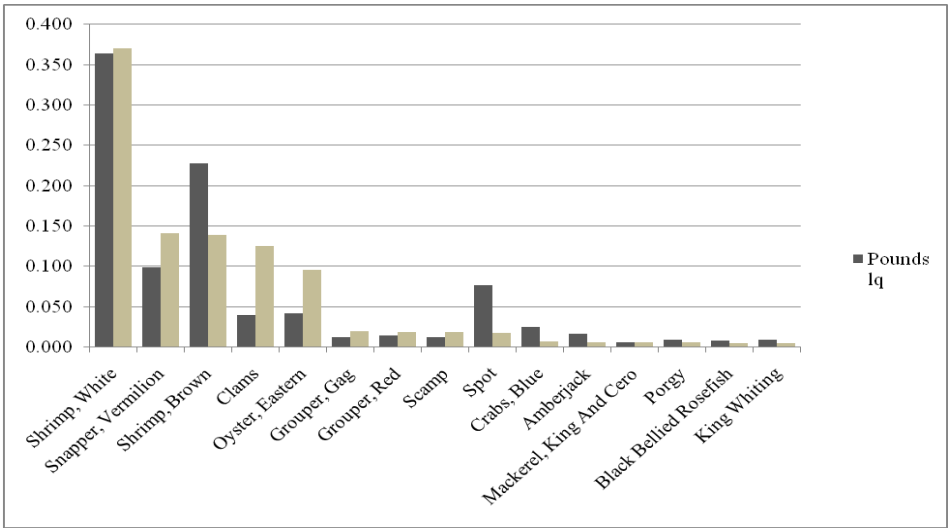
**Table 3-37.** Snapper grouper charter, class 1, and class 2 permits aggregated by vessel homeport of Southport, North Carolina 2000-2010.

| Year | Snapper Grouper Charter | Snapper Grouper Class 1 | Snapper Grouper Class 2 |
|---|---|---|---|
| 2000 | 7 | 18 | 3 |
| 2001 | 9 | 18 | 2 |
| 2002 | 8 | 18 | 2 |
| 2003 | 17 | 18 | 3 |
| 2004 | 12 | 17 | 3 |
| 2005 | 16 | 21 | 3 |
| 2006 | 31 | 33 | 4 |
| 2007 | 11 | 13 | 3 |
| 2008 | 26 | 18 | 2 |
| 2009 | 33 | 28 | 4 |
| 2010 | 26 | 30 | 2 |

Source: NMFS
Note: These data are presented for trend analysis only as some data anomalies exist.

Supply

Supply was ranked tenth in terms of red grouper landings in 2008 with 5.1% of the total pounds and 4.9% of the total value of the South Atlantic red grouper fishery (**Figure 3-4**). The top species with a high local quotient landed in Supply include white shrimp, vermilion snapper, brown shrimp, clams, and eastern oyster. Red grouper is the number seven top species for Supply in terms of the local quotient landed and comprised 1.8% of the value and 1.4% of the pounds (**Figure 3-10**).




Source: ALS 2008

**Figure 3-10.** Proportion (lq) of landings and value for top fifteen species out of total landings and value for Supply, North Carolina.

As shown in **Table 3-38** the participation of residents of Supply in the snapper grouper charter fishery has remained relatively stable over the last ten years, fluctuating from four to one permits registered to vessels naming Supply as their homeport. Over the last ten years, snapper grouper commercial class 1 permits were attributed to vessels homeported in Supply in the years 2005-2007 (range of one to two permits held), but no permits were held during other years. No snapper group class 2 commercial permits were held by vessels homeported in Supply over the last ten years.

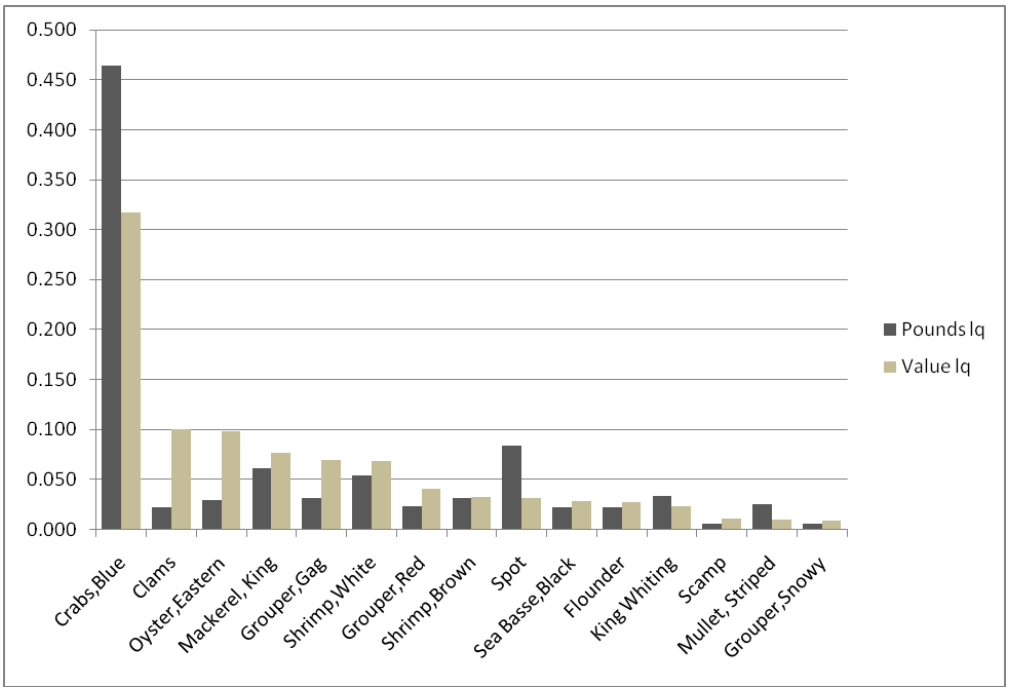
**Table 3-38.** Snapper grouper charter, class 1, and class 2 permits aggregated by vessel homeport of Supply, North Carolina 2000-2010.

| Year | Snapper Grouper Charter | Snapper Grouper Class 1 | Snapper Grouper Class 2 |
|---|---|---|---|
| 2000 | 1 | . | . |
| 2001 | 1 | . | . |
| 2002 | 2 | . | . |
| 2003 | 2 | . | . |
| 2004 | 4 | . | . |
| 2005 | 3 | 1 | . |
| 2006 | 4 | 2 | . |
| 2007 | 1 | 1 | . |
| 2008 | 2 | . | . |
| 2009 | 3 | . | . |
| 2010 | 2 | . | . |

Source: NMFS
Note: These data are presented for trend analysis only as some data anomalies exist.

Wilmington

Wilmington was ranked eighth in terms of red grouper landings in 2008 with 6.0% of the total pounds and 5.8% of the total value of the South Atlantic red grouper fishery (**Figure 3-4**). The top species with a high local quotient landed in Wilmington include blue crabs, clams, eastern oyster, gag grouper, and white shrimp. Red grouper is the number seven top species in terms of the local quotient landed in Wilmington and comprised 4.1% of the value and 2.3% of the pounds (**Figure 3-11**).




Source: ALS 2008

**Figure 3-11.** Proportion (lq) of landings and value for top fifteen species out of total landings and value for Wilmington, North Carolina.

As shown in **Table 3-39** the participation of residents of Wilmington in the snapper grouper charter fishery has fluctuated from a low of three permits registered to vessels homeported in the community in the year 2002 to a high of 15 permits held in the year 2006. In the year 2010, 12 snapper grouper charter permits were registered to vessels homeported in Wilmington. Over the last ten years the snapper grouper commercial class 1 permits held by homeported vessels in the community have fluctuated extensively with nearly a 50% decrease from the high of the year 2000 when 19 permits were held to recent years where the number of permits has fluctuated from a low of 8-11 permits held. The number of snapper group class 2 commercial permits attributed to Wilmington vessels has remained nearly stable over the last ten years with three class 2 permits held in the year 2000, but one permit held during the remainder of the years.

**Table 3-39.** Snapper grouper charter, class 1, and class 2 permits aggregated by vessel homeport of Wilmington, North Carolina 2000-2010.

| Year | Snapper Grouper Charter | Snapper Grouper Class 1 | Snapper Grouper Class 2 |
|---|---|---|---|
| 2000 | 6 | 19 | 3 |
| 2001 | 4 | 17 | 1 |
| 2002 | 3 | 18 | 1 |
| 2003 | 8 | 14 | 1 |
| 2004 | 9 | 16 | 1 |
| 2005 | 10 | 15 | 1 |

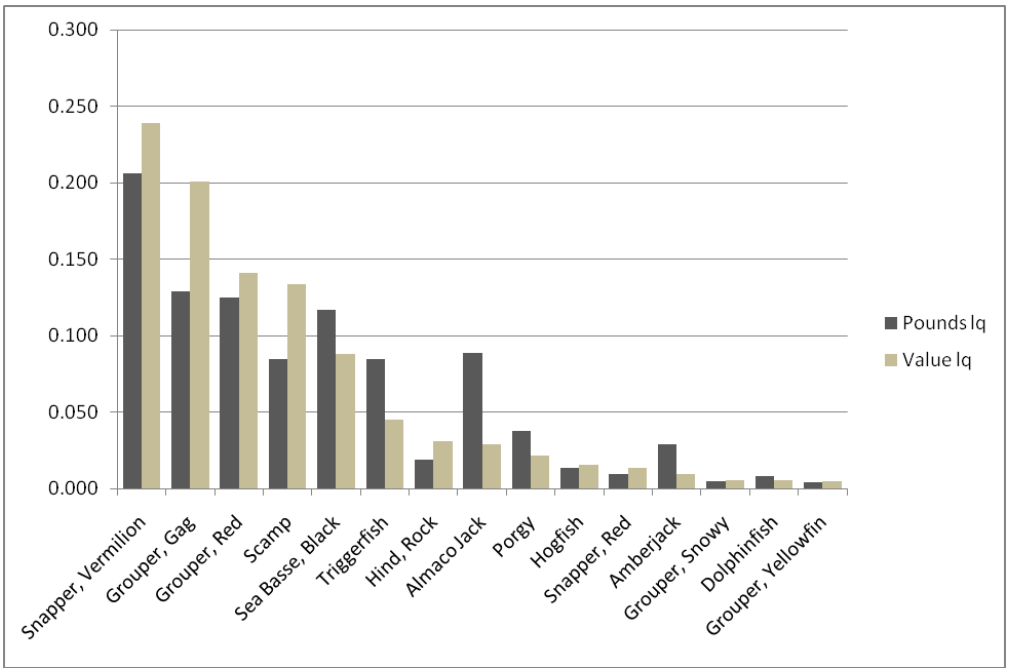
| | | | |
|---|---|---|---|
| 2006 | 15 | 14 | 1 |
| 2007 | 6 | 8 | 1 |
| 2008 | 9 | 10 | 1 |
| 2009 | 13 | 11 | 1 |
| 2010 | 12 | 10 | 1 |

Source: NMFS
Note: These data are presented for trend analysis only as some data anomalies exist.

**South Carolina**

Little River

Little River was ranked third in terms of red grouper landings in 2008 with 9.6% of the total pounds and 10.5% of the total value of the South Atlantic red grouper fishery (**Figure 3-4**). The top species with a high local quotient landed in Little River include vermilion snapper, gag grouper, red grouper (14.1% of value and 12.5% of pounds), scamp, and black sea bass (**Figure 3-12**).




Source: ALS 2008

**Figure 3-12.** Proportion (lq) of landings and value for top fifteen species out of total landings and value for Little River, South Carolina.

As shown in **Table 3-40** the participation of residents of Little River in the snapper grouper charter fishery has fluctuated extensively from high of 27 charter permits registered to vessels naming Little River as their homeport in the year of 2010 and lows of 6-11 permits held in various other years. The number of snapper grouper commercial class 1 permits held has also fluctuated extensively with a low of 11 permits held in the years of 2000 and 2007 and a high of 26 permits held in the years of 2006 and 2010. The number of snapper group class 2 commercial permits attributed to vessels homeported in the community has remained relatively stable over the last ten years, varying from zero permits to two permits.

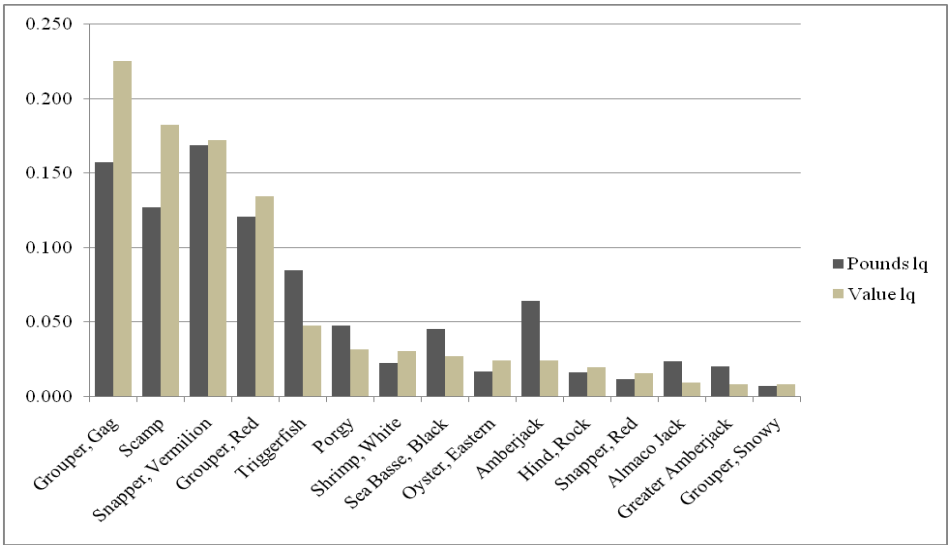
**Table 3-40.** Snapper grouper charter, class 1, and class 2 permits aggregated by vessel homeport of Little River, South Carolina 2000-2010.

| Year | Snapper Grouper Charter | Snapper Grouper Class 1 | Snapper Grouper Class 2 |
|---|---|---|---|
| 2000 | 9 | 11 | 1 |
| 2001 | 9 | 12 | 1 |
| 2002 | 11 | 13 | 1 |
| 2003 | 11 | 14 | 1 |
| 2004 | 11 | 14 | 1 |
| 2005 | 12 | 14 | 1 |
| 2006 | 21 | 26 | 2 |
| 2007 | 6 | 11 | . |
| 2008 | 19 | 18 | 1 |
| 2009 | 20 | 20 | 2 |
| 2010 | 27 | 26 | 1 |

Source: NMFS
Note: These data are presented for trend analysis only as some data anomalies exist.

Murrells Inlet

Murrells Inlet was ranked number one in terms of red grouper landings in 2008 with 12.5% of the total pounds and 15.2% of the total value of the South Atlantic red grouper fishery (**Figure 3-4**). The top species with a high local quotient landed in Murrells Inlet include gag grouper, scamp, vermilion snapper, red grouper (13.4% of value and 12.1% of pounds), and triggerfish (**Figure 3-13**).




Source: ALS 2008

**Figure 3-13.** Proportion (lq) of landings and value for top fifteen species out of total landings and value for Murrells Inlet, South Carolina.

As shown in **Table 3-41** the participation of residents of Murrells Inlet in the snapper grouper charter fishery has fluctuated extensively with a high of 40 charter permits registered to vessels homeported in the community in the year of 2009 and a low of 13 permits held in 2005. A total of 33 charter permits were held in 2010. The number of snapper grouper commercial class 1 permits registered to homeported vessels follows a similar trend with a high of 31 class 1 permits held in the year 2003 and a total of 13 held in 2007. A total of 21 class 1 permits were held in the year 2010. At the beginning of decade, a range of one to four snapper group class 2 commercial permits were registered to vessels naming Murrells Inlet their homeport; however no class 2 permits have been held since 2004.

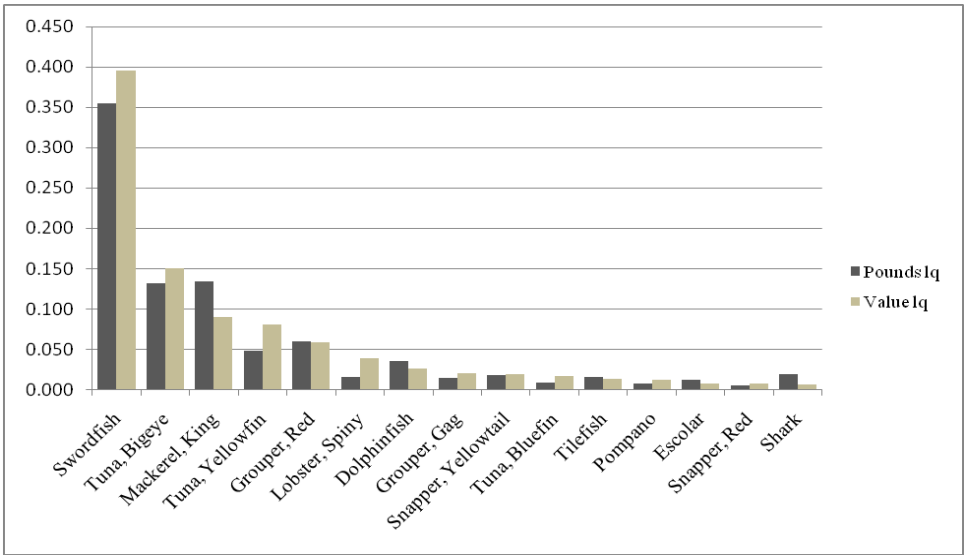
**Table 3-41.** Snapper grouper charter, class 1, and class 2 permits aggregated by vessel homeport of Murrells Inlet, South Carolina 2000-2010.

| Year | Snapper Grouper Charter | Snapper Grouper Class 1 | Snapper Grouper Class 2 |
|---|---|---|---|
| 2000 | 20 | 29 | 4 |
| 2001 | 20 | 29 | 2 |
| 2002 | 14 | 28 | 1 |
| 2003 | 16 | 31 | 1 |
| 2004 | 15 | 26 | 2 |
| 2005 | 13 | 25 | . |
| 2006 | 33 | 28 | . |
| 2007 | 15 | 13 | . |
| 2008 | 32 | 19 | . |
| 2009 | 40 | 24 | . |
| 2010 | 33 | 21 | . |

Source: NMFS
Note: These data are presented for trend analysis only as some data anomalies exist.

**Florida**

Palm Beach Gardens
Palm Beach Gardens was ranked fourth in terms of red grouper landings in 2008 with 8.1% of the total pounds and 7.4% of the total value of the South Atlantic red grouper fishery (**Figure 3-4**). As shown in **Figure 3-14**, the top species with a high local quotient landed in Palm Beach Gardens include swordfish, bigeye tuna, king mackerel, yellowfin tuna, and red grouper (5.8% of value and 6% of pounds).



Source: ALS 2008

**Figure 3-14.** Proportion (lq) of landings and value for top fifteen species out of total landings and value for Palm Beach Gardens, Florida.

As shown in **Table 3-42** the participation of residents of Palm Beach Gardens in the snapper grouper charter fishery has remained relatively stable, fluctuating from zero to two permits registered to vessels homeported in the community. The number of snapper grouper commercial class 1 permits attributed to vessels homeported in Palm Beach Gardens has followed the same trend, fluctuating from zero to two permits held by community members. The number of snapper group class 2 commercial permits has also remained relatively stable with zero permits held in the year 2000 and with one permit held from 2001-2010.

**Table 3-42.** Snapper grouper charter, class 1, and class 2 permits aggregated by vessel homeport of Palm Beach Gardens, Florida 2000-2010.

| Year | Snapper Grouper Charter | Snapper Grouper Class 1 | Snapper Grouper Class 2 |
|---|---|---|---|
| 2000 | 1 | . | . |
| 2001 | . | . | 1 |
| 2002 | . | . | 1 |
| 2003 | 1 | 1 | 1 |
| 2004 | 1 | 1 | 1 |
| 2005 | 1 | 1 | 1 |
| 2006 | 1 | 2 | 1 |
| 2007 | . | 1 | 1 |
| 2008 | 1 | 2 | 1 |
| 2009 | 1 | 2 | 1 |
| 2010 | 2 | 1 | 1 |

Source: NMFS
Note: These data are presented for trend analysis only as some data anomalies exist.

### 3.4.2 Environmental Justice Considerations

Executive Order 12898 requires federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. This executive order is generally referred to as environmental justice (EJ).

Persons employed in the snapper grouper fishery, those involved in the recreational fishery, and associated businesses and communities along the South Atlantic coast would be expected to be affected by this proposed action. Information on the race and income status for groups at the different participation levels (vessel owners, crew, dealers, processors, employees, employees of associated support industries, etc.) is not available. Community level data (and in some cases county level data when community level data was not available), however, for all 57 South Atlantic communities with red grouper landings in the year 2008 (as shown in **Figure 3-3)** have been assessed to examine potential EJ concerns. Out of 57 communities with red grouper landings, the communities which exceeded EJ thresholds are displayed below in **Table 3-43**. Because this proposed action would be expected to affect fishermen and associated industries in numerous communities along the South Atlantic coast and not just those with commercial landings, it is possible that other counties or communities have poverty or minority rates that exceed the EJ thresholds.

In order to identify the potential for EJ concern, the rates of minority populations (non-white, including Hispanic) and the percentage of the population that was below the poverty line were examined. The threshold for comparison that was used was 1.2 times the state average such that, if the value for the community or county was greater than or equal to 1.2 times the state average, then the community or county was considered an area of potential EJ concern. Census data for the year 2000 was used. Estimates of the state minority and poverty rates, associated thresholds, and community rates are provided in **Table 3-43** for those communities which exceeded either the minority or poverty threshold, or both. The exceeded threshold(s) are highlighted in gray in the table.

**Table 3-43.** Environmental Justice thresholds and examined communities.

| State | Community | Minority Rate* | Minority Threshold | Poverty Rate | Poverty Threshold* |
|---|---|---|---|---|---|
| North Carolina | | 29.80 | 35.76 | 12.30 | 14.76 |
| | Beaufort | 25.43 | | 16.55 | |
| | Jacksonville | 39.17 | | 14.14 | |
| | Leland | 24.10 | | 18.81 | |
| | New Bern | 45.15 | | 19.44 | |
| | Surf City | 2.87 | | 15.39 | |
| | Wilmington | 30.59 | | 19.57 | |
| South Carolina | | 33.90 | 40.68 | 14.10 | 16.92 |
| | Charleston | 37.73 | | 19.14 | |
| | Columbia | 51.85 | | 22.07 | |
| | Georgetown | 59.65 | | 24.10 | |

| | | | | | |
|---|---|---|---|---|---|
| Florida | | 34.60 | 41.52 | 12.50 | 15.00 |
| | Cocoa | 40.05 | | 24.07 | |
| | Fort Lauderdale | 42.53 | | 17.74 | |
| | Fort Pierce | 58.64 | | 30.91 | |
| | Homestead | 77.14 | | 57.97 | |
| | Lake Worth | 51.94 | | 19.98 | |
| | Miami | 88.17 | | 28.45 | |
| | Miami Beach | 59.11 | | 21.84 | |
| | Miramar | 78.39 | | 8.17 | |
| | Saint Augustine | 20.70 | | 15.81 | |
| | South Miami | 61.14 | | 17.09 | |

Source: 2000 U.S.
*Calculated as 1.2 times the state rate.

Among the communities examined, only the community of Wilmington, North Carolina is involved to a larger extent (have at least 5% of red grouper regional pounds or value as described above in **Section 3.3.3.1**) in the commercial fishing of red grouper and suggests the most EJ concern. The other examined communities with EJ concern are involved in commercial fishing for the red grouper to a lesser degree, but it is possible that they could be impacted because the proposed management measures would apply to all participants in the affected area. However, information is not available to suggest that minorities or lower income persons are, on average, more dependent on the affected species than non-minority or higher income persons.

As noted above, however, additional communities beyond those profiled would be expected to be affected by the actions in this proposed amendment. Because these communities have not been profiled, the absence of additional potential EJ concerns cannot be assumed and the total number of additional communities that exceed the thresholds is unknown.

However, while some communities expected to be affected by this proposed amendment may have minority or economic profiles that exceed the EJ thresholds and, therefore, may constitute areas of concern, significant EJ issues are not expected to arise as a result of this proposed amendment. No adverse human health or environmental impacts are expected to accrue to this proposed amendment, nor are these measures expected to result in increased risk or exposure of affected individuals to adverse health hazards.

Finally, the general participatory process used in the development of fishery management measures is expected to provide sufficient opportunity for meaningful involvement by potentially affected individuals to participate in the development process of this amendment and have their concerns factored into the decision process.

## 3.5 Administrative Environment

## 3.5.1 The Fishery Management Process and Applicable Laws

### 3.5.1.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the 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 Magnuson-Stevens Act and with other applicable laws. In most cases, the Secretary has delegated this authority to NOAA Fisheries Service.

The South Atlantic Council is responsible for conservation and management of fishery resources in Federal waters of the U.S. South Atlantic. These waters extend from 3 to 200 miles offshore from the seaward boundary of the States of North Carolina, South Carolina, Georgia, and east Florida to Key West. The South Atlantic 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. South Atlantic 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 South Atlantic 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.

### 3.5.1.2 State Fishery Management

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

### 3.5.1.3 Enforcement

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

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

through the State when a state violation has occurred.

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. NOAA General Counsel requested public comment through December 20 2010, on a new draft policy.

# Chapter 4. Environmental Consequences

## 4.1 Action 1. Re-define Maximum Sustainable Yield

The following are the effects expected from the proposed modifications to the MSY for red grouper (**Table 4-1**).

**Table 4-1.** 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. | $F_{30\%SPR}$=0.178[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]Estimate from the Beaufort catch-age model
[2,3]SEDAR 19 (2010)

### 4.1.1 Biological Effects

The maximum sustainable yield (MSY) is a reference point used by managers to assess fishery performance over the long term. As a result, redefined management reference points could require regulatory changes in the future as managers monitor the long-term performance of the stock with respect to the new reference point. Therefore, these parameter definitions would affect subject stocks and the ecosystem of which they are a part, by influencing decisions about how to maximize and optimize the long-term yield of fisheries under equilibrium conditions

### *What Does SPR Mean?*

SPR stands for **S**pawner **R**ecruit **R**atio. It is defined as the spawners per recruit in a fished population relative that that at an unfished level. The yield at an $F_{SPR}$ proxy may serve as proxy for $F_{MSY}$ if the spawner-recruit relationship cannot be estimated reliably.

and triggering action when stock biomass decreases below a threshold level.

Specifying MSY will not impact protected species; however, subsequent regulatory changes implemented to achieve long term performance goals based on MSY could potentially impact protected species. The biological effects of the choice of management reference points are described below.

MSY in **Alternative 1 (No Action)** is defined as the yield produced by $F_{MSY}$ where $F_{30\%SPR}$ is used as the $F_{MSY}$ proxy and represents the overfishing defined in Amendment 11 to the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic Region (Amendment 11, SAFMC 1998b). In **Alternative 1 (No Action)**, a poundage for MSY was not specified in the Sustainable Fisheries Act (SFA) Amendment 11 due to data limitations and SEDAR 19 (2010) did not estimate the MSY level for the yield at $F_{30\%SPR}$.

**Alternative 2 (Preferred)** would redefine the MSY proxy of the red grouper stock based on the recommendation of the SEDAR 19 Review Panels and Scientific and Statistical Committee (SSC) to equal the value associated with the yield at $F_{MSY}$ (1,110,00 lbs whole weight). The implementation of a MSY equation would have beneficial effects to the red grouper stock as it provides a reference point to monitor the long-term performance of the stock.

The implementation of a MSY equation would not directly affect the protected species because it is meant to be a reference point to monitor the long-term performance of the stock once it is rebuilt. In the future, when the stock is rebuilt, any specific management actions based on the MSY equation that may affect protected species will be evaluated as they are developed.

### *Bottom-Line*

Alternative 2 would have beneficial effects to the red grouper stock as it provides a reference point to monitor the long-term performance of the stock.

## 4.1.2 Economic Effects

Defining the MSY for red grouper does not alter the current harvest or use of the resource. Specification of this measure merely establishes a benchmark for fishery and resource evaluation from which additional management actions for the species would be based, should comparison of the fishery and resource with the benchmark indicate that management adjustments are necessary. The impacts of these management adjustments will be evaluated at the time they are proposed. As a benchmark, MSY would not limit how, when, where, or with what frequency participants in the fishery engage the resource.

This includes participants who directly utilize the resource (principally, commercial vessels, for-hire operations, and recreational anglers), as well as participants associated with peripheral and support industries.

Since there would be no direct effects on resource harvest or use, there would be no direct effects on fishery participants, associated industries or communities. Direct effects only accrue to actions that alter harvest or other use of the resource. Specifying MSY, however, establishes the platform for future management, specifically from the perspective of bounding allowable harvest levels. In this sense, MSY may be considered to have indirect effects on fishery participants.

As a benchmark, MSY sets off the parameters that condition subsequent management actions, and as such, defining MSY takes special significance. Of the alternatives considered in this action, **Alternative 2 (Preferred)**, which is recommended in the most recent SEDAR and by the SSC, has a better scientific basis. Hence, it provides a more solid ground for management actions that have economic implications.

### 4.1.3 Social Effects

The setting of MSY for red grouper is primarily a biological threshold that may impact the social environment depending upon where the threshold is set. These thresholds are determined through the assessments by several scientific panels and are entirely determined on the biology of the red grouper. Therefore, any indirect effect on the social environment would depend upon the level determined for each threshold and how it relates to current landings by both commercial and recreational sectors. The setting of this threshold becomes even more critical if sector allocation is chosen and at what level each sector allocation is set. Certainly if this threshold is set below current landing levels, there will be changes to the social environment and setting sector allocation will become controversial.

**Alternative 1 (No Action)** would likely have few social impacts as it uses the present value for $F_{MSY}$. **Alternative 2 (Preferred),** which uses the MSY proxy recommended by their SSC, will likely have few negative social effects if the threshold is above the mean landings and not substantially reduced by other management action.

### 4.1.4 Administrative Effects

The potential administrative effects of these alternatives differ in terms of the implied restrictions required to constrain the fisheries to the respective benchmarks. Defining a MSY proxy establishes a harvest goal for the fishery, for which management measures will be implemented. Those management measures would directly impact the administrative environment according to the level of MSY conservativeness and subsequent restrictions placed on the fishery to constrain harvest levels. **Alternative 2 (Preferred)** would implement an MSY equation that would allow for periodic adjustments of $F_{MSY}$ and MSY values based on new assessments without the need for a plan amendment. This would reduce the administrative burden from current levels and is the least administratively burdensome MSY proxy alternatives considered under this action.

***What Is the Proposed MSY Equation?***

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.

## 4.2 Action 2. Re-define Minimum Stock Size Threshold

The following are the effects expected from the proposed modifications to the MSST for red grouper (**Table 4-2**).

**Table 4-2.** MSST alternatives added 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[1] | 4,914,053[1] |
| **Alternative 2** | MSST equals 50% of $SSB_{MSY}$ | n/a | 2,857,162 |
| **Alternative 3 (Preferred)** | MSST equals 75% of $SSB_{MSY}$ | n/a | 4,285,742 |
| **Alternative 4** | MSST equals 85% of $SSB_{MSY}$ | n/a | 4,857,175 |
| **Alternative 5** | MSST at which rebuilding to the MSY level would be expected to occur within 10 years at the MFMT level.[2] | | |

[1]Source: Determination from SEDAR 19 (2010).
[2]At the December 2010 meeting, the South Atlantic Council requested the Southeast Fisheries Science Center (SEFSC) provide an estimate of the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years when fishing mortality is at the minimum fishing mortality threshold (MFMT) level and that this be added as an alternative. This analysis is contained in Appendix D.

### 4.2.1 Biological Effects

**Alternative 1 (No Action)** would retain the MSST definition established in the Snapper Grouper FMP Amendment 11 (SAFMC 1998b). It requires MSST to be at least one half of $SSB_{MSY}$, but allows for it to be greater than this value if natural mortality rate (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 (No Action)** would result in MSST equal to 4,914,053 lbs whole weight if M=0.14. This MSST estimate is close to $SSB_{MSY}$ (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 $SSB_{MSY}$, which is the stock biomass expected to exist under equilibrium conditions when fishing at $F_{MSY}$.

Because the natural mortality rate is small, the current definition of MSST would trigger a rebuilding plan if biomass fell slightly below $SSB_{MSY}$. 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, under **Alternative 1 (No Action)** a rebuilding plan for red grouper could be required when the stock is not overfished. **Alternative 1 (No Action)** could

be considered to have the greatest biological benefit among **Alternatives 1 (No Action)** through **4** because an overfished determination would be made when biomass is only slightly less than $B_{MSY}$. However, as explained in the following sections, **Alternative 1 (No Action)** could have unnecessary negative economic, social, and administrative effects.

**Alternatives 2** through **4** would establish a larger buffer than **Alternative 1 (No Action)** between what is considered to be an overfished and rebuilt condition. **Alternative 2** would allow stock biomass to decrease to as little as 50% of the MSY level before an overfished determination was made. As **Alternative 2** would allow for the greatest decrease in biomass before an overfishing determination is made, it would have the least amount of biological benefit among **Alternatives 1-4**. The biological effect of **Alternative 3 (Preferred)** would be intermediate between **Alternatives 2** and **4**. The impacts of **Alternative 4** would be similar to **Alternative 1** as the difference in the MSST value between the two alternatives is 56,878 pounds. The biological impacts of **Alternative 5** have not been estimated as the Southeast Regional Science Center stated that the computation of MSST as recommended by **Alternative 5** would need to be completed through projection methods usually done during the stock assessment process. The computation of MSST through projection methods raises several practical and technical issues as documented in **Appendix D**.

## 4.2.2 Economic Effects

Like MSY, MSST does not alter the current harvest or use of the resource, and thus would have no direct economic effects on fishery participants and associated industries or communities. Unlike MSY, however, MSST is directly related to actions for rebuilding the stock, actions that would have economic implications.

In general, a high MSST level is susceptible to trigger rebuilding actions that could limit harvest or fishing opportunities, thereby affecting the economic status of fishery participants. A low MSST level would be associated with lower probability of enacting rebuilding actions that would alter the economic environment. To the extent that rebuilding actions necessitated by a chosen MSST would tend to have economic effects, it is possible to provide some general implications of the MSST alternatives.

With rebuilding taking place over a number of years, management actions and their economic consequences could change over time depending on a variety of factors, including the status of the stock and fishing conditions. **Alternative 2** would appear to be best from an economics standpoint, because it is unlikely to trigger restrictive rebuilding actions in the short term. One possible downside of this alternative is that once the stock is considered overfished, the required rebuilding actions could be very restrictive and potentially remain for quite some time. **Alternative 1 (No Action)** lies on the opposite end because it has the highest probability of triggering restrictive rebuilding actions. As discussed in the Biological Effects section, **Alternative 1 (No Action)** defines MSST close to $SSB_{MSY}$ as to render the stock biomass to frequently fluctuate between an overfished and rebuilt status even merely considering the natural variation in recruitment. A possible mitigating factor with this alternative is the possibility that the required management actions that would have adverse economic effects would not last long. But a frequently varying regulatory regime would tend to de-stabilize business planning and fishing decisions which could have potentially worse economic consequences. The economic implications of the other alternatives may be characterized as falling between those of **Alternatives 1 (No Action) and 2**.

### 4.2.3 Social Effects

Like MSY, the setting of the MSST for red grouper is primarily a biological threshold that may impact the social environment depending upon where the threshold is set. With all of these thresholds it is assumed that the long-term effect will ensure a stable stock and should have positive social benefits. But as mentioned earlier, there can be short-term negative social effects if the thresholds impose levels that reduce the current levels of harvest. These thresholds are determined through the assessments by several scientific panels and are entirely determined on the biology of red grouper Therefore, the effect on the social environment would depend upon the level determined for the overfishing threshold and how it relates to current landings by both commercial and recreational sectors. Like the other alternatives, the setting of this threshold becomes important if sector allocation is chosen and at what level each sector allocation is set. **Alternative 1 (No Action)** would likely have few impacts as it uses the present definition, although if this value for MSST is highest, and the stock can be determined to be overfished at a higher level than the other alternatives. **Alternatives 2-4** provide MSST values of increasing percentage of the SSB (50%, 75%, 85%). In general, as the MSST value decreases, short-term social impacts (likely due to harvest limits or closures) would also decrease, but long broad long-term social impacts would increase if any management action was delayed due to a low MSST. **Alternative 3 (Preferred)** provides an MSST value in between those in **Alternative 2** and **Alternative 4**. **Alternative 3 (Preferred)** is expected to result in greater short-term social impacts than **Alternative 2** from closures and other regulations that limit harvest due to MSST being reached, but less long-term social impacts than **Alternative 4.** The social impacts of **Alternative 5** would depend on the MSST level.

### 4.2.4 Administrative Effects

Because the current MSST would cause red grouper to readily fluctuate between an overfished and rebuilt condition (constantly triggering rebuilding plans), **Alternative 1 (No Action)** is the most administratively burdensome of all the MSST alternatives considered. The larger the buffer between MSST and $SSB_{MSY}$ is the lower the probability that red grouper would be considered overfished and require a rebuilding plan. Therefore, **Alternative 2** would be considered the least administratively burdensome alternative of all the alternatives considered since under **Alternative 2** red grouper would be least likely to be considered overfished and least likely to require a rebuilding plan. The potential administrative impacts of **Alternatives 3 (Preferred) and 4** increase as the buffer between MSST and $SSB_{MSY}$ decreases. As the distance between the value of MSST and $SSB_{MSY}$ gets smaller, the probability red grouper would be considered overfished and require a rebuilding plan increases. **Alternative 5**, depending upon the SEFSC estimate, may or may not be more or less administratively burdensome than **Alternatives 3 (Preferred) and 4**. **Alternative 5** is unlikely to result in greater administrative impacts than **Alternative 1 (No Action)**, or lower administrative impacts than **Alternative 2**, which is the lowest value at which MSST may be set.

## 4.3 Action 3. Establish a Rebuilding Schedule

The Council is proposing the implementation of a rebuilding plan for red grouper as the stock is overfished. The Council is considering a range of rebuilding schedule alternatives that define the time it takes to rebuild the stock **(Table 4-3)**.

**Table 4-3.** Rebuilding schedule alternatives for red grouper.

| Alternatives | Definition |
|---|---|
| **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 7 years with the rebuilding time period ending in 2017. 2011 is Year 1. |
| **Alternative 4** | Define a rebuilding schedule as the mid-point between the shortest possible and maximum recommended period to rebuild. This would equal 8 years with the rebuilding time period ending in 2018. 2011 is Year 1. |
| **Alternative 5 (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. |

### 4.3.1 Biological Effects

**Alternative 1 (No Action)** would not establish a rebuilding schedule for red grouper. Without a rebuilding schedule, the stock would rebuild to $SSB_{MSY}$ if overfishing was ended; however, there would be no timeframe to specify when the stock would be rebuilt. Therefore, even though this alternative would rebuild the stock, it would not meet the requirements of the Magnuson-Stevens Act. This alternative would also maintain the existing levels of risk to Endangered Species Act (ESA)-listed species.

Choice of a rebuilding schedule has a direct effect on the biological, ecological, and physical environment by determining the length of time over which rebuilding efforts can be extended.

The overall effects of **Alternative 2, 3, 4,** and **5 (Preferred)** are expected to be beneficial to the fish stock because each defines a plan for rebuilding the stock. Regardless of the approach chosen (shorter versus longer schedules), specifying a rebuilding schedule for red grouper will have no immediate effect on species protected under the ESA and the Marine Mammal Protection Act because these parameters are not used in determining immediate harvest objectives.

**Alternative 2, 3, 4,** and **5 (Preferred)** would establish schedules that would achieve rebuilding within time periods allowed by the Magnuson-Stevens Act, and therefore, **Alternative 2, 3, 4,** and **5 (Preferred)** would be expected to benefit the ecological environment by restoring a crucial link within the trophic structure of the ecosystem. See the text box above for a comparison between alternatives. **Alternative 2** would have the greatest biological benefits as it would rebuild the stock in the shortest amount of time, with **Alternative 5** (**Preferred**) the least of all the action alternatives.

The SSC recommended the South Atlantic Council select 10 years as their preferred rebuilding alternative. However, it must be noted that the SSC also recommended the strategy used to rebuild red grouper have a 70% probability of success within the 10 year timeframe, rather than the 50% probability of rebuilding success required by the Magnuson-Stevens Act. (Rebuilding strategy alternatives are considered in **Action 4**). Therefore, the South Atlantic Council is adopting the SSC's recommended approach that would consider a higher probability of rebuilding success than required.

***A Comparison of Shorter Vs. Longer Rebuilding Periods****

| *Shorter* | *Longer* |
|---|---|
| • Generally greater beneficial impacts to biological environment | • Generally lower beneficial impacts to biological environment |
| • Generally require stocks be provided a greater amount of (and more immediate) relief from fishing pressure | • Allow stocks to be harvested at higher rates as they rebuild |
| • Allows biomass, the age and size structure, sex ratio, and community structure to be restored to healthy levels at the fastest possible rate | • Increases the risk that environmental or other factors could prevent the stocks from recovery |

*Assumes the probability of rebuilding would be the same for the different time periods.

## 4.3.2 Economic Effects

A major economic issue associated with the choice of a rebuilding schedule relates to the cost/benefit configuration of the various alternatives over time. This cost/benefit configuration depends on the functional distance between current and target fishery status and the length of the rebuilding schedule. The length of the rebuilding period would determine how stringent the management measure should be; the shorter the rebuilding period, the more stringent would be the required management measures, but the sooner would the benefits also accrue. Conversely, longer rebuilding periods would require less stringent management measures, but benefits would accrue later.

Regardless of the length of the rebuilding period chosen, the long-term benefits from the fishery would depend on, among others, the regulatory regime adopted over time and the discount factor. Regulatory regimes that promote economic efficiency generally have a higher likelihood of generating higher economic values while preserving the sustainability of the fish stock. Other regulatory regimes could very well erode the economic benefits over time, even at higher stock levels. For example, if regulations proposed in this amendment were successful in rebuilding the red grouper stock, higher levels of harvest approaching the chosen OY would be allowed. But if nothing is done to address overcapacity and other open-access problems in the fishery that currently beset the fishery or will develop over time, the economic status of the fishery could fall back to its current, or possibly worse, condition.

The issue of rebuilding timeframe in fisheries management was explored by Larkin et al. (2006). They constructed a dynamic programming bioeconomic model and applied it to two hypothesized fisheries, one involving moderate-live stock and the other, a long-lived stock. They noted the possibility of generating higher net present values when moving from a 10-year rebuilding timeframe to 20-year and 30-year timeframes, with a higher discounting rate resulting in larger increases than a lower one. One of the additional regulations they simulated was a 10-year fishery closure within a 40-year rebuilding timeframe. Their results showed minimal changes in net present values and allowable catch under a low discount rate, but an increase in allowable catch with slight reduction in net present value under a higher discount rate.

**Alternative 1 (No Action)** would not be a viable alternative because the most recent stock assessment determined red grouper to be overfished, thereby requiring a rebuilding plan. **Alternative 2** would provide the shortest rebuilding period of 3 years and very likely the most restrictive management measures over the rebuilding timeframe. **Alternative 5 (Preferred)** would provide the longest rebuilding period of 10 years and hence possibly the least restrictive management measures over the rebuilding timeframe. The restrictiveness of management measures for **Alternative 3** (7 years) and **Alternative 4** (8 years) would fall between that of **Alternatives 1 (No Action) and 5**. The degree of short-term adverse economic consequences would directly vary with the restrictiveness of management measures implied under the various alternatives. It can be expected that more future benefits would accrue soonest under **Alternative 1 (No Action)** and latest under **Alternative 5**. Determining which alternative would provide the largest net benefit over time would require at least two sets of information, one relates to the management actions provided under each alternative and the other pertains to each alternative's underlying cost and benefits over time. The economic analysis reported in **Section 4.6.2** provides some insights into the economic implications of shorter versus longer rebuilding period for red grouper.

### 4.3.3 Social Effects

Although defining a rebuilding schedule is an administrative action, the schedule determines the severity of the management measures necessary to rebuild the resource within the allotted timeframe. The severity of these measures, in turn, determines the magnitude of the associated social and economic effects expected to accrue during the recovery period. Generally, the shorter the rebuilding schedule, the more severe the necessary harvest restrictions. The more severe the harvest restrictions, the greater the short-term adverse effects associated with business failure, job or living dislocations, and overall adjustments for the social environment. Commercial and recreational fishermen may be able to adjust to the restrictions by switching to other species or by leaving fishing and seeking other employment or recreational pursuits, thereby mitigating any potential adverse social impacts. If other species are also depleted, regulations may prevent switching to another fishery, or if other forms of employment or recreational activities are unavailable or difficult to find, then mitigation opportunities are reduced and net adverse social impacts are potentially more severe.

With respect to individual user groups, depending on the value of the resource and the yield stream of benefits realized upon recovery, particularly severe restrictions may result in losses to current users that cannot be recovered in the long term, or can be recovered, but are realized by different users, particularly if current users choose or are economically forced to exit the fishery due the measures implemented to achieve any required harvest reductions.

Because the red grouper resource has been declared overfished, a rebuilding schedule is required. Therefore, **Alternative 1 (No Action),** which would not establish a rebuilding schedule, is not a viable alternative, and its selection would require subsequent additional management action to adopt a legally compliant rebuilding schedule. Further, if red grouper are not rebuilt as mandated and the population decreases, the species could qualify to be listed as threatened or endangered under the ESA, which would have significant long-term social impacts due to spatial closures and prohibited harvest of other species caught with red grouper.

**Alternatives 2-5 (Preferred)** specify rebuilding schedules of different length. Red grouper would be closed during the initial years under each rebuilding schedule and would likely be closed for longer periods within the years for rebuilding schedules of shorter length, which require more restrictive management measures. Faster recovery conceptually allows faster receipt of the benefits of a recovered resource -- a long-term positive effect on fishermen and fishing communities -- but it is less likely that the resource could recover under the shortest schedule (**Alternative 2**) and the restrictions would likely be more severe, increasing immediate social impacts on fishermen. Regardless of duration, severe restrictions on red grouper harvest could result in loss of the jobs in commercial and for-hire fleets, and after even just a few years, the commercial and for-hire sectors may not recover. Under the intermediate rebuilding schedules in **Alternative 3** and **Alternative 4**, recovery of the red grouper stock is realistic and likely would not require reduced harvest to meet the rebuilding strategy, resulting in less short-term social impacts in **Alternative 2. Alternative 5 (Preferred)** would allow the longest possible rebuilding timeframe would be expected to allow the greatest flexibility to recover red grouper and minimize the adverse social and economic effects on associated fisheries.

### 4.3.4 Administrative Effects

In general, the shorter the rebuilding schedule the more restrictive harvest limitations need to be in order to rebuild the stock within the specified timeframe. Greater restrictions can result in increased impacts on the administrative environment due to an increased need to closely track landings; enforce bag, trip; and size limits; or implement in-season and post-season AMs. **Alternative 1 (No Action)** would not establish a rebuilding schedule and would therefore, not comply with Magnuson-Stevens Act requirements for developing rebuilding plans. If **Alternative 1 (No Action)** were chosen as a preferred alternative and litigation resulted from that choice, the impact on the administrative environment would be significant. **Alternative 2** is the shortest rebuilding schedule considered and would require implementation of additional harvest restrictions to meet the goal of rebuilding the stock within 3 years. Therefore, of all the rebuilding schedule alternatives that

specify a timeframe, **Alternative 2** would be most likely to impact the administrative environment in the form of developing, implementing, and monitoring more restrictive harvest regulations for red grouper. Alternately, **Alternative 5 (Preferred)** would specify the longest rebuilding schedule at 10 years, and would not require implementation of additional harvest restrictions beyond the status quo.

**Alternative 5 (Preferred)** would incur the lowest impact on the administrative environment since measures to limit harvest of red grouper and other shallow water grouper species are already in place and considered sufficient to end overfishing of red grouper. **Alternatives 3 and 4** would specify rebuilding schedules of 7 and 8 years, respectively, and would; therefore, result in administrative impacts at levels in-between those of **Alternative 2** and **Alternative 5 (Preferred).**

## 4.4 Action 4. Establish a Rebuilding Strategy and Acceptable Biological Catch Levels

The South Atlantic Council is proposing the implementation of a rebuilding plan for red grouper as the stock is overfished. The South Atlantic Council is considering a range of rebuilding strategy alternatives that define the maximum fishing mortality rate throughout the rebuilding timeframe. The alternatives are listed following **Tables 4-4 and 4-5** that summarize the alternatives.

**Table 4-4.** A summary of the rebuilding strategy alternatives for red grouper

| Alternatives | Rebuilding strategy ($F_{OY}$ Equal To) | | ABC (lbs whole weight) *Landings and Discards* | ABC (lbs whole weight) *Landings* |
|---|---|---|---|---|
| | Scenario | F rate | | |
| **Alternative 1 (No Action)** | $F_{45\%SPR}$ | 0.1055 | 399,000 (2011)<br>468,000 (2012)<br>537,000 (2013)<br>602,000 (2014) | 374,000 (2011)<br>442,000 (2012)<br>511,000 (2013)<br>575,000 (2014) |
| **Alternative 2** | $F_{REBUILD}$ (10 years) | 0.181 | 665,000 (2011)<br>737,000 (2012)<br>806,000 (2013)<br>866,000 (2014) | 622,000 (2011)<br>693,000 (2012)<br>762,000 (2013)<br>822,000 (2014) |
| **Alternative 3 (Preferred)** | $75\%F_{MSY}$ | 0.166 | 613,000 (2011)<br>687,000 (2012)<br>759,000 (2013)<br>821,000 (2014) | 573,000 (2011)<br>647,000 (2012)<br>718,000 (2013)<br>780,000 (2014) |
| **Alternative 4** | $65\%F_{MSY}$ | 0.144 | 535,000 (2011)<br>610,000 (2012)<br>683,000 (2013)<br>749,000 (2014) | 501,000 (2011)<br>575,000 (2012)<br>648,000 (2013)<br>713,000 (2014) |
| **Alternative 5** | $F_{REBUILD}$ (7 years) | 0.157 | 583,000 (2011)<br>657,000 (2012)<br>730,000 (2013)<br>794,000 (2014) | 545,000 (2011)<br>619,000 (2012)<br>691,000 (2013)<br>755,000 (2014) |
| **Alternative 6** | $F_{REBUILD}$ (8 years) | 0.168 | 620,000 (2011)<br>695,000 (2012)<br>765,000 (2013)<br>828,000 (2014) | 580,000 (2011)<br>654,000 (2012)<br>724,000 (2013)<br>787,000 (2014) |

NOTE: Alternatives 2-4 are based on a 70% probability of rebuilding success in 10 years. Alternative 5 is based on a 70% probability of rebuilding success in 7 years. Alternative 6 is based on a 70% probability of rebuilding success in 8 years.

**Table 4-5.** A comparison of rebuilding strategy alternatives for red grouper in terms of probability of stock recovery.

| | Alternatives | | | | | |
|---|---|---|---|---|---|---|
| | **1** (no action) | **2** $F_{REBUILD}$ (10 years) | **3** $75\%F_{MSY}$ | **4** $65\%F_{MSY}$ | **5** $F_{REBUILD}$ (7 years) | **6** $F_{REBUILD}$ (8 years) |
| **Probability of rebuilding to $SSB_{MSY}$ in 10 years (2020)** | n/a | 70% | 81% | 92% | n/a | n/a |
| **Probability of rebuilding to $SSB_{MSY}$ in 7 years (2017)** | n/a | 54% | 64% | 78% | 70% | n/a |
| **Probability of rebuilding to $SSB_{MSY}$ in 8 years (2018)** | n/a | 61% | 72% | 85% | n/a | 70% |
| **Year in which 50% probability of rebuilding to $SSB_{MSY}$ would be reached** | 2014[1] | 2017 | 2016 | 2016 | 2015[2] | 2016[3] |

[1]Based upon a $F_{30\%SPR}$ proxy for $F_{MSY}$
[2]A 48% probability of rebuilding
[2]A 54% probability of rebuilding
NOTE: Alternatives 2-4 are based on a 70% probability of rebuilding success in 10 years. Alternative 5 is based on a 70% probability of rebuilding success in 7 years.
Alternative 6 is based on a 70% probability of rebuilding success in 8 years.

## Alternatives

**Alternative 1 (No Action).** Do not specify a rebuilding strategy.

**Alternative 2.** Define a rebuilding strategy for red grouper that sets ABC equal to the yield at $F_{REBUILD}$. $F_{REBUILD}$ 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 Overfishing Limit is the yield at $F_{MSY}$.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee is the projected yield stream with a 70% probability of rebuilding success.
- The Acceptable Biological Catch values with dead discards would be 665,000 lbs whole weight (2011), 737,000 lbs whole weight (2012), 806,000 lbs whole weight (2013), and 866,000 lbs whole weight (2014).

- The Acceptable Biological Catch values without dead discards would be 622,000 lbs whole weight (2011), 693,000 lbs whole weight (2012), 762,000 lbs whole weight (2013), and 822,000 lbs whole weight (2014).

**Table 4-6.** Projection results if the fishing mortality rate is fixed at F = Rebuild with a 70% probability of rebuilding success in 10 years.

| Year | F (per year) | Probability of Rebuilt Stock | Projections | | |
|---|---|---|---|---|---|
| | | | 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 |

*Where Does a 70% Probability of Rebuilding Success Come From?*

The SSC is recommending a P* of .30. A P* is the risk that overfishing is occurring. The probability of rebuilding success = 100 – P*. So in the case of red grouper, the SSC is recommending that the Council chooses a rebuilding plan that would be expected to have a 70% chance or better of rebuilding to the target within the specified rebuilding timeframe.

**Alternative 3 (Preferred).** Define a rebuilding strategy for red grouper that sets ABC equal to the yield at 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 Overfishing Limit is the yield at $F_{MSY}$.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee is the projected yield stream with a 70% probability of rebuilding success.
- The Acceptable Biological Catch values with dead discards would be 613,000 lbs whole weight (2011), 687,000 lbs whole weight (2012), 759,000 lbs whole weight (2013), and 821,000 lbs whole weight (2014).
- The Acceptable Biological Catch values without dead discards would be 573,000 lbs whole weight (2011), 647,000 lbs whole weight (2012), 718,000 lbs whole weight (2013), and 780,000 lbs whole weight (2014).

**Table 4-7.** Projection results if the fishing mortality rate is fixed at F = 75%$F_{MSY}$.

| Year | F (per year) | Probability of Rebuilt Stock | Projections | | |
|---|---|---|---|---|---|
| | | | 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 4.** Define a rebuilding strategy for red grouper that sets ABC equal to the yield at 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 Overfishing Limit is the yield at $F_{MSY}$.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee is the projected yield stream with a 70% probability of rebuilding success.
- The Acceptable Biological Catch values with dead discards would be 535,000 lbs whole weight (2011), 610,000 lbs whole weight (2012), 683,000 lbs whole weight (2013), and 749,000 (2014).
- The Acceptable Biological Catch values without dead discards would be 501,000 lbs whole weight (2011), 575,000 lbs whole weight (2012), and 648,000 lbs whole weight (2013), and 713,000 lbs whole weight (2014).

**Table 4-8.** Projection results if the fishing mortality rate is fixed at F = 65%$F_{MSY}$.

| Year | F(per year) | Probability of Rebuilt Stock | Projections | | |
|---|---|---|---|---|---|
| | | | 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 5.** Define a rebuilding strategy for red grouper that sets ABC equal to the yield at $F_{REBUILD}$. $F_{REBUILD}$ is a fishing mortality rate that would have a 70% probability of rebuilding success to $SSB_{MSY}$ in 7 years. 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 Overfishing Limit is the yield at $F_{MSY}$.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee is the projected yield stream with a 70% probability of rebuilding success.
- The Acceptable Biological Catch values with dead discards would be 583,000 lbs whole weight (2011), 657,000 lbs whole weight (2012), 730,000 lbs whole weight (2013), and 794,000 lbs whole weight (2014).
- The Acceptable Biological Catch values without dead discards would be 545,000 lbs whole weight (2011), 619,000 lbs whole weight (2012), 691,000 lbs whole weight (2013), and 755,000 lbs whole weight (2014).

**Table 4-9.** Projection results if the fishing mortality rate is fixed at F = Rebuild with a 70% probability of rebuilding success in 7 years.

| Year | F (per year) | Probability of Rebuilt Stock | Projections | | |
|---|---|---|---|---|---|
| | | | 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 |

**Alternative 6.** Define a rebuilding strategy for red grouper that sets ABC equal to the yield at $F_{REBUILD}$. $F_{REBUILD}$ is a fishing mortality rate that would have a 70% probability of rebuilding success to $SSB_{MSY}$ in 8 years. Under this strategy, the fishery would have at least a 54% chance of rebuilding to $SSB_{MSY}$ by 2016 and 70% chance of rebuilding to $SSB_{MSY}$ by 2018.

- The Overfishing Limit is the yield at $F_{MSY}$.
- The Acceptable Biological Catch recommendation from the Scientific and Statistical Committee is the projected yield stream with a 70% probability of rebuilding success.
- The Acceptable Biological Catch values with dead discards would be 620,000 lbs whole weight (2011), 695,000 lbs whole weight (2012), 765,000 lbs whole weight (2013), and 828,000 lbs whole weight (2014).
- The Acceptable Biological Catch values without dead discards would be 580,000 lbs whole weight (2011), 654,000 lbs whole weight (2012), 724,000 lbs whole weight (2013), and 787,000 lbs whole weight (2014).

**Table 4-10.** Projection results if the fishing mortality rate is fixed at F = Rebuild with a 70% probability of rebuilding success in 8 years.

| Year | F (per year) | Probability of Rebuilt Stock | Projections | | |
|---|---|---|---|---|---|
| | | | 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) | 0.168 | 0.01 | 580,000 | 40,000 | 620,000 |
| 2012 | 0.168 | 0.07 | 654,000 | 41,000 | 695,000 |
| 2013 | 0.168 | 0.17 | 724,000 | 41,000 | 765,000 |
| 2014 | 0.168 | 0.3 | 787,000 | 41,000 | 828,000 |
| 2015 | 0.168 | 0.42 | 840,000 | 42,000 | 882,000 |
| 2016 | 0.168 | 0.54 | 886,000 | 42,000 | 928,000 |
| 2017 | 0.168 | 0.63 | 924,000 | 42,000 | 966,000 |
| 2018 | 0.168 | 0.70 | 956,000 | 42,000 | 998,000 |

## 4.4.1 Biological Effects

This action determines the target level of fishing mortality during the rebuilding time frame, hence the term "strategy" is used. The outcome of the decision is the acceptable biological catch (ABC) upon which Annual Catch Limit (ACL) and the optimum yield (OY) are based (see **Action 6**).

There are negative consequences with retaining **Alternative 1 (No Action).** Although the rebuilding strategy is specified ($F_{45\%SPR}$), the ABC, ACL, and OY levels are not explicitly stated. The specification of targets and limits are a crucial component of any management program involving natural resources. Without the designation of these components, regulations may not be sufficient to prevent overfishing.

ABC, ACL, and OY values at equilibrium in the alternatives are distinguished from each another by the level of risk (and associated tradeoffs) each would assume. The more conservative the

estimates, the larger the sustainable biomass when the stock is rebuilt.

**Alternatives 2-6** would have positive biological effects to the stock as a biological benchmark, in the form of an Acceptable Biological Catch level, would be established for management. The alternatives may be ranked by the allowable, maximum fishing mortality rate of each rebuilding strategy. Beginning with the least amount of expected beneficial effects, the ranking of alternatives are as follows: **Alternative 2** (0.181), **Alternative 6** (0.168), **Alternative 3 (Preferred)** (0.166), **Alternative 5** (0.157), **Alternative 4** (0.144). The effects of **Alternatives 3 and 6** would be expected to be similar as difference in the allowable fishing mortality rate is only 0.002.

It must be noted that **Alternative 2** is the rebuilding strategy recommended by the South Atlantic Council's SSC. When evaluating SEDAR 19 at their August 2010 meeting, the SSC recommended the South Atlantic Council consider a 10-year rebuilding schedule with a strategy that had a 70% chance of rebuilding the stock within this time period. **Alternative 2** is more conservative than rebuilding strategies that have only a 50% chance of rebuilding the stock within 10 years as required by the Magnuson-Stevens Act.

There is likely to be no additional biological benefit to protected species from **Alternative 1 (No Action)** because it would perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. Previous ESA consultations determined the snapper grouper fishery was not likely adversely affect marine mammals or *Acropora* species. **Alternatives 2-6** are unlikely to alter fishing behavior in a way that would cause new adverse effects to these species. The impacts of **Alternatives 2-6** on sea turtles and smalltooth sawfish will likely vary depending on the rebuilding strategy selected. Assuming that smaller ACBs, ACLs, and OYs result in less fishing effort for red grouper, more conservative values may reduce the likelihood of interactions between fishers targeting that species and sea turtles and smalltooth sawfish. Under that assumption, **Alternative 4** would be the most beneficial to sea turtles and smalltooth sawfish and **Alternative 2** would be the least beneficial because those alternatives set the lowest and highest ABCs, respectively. The benefit of the remaining alternatives would fall between those extremes.

## 4.4.2 Economic Effects

### 4.4.2.1 Economic Effects on the Commercial Sector

Fishers with permits to fish in federal waters for species in the snapper grouper fishery have been required since 1993 to submit trip reports of their landings by species. These logbook trip reports from 2005-2009 constitute the source of data used in this analysis.

The simulation model uses logbook trip reports to predict the short-term economic effects of proposed management alternatives.[1] The general method of analysis is to hypothetically impose proposed regulations on individual fishing trips as reported to the logbook database, and then calculate their effects on trip catches, revenues, and costs. Trip-level results are totaled by year for 2005-2009, and the five-year average of simulated results is interpreted as the expected annual outcome of proposed regulations. The five-year average is used so that short-term anomalies that may have affected fishing success in any one year will be averaged out. The simulated average annual fishing income net of

[1] The simulation model is described in more detail in Waters, James R. July 2008. An Economic Model to Analyze Management Alternatives Proposed for the Commercial Fishery in Amendment 16 to the Snapper grouper Fishery Management Plan. NOAA National Marine Fisheries Service, Southeast Fisheries Science Center, 14p.

trip costs (excluding labor) for the proposed alternatives is compared to the no-action alternative to estimate the expected economic effects on commercial fishers. This net income calculation will henceforth be referred to as *net operating revenues*. Details of the methodology used and assessment results are found in **Appendix J**.

The results from the economic analysis for **Action 4** are summarized in **Tables 4-11** to **4-14**. The net present values of changes in net operating revenues (NOR) to the commercial sector associated with the rebuilding strategy alternatives proposed in **Action 4** are presented in **Table 4-11**. This table organizes these changes into two separate time horizons, seven and ten years, for a range of discount rates from zero to seven percent. The choice of the appropriate discount rate does not change the relative ranking of the alternatives but will change the magnitude of the net present value of future NOR streams. The projected NOR streams of the ten-year rebuilding strategies (i.e. **Alternatives 2-4**) created by the proposed ACLs and projected biomass figures were discounted over a period of seven and ten years to populate **Table 4-11**. **Alternatives 5 and 6** have proposed rebuilding horizons of seven and eight years, respectively. Thus, to derive estimates for the ten year horizon for these alternatives we assumed the same biomass projections of the ten-year plans and kept ACLs constant from the last year of the proposed rebuilding plan through the tenth year.

The analysis suggests that from an industry-wide perspective **Alternative 2** is economically superior to the other rebuilding strategy alternatives presented in **Action 4**. **Alternatives 6 and 3 (Preferred)** provide the second and third highest economic benefits, respectively. In **Table 4-11** if we assume a discount rate of three percent then **Alternative 2** is expected to generate an additional $1,470,000 over the first seven years of the rebuilding schedule relative to the no-action alternative with an additional $530,000 generated in years eight through ten. Over a time horizon of ten years with an assumed discount rate of three percent **Alternative 2** is expected to generate at least $320,000 more than the next two best alternatives, which are **Alternatives 6 and 3**. **Preferred Alternative 3** is expected to generate an additional $1,180,000 over the first seven years of the rebuilding schedule relative to the no-action alternative with an additional $450,000 generated in years eight through ten assuming a discount rate of three percent. The least favorable alternative to the commercial fleet is **Alternative 4** which will result in a gain of about $920,000 relative to the no-action alternative in the first seven years of the rebuilding plan assuming a discount rate of three percent (**Table 4-11**).

The anticipated economic effects of the projected increase in red grouper landings are relatively small compared to the size of the snapper grouper fishery as a whole. Over ten years, the predicted increase in NOR due to red grouper landings relative to all landings on trips that catch at least one pound of snapper grouper species ranges from 1.6% (**Alternative 4**) to 2.6% (**Alternative 2**) assuming a discount rate of three percent. Another interesting trend from **Table 4-11** is the relative increase in NOR during years eighth through tenth is much larger than those for the first seven years of each of the rebuilding plans. This phenomenon is driven by the projected increase in biomass during those years as the ACLs are held constant after year four. This is a preliminary conclusion at best as the simulation model is best suited for short-term predictions.

**Table 4-11.** Net present value of changes in net operating revenues (NOR) to the commercial sector associated with the rebuilding strategy alternatives in **Action 4** over time horizons of seven and ten years, assuming ACL=ABC, 45% commercial allocation, no commercial sector ACT, and using different discount rates. Dollar amounts are in million 2009 dollars.

| Rebuilding Strategy and Discount Rate | 7-Year Horizon | | | | | 10-Year Horizon | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 |
| | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Change in NOR | $1.66 | $1.33 | $1.03 | $1.19 | $1.36 | $2.34 | $1.92 | $1.40 | $1.70 | $1.98 |
| % Change in NOR | 2.7% | 2.1% | 1.7% | 1.9% | 2.2% | 2.6% | 2.1% | 1.6% | 1.9% | 2.2% |

| Rebuilding Strategy and Discount Rate | 7-Year Horizon | | | | | 10-Year Horizon | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 |
| | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Change in NOR | $1.47 | $1.18 | $0.92 | $1.06 | $1.21 | $2.00 | $1.63 | $1.20 | $1.45 | $1.68 |
| % Change in NOR | 2.7% | 2.1% | 1.7% | 1.9% | 2.2% | 2.6% | 2.1% | 1.6% | 1.9% | 2.2% |

| Rebuilding Strategy and Discount Rate | 7-Year Horizon | | | | | 10-Year Horizon | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 |
| | 7% | 7% | 7% | 7% | 7% | 7% | 7% | 7% | 7% | 7% |
| Change in NOR | $1.27 | $1.02 | $0.80 | $0.91 | $1.05 | $1.65 | $1.34 | $1.00 | $1.19 | $1.38 |
| % Change in NOR | 2.7% | 2.1% | 1.7% | 1.9% | 2.2% | 2.6% | 2.1% | 1.6% | 1.9% | 2.2% |

The changes in the net present values of NOR by state of landing to the commercial sector associated with the various rebuilding alternatives in **Action 4** are presented in **Table 4-12**. This table organizes these changes into three separate time horizons: seven, eight, and ten years, with an assumed discount rate of three percent. The projected NOR streams of all the proposed rebuilding strategies (i.e., **Alternatives 2-6**) created by the proposed ACLs and projected biomass figures were discounted over a period of ten years while NOR streams associated with **Alternatives 5 and 6** were also discounted over a period of seven and eight years, respectively.

**Table 4-12.** Net present value of changes in net operating revenues (NOR) by state of landing to the commercial sector associated with the rebuilding strategy alternatives in **Action 4** over time horizons of seven, eight, and ten years, assuming ACL=ABC, 45% commercial allocation, no commercial sector ACT, and a discount rate of 3%. Dollar amounts are in thousands of 2009 dollars.

| Rebuilding Strategy and Discount Rate | **North Carolina – 7 (Alt 5)- or 8 (Alt 6)-Year Horizon** | | | | | **North Carolina - 10-Year Horizon** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 |
| | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Change in NOR | N/A | N/A | N/A | $792 | $904 | $1,371 | $1,082 | $845 | $956 | $1,116 |
| % Change in NOR | N/A | N/A | N/A | 5.3% | 5.3% | 6.6% | 5.2% | 4.1% | 4.6% | 5.4% |

| Rebuilding Strategy and Discount Rate | **South Carolina – 7 (Alt 5)- or 8 (Alt 6)-Year Horizon** | | | | | **South Carolina - 10-Year Horizon** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 |
| | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Change in NOR | N/A | N/A | N/A | $335 | $432 | $572 | $509 | $327 | $457 | $527 |
| % Change in NOR | N/A | N/A | N/A | 3.4% | 3.8% | 4.1% | 3.7% | 2.4% | 3.3% | 3.8% |

| Rebuilding Strategy and Discount Rate | **Georgia/NE Florida – 7 (Alt 5)- or 8 (Alt 6)-Year Horizon** | | | | | **Georgia/NE Florida - 10-Year Horizon** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 |
| | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Change in NOR | N/A | N/A | N/A | $(1) | $(14) | $3 | $(16) | $2 | $(18) | $(18) |
| % Change in NOR | N/A | N/A | N/A | 0.0% | -0.2% | 0.0% | -0.2% | 0.0% | -0.1% | -0.1% |

| Rebuilding Strategy and Discount Rate | **Central and South Florida – 7 (Alt 5)- or 8 (Alt 6)-Year Horizon** | | | | | **Central and South Florida - 10-Year Horizon** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 |
| | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Change in NOR | N/A | N/A | N/A | $31 | $31 | $40 | $35 | $23 | $30 | $40 |
| % Change | N/A | N/A | N/A | 0.2% | 0.2% | 0.2% | 0.2% | 0.1% | 0.2% | 0.2% |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| in NOR | | | | | | | | | | |
| | | | | | | | | | | |
| Rebuilding Strategy and Discount Rate | **Florida Keys – 7 (Alt 5)- or 8 (Alt 6)-Year Horizon** | | | | | **Florida Keys - 10-Year Horizon** | | | | |
| | | | | | | | | | | |
| | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 |
| | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| | | | | | | | | | | |
| Change in NOR | N/A | N/A | N/A | $5 | $19 | $14 | $21 | $3 | $17 | $27 |
| % Change in NOR | N/A | N/A | N/A | 0.0% | 0.1% | 0.1% | 0.1% | 0.0% | 0.1% | 0.2% |

The information at the state-level provides more insight into which rebuilding strategy would be preferable. In the state-level analysis each rebuilding alternative is evaluated within its proposed time frame. **Alternatives 2-4** are evaluated over a period of ten years while **Alternatives 5 and 6** are evaluated over a time horizon of seven and eight years, respectively. **Alternatives 5 and 6** are also discounted over ten years for comparison among alternatives. The change in NOR reported in the table should not be compared across alternatives when the time frames are different although a comparison of the benefits of each rebuilding plan over the ten year horizon is valid. The percentage change is comparable across rebuilding alternatives for different time periods as this statistic is a relative measure of the change in NOR associated with each alternative and a comparable baseline estimate under the same time horizon.

Again, **Alternative 2** is economically superior to the other alternatives due to the amount of additional NOR that is expected to be generated in a particular time horizon. Also, in all cases fishers who land their catch in North Carolina are expected to benefit the greatest relative to fishers in other states. Only fishers in Georgia and northeast Florida are expected to lose a relatively small amount of NOR (not more than $18,000). This reinforces that **Alternative 2** is not only globally (i.e. industry-wide) superior from an economic perspective but also regionally superior. It also suggests that at least from a geographical perspective **Alternative 2** is a *Pareto efficient* alternative (as is **Alternative 4**). In other words, from a regional perspective it is a rebuilding strategy that makes all constituents better off without making anybody worse off. The predicted benefits of **Alternative 2** are greater than those of all the other alternatives as well. This is strong evidence from an economic perspective about the superiority of **Alternative 2** to the other alternatives. **Preferred Alternative 3** ranks third behind **Alternatives 2 and 6**. Finally, fishers in Georgia and Florida are predicted to only receive relatively minor benefits from the proposed rebuilding plans. The most generated by these fishers would be $40,000 by central south Florida boats under **Alternatives 2 and 6**.

The changes in the net present values of NOR by primary gear type to the commercial sector associated with the rebuilding strategy alternatives proposed in **Action 4** are presented in **Table 4-13**. We define the primary gear for a trip as that which produced a plurality of revenues on a trip. The vertical line sector includes all hook and line gear including handlines, electric and bandit gears, and troll lines. The diving sector includes both spears and powerhead gear. Fishers primarily using other gears will likely not be affected by the red grouper legislation. The table organizes these changes into three separate time horizons, seven, eight, and ten years, with an assumed discount rate of three percent. The projected NOR streams of all the proposed rebuilding strategies (i.e., **Alternatives 2-6**) created by the proposed ACLs and projected biomass figures were discounted over a period of ten years while NOR streams associated with **Alternatives 5 and 6** were also discounted over a period of seven and eight years, respectively.

Then data presented in **Table 4-13** suggest that most of the benefits from the rebuilding strategy alternatives will accrue to the vertical line fishers, especially those who utilize hook-and-line and bandit gears. Assuming a discount rate of three percent, **Alternative 2** creates the most benefits totaling $1,847,000 to the vertical line sector and $37,000 to the diving sector over a period of ten years. The rankings of the other alternatives are the same as the previous analyses above. **Alternatives 3 (Preferred) and 6** are the next best alternatives, followed by **Alternative 5**. **Alternative 4** accrues the least benefits.

**Table 4-13.** Net present value of changes in net operating revenues (NOR) by primary gear to the commercial sector associated with the rebuilding strategy alternatives in **Action 4** over time horizons of seven, eight, and ten years, assuming ACL=ABC, 45% commercial allocation, no commercial sector ACT, and a discount rate of 3%. Dollar amounts are in thousands of 2009 dollars.

| Rebuilding Strategy and Discount Rate | **Vertical Lines – 7 (Alt 5)- or 8 (Alt 6)-Year Horizon** | | | | | **Vertical Lines - 10-Year Horizon** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 |
| | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Change in NOR | N/A | N/A | N/A | $1,022 | $1,360 | $1,847 | $1,613 | $1,064 | $1,434 | $1,662 |
| % Change in NOR | N/A | N/A | N/A | 2.4% | 2.8% | 3.1% | 2.7% | 1.8% | 2.4% | 2.8% |

| Rebuilding Strategy and Discount Rate | **Diving – 7 (Alt 5)- or 8 (Alt 6)-Year Horizon** | | | | | **Diving - 10-Year Horizon** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 | Alt 2 | Alt 3 | Alt 4 | Alt 5 | Alt 6 |
| | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Change in NOR | N/A | N/A | N/A | $7 | $9 | $37 | $14 | $24 | $13 | $15 |
| % Change in NOR | N/A | N/A | N/A | 0.3% | 0.3% | 0.9% | 0.3% | 0.6% | 0.3% | 0.4% |

#### 4.4.2.2 Impacts on Business Activity

In addition to the estimated change in economic value discussed above, management actions would also have consequences on the level of business activity. Business activity is characterized in the form of employment (FTE jobs) impacts, income impacts (wages, salaries, and self-employed income), and output (sales) impacts (gross business sales). Income impacts should not be added to output (sales) impacts because this would result in double counting.

Business activity and economic value are not equivalent concepts, but the calculation of the change in business activity utilizes variables that were used in the calculation of the expected change in economic value, specifically ex-vessel revenues in the commercial sector. Because both assessments (change in economic value and change in business activity) use this common variable, the ranking of alternatives based on the magnitude of these effects would likely be unaffected by the metric examined; the greater the estimated change in economic value, the greater the estimated change in business activity.

The estimates of the change in business activity should be interpreted and used with caution. While some change (loss or gain) of business activity would be expected to result from any change in commercial revenues, the full loss or gain of the estimates provided below should not be expected to occur as a result of the proposed management changes. The primary reason for this is the calculation of these results does not account for behavioral changes that would be expected to occur in response to the proposed

management changes. An estimated loss in ex-vessel revenues may be overstated if fishermen are able to re-direct their fishing effort to substitute species, while an estimated gain in ex-vessel revenues may come at the expense of reduced harvests of, and revenues from, other species.

Fishing revenues generate business activity in multiple sectors of the economy. These sectors are combined and summarized in the business activity model as harvester, dealer/processor, wholesaler/distributor, grocer, and restaurant sectors. It is sufficient for the current purpose to present only the overall changes in business activity to the harvesters and seafood industry.

The ex-vessel revenues used to generate the impacts on business activities were average annual revenues. These were derived by taking the average of annual stream revenues from each alternative. In this way, the impacts shown in the table may be interpreted as annual changes in business activities over the rebuilding period. Note that impacts on business activities for Georgia are combined with those of Northeast Florida for confidentiality reasons. The dollar values are expressed in 2008 dollars.

The magnitude of business activity impacts shown in **Table 4-14** mimics the magnitude of ex-vessel revenues for each state due to the various alternatives, with North Carolina having the largest impacts, followed by South Carolina, Florida, and Georgia/Northeast Florida.

**Alternative 2** would generate the largest positive impacts on employment, income, and output for all states combined. On a state-by-state basis, **Alternative 2** would dominate the other alternatives for all states, except Florida for which **Preferred Alternative 3** would be best. While the overall effects of **Preferred Alternative 3** would be positive for all states combined, Georgia/Northeast Florida would experience some reductions in business activities. Negative effects on business activity for all states would result from **Alternatives 5 and 6**.

**Table 4-14.** Potential change in business activities associated with the rebuilding strategy alternatives relative to the No Action Alternative. All dollar values are in thousands of 2008 dollars.

| | North Carolina | South Carolina | Georgia/NE FL | Florida |
|---|---|---|---|---|
| | **Alternative 2** | | | |
| Employment | 27 | 10 | 0 | 1 |
| Income | $635 | $215 | $0 | $15 |
| Output | $1,180 | $445 | $1 | $29 |
| | **Preferred Alternative 3** | | | |
| Employment | 21 | 9 | 0 | 1 |
| Income | $494 | $189 | -$10 | $17 |
| Output | $917 | $391 | -$20 | $32 |
| | **Alternative 4** | | | |
| Employment | 17 | 6 | 0 | 0 |
| Income | $386 | $121 | $0 | $7 |
| Output | $717 | $251 | -$1 | $12 |
| | **Alternative 5** | | | |
| Employment | -138 | -81 | -66 | -129 |
| Income | -$3,205 | -$1,702 | -$1,430 | -$3,459 |

| | | | | |
|---|---|---|---|---|
| Output | -$5,955 | -$3,526 | -$2,943 | -$6,508 |
| | **Alternative 6** | | | |
| Employment | -85 | -50 | -45 | -86 |
| Income | -$1,972 | -$1,060 | -$961 | -$2,296 |
| Output | -$3,664 | -$2,196 | -$1,977 | -$4,322 |

#### 4.4.2.3 Economic Effects on the Recreational Sector

Due to the direct relationships between rebuilding strategies, allocations, and ACL/OY, the effects of the alternatives for rebuilding strategy are evaluated assuming the preferred alternatives for allocations and ACLs/OYs.

This assessment evaluated the expected change in economic value relative to the no action alternative. The change in economic value is measured in terms of the consumer surplus (CS) to recreational anglers. The relatively sparse number of target trips for red grouper by anglers fishing through the for-hire vessels precluded the estimation of effects on the net operating revenues (NOR) of for-hire vessels. CS in the present case is the net benefit an angler derives from an additional fish kept on a fishing trip and is equivalent to the difference between the monetized benefit an angler receives and the actual cost. This value is an appropriate measure of economic effects on recreational anglers as a result of changes in fishing regulations. More details on the methodology and assessment results are found in **Appendix J**.

In estimating the CS effects of the various rebuilding strategies, the current preferred alternatives for **Actions 5 and 6** were assumed. Specifically, these assumptions are ACL being equal to ABC and the recreational allocation being equal to 55% of ABC. In addition, the aggregate ACL for black grouper, gag, and red grouper was assumed not to be met during the period of the analysis. A 7% discount rate was used to convert the stream for CS over time into net present values. The use of other discount rates would merely change the magnitude of effects but not the ranking of alternatives (see **Appendix K**).

All the rebuilding strategies would be expected to result in CS increases to recreational anglers, mainly because the baseline recreational landings are lower than the ACL implied in any of the rebuilding alternatives. Indeed the assumptions regarding the ACL being equal to ABC and the recreational allocation being equal to 55% of ACL played some important roles in determining the economic outcome of the various rebuilding strategies.

**Preferred Alternative 3** would result in CS increases ranging from $0.78 million to $3.58 million over four years, or from $2.18 million to $10 million over ten years. Over four years, the alternatives may be ranked in descending order as follows: **Alternative 2**, **Alternative 6**, **Alternative 3 (Preferred)**, **Alternative 5**, and **Alternative 4**. The only change in ranking over a ten-year period involves **Alternatives 3 (Preferred) and 5**, with **Alternative 5** being ranked higher than **Alternative 3 (Preferred)**. There is then a fair level of consistency in the ranking of **Alternatives 2, 4, and 6**.

**Table 4-15.** Net present value of changes in CS to the recreational sector associated with the rebuilding strategies over 4 years and 10 years, assuming recreational allocation of 55% of ACL and ACL=ABC, and using a 7% discount rate. Dollar amounts are in millions of 2010 dollars.

| Rebuilding Strategy | 4- Year Horizon | 10-Year Horizon |
|---|---|---|
| | **High** | |
| Alternative 2: $F_{REBUILD}(10)$ | $4.61 | $12.05 |
| Alternative 3: $75\%F_{MSY}$ | $3.58 | $10.00 |
| Alternative 4: $65\%F_{MSY}$ | $1.98 | $6.78 |
| Alternative 5: $F_{REBUILD}(7)$ | $2.97 | $10.35 |
| Alternative 6: $F_{REBUILD}(8)$ | $3.73 | $11.52 |
| | **Medium** | |
| Alternative 2: $F_{REBUILD}(10)$ | $3.85 | $10.08 |
| Alternative 3: $75\%F_{MSY}$ | $2.99 | $8.37 |
| Alternative 4: $65\%F_{MSY}$ | $1.66 | $5.67 |
| Alternative 5: $F_{REBUILD}(7)$ | $2.48 | $8.65 |
| Alternative 6: $F_{REBUILD}(8)$ | $3.12 | $9.63 |
| | **Low** | |
| Alternative 2: $F_{REBUILD}(10)$ | $1.00 | $2.62 |
| Alternative 3: $75\%F_{MSY}$ | $0.78 | $2.18 |
| Alternative 4: $65\%F_{MSY}$ | $0.43 | $1.48 |
| Alternative 5: $F_{REBUILD}(7)$ | $0.64 | $2.25 |
| Alternative 6: $F_{REBUILD}(8)$ | $0.81 | $2.50 |

### 4.4.3 Social Effects

The rebuilding strategies and associated ABCs in this action are trade-offs of long-term and short-term biological benefits, which are directly tied to long-term and short-term social benefits. A more conservative rebuilding strategy would likely result in short-term negative social impacts such as loss of income and decreased fishing opportunities due to lower target fishing mortality. However, the resulting larger sustainable biomass once the stock is rebuilt is expected to produce long-term social benefits, including stable and sustainable livelihoods for commercial fishermen and the for-hire sector; consistent product for fish houses and restaurants; and private recreational fishing opportunities.

The preferred rebuilding strategy from the perspective of the social environment would be expected to be influenced by the fishermen's perceptions of stock status. If the commercial and recreational fishermen believe that the resource is overfished, then fishermen and associated businesses would be expected to generally accept short-term socio-economic losses in exchange for long-term increases in harvest rates if timing and amount of pay-back is reasonable. However, if fishermen disagree with the stock assessment, then they would be expected to be less willing to incur reductions in current harvest rates.

The rebuilding strategy decision will result in the establishment of the ABC for red grouper, which will be used by the Council to select the ACL for the species, a number that can be set at but not higher than the ABC. **Alternative 1 (No Action)** includes the lowest F rate and the lowest resulting ABC, while **Alternative 2** includes the

highest F rate and associated ABC. **Alternatives 3 (Preferred)-6** include a range between the F rates in the first two alternatives. **Alternative 3 (Preferred)** includes an F rate and ABC between the highest and lowest F rates, and would be expected to have fewer short-term social impacts than the **Alternatives 1 (No Action)** and **2.** Although a more conservative F rate would likely result in a higher probability in rebuilding over a shorter period of time, the probability of rebuilding using the strategy in **Alternative 3 (Preferred)** will provide more long-term social benefits than **Alternative 2** or **Alternative 6.**

### 4.4.4 Administrative Effects

**Alternative 1 (No Action)** would not establish a rebuilding strategy and would therefore, not comply with Magnuson-Stevens Act requirements for developing rebuilding plans. If **Alternative 1 (No Action)** were chosen as a preferred alternative and litigation resulted from that choice the impact on the administrative environment would be significant. **Alternative 4** is the most conservative rebuilding strategy and would result in an ABC of 749,000 lbs whole weight including discards by 2014, and is likely to result in the greatest impact on the administrative environment. The lower the ABC, from which the ACL may be derived, the more pro-active AMs in the Comprehensive ACL Amendment and monitoring of landings needs to be to maintain harvest at or below the resultant ACL. As the ABC increases under **Alternatives 5, 3 (Preferred), and 6, and 2**, the ACL specified would increase proportionately, and AMs would be less likely to be triggered due to ACL overages if the ACL were to increase proportionately with the ABC. **Alternative 2** would result in the highest ABC and would likely be associated with the highest ACL value specified in **Action 6**, depending upon the preferred rebuilding strategy. Therefore, impacts on the administrative environment that would result from AMs being triggered would likely be lowest under **Alternative 2**. **Alternatives 3 (Preferred), 5, and 6** are unlikely to result in administrative impacts greater than **Alternative 1 (No Action)**, or lower than **Alternative 2**. All the rebuilding strategy alternatives considered would require continued monitoring of commercial and recreational landings in addition to continued enforcement of current harvest restrictions for red grouper including the 20 inch size limit, the 3-fish aggregate bag limit, and the shallow water seasonal closure. Overall, administrative impacts under any of the rebuilding strategy alternatives, with the exception of **Alternative 1 (No Action)**, are not likely to be significant.

## 4.5 Action 5. Specify Sector Allocations

The South Atlantic Council and NOAA Fisheries Service 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 South Atlantic Council and NOAA Fisheries Service have determined 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 Environmental Impact Statement (EIS), including those that base allocation decisions on historical landings.

**Alternative 1 (No action).** Do not establish a sector allocation of the red grouper annual catch limit (ACL).

**Alternative 2 (Preferred).** Specify allocations for the commercial and recreational sectors based on criteria as outlined in one of the following options below.

**Subalternative 2a**. Commercial = 60% and recreational = 40% (Established by using catch history from 1986-2008).

**Subalternative 2b**. Commercial = 67% and recreational = 33% (Established by using catch history from 1986-1998).

**Subalternative 2c**. Commercial = 55% and recreational = 45% (Established by using catch history from 1999-2008).

**Subalternative 2d**. Commercial = 43% and recreational = 57% (Established by using catch history from 2006-2008).

**Subalternative 2e (Preferred)**. Commercial = 45% and recreational = 55% (Established by using 50% of catch history from 1991-2008 + 50% of catch history from 2006-2008).

**Alternative 3.** Specify allocations for the commercial, for-hire, and recreational sectors based on criteria as outlined in one of the following options below.

**Subalternative 3a**. Commercial = 60%, for-hire = 28%, and recreational = 12% (Established by using catch history from 1986-2008).

**Subalternative 3b**. Commercial = 67%, for-hire = 20%, and recreational = 13% (Established by using catch history from 1986-1998).

**Subalternative 3c**. Commercial = 55%, for-hire = 34%, and recreational = 11% (Established by using catch history from 1999-2008).

**Subalternative 3d**. Commercial = 43%, for-hire = 49%, and recreational = 8% (Established by using catch history from 2006-2008).

**Subalternative 3e**. Commercial = 45%, for-hire = 28%, and recreational = 27% (Established by using 50% of catch history from 1991-2008 + 50% of catch history from 2006-2008).

Add table (**Table 4-16**) that shows the ACLs under all these alternatives once there is preferred rebuilding strategy and ACL.

## 4.5.1 Biological Effects

**Alternative 1 (No Action)** would not specify a commercial or recreational allocation for red grouper. If an allocation is not specified then it would not be possible to identify the sector-ACLs. Only a single ACL could be established for both sectors. **Alternatives 2 and 3**, including the associated sub-alternatives, would have positive effects to the stock allocation decisions allow managers to separate the stock ACL into sector-ACLs. As such, the specification of allocations is a often a necessary component of the fishery management system that specifies catch limits and accountability measures.

Options for allocations under **Alternative 2** would range from 43% commercial/57% recreational (**Subalternative 2d**) to 67% commercial/33% recreational (**Subalternative 2b**). Options under **Alternative 3** are similar to **Alternative 2** with the exception that the recreational sector is divided into for-hire and private recreational. Options for allocations under **Alternative 3** would range from 43% commercial/49% for-hire/8% private recreational (**Subalternative 3d**) to 67% commercial/20% for-hire/13% private recreational (**Subalternative 3b**).

The commercial allocation under options for **Alternatives 2**, which contains **Preferred Subalternative 2e**, and **Alternative 3** would be identical. Sector specific ACLs would be based on allocations. Therefore, there is a greater chance that the ACLs would be exceeded for the for-hire and private recreational sectors under **Alternative 3** than for the for-hire and private recreational sectors combined under **Alternative 2**. Furthermore, estimates of recreational landings could be less certain when recreational data are divided into sectors.

Options that capture early landings would allocate more of the ABC to the commercial sector than the recreational sector. For example, **Subalternatives 2a-2b and 3a-3b**, which are based on landings from 1986-2008 and 1986-1998, would allocate 60 and 67% of the ABC to the commercial sector, respectively. In contrast, options which capture recent landings (**Subalternatives 2d, 2e Preferred, 3d, 3e**) would allocation a higher percentage of the ABC to the recreational sector.

**Preferred Subalternative 2e** would be based on data from 1986-2008, which includes the early time period when the commercial sector dominated the catch, as well as recent data from 2006-2008 when the for-hire sector dominated catch. As a result, ABC would be somewhat evenly divided among the commercial (45%) and recreational (55%) sectors.

The biological effects of the different allocation alternatives would be similar if landings in various sectors could be closely monitored. Given that recreational data can be less certain when recreational data are divided into sectors, the chance of an ACL being exceeded could be greatest for options under **Alternative 3**. Further, the biological effects of options that allocate more of the ABC to the commercial sector could have a greater biological effect because there is a greater chance a recreational ACL would be exceeded than a commercial ACL. Commercial data can often be more closely monitored as they are based on dealer reports; whereas, much of the recreational data (except headboat data) are based on survey information.

There is likely to be no additional biological benefit to protected species from **Alternative 1 (No Action)** because it would perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. Previous ESA consultations determined the snapper grouper fishery was not likely adversely affect marine mammals or *Acropora* species. **Alternatives 2 and 3** and their sub-alternatives are unlikely to alter fishing behavior in a way

that would cause new adverse effects to these species. The impacts from **Alternatives 2 and 3** and their sub-alternatives on sea turtles and smalltooth sawfish are unclear. If these allocations perpetuate the existing amount of fishing effort they are unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. This scenario is likely to provide little additional biological benefits to sea turtles and smalltooth sawfish, if any. However, if these alternatives reduce the overall amount of effort in the fishery the risk of interaction with sea turtles and smalltooth sawfish will likely decrease, providing additional biological benefits to these species.

## 4.5.2 Economic Effects

### 4.5.2.1 Economic Effects on the Commercial Sector

The results from the economic analysis for **Action 5** are summarized in **Table 4-17**. The net present values of changes in NOR to the commercial sector associated with the allocation alternatives proposed in **Action 5** are presented in **Table 4-17**. This table compares these changes assuming the preferred rebuilding strategy (**Alternative 3**) proposed in **Action 4** for various discount rates. The projected NOR streams created by the proposed ACLs and projected biomass figures derived from the preferred rebuilding strategy were discounted over a period of ten years.

When the different allocation ratios are analyzed, it should be no surprise that predicted changes in the net present value of future NOR streams get larger as the commercial allocation increases; however, determining an optimal allocation rate is outside the scope of this analysis. Since **Subalternative 2e (Preferred)** equals the historical allocation rate from 2005-2009, the simulation model does not predict any effects by adopting a 45% commercial allocation ratio. **Alternative 3** from **Action 4** results in streams of NOR equaling $77,596,000 over ten years assuming a discount rate of 3% (Table 6).

**Table 4-17.** Net present value of changes in net operating revenues (NOR) to the commercial sector associated with the various allocation alternatives in **Action 5** over a time horizon of ten years, assuming ACL=ABC, no commercial sector ACT, and using different discount rates. Dollar amounts are in millions of 2009 dollars.

| | Sector Allocation of Commercial ACL | | | | |
|---|---|---|---|---|---|
| Rebuilding Strategy | Subalternative 2a | Subalternative 2b | Subalternative 2c | Subalternative 2d | Subalternative 2e (Preferred) |
| | Comm. – 60% Rec. – 40% | Comm. – 67% Rec. – 33% | Comm. – 55% Rec. – 45% | Comm. – 43% Rec. – 57% | Comm. – 45% Rec. – 55% |
| | **Net Present Value of Changes in NOR – 0% Discount Rate** | | | | |
| $75\%F_{MSY}$ | $1.53 | $1.63 | $1.11 | -$0.28 | $0.0 |
| | **Net Present Value of Changes in NOR – 3% Discount Rate** | | | | |
| $75\%F_{MSY}$ | $1.28 | $1.38 | $0.92 | -$0.23 | $0.0 |
| | **Net Present Value of Changes in NOR – 7% Discount Rate** | | | | |
| $75\%F_{MSY}$ | $1.02 | $1.12 | $0.74 | -$0.19 | $0.0 |

#### 4.5.2.3 Impacts on Business Activity

The magnitude of effects of the allocation alternatives on business activity would fairly correspond to the proportion of ACL allocated to the commercial sector for all states combined (**Table 4-18**). **Subalternative 2b**, which would assign the largest allocation to the commercial sector, would also result in the largest positive effects for all states combined. A slightly different scenario is depicted when state-by-state effects are considered. **Subalternative 2b** would result in larger impacts than **Subalternative 2a** for North Carolina but not for the other states. In addition, the effects of the alternatives are not unidirectional. **Subalternatives 2a, 2b, and 2c** would have negative impacts on Georgia/Northeast Florida and positive for all other states. **Preferred Subalternative 2e** would not result in any changes to business activity, because the allocation ratio under this subalternative would be the same as that of the no action alternative. One more issue to consider in the tabulated results is that the effects of the various subalternatives under **Alternative 3** would be the same as those of the corresponding subalternatives under **Alternative 2**.

**Table 4-18.** Potential change in business activities associated with the commercial/recreational allocation alternatives relative to **Alternative 1 (No Action)**. All dollar values are in thousands of 2008 dollars.

| | North Carolina | South Carolina | Georgia/NE FL | Florida |
|---|---|---|---|---|
| | **Subalternative 2a** | | | |
| Employment | 17 | 8 | -1 | 0 |
| Income | $400 | $159 | -$13 | $12 |
| Output | $744 | $329 | -$27 | $22 |
| | **Subalternative 2b** | | | |
| Employment | 21 | 7 | -1 | 0 |
| Income | $488 | $143 | -$31 | $4 |
| Output | $907 | $296 | -$65 | $7 |
| | **Subalternative 2c** | | | |
| Employment | 13 | 5 | -1 | 0 |
| Income | $296 | $105 | -$13 | $9 |
| Output | $550 | $218 | -$27 | $16 |
| | **Subalternative 2d** | | | |
| Employment | -3 | -1 | 0 | 0 |
| Income | -$75 | -$28 | $0 | -$3 |
| Output | -$140 | -$58 | $0 | -$5 |
| | **Preferred Subalternative 2e** | | | |
| Employment | 0 | 0 | 0 | 0 |
| Income | $0 | $0 | $0 | $0 |
| Output | $0 | $0 | $0 | $0 |

**Table 4-19.** Potential change in business activities associated with the commercial/for-hire/private allocation alternatives relative to **Alternative 1 (No Action)**. All dollar values are in thousands of 2008 dollars.

| | North Carolina | South Carolina | Georgia/NE FL | Florida |
|---|---|---|---|---|
| | **Subalternative 3a** | | | |
| Employment | 17 | 8 | -1 | 0 |
| Income | $400 | $159 | -$13 | $12 |
| Output | $744 | $329 | -$27 | $22 |
| | **Subalternative 3b** | | | |
| Employment | 21 | 7 | -1 | 0 |
| Income | $488 | $143 | -$31 | $4 |
| Output | $907 | $296 | -$65 | $7 |
| | **Subalternative 3c** | | | |
| Employment | 13 | 5 | -1 | 0 |
| Income | $296 | $105 | -$13 | $9 |
| Output | $550 | $218 | -$27 | $16 |
| | **Subalternative 3d** | | | |
| Employment | -3 | -1 | 0 | 0 |
| Income | -$75 | -$28 | $0 | -$3 |
| Output | -$140 | -$58 | $0 | -$5 |
| | **Subalternative 3e** | | | |
| Employment | 0 | 0 | 0 | 0 |
| Income | $0 | $0 | $0 | $0 |
| Output | $0 | $0 | $0 | $0 |

#### 4.5.2.3 Economic Effects on the Recreational Sector

In evaluating the economic effects of the allocation alternatives, the following assumptions were made: the rebuilding strategy would be 75%$F_{MSY}$ and ACL would be equal to ABC. Again, the aggregate ACL for black grouper, gag, and red grouper was assumed not to be reached over the period of the analysis.

There are two sets of allocation alternatives evaluated. The first is the allocation of ACL between the commercial and recreational sectors (**Preferred Alternative 2**) and the second, the allocation of ACL among the commercial, for-hire, and private sectors (**Alternative 3**). **Table 4-20** presents the results for the allocation of ACL between the commercial and recreational sectors while **Table 4-21**, those for the allocation of the ACL separately for the for-hire and private sectors.

A recreational allocation of no more than 40% of ACL would likely result in CS reductions to the recreational anglers over the short term (**Table 4-20**). On the other hand, an allocation of at least 45% would benefit the recreational sector. **Preferred Subalternative 2e** would result in CS increases ranging from $0.78 million to $3.58 million over four years, or from $2.18 million to $10 million over ten years. Note that these are the same figures mentioned earlier as the effects of the preferred alternative for a rebuilding strategy, because these numbers are based on all preferred alternatives as in the previous case. Regardless of the time horizon, the alternatives

may be ranked in descending order as follows: **Subalternative 2d**, **Subalternative 2e (Preferred)**, **Subalternative 2c**, **Subalternative 2a**, and **Subalternative 2b**. This ranking is mainly driven by the size of the recreational allocation, with the highest allocation under **Subalternative 2e (Preferred)** and the lowest under **Subalternative 2a**. Worth noting in the results is that the effects of **Subalternative 2a** would turn from negative to positive when moving from a 4-year to a 10-year horizon. In this situation, benefits from an increasing ACL over time would overcome the short-term benefit reductions from a relatively low allocation of 40%. It may be added that benefits from an increasing ACL would not outweigh the short-term benefit reductions due to a lower allocation of 33%.

**Alternative 3** specifies five subalternatives for allocating the ACL among the commercial, for-hire, and private sectors. Relative to historical proportional landings of red grouper by the for-hire and private sectors, each of the subalternatives would end up assigning more to the for-hire sector. Because of this, each subalternative would be expected to benefit the for-hire sector at the expense of the private sector. This is verified in terms of positive effects to the for-hire sector and negative effects to the private sector as shown in **Table 4-21**. It is but expected that a higher (lower) allocation assigned to the for-hire (private) sector would result in larger positive (negative) effects. Depending on the magnitudes of the respective effects on the two sectors, the net economic effects may be positive or negative. In principle, the various subalternatives for the for-hire and private sectors may be compared based on net effects. In the present case, this cannot be done directly because the overall share of the recreational sector would vary across subalternatives. However, some general comparative statements based on net effects may be made. It should be noted that, although net effects are not reported, they can be easily calculated from **Table 4-21**.

With the sole exception of **Subalternative 3b** over a four-year period, all sector allocation subalternatives would result in net positive effects. That is, the positive effects on the for-hire sector would outweigh the negative effects on the private sector. This result would even hold true for **Subalternative 3b** over a ten-year period. Based on net effects the subalternatives may be ranked in descending order as follows: **Subalternative 3d**, **Subalternative 3e**, **Subalternative 3c**, **Subalternative 3a**, and **Subalternative 3b**.

**Table 4-20.** Net present value of changes in CS to the recreational sector associated with the commercial/recreational allocation alternatives over 4 years and 10 years, assuming 75%$F_{MSY}$ rebuilding strategy and ACL=ABC, and using a 7% discount rate. Dollar amounts are in millions of 2010 dollars.

| Recreational Allocation | 4- Year Horizon | 10-Year Horizon |
|---|---|---|
| | **High** | |
| Subalternative 2a: 40% of ACL | -$0.58 | $0.68 |
| Subalternative 2b: 33% of ACL | -$2.52 | -$3.68 |
| Subalternative 2c: 45% of ACL | $0.81 | $3.79 |
| Subalternative 2d: 57% of ACL | $4.13 | $11.25 |
| Subalternative 2e: 55% of ACL | $3.58 | $10.00 |
| | **Medium** | |
| Subalternative 2a: 40% of ACL | -$0.49 | $0.57 |
| Subalternative 2b: 33% of ACL | -$2.11 | -$3.08 |

| | | |
|---|---|---|
| Subalternative 2c: 45% of ACL | $0.67 | $3.17 |
| Subalternative 2d: 57% of ACL | $3.46 | $9.41 |
| Subalternative 2e: 55% of ACL | $2.99 | $8.37 |
| | **Low** | |
| Subalternative 2a: 40% of ACL | -$0.13 | $0.15 |
| Subalternative 2b: 33% of ACL | -$0.55 | -$0.80 |
| Subalternative 2c: 45% of ACL | $0.18 | $0.82 |
| Subalternative 2d: 57% of ACL | $0.90 | $2.45 |
| Subalternative 2e: 55% of ACL | $0.78 | $2.18 |

**Table 4-21.** Net present value of changes in CS to the recreational sector associated with the for-hire/private sector allocation alternatives over 4 years and 10 years, assuming 75%$F_{MSY}$ rebuilding strategy and ACL=ABC, and using a 7% discount rate. Dollar amounts are in millions of 2010 dollars.

| | For-hire and Private Sector Allocation of ACL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time Horizon | Alternative 3a | | Alternative 3b | | Alternative 3c | | Alternative 3d | | Alternative 3e | |
| | For Hire | Private | For Hire | Private | For Hire | Private | For Hire | Private | For Hire | Private |
| | 28% | 12% | 20% | 13% | 34% | 11% | 49% | 8% | 28% | 27% |
| | **High** | | | | | | | | | |
| 4 Years | $7.76 | -$6.04 | $5.16 | -$5.80 | $9.71 | -$6.27 | $14.59 | -$6.96 | $7.76 | -$2.55 |
| 10 Years | $17.64 | -$12.04 | $11.81 | -$11.52 | $22.02 | -$12.56 | $32.95 | -$14.13 | $17.64 | -$4.23 |
| | **Medium** | | | | | | | | | |
| 4 Years | $6.49 | -$5.05 | $4.32 | -$4.85 | $8.13 | -$5.24 | $12.20 | -$5.83 | $6.49 | -$2.13 |
| 10 Years | $14.76 | -$10.07 | $9.88 | -$9.64 | $18.42 | -$10.51 | $27.57 | -$11.82 | $14.76 | -$3.53 |
| | **Low** | | | | | | | | | |
| 4 Years | $1.69 | -$1.31 | $1.12 | -$1.26 | $2.11 | -$1.36 | $3.17 | -$1.51 | $1.69 | -$0.55 |
| 10 Years | $3.84 | -$2.62 | $2.57 | -$2.51 | $4.79 | -$2.73 | $7.17 | -$3.07 | $3.84 | -$0.92 |

## 4.5.3 Social Effects

By establishing sector allocations there would likely be some changes in fishing behavior and impacts to the social environment. The mere act of separating the ACL into two sector ACLs has the perception of creating scarcity in that limits have been imposed on each individual sector; further separations of the recreational ACL into for-hire and private may further these perceptions. The setting of an ACL has the same impact but on the overall fishery. Each subsequent division will drive perceptions of scarcity and likely change the fishing behavior of those within a particular sector.

By not establishing separate sector allocations, **Alternative 1 (No Action)** allows for an overall ACL for the recreational and commercial sectors. This alternative would allow for harvest to freely flow between the commercial and recreational sectors as it has in the past; although, if harvest exceeds the overall ACL then both sectors could be closed. This would likely become more an issue for the commercial sector than the recreational, because the recreational sector has shown a pattern of growth and recreational effort may continue to inrease, requiring more of the ACL. However, by not allocating separate ACLs among sectors and sub-sectors, it is less likely that a sector ACL would not be reached, which would be expected to provide maximum broad social benefits by optimizing use of the resource.

**Preferred Alternative 2** presents five subalternatives of allocation between the commercial and recreational sector based on different qualifying periods to reflect long-term harvest trends and more recent harvest. In general, it would be expected that there may be negative social effects to whichever sector receives less than their current allocation and those effects would correspond to the amount of reduction. **Subalternative 2a, 2b** and **2c** are based on historic catch and the commercial fishery receives a higher allocation. Because more recently the recreational catch has increased to more than the commercial catch, the likelihood of an early closure would increase for the recreational sector and would be expected to impact recreational fishing opportunities and

affiliated businesses, such as for-hire captains and crew, bait and tackle shops, and associated tourism. **Subalternative 2d** reflects more recent distribution between the commercial and recreational sector, which would benefit the recreational sector by allowing continued fishing opportunities. However, the allocation scenario could impact the commercial sector by limiting growth. With restrictions and closures in other fisheries, the commercial sector may increase harvest of red grouper; the smaller allocation could prevent this harvest and impact fishermen and affiliated businesses, such as fish houses and restaurants. For example, in Murrells Inlet, SC, red grouper are nearly as important to the community as gag grouper or vermilion snapper. Should new management measures limit harvest of those two species, the commercial fishermen in the community may shift effort to red grouper, but ultimately be limited by the commercial ACL. **Subalternative 2e (Preferred)** has a similar allocation (45% commercial, 55% recreational) and would likely have similar impacts as **Subalternative 2d.**

**Alternative 3, Subalternatives 3a-3e,** present several allocation options that further separate the recreational sector into for-hire and private anglers. Under this alternative, the commercial allocations would be identical to those in **Alternative 2** and would be expected to have the same impacts on the commercial sector. As with the previous alternative, in general lower allocations would be expected to result in negative social effects due to a decrease in allowable catch for a sector, or due to a limitation on growth. In all subalternatives, the for-hire sector is allocated the largest portion of the recreational ACL, and would most benefit from the 49% allocation in **Subalternative 3d**. Conversely the private recreational allocation is significantly less than the for-hire ACL, which may result in negative long term social impacts on the private recreational community by limiting potential for growth of recreational effort and fishing opportunities. The private recreational sector would be allocated almost the same portion of the ACL as the for-hire sector in **Subalternative 3e**, which may impact the for-hire sector by not allowing access to an ACL that may be unused.

### 4.5.4 Administrative Effects

**Alternative 1 (No Action)** would establish one single ACL for commercial and recreational sectors for red grouper. This is not consistent with current AM alternatives in the Comprehensive ACL Amendment, under development, which includes separate AMs for the commercial and recreational sectors.

**Alternative 2 (Preferred)** would not necessarily result in additional administrative burdens beyond the status quo since commercial and recreational landings are already tracked through, MRFSS/MRIP, headboat logbooks, dealer reports, and commercial vessel logbooks. **Alternative 2 (Preferred)** would require monitoring the two sector's landings separately in order to determine when each ACL is projected to met or by how much it has been exceeded. Subsequent to those determinations, staff time and resources would be needed to implement the requisite AMs associated with each of the sector ACLs. **Alternative 3** would divide the ACL into three sectors rather than two, and would allocate a portion of the ACL to the for-hire sector. Administratively, the impact would be expected to be slightly higher than under **Alternative 2 (Preferred)** since three ACLs would need to be monitored rather than two. Staff time and cost associated with tracking an additional sector ACL and implementing AMs if needed is likely to be moderately increased when compared to **Alternative 1 (No Action)** and minimally increased when compared to **Alternative 2 (Preferred)**.

## 4.6 Action 6. Specify Annual Catch Limits and Optimum Yield

Note: More than one preferred alternative may be chosen.

**Alternative 1 (No Action).** An individual ACL is currently not in place for red grouper. Retain aggregate recreational and commercial ACLs for black grouper, red grouper, and gag. The commercial sector ACL for gag, black grouper, and red grouper is 662,403 lbs gw (781,636 lbs ww) and 648,663 lbs gw (765,422 lbs ww) for the recreational sector. The total group ACL is 1,311,066 lbs gw (1,547,058 lbs ww). These values are equivalent to the expected catch resulting from the implementation of management measures for red grouper in Amendment 16 and specified in Amendment 17B.

**Alternative 2 (Preferred)**. ACL = OY = ABC. Specify commercial and recreational ACLs for red grouper for 2012, 2013, and 2014 and beyond as indicated in the table below (**Table 4-22**). The ACL for 2014 would remain in effect until modified. ACLs will not increase in a subsequent year if present year projected catch has exceeded the ACL.

**Alternative 3.** ACL = OY = 90% of the ABC. Specify commercial and recreational ACLs for red grouper for 2012, 2013, and 2014 and beyond as indicated in the table below (**Table 4-23**). The ACL for 2014 would remain in effect until modified. ACLs will not increase in a subsequent year if present year projected catch has exceeded the ACL.

**Alternative 4.** ACL = OY = 80% of the ABC. Specify commercial and recreational ACLs for red grouper for 2012, 2013, and 2014 and beyond as indicated in the table below (**Table 4-24**). The ACL for 2014 would remain in effect until modified. ACLs will not increase in a subsequent year if present year projected catch has exceeded the ACL.

**Alternative 5 (Preferred).** Eliminate the commercial sector aggregate ACL of 662,403 lbs gw for black grouper, gag, and red grouper. Eliminate the in-season AM that specifies a prohibition on possession of all shallow water groupers once the commercial aggregate ACL is projected to be met.

**Alternative 6 (Preferred).** Eliminate the recreational sector aggregate ACL of 648,663 lbs gw for black grouper, gag, and red grouper. Eliminate the in-season AM that specifies a prohibition on possession of black grouper, gag, and red grouper once the ACL is projected to be met if any one of the three species is listed as overfished. Eliminate the post-season AM that specifies a reduction in a subsequent year's ACL by the amount of an overage if landings exceed the aggregate ACL. Eliminate the regulation that states that the recreational landings are evaluated relative to the ACL as follows: For 2010, only 2010 recreational landings will be compared to the ACL; in 2011, the average of 2010 and 2011 recreational landings will be compared to the ACL; and in 2012 and subsequent fishing years, the most recent 3-year running average recreational landings will be compared to the ACL.

**Table 4-22.** The ACL values (lbs whole weight) for red grouper in Alternative 2 (ACL=ABC). ACL values are based on preferred allocation alternative (45% commercial/55% recreational).

| **Alt. 2 (Preferred) ACL=ABC** | | | | | | |
|---|---|---|---|---|---|---|
| **Commercial** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| landings | 2012 | 311,850 | 291,150 | 258,750 | 278,550 | 294,300 |
| | 2013 | 342,900 | 323,100 | 291,600 | 310,950 | 325,800 |
| | 2014 | 369,900 | 351,000 | 320,850 | 339,750 | 354,150 |
| | | | | | | |
| landings and discards | 2012 | 331,650 | 309,150 | 274,500 | 295,650 | 312,750 |
| | 2013 | 362,700 | 341,550 | 307,350 | 328,500 | 344,250 |
| | 2014 | 389,700 | 369,450 | 337,050 | 357,300 | 372,600 |
| | | | | | | |
| **Recreational** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| landings | 2012 | 381,150 | 355,850 | 316,250 | 340,450 | 359,700 |
| | 2013 | 419,100 | 394,900 | 356,400 | 380,050 | 398,200 |
| | 2014 | 452,100 | 429,000 | 392,150 | 415,250 | 432,850 |
| | | | | | | |
| landings and discards | 2012 | 405,350 | 377,850 | 335,500 | 361,350 | 382,250 |
| | 2013 | 443,300 | 417,450 | 375,650 | 401,500 | 420,750 |
| | 2014 | 476,300 | 451,550 | 411,950 | 436,700 | 455,400 |

**Table 4-23.** The ACL values (lbs whole weight) for red grouper in Alternative 3 (ACL=90%ABC). ACL values are based on preferred allocation alternative (45% commercial/55% recreational).

| **Alt. 3 ACL=90%ABC** | | | | | | |
|---|---|---|---|---|---|---|
| **Commercial** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| landings | 2012 | 280,665 | 262,035 | 232,875 | 250,695 | 264,870 |
| | 2013 | 308,610 | 290,790 | 262,440 | 279,855 | 293,220 |
| | 2014 | 332,910 | 315,900 | 288,765 | 305,775 | 318,735 |
| | | | | | | |
| landings and discards | 2012 | 298,485 | 278,235 | 247,050 | 266,085 | 281,475 |
| | 2013 | 326,430 | 307,395 | 276,615 | 295,650 | 309,825 |
| | 2014 | 350,730 | 332,505 | 303,345 | 321,570 | 335,340 |
| | | | | | | |
| **Recreational** | | | | | | |
| | **Year** | **Frebuild (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **Frebuild (7 years)** | **Frebuild (8 years)** |
| landings | 2012 | 343,035 | 320,265 | 284,625 | 306,405 | 323,730 |
| | 2013 | 377,190 | 355,410 | 320,760 | 342,045 | 358,380 |
| | 2014 | 406,890 | 386,100 | 352,935 | 373,725 | 389,565 |
| | | | | | | |
| landings and discards | 2012 | 364,815 | 340,065 | 301,950 | 325,215 | 344,025 |
| | 2013 | 398,970 | 375,705 | 338,085 | 361,350 | 378,675 |
| | 2014 | 428,670 | 406,395 | 370,755 | 393,030 | 409,860 |

**Table 4-24.** The ACL values (lbs whole weight) for red grouper in Alternative 3 (ACL=80%ABC). ACL values are based on preferred allocation alternative (45% commercial/55% recreational).

| **Alt. 4 ACL=80%ABC** | | | | | | |
|---|---|---|---|---|---|---|
| **Commercial** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| landings | 2012 | 249,480 | 232,920 | 207,000 | 222,840 | 235,440 |
| | 2013 | 274,320 | 258,480 | 233,280 | 248,760 | 260,640 |
| | 2014 | 295,920 | 280,800 | 256,680 | 271,800 | 283,320 |
| | | | | | | |
| landings and discards | 2012 | 265,320 | 247,320 | 219,600 | 236,520 | 250,200 |
| | 2013 | 290,160 | 273,240 | 245,880 | 262,800 | 275,400 |
| | 2014 | 311,760 | 295,560 | 269,640 | 285,840 | 298,080 |
| | | | | | | |
| **Recreational** | | | | | | |
| | **Year** | **$F_{REBUILD}$ (10 years)** | **75%$F_{MSY}$** | **65%$F_{MSY}$** | **$F_{REBUILD}$ (7 years)** | **$F_{REBUILD}$ (8 years)** |
| landings | 2012 | 304,920 | 284,680 | 253,000 | 272,360 | 287,760 |
| | 2013 | 335,280 | 315,920 | 285,120 | 304,040 | 318,560 |
| | 2014 | 361,680 | 343,200 | 313,720 | 332,200 | 346,280 |
| | | | | | | |
| landings and discards | 2012 | 324,280 | 302,280 | 268,400 | 289,080 | 305,800 |
| | 2013 | 354,640 | 333,960 | 300,520 | 321,200 | 336,600 |
| | 2014 | 381,040 | 361,240 | 329,560 | 349,360 | 364,320 |

### 4.6.1 Biological Effects

**Alternative 1 (No Action)** would retain the aggregate ACLs for red grouper, black grouper, and gag of 662,403 lbs gw (781,636 lbs ww) and 648,663 lbs gw (765,422 lbs ww) for the commercial and recreational sectors, respectively. The red grouper portion of this group ACL was estimated to be 221,577 lbs gw (261,461 lbs ww) and 276,740 lbs gw (326,553 lbs ww) for the commercial and recreational sectors, respectively based on the expected catch resulting from the implementation of management measures in Amendment 16 to the Snapper Grouper FMP.

**Alternatives 2 (Preferred)-4** would establish an ACL = OY for red grouper in the commercial and recreational sector based on new assessment information specified in SEDAR 19 (2010). Setting OY equal to ACL would provide greater insurance that overfishing is prevented, the long-term average biomass is near or above $B_{MSY}$. Setting OY equal to the ACL, which range from being equal to the ABC in **Alternative 2 (Alternative 2)** to some portion of the ACL in **Alternatives 3-4**, would be based on the ABC

specified by SEDAR 19 (2010), which takes into consideration scientific uncertainty in the specification of OFL and ABC. **Alternative 1** could have adverse effects to the red grouper stock as an ACL aids in the avoidance of overfishing conditions. However, the adverse biological effects are mitigated by the fact a three species aggregate is in place.

**Alternatives 2 (Preferred)-4** would specify an individual ACL for red grouper based on the ABC from the recent SEDAR stock assessment. The South Atlantic Council's SSC has specified that for overfished stocks like red grouper, a rebuilding ABC must be set to reflect the annual catch that is consistent with the schedule of fishing mortality rates in the rebuilding plan. The South Atlantic Council's preferred rebuilding plan outlined in **Actions 3 and 4**. would specify an ABC = to the yield at 75% of $F_{MSY}$ and a rebuilding time period of 10 years.

Based on the preferred allocation alternatives in **Action 5**, 45% of the ACL would be allocated to the commercial sector and 55% of the ACL would be allocated to the commercial sector. The commercial and recreational ACLs based on alternatives in this action as well as the preferred allocation alternative in **Action 5** are shown in **Tables 4-22, 4-23, and 4-24.**

**Alternative 2 (Preferred)** would set the ACL equal to the ABC. The National Standard 1 guidelines indicate the ACL may typically be very close to the ABC. **Alternatives 3** and **4** would have a greater positive biological effect to the stock than **Alternative 2 (Preferred)** because they would create a buffer between the ACL and ABC, with **Alternative 4** setting the most conservative ACL at 80% of the ABC. **Alternative 4** would have the greatest positive effect. Creating a buffer between the ACL and ABC would provide greater assurance overfishing would not occur. Setting a buffer between the ACL and ABC would be appropriate in situations where there is uncertainty in whether or not management measures are constraining fishing mortality to target levels. Annual catch targets, which are not required, can also be set below the ACLs to account for management uncertainty and provide greater assurance overfishing does not occur.

**Alternatives 5 and 6 (Preferreds)** would eliminate the aggregate commercial and recreational ACLs and accountability measures (AMs) currently in place for red grouper, black grouper, and gag. The ACL for red grouper would be based on **Alternative 2 (Preferred)** in this action. **Actions 7 and 8** of this amendment would specify commercial and recreational AMs for red grouper, respectively.

The removal of the three species aggregate ACL and AM could biologically affect the stock adversely as the ACL and AM offers an additional method to prohibit harvest. However, this action would implement a red grouper individual ACL/AM, gag ACLs/AMs are in place, and the Comprehensive ACL Amendment proposes the implementation of black grouper ACLs/AMs. All three ACLs are based upon the Scientific and Statistical Committee's catch recommendation that in turn is based upon SEDAR stock assessments. These ACLs are based upon the best scientific information where the three species aggregate ACL used catch history for black grouper and red grouper to determine the aggregate ACL.

## 4.6.2 Economic Effects

### 4.6.2.1 Economic Effects on the Commercial Sector

The results from the economic analysis for **Action 6** are summarized in **Table 4-25**. The net present values of changes in NOR to the commercial sector associated with the ACL/OY alternatives proposed in **Action 6** are presented in **Table 4-25**. This table compares these changes assuming the preferred rebuilding strategy (**Alternative 3**) proposed in **Action 4**

for various discount rates. The projected NOR streams created by the proposed ACLs and projected biomass figures derived from the preferred rebuilding strategy were discounted over a period of ten years.

**Preferred Alternative 2** which equates the ACL to the ABC defined by the preferred rebuilding strategy (**Action 4**, **Alternative 3**) is predicted to generate an additional $380,000 in NOR when compared to **Alternative 1 (No Action)** over ten years and assuming a discount rate of 3%. If the ACL is set at 90% of the ABC then fishermen are expected to lose $180,000 over the same ten-year period. If the ACL is set at 80% of the ABC losses are expected to total $780,000 over a ten-year period and assuming a discount rate of 3%.

The dissolution of the aggregate quota for red, gag, and black (**Preferred Alternative 5**) is not expected to have any effect on the commercial fleet. Since we have constrained landings of shallow water groupers to zero during the first four months of the year the aggregate quota is not predicted to be met based on model simulations. However, if fishers change their behavior and fish more in the remaining eight months then the aggregate quota may be met and a reduction in benefits would be expected.

**Table 4-25.** Net present value of net operating revenues (NOR) to the commercial sector associated with the ACL alternatives in **Action 6** over a time horizon of ten years, assuming the preferred rebuilding path in **Action 4** (**Alternative 3**), 45% commercial allocation, no commercial sector ACT, and using different discount rates. Dollar amounts are in millions of 2009 dollars.

| | Specification of Alternative Commercial ACLs | | | | |
|---|---|---|---|---|---|
| Rebuilding Strategy | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
| | No Action | (Preferred) ACL = ABC | ACL = 90%ABC | ACL = 80%ABC | (Preferred) Eliminate aggregate quota |
| | **Net Present Value of NOR Streams – 0% Discount Rate** | | | | |
| $75\%F_{MSY}$ | $90.65 | $91.14 | $90.49 | $89.77 | $91.14 |
| | **Net Present Value of NOR Streams – 3% Discount Rate** | | | | |
| $75\%F_{MSY}$ | $77.22 | $77.60 | $77.04 | $76.44 | $77.60 |
| | **Net Present Value of NOR Streams – 7% Discount Rate** | | | | |
| $75\%F_{MSY}$ | $63.48 | $63.73 | $63.28 | $62.78 | $63.73 |

The magnitude of effects of the ACL/OY alternatives on business activity would directly correlate with the level of ACL. **Preferred Alternative 2** would provide the largest ACL, and would also result in the largest positive impacts on business activity for all states combined (**Table 4-26**). Under **Preferred Alternative 2,** all states except South Carolina would experience positive impacts on business activity. **Alternatives 3 and 4** would result in positive impacts for Georgia/Northeast Florida and Florida, and negative impacts for North and South Carolina. **Preferred Alternative 5** would have the same impacts as **Preferred Alternative 2**. The impacts of these two preferred alternatives on business activity should not be added, because one alternative practically assumed the other. In particular, **Preferred Alternative 2** was evaluated by closing the fishery during the first four months of the year, resulting in the commercial aggregate ACL not to be reached.

**Table 4-26.** Potential change in business activities associated with the ACL/OY alternatives relative to **Alternative 1 (No Action).** All dollar values are in thousands of 2008 dollars.

| | North Carolina | South Carolina | Georgia/NE FL | Florida |
|---|---|---|---|---|
| | **Preferred Alternative 2** | | | |
| Employment | 4 | -5 | 1 | 0 |
| Income | $99 | -$105 | $22 | $8 |
| Output | $185 | -$217 | $45 | $16 |
| | **Alternative 3** | | | |
| Employment | -3 | -8 | 1 | 0 |
| Income | -$66 | -$171 | $25 | $3 |
| Output | -$123 | -$354 | $52 | $6 |
| | **Alternative 4** | | | |
| Employment | -11 | -11 | 1 | 0 |
| Income | -$253 | -$242 | $26 | -$4 |
| Output | -$469 | -$502 | $54 | -$7 |
| | **Preferred Alternative 5** | | | |
| Employment | 4 | -5 | 1 | 0 |
| Income | $99 | -$105 | $22 | $8 |
| Output | $185 | -$217 | $45 | $16 |

#### 4.6.2.2 Economic Effects on the Recreational Sector

In evaluating the economic effects of the ACL/OY alternatives, the following assumptions were made: the rebuilding strategy would be 75%$F_{MSY}$ and the recreational allocation would be 55% of ACL. Again, the aggregate ACL for black grouper, gag, and red grouper was assumed not to be reached over the period of the analysis.

The estimated economic effects of the various ACL/OY alternatives would directly correlate with the level of ACL as a percent of ABC. That is, the closer the ACL would be to ABC, the higher would be the consequent effects on the recreational sector. Thus, the ranking of alternatives is rather straightforward, with **Alternative 2 (Preferred)** being first and **Alternative 4**, last. Under **Alternative 2 (Preferred)**, CS increases to the recreational sector would range from $0.78 million to $3.58 million over four years, or from $2.18 million to $10 million over ten years. Again, these results are the same as those of the preferred alternatives for the previous actions.

As noted earlier, the estimates of economic effects were generated assuming the recreational sector aggregate ACL for black grouper, gag, and red grouper would not be reached in any year during the rebuilding period. In this sense, the economic effects of **Alternative 6 (Preferred)** would be the same as those for **Alternative 2**. Without **Alternative 6 (Preferred)**, the economic effects of the various alternatives would be lower than shown in **Table 4-27**, particularly for higher ACLs, such as those under **Alternatives 2 (Preferred) and 3**.

**Table 4-27.** Net present value of changes in CS to the recreational sector associated with the ACL/OY alternatives over 4 years and 10 years, assuming 75%$F_{MSY}$ rebuilding strategy and recreational allocation of 55% of ACL, and using a 7% discount rate. Dollar amounts are in millions of 2010 dollars.

| Rebuilding Strategy | 4- Year Horizon | 10-Year Horizon |
|---|---|---|
| | **High** | |
| Alternative 2: ACL=OY=ABC | $3.58 | $10.00 |
| Alternative 3: ACL=OY=90%ABC | $3.22 | $9.00 |
| Alternative 4: ACL=OY=80%ABC | $2.86 | $8.00 |
| | **Medium** | |
| Alternative 2: ACL=OY=ABC | $2.99 | $8.37 |
| Alternative 3: ACL=OY=90%ABC | $2.69 | $7.53 |
| Alternative 4: ACL=OY=80%ABC | $2.39 | $6.70 |
| | **Low** | |
| Alternative 2: ACL=OY=ABC | $0.78 | $2.18 |
| Alternative 3: ACL=OY=90%ABC | $0.70 | $1.96 |
| Alternative 4: ACL=OY=80%ABC | $0.62 | $1.74 |

### 4.6.3 Social Effects

Although an administrative action, defining the optimum yield (OY) for a species or species complex establishes a management target for allowable harvests. If defined as a percentage (less than one) of the maximum sustainable yield, the target would incorporate a protective buffer to help ensure the biological health of the resource is not threatened, thereby helping support stable environmental, economic, and social benefit streams. The larger the buffer, the greater the certainty of biological protection. However, an excessively large buffer (i.e., a buffer that exceeds the biological variability of the resource, environmental challenges, and potential for fishery-induced problems) would result in overly restrictive harvest allowances, leading to foregone social benefits. While none of the relevant biological parameters are ever likely known with certainty, the best OY specification would be expected to balance the risk and costs of being insufficiently conservative against the costs of potentially unnecessarily "leaving fish in the water," all decisions on which incorporate best available knowledge of the biology of the resource, environmental challenges, and the harvest capabilities of the fishing sectors. **Alternative 2 (Preferred), Alternative 3,** and **Alternative 4** set the OY equal to the ACL, which leaves no buffer and likely to result in underutilized resource.

With regard to the ACL, in general the higher the ACL, the greater the short-term social and economic benefits that would be expected to accrue, assuming long-term recovery and rebuilding goals are met. Adhering to stock recovery and rebuilding goals is assumed to result in net long-term positive social and economic benefits. **Alternative 1 (No Action)** would retain the aggregate ACL for gag, black and red grouper, and likely would not allow red grouper to be rebuilt, foregoing long-term social benefits associated with rebuilding the stock. **Alternative 2 (Preferred)** sets the ACL equal to the ABC, the highest possible ACL, and would result in fewer short-term social impacts than under **Alternatives 3** and **4**, which each set the ACL at a percentage of the ABC. **Alternative 5 (Preferred)** and **Alternative 6 (Preferred)**

eliminate the previously established aggregate ACL and AMs for gag, black and red grouper, and any social effects would be expected to result from a species-specific limit that could impact fishermen by limiting harvest of red grouper.

### 4.6.4 Administrative Effects

Defining an ACL and OY for red grouper is not in itself an action that has direct impacts on the administrative environment. However, indirect administrative burdens such as monitor landings, and correcting for and preventing ACL overages would result from the specification of an ACL and OY for the species. In general, the lower the ACL is set the more likely it is to be met or exceeded (if no additional harvest restrictions are implemented), and the more likely an AM would be triggered. **Alternative 2 (Preferred)** combined with the preferred allocation alternative would establish the highest sector ACLs for red grouper and would provide no buffer between the ACL and the ABC and is thus the least precautionary of the alternatives considered. Because the sector ACLs are slightly higher under **Alternative 2 (Preferred)** than under **Alternatives 3 and 4**, greater harvest would be allowed before an AM is triggered. **Alternatives 3 and 4** would implement lower sector ACLs than **Alternative 2 (Preferred)** and are therefore more likely to met or exceeded than ACLs specified under **Alternative 2 (Preferred)**, which would trigger some type of corrective action requiring administrative resources to implement. In the long-term, taking action to prevent an ACL overage or correcting for an ACL overage, may be administratively beneficial since those actions may prevent the stock from reaching an overfished condition that would trigger development of a new rebuilding plan.

**Alternatives 5 (Preferred)** and **6 (Preferred)** would remove red grouper from the aggregate ACL species group established in Amendment 17B so an individual ACL may be established for the stock. Removing the ACL and AM regulations implemented for red grouper in Amendment 17B requires no administrative time or cost beyond the work needed to specify a new ACL in this amendment and specifying new AMs in this amendment.

## 4.7 Action 7. Establish Accountability Measures for the Commercial Sector

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 OY from a fishery. One such tool is the Annual Catch Limit or ACL; an ACL must be specified for each fishery managed by the South Atlantic Council. An ACL is the level of annual catch of a stock that, if met or exceeded, triggers some corrective action. Accountability Measures are actions triggered when an ACL is met or projected to be met.

Management action could be necessary if future landings are projected to exceed the ACL. The ACLs in Amendment 24 vary according to the selected rebuilding strategy. The current range for red grouper commercial ACL alternatives is presented in **Table 4-28**.

**Table 4-28.** Commercial and total (commercial and recreational) red grouper landings in 2010 compared to the proposed ACLs.

| | Reported 2010 Landings (lbs whole weight) | Range of Proposed ACLs (lbs whole weight) | Proposed ACLs in Year 1 (2012) for Preferred Alternatives (lbs whole weight) |
|---|---|---|---|
| **Commercial**[1] | 322,730 lbs ww | 207,000 - 311,850 (landings)<br>219,600 - 331,650 (landings and discards) | 291,150 (landings)<br>309,150 (landings and discards) |
| **Total** | 425,464 lbs ww | 460,000 – 693,000 (landings)<br>488,000 – 737,000 (landings and discards) | 647,000 (landings)<br>687,000 (landings and discards) |

[1]Source: Commercial ACL data set (June 16, 2011 version)

**Alternative 1 (No Action).** Do not specify new commercial AMs for red grouper.

**Alternative 2**. Specify Annual Catch Targets (ACT) for red grouper.

**Subalternative 2a (Preferred).** Do not establish a commercial sector ACT.
**Subalternative 2b.** The ACT equals 90% of the ACL.
**Subalternative 2c.** The ACT equals 80% of the ACL.

**Alternative 3 (Preferred).** If the ACL is met or is projected to be met, all subsequent purchase and sale of red grouper is prohibited and harvest and/or possession is limited to the bag limit.

**Alternative 4 (Preferred).** If the ACL is exceeded, the Regional Administrator shall publish a notice to reduce the ACL in the following season by the amount of the overage.

### 4.7.1 Biological Effects

There are several types of AMs that may be applied to the red grouper fishery. In-season AMs are those that are triggered during the fishing season, typically before an ACL is exceeded or when it is projected to be met. Some examples of in-season AMs include quota closures, trip or bag limit changes, gear restrictions, or catch shares. Post-season AMs would be triggered if the ACL is exceeded and would typically be implemented the following fishing season. Post-season AMs could include seasonal closures, reduced trip or bag limits, or shortening of the fishing season implemented in the subsequent year. Ideally, a combination of in-season and post-season AMs would be used to first prevent the ACL from being exceeded, and then provide a mechanism to correct for an overage if one should occur. Implementing a post-season AM in addition to an in-season AM would reduce the risk of overfishing since there would be two layers of protection against unsustainable harvest rates. It is important to note that the new framework procedure for setting total allowable catch in the snapper grouper fishery in Amendment 17B (SAFMC 2010b), would allow for timely adjustments to be made to AMs if the South Atlantic Council and NOAA Fisheries Service determine a change is needed.

The South Atlantic Council may choose one or more post-season AMs to supplement any of the in-season AMs. If an ACL overage were to occur after an in-season AM has been implemented, a post-season AM would be available to the Regional Administrator (RA) as a means to correct an overage and prevent overfishing. Post-season AMs would allow all landings for a particular season to be reported before any harvest restriction measures would take effect. This method of accountability alone may correct for one year's or several years' overages; however, it does little to prevent an overage from occurring again unless it is chosen in conjunction with an in-season AM.

The NS1 guidelines recommend the use of ACTs in systems of AMs so that an ACL is not exceeded. For fisheries without in-season management control to prevent the ACL from being exceeded, AMs may utilize ACTs that are set below ACLs so that catches do not exceed the ACLs. If an ACT is specified as part of the AMs for red grouper, an ACT control rule that accounts for management uncertainty may be utilized for setting the ACT. The objective for establishing an ACT and related AMs is that the ACL not be exceeded.

Accountability measures are also designed to provoke an action once either the ACL or ACT is reached during the course of a fishing season to reduce the risk overfishing will occur. However, depending on how timely the data are, it might not be realized that either the ACL and/or ACT has been reached until after a season has ended. Such AMs include prohibited retention of species once the sector annual catch target is met, shortening the length of the subsequent fishing season to account for overages of the ACL, and reducing the ACL in the subsequent fishing season to account for overages.

The updated framework procedure included in Amendment 17B (SAFMC 2010b) allows for the timely establishment and adjustment of ACTs (and ACLs) if the South Atlantic Council and NOAA Fisheries Service determine they are necessary. Therefore, if the South Atlantic Council chooses not to implement ACTs for red grouper through this amendment, ACTs may be easily established and modified in the future if needed.

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

*...if catch exceeds the ACL for a given stock or stock complex more than once in the last four years, the system of ACLs and AMs should be re-evaluated, and modified if necessary, to improve its performance and effectiveness (74 FR 3178).*

If an evaluation concludes that the ACL is being chronically exceeded for any one species or species group, and post-season AMs are repeatedly needed to correct for ACL overages, adjustments to management measures would be made.

**Alternative 1 (No Action)** would not establish new Accountability Measures for the commercial sector of the red grouper fishery. The AMs that were implemented through Amendment 17B, therefore, would continue to apply. However, an individual ACL for black grouper is being established through the Comprehensive ACL Amendment. **Alternative 1 (No Action)** would no establish an individual commercial ACL for red grouper and therefore would not benefit the biological environment.

**Alternative 2** invokes the concept of establishing a commercial sector ACT, which would presumably be set lower than the commercial sector ACL, except under **Subalternative 2a (Preferred)**. **Subalternative 2a (Preferred)** would not set a commercial sector ACT. **Subalternatives 2b** and **2c** would establish an ACT as an actual harvest level that presumably once exceeded, would trigger an AM as intended under NS1 guidelines.

**Subalternatives 2b** and **2c** would establish reduced harvest levels (90% and 80% of the ACL, respectively) designed to hedge against an ACL overage and therefore, provide a buffer between the ACT and ACL, and account for management uncertainty. Establishing an ACT that is 90% or 80% of the commercial ACL would also reduce the probability that post-season AMs that are meant to correct for an ACL overage would be needed.

**Alternative 3 (Preferred)** would prevent the commercial sector from profiting from the harvest of red grouper in quantities exceeding the ACL, and thus provides a disincentive to target red grouper once the ACL has been reached.

**Alternative 3 (Preferred)** could serve as a complement to **Alternative 4 (Preferred)** in that it would correct for an ACL overage post-season if one were to occur during the fishing season. Because the ACL for red grouper would be set equal to the ABC (**Action 6**), it is possible the fishing season could be shortened under **Alternative 3 (Preferred)** since the ACL could be projected to be met earlier in the season than under the status quo conditions. The biological benefits of a shortened fishing season for red grouper would depend on the exact reduction of the season length, and subsequent changes to fishing behavior. If a commercial fishing season is shortened due to triggering the **Alternative 3 (Preferred)** AM regulatory discards may not necessarily increase since fishermen would still be allowed to retain the bag limit.

**Alternative 4 (Preferred)** could complement **Alternative 3 (Preferred)** because it would correct for an ACL overage post-season if such an event were to occur. **Alternative 4 (Preferred)** would reduce the commercial sector ACL in the following season by the amount of the overage. The ACL can be reduced by the approximate amount as that taken in excess the year before, and may shorten the season if the lower ACL is met earlier in the year. A shortened season may result in increased regulatory discards if no level of harvest is permitted after the ACL is reached. However, under **Alternative 3 (Preferred)**, fishermen would still be able to retain bag limit quantities of red grouper, which may reduce the number of regulatory discards that would otherwise result from a shortened season. Under this scenario

**Alternative 4 (Preferred)** could be expected to provide a moderate biological benefit.

There is likely to be no additional biological benefit to protected species from **Alternative 1 (No Action)** because it would perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. Previous ESA consultations determined the snapper grouper fishery was not likely to adversely affect marine mammals or *Acropora* species. **Alternatives 2-4** and the associated subalternatives are unlikely to alter fishing behavior in a way that would cause new adverse effects to these species. The biological benefits to sea turtles and smalltooth sawfish from **Alternatives 2-4** and the associated subalternatives are unclear. If they perpetuate the existing amount of fishing effort they are unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. This scenario is likely to provide little additional biological benefits to sea turtles and smalltooth sawfish, if any. However, if these alternatives reduce the overall amount of effort in the fishery the risk of interaction with sea turtles and smalltooth sawfish will likely decrease, providing additional biological benefits to these species.

### 4.7.2. Economic Effects

**Alternative 1 (No Action)** would economically benefit the commercial sector the most in the short-term but the least in the long-term since lack of an AM could result in further overfishing. **Alternative 3 (Preferred)** would provide greater short-term economic benefits to the commercial sector compared to **Alternative 4 (Preferred)** but less than **Alternative 1 (No Action)**. **Alternative 4 (Preferred)** would provide the greatest long-term economic benefits to the commercial sector compared to **Alternatives 1 (No Action)** and **Alternative 3 (Preferred)**.

**Alternative 3 (Preferred)** is expected to result in greater short-term and long-term economic benefits than **Alternative 1 (No Action)** because while it does limit the commercial sector from the opportunity to land a greater number of fish, it reserves a specific amount of fish for commercial vessels only, and in that way, protects future landings. This stability could benefit the commercial sector in a financial way by paving the way for more confident business planning with more predictable landings that could result in improvements in marketing and reliability of landings to dealers. **Alternative 4 (Preferred)** would reduce the commercial sector ACL in the following season by the amount of the overage. This ensures future harvest and stability of landings while avoiding overfishing. **Alternative 2** offers the option to create a buffer between the ACT and ACL. This increases the chances of avoiding overfishing with **Subalternative 2c** being the most conservative and **Subalternative 2a** the least conservative of the **Alternative 2 Subalternatives**. Alternatives and subalternatives with the greatest chance of avoiding overfishing are typically believed to provide the greatest long-term economic benefits. However, this needs to be weighed against short-term economic losses.

As shown in **Table 4-28**, the 2010 commercial landings, which already accounted for newly implemented measures affecting the commercial red grouper sector, are higher than the currently preferred ACL alternative. In this context, applications of AM, particularly under **Alternatives 3 and 4,** may occur in the near future.

Additional calculations on the various ACT alternatives are presented in **Table 4-29**. **Preferred Alternative 2** which equates the ACT to the ACL defined by the preferred rebuilding strategy (**Action 4**, **Alternative 3**) would generate the same benefits to commercial fishers as **Alternative 1 (No Action)**. If the ACT is set at 90% of the ACL then fishermen are predicted to lose $540,000 over the ten-year period. If the

ACL is set at 80% of the ABC losses are expected to total $1,160,000 over a ten-year period and assuming a discount rate of 3%.

**Table 4-29.** Net present value of net operating revenues (NOR) to the commercial sector associated with the AM alternatives in **Action 7** over a time horizon of ten years, assuming the preferred rebuilding path in **Action 4 (Alternative 3)**, 45% commercial allocation, ACL=ABC, and using different discount rates. Dollar amounts are in millions of 2009 dollars.

| | Specification of Alternative Commercial AMs | | | | |
|---|---|---|---|---|---|
| Rebuilding Strategy | Alternative 1 | Subalternative 2a | Subalternative 2b | Subalternative 2c | |
| | No Action | (Preferred) No Comm. ACT | ACT = 90%ACL | ACT = 80%ACL | |
| | **Net Present Value of NOR Streams – 0% Discount Rate** | | | | |
| $75\%F_{MSY}$ | $91.14 | $91.14 | $90.49 | $89.77 | |
| | **Net Present Value of NOR Streams – 3% Discount Rate** | | | | |
| $75\%F_{MSY}$ | $77.60 | $77.60 | $77.04 | $76.44 | |
| | **Net Present Value of NOR Streams – 7% Discount Rate** | | | | |
| $75\%F_{MSY}$ | $63.73 | $63.73 | $63.28 | $62.78 | |

#### 4.7.2.1 Impacts on Business Activity

Should ACTs be used to trigger AMs, the impacts of the various ACT alternatives would be those presented in **Table 4-30**. **Preferred Subalternative 2a** would essentially equate ACT to ACL, and thus would have no impacts on business activity over those of the preferred alternative for ACL (ACL=ABC). **Subalternatives 2b and 2c** would result in negative impacts on business activity for North Carolina, South Carolina, and Florida but positive impacts for Georgia/Northeast Florida.

**Table 4-30.** Potential change in business activities associated with the ACT alternatives relative to the **Alternative 1 (No Action).** All dollar values are in thousands of 2008 dollars.

| | North Carolina | South Carolina | Georgia/NE FL | Florida |
|---|---|---|---|---|
| | **Preferred Subalternative 2a** | | | |
| Employment | 0 | 0 | 0 | 0 |
| Income | $0 | $0 | $0 | $0 |
| Output | $0 | $0 | $0 | $0 |
| | **Subalternative 2b** | | | |
| Employment | -7 | -3 | 0 | 0 |
| Income | -$165 | -$66 | $4 | -$5 |
| Output | -$307 | -$137 | $8 | -$10 |
| | **Subalternative 2c** | | | |
| Employment | -15 | -7 | 0 | 0 |
| Income | -$352 | -$137 | $4 | -$12 |
| Output | -$654 | -$285 | $9 | -$23 |

### 4.7.3 Social Effects

It is the setting of ACTs where social and economic considerations might enter the equation as management uncertainty is evaluated. Setting of ACTs is utilized in fisheries where there may be management uncertainty that adds risk to reaching target harvest levels beyond the biological risks. It usually entails a further reduction in harvest levels to ensure catch remains at or below the ACL and does not wildly fluctuate. For fisheries where information is scarce and management is uncertain, it becomes a real possibility that there can be negative short-term impacts that may not have been necessary if thresholds are too restrictive. In other fisheries which have more certainty in management and monitoring of catch, a more precise harvest level can be set with certainty and reduce volatility in the fishery.

The setting of AMs or ACTs can have significant direct and indirect effects on the social environment as they usually impose some restriction on harvest, either during the current season or the next. The long-term effects should be beneficial as they provide protection from further negative impacts on the stock. While the negative effects are usually short-term, they may at times induce other indirect effects through changes in fishing behavior or business operations that could have long-term social effects.

For the commercial sector, **Alternative 1 (No Action)** would not impose further restrictions on harvest and would have the same social impacts as commercial AMs implemented in the Comprehensive ACL Amendment. With **Alternative 2** and its subalternatives a buffer could be imposed which would reduce the harvest threshold further from the ACL. **Subalternative 2a** (**Preferred)** would not impose that buffer and is less restrictive than **Subalternative 2b** or **2c**. Therefore there is an increasing possibility of negative short-term social effects going from **Subalternatives 2a (Preferred)** to **2c**. Some of those effects are similar to other thresholds being met and may involve switching to other species or discontinuing fishing altogether. Although these are common responses to closures, it is not known how fishermen may respond if closures are anticipated for several different species or groups. There could be a domino effect as one

closure forces them to switch to another species which closes as thresholds are met with the added fishing pressure.

Continuing with the commercial AMs/ACTs, comparing the payback that is implemented in **Alternative 4** (**Preferred)** it would further assist with rebuilding where **Alternative 3** (**Preferred)** would not. However, when combined with **Alternative 3** (**Preferred)** there is an in-season accountability measure that provides some protection from continued overages during the fishing season. So, with **Alternatives 3 (Preferred)** and **4 (Preferred)** combined there should be sufficient protection with some beneficial social effects through the payback provisions because they do allow accountability when specified for a particular sector. While payback does incur short-term negative social impacts, the long-term benefits of stock protection should contribute to the overall benefits as stock status should remain at sustainable levels.

### 4.7.4 Administrative Effects

**Alternative 1 (No Action)** would not produce near-term administrative impacts. However, this alternative would not comply with Magnuson-Stevens Act requirements and therefore, may trigger some type of legal action for not doing so. If this scenario were to occur, the burden on the administrative environment could be significant in the future. Administrative impacts of **Alternatives 2-4** would be greatest relative to the commercial AMs proposed. Specifying an ACT (**Alternative 2** and associated subalternatives) or sector ACTs alone would not increase the administrative burden over the status quo. However, the monitoring and documentation needed to track how much of the ACT has been harvested throughout a particular fishing season can potentially result in a need for additional cost and personnel resources if a monitoring mechanism is not already in place. The need for enforcement and monitoring of AMs would also increase the administrative burden. However, **Alternative 3 (Preferred)** and **Alternative 4 (Preferred)** would be expected to have similar administrative impacts.

## 4.8 Action 8. Establish Accountability Measures for the Recreational Sector

As mentioned previously, Accountability Measures are actions triggered when an ACL is met or projected to be met. The South Atlantic Council is proposing the implementation of Annual Catch Targets as part of the system of accountability measures for the recreational sector. *Annual Catch Target (ACT)* is an amount of annual catch of a stock or stock complex that is the management target of the fishery, and accounts for management uncertainty in maintaining the actual catch at or below the ACL. ACTs are recommended in the system of accountability measures so that ACL is not exceeded. ACTs may be considered "soft targets" (do not trigger action).

Management action could be necessary if future landings are projected to exceed the ACL. As for the commercial sector the ACLs in Amendment 24 vary according to the selected rebuilding strategy. Recreational landings in 2010 are below the proposed recreational ACL range (**Table 4-31**); therefore, management measures currently in place may be sufficient to limit landings to the below the ACL.

**Table 4-31.** Red grouper recreational and total (commercial and recreational) landings in 2010 compared to the proposed recreational ACL.

| | Reported 2010 Landings (lbs whole weight) | Range of Proposed ACLs (lbs whole weight) | Proposed ACLs in Year 1 (2012) for Preferred Alternatives (lbs whole weight) |
|---|---|---|---|
| **Recreational**[1,2] | 102,734 lbs ww | 253,000 - 381,150 (landings)<br>268,400 - 405,350 (landings and discards) | 355,850 (landings)<br>377,850 (landings and discards) |
| **Total** | 425,464 lbs ww | 460,000 – 693,000 (landings)<br>488,000 – 737,000 (landings and discards) | 647,000 (landings)<br>687,000 (landings and discards) |

[1]Source: Recreational ACL dataset (May 16, 2011 version).
[2]Private recreational, charterboat, and headboat landings are 84,361 lbs, 8,864 lbs, and 9,509 lbs, respectively.

**Alternative 1 (No Action).** Do not specify new recreational AMs for red grouper.

**Decision 1. Specify an ACT?**

**Alternative 2**. Specify an ACT.

**Subalternative 2a**. Do not specify an ACT.

**Subalternative 2b.** The ACT equals 85% of the ACL.

**Subalternative 2c.** The ACT equals 75% of the ACL.

**Subalternative 2d (Preferred).** The ACT equals ACL*(1-PSE) or ACL*0.5, whichever is greater.

**Decision 2. What is the AM trigger?**

**Alternative 3**. Specify the AM trigger.

**Subalternative 3a**. Do not specify an AM trigger.

**Subalternative 3b (Preferred)**. If the *annual landings* exceed the ACL in a given year.

**Subalternative 3c.** If the *mean landings* for the past three years exceed the ACL.[1, 2]

**Subalternative 3d.** If the *modified mean landings* exceeds the ACL. The modified mean is the most recent 5 years of available landings data with highest and lowest landings estimates from consideration removed.[1,2]

**Subalternative 3e.** If the lower bound of the 90% *confidence interval* estimate of the MRFSS landings' population mean plus headboat landings is greater than the ACL.

Notes:
[1] *Start the clock over.* In any year the ACL is reduced or increased, the sequence of future ACLs will begin again starting with a single year of landings compared to the ACL for that year, followed by a 2-year average of landings compared to the 2-year average annual catch limits in the next year, followed by a 3-year average of landings compared to the 3-year average of ACLs for the third year, and so on.

[2] For 2011, use only 2011 landings. For 2012, use the mean landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running mean.

**Decision 3. Is there an in-season AM?**

**Alternative 4**. Specify the in-season AM.

**Subalternative 4a**. Do not specify an in-season AM.

**Subalternative 4b (Preferred).** The Regional Administrator shall publish a notice to close the recreational sector when the ACL is projected to be met.

**Decision 4. Is there a post-season AM?**

**Alternative 5**. Specify the post-season AM.

**Subalternative 5a**. Do not specify a post-season AM.

**Subalternative 5b.** For post-season accountability measures, compare ACL with landings over a range of years. For 2011, use only 2011 landings. For 2012, use the mean landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running mean.[1]

**Subalternative 5c.** *Monitor following year.* If the ACL is exceeded, the following year's landings would be monitored for persistence in increased landings. The Regional Administrator would take action as necessary.

**Subalternative 5d.** *Monitor following year and shorten season as necessary.* If the ACL is exceeded, the following year's landings would be monitored in-season for persistence in increased landings. The Regional Administrator will publish a notice to reduce the length of the fishing season as necessary.

**Subalternative 5e.** *Monitor following year and reduce bag limit as necessary.* If the ACL is exceeded, the following year's landings would be monitored for persistence in increased landings. The Regional Administrator will publish a notice to reduce the bag limit as necessary.

**Subalternative 5f.** *Shorten following season.* If the 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 ACL for the following fishing season.

**Subalternative 5g (Preferred).** *Payback.* If the ACL is exceeded, the Regional Administrator shall publish a notice to reduce the ACL in the following season by the amount of the overage.

### 4.8.1 Biological Effects

There are several types of AMs that may be applied in the red grouper fishery. In-season AMs are those that are triggered during the fishing season, typically before an ACL is exceeded or when it is projected to be met. Some examples of in-season AMs include quota closures, trip or bag limit changes, gear restrictions, or catch shares. Post-season AMs would be triggered if the ACL is exceeded and would typically be implemented the following fishing season. Post-season AMs could include seasonal closures, reduced trip or bag limits, or shortening of the fishing season implemented in the subsequent year. Ideally, a combination of in-season and post-season AMs would be used to

first prevent the ACL or ACT from being exceeded, and then provide a mechanism to correct for an overage if one should occur. Implementing a post-season AM in addition to an in-season AM would reduce the risk of overfishing since there would be two layers of protection against unsustainable harvest rates. It is important to note that the new framework procedure for setting total allowable catch in the snapper grouper fishery in Amendment 17B (SAFMC 2010b), would allow for timely adjustments to be made to AMs if the South Atlantic Council and NOAA Fisheries Service determine a change is needed.

The efficacy of in-season AMs is largely reliant upon in-season monitoring of landings, which may be especially difficult for the recreational sector. The MRFSS and the newly implemented MRIP uses random survey methods and may not capture data on species that are infrequently encountered. Therefore, in-season tracking of red grouper landings in the recreational sector would be based on the MRFSS program and state landings reports. An additional obstacle to tracking recreational harvest in-season is that there is a lag time between when the fish are landed and when those landings are reported in the landings database. This lag time means that projections of when the ACL is expected to be met would need to be employed. Landings projections are not always 100% accurate, thus using such estimates could lead to an in-season AM being triggered prematurely, or not soon enough causing an ACL overage.

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

**Alternative 1 (No Action)** would not specify recreational AMs for red grouper. The AMs that were implemented through Amendment 17B, therefore, would continue to apply. However, an individual ACL for black grouper is being established through the Comprehensive ACL Amendment essentially negating the aggregate gag/black grouper/red grouper ACL.
**Alternative 1 (No Action)** would not establish an individual recreational ACL for red grouper and therefore would not benefit the biological environment.

With the exception of **Subalternative 2a, Alternative 2** and its subalternatives would specify a recreational sector ACT, which would be set lower than the recreational sector ACL**.** **Subalternatives 2b** and **2c** would establish an ACT as an actual harvest level that presumably, once exceeded, would trigger an AM. **Subalternatives 2b** and **2c** would establish reduced harvest levels (85% and 75% of the ACL, respectively) designed to hedge against an ACL overage and therefore, provide a buffer between the ACT and ACL, and account for management uncertainty.

**Subalternative 2d (Preferred)** would have the greatest biological benefit of the three subalternatives by adjusting the ACL by 50% or one minus the Percent Standard Error (PSE) from the recreational fishery, whichever is greater (**Table 4-32**). The lower the value of the PSE the more reliable the landings data. Establishing an ACT below the recreational ACL would also reduce the need to close or implement post-season AMs that are meant to correct for an ACL overage.

Insert table 4-32

With the exception of **Subalternative 3a**, **Alternative 3** and its subalternatives would specify the AM trigger under different scenarios. Under **Subalternative 3b (Preferred)**, AMs would be triggered if the annual landings exceeded the ACL in a given year. **Subalternative 3c** would examine the trend in the past three years of landings data to determine if AMs would be triggered. If in any year the ACL is reduced or increased, the sequence of future ACLs would begin again starting with a single year of landings compared to the ACL for that year, followed by a 2-year average of landings compared to the 2-year average ACLs in the next year, further followed by a 3-year average of landings compared to the 3-year average of ACLs for the third year, and so on. For example, for year 2011, 2011 landings would be used. For 2012, mean landings of 2011 and 2012 would be used. For 2013 and beyond, the most recent three-year running mean would be used to determine if the ACL is exceeded.

Using the average of three years landings could help address any anomalous highs and lows reflected in the landings data; however, if one of the three years was associated with an extremely large spike in landings, which may or may not be attributable to an actual increase in harvest or some sampling variability, that spike would greatly influence the 3-year average for several years in the future and potentially result in the unnecessary triggering of harvest restrictions. Therefore, the average could create a lag and mask what is actually happening in the landings.

**Subalternative 3d** is similar to **Subalternative 3c**, except that a review of the most recent 5-year series of landings data would be conducted to determine which of the five years were associated with the highest and lowest harvest levels. After the years of highest and lowest landings were determined, those two years' landings would be removed from the time series leaving three years of landings to be averaged. If the averaged total of the remaining three years' landings was greater than the ACL then the AMs would be triggered.

**Subalternative 3e** would trigger AMs if the lower 90% confidence interval (CI) estimate of MRFSS landings' population mean plus headboat landings is greater than the ACL. The application of the 90% confidence interval could be considered a more conservative parameter to use when estimating overage amounts. Additionally, if years of high landings are indeed attributable to increased harvest due to spikes in recruitment or effort shifts rather than sampling effects, this method of implementing AMs may remove years of high landings inappropriately, and thus fail to trigger corrective action when it would have been needed. By using the lower bound of the 90% CI, the landings estimate is effectively being lowered the by the amount of uncertainty. This is the same as if the ACL was being increased by the amount of the uncertainty. However, the actual landings are just as likely to be higher than the estimate, but this isn't taken into consideration by using only the lower bound of the CI.

One of the benefits of employing the approaches in **Subalternatives 3c-3e** to implementing AMs is that it provides an opportunity for fishery managers to use a data set uninfluenced by anomalous highs and lows, which could be caused by statistical variability. Alternatively, it may be difficult to decide if such differences in recreational landings are due to statistical or sampling variances, or if they can be attributed to actual increased harvest. In the case of the latter, the modified mean approach (**Subalternative 3d**) may not be the most biologically advantageous compared to other alternatives considered that would remove high and low landings years. In cases where it cannot be determined that one year's high landings are definitively caused by statistical variation, it may be difficult to justify removing that year's landings from the time series of data, especially if there is a strong year class known to have entered the fishery at that time or if there have

regulations implemented that cause an extreme effort shift.

Since management uncertainty is already accounted for in the choice of an ACT (**Subalternative 2d**, **Preferred**) and scientific uncertainty is accounted for in the South Atlantic Council SSC's ABC control rule (and its corresponding ACL), the biological benefits would increase in order from **Subalternatives 3e** to **3b (Preferred).**

**Alternative 4** and its subalternatives examine the need for an in-season AM. **Subalternative 4b (Preferred)** would allow the RA to publish a notice to close the recreational sector when the ACL is projected to be met. In-season monitoring of recreational landings is difficult, however. Currently, there is a time lag in when recreational data become available. There would likely be some uncertainty associated with imposing in-season AMs for the recreational sector making post-season AMs more appropriate for the recreational sector.

With the exception of **Subalternative 5a**, which would not specify a post-season AM, **Alternative 5** and its subalternatives specify methodologies for post-season AM actions that would be taken if the ACL is exceeded. Under **Subalternative 5b**, ACLs would be compared with landings over a range of years to determine the magnitude of the ACL overage. For example, for 2011, only 2011 landings would be used. For 2012, the mean landings from 2011 and 2012 would be used, and for 2013 and beyond, the most recent three-year running mean would be used. If the ACL is exceeded, **Subalternatives 5c-5e** would monitor the following year's landings for persistence in increased landings. Under **Subalternative 5c**, the RA would take action as necessary to ensure an ACL was not exceeded in a year subsequent to an ACL overage. Under **Subalternative 5d** the RA would publish a notice to reduce the length of the fishing season as necessary, and under **Subalternative 5e**, the RA would publish a notice to reduce the bag limit as necessary. Under **Subalternative 5f**, if the ACL is exceeded, the RA would 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 season. In contrast, under **Subalternative 5g (Preferred)**, there would be a payback provision for exceeding an ACL, whereby, the RA would publish a notice to reduce the recreational sector ACL in the following season by the amount of the overage. This is consistent with the approach the South Atlantic Council has taken in previous amendments to address species that are overfished and/or experiencing overfishing.

**Subalternatives 5d** and **5f** would ensure that the amount of the previous year's ACL overage would be accounted for in the subsequent year's protection via a shortened season, and thus would be biologically beneficial. The monitoring component of **Subalternatives 5c-5e** would allow for any anomalies or data reporting irregularities to be taken into account before the AMs would be effective, hence possibly adding a socio-economic benefit to the biological benefit of any management measures such as reducing the length of the following fishing season (**Subalternative 5f)**. There would be an opportunity to determine if a spike in landings is merely a factor of some statistical variability, or if it is due to truly high landings that continue to persist into the following fishing season. Years of exceptionally high landings are not eliminated under these alternatives, rather they are monitored to assess whether spikes in landings can truly be considered outliers or if they are in fact years of increased harvest that need to be addressed through corrective action.

If the ACL is continually exceeded, additional AMs may need to be implemented to reduce harvest pursuant to NS 1 guidelines for performance standards. Under the updated framework procedure implemented through Amendment 17B (SAFMC 2010b), the SSC

would examine the social and economic impact analyses for a specific allocation, ACL, ACT, AM, quota, bag limit, or other fishing restriction. If it was determined by the South Atlantic Council and its SSC that the management measures in place are not constraining catch to a target level, adjustments could be made through a future regulatory amendment.

There is likely to be no additional biological benefit to protected species from **Alternative 1 (No Action)** because it would perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. Previous ESA consultations determined the snapper grouper fishery was not likely to adversely affect marine mammals or *Acropora* species. **Alternatives 2-5** and the associated subalternatives are unlikely to alter fishing behavior in a way that would cause new adverse effects to these species. The biological benefits to sea turtles and smalltooth sawfish from **Alternatives 2-5** and the associated subalternatives are unclear. If they perpetuate the existing amount of fishing effort they are unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. This scenario is likely to provide little additional biological benefits to sea turtles and smalltooth sawfish, if any. However, if these alternatives reduce the overall amount of effort in the fishery the risk of interaction with sea turtles and smalltooth sawfish will likely decrease, providing additional biological benefits to these species.

### 4.8.2. Economic Effects

**Alternative 1 (No Action)** would economically benefit the recreational sector the most in the short-term but the least in the long-term since lack of an AM could result in further overfishing. **Alternative 2** offers the option to create a buffer between the ACT and ACL. This increases the chances of avoiding overfishing with **Subalternative 2d** being potentially the most conservative and **Subalternative 2a** the least conservative of the **Alternative 2** subalternatives. If ACTs are used to trigger certain management measures, the biologically most conservative subalternative would likely result in the highest adverse economic impacts in the short term because it would require the most stringent management measures. **Alternative 3** deals with specific AM trigger. **Subalternative 3a**, which does not specify an AM trigger, would economically benefit the recreational sector the most in the short-term but the least in the long-term when more restrictive measures become necessary to meet the rebuilding target. The short-term economic effects of the other subalternatives would vary according to the likelihood of triggering the AM. Under **Subalternatives 3c and 3d**, the AM would less likely be triggered than under **Subalternatives 3b (Preferred) and 3e** as a result of taking into account landings over a number of years. In this sense, **Subalternatives 3c and 3d** would likely provide less adverse short-term economic effects than the other subalternatives. **Subalternative 3d** would be particularly noteworthy because it would eliminate the highest and lowest landings. Under **Subalternative 3c**, one year of very high landings would have a strong influence in triggering the AM. Between the two subalternatives of **Alternative 4**, **Subalternative 4a** would economically benefit the recreational sector better in the short-term since no further restrictions would be imposed on the recreational sector. However, it would result in worse long-term economic situation, since lack of an AM could result in further overfishing of the stock that, in turn, would require more restrictive regulations. **Alternative 5** addresses the issue of implementing post-season AM. **Subalternative 5a** would economically benefit the recreational sector best in the short-term since no further restrictions would be imposed on the recreational sector. However, it would result in the worst long-term economic situation, since lack of an AM could result in moving further away from the rebuilding trajectory that, in turn, would require more restrictive regulations. The short-

term economic effects of the other subalternatives would depend on the nature and extent of the restrictions imposed on the harvest of the species and/or on the opportunities to fish for the resource. **Subalternative 5a** has similar economic implications as the corresponding subalternatives of **Alternative 4**. Of the remaining subalternatives, **Subalternative 5c** would likely result in the least adverse economic effects on the recreational sector in the short term, although the actual effects would depend on the type of restrictions that would be imposed by the RA. **Subalternatives 5d and 5e** would likely result in less adverse economic effects in the short term than **Subalternatives 5f and 5g (Preferred)** to the extent that post-season AM may not be imposed depending on how persistent the upward trend in landings would be.

**Subalternative 5d** may yield larger adverse economic impacts than **Subalternative 5e** because it would totally eliminate fishing opportunities during part of the fishing year rather than mainly reduce the fishing experience for part of the fishing year. There is a good possibility that **Subalternatives 5f and 5g (Preferred)** would result in the same fishing season length, although some other measures, like bag limit reduction, may be employed under **Subalternative 5g (Preferred)** to effect a longer season that would provide more fishing opportunities. Whichever of these two subalternatives can provide for more fishing opportunities may be considered better than the other for economic reasons.

As shown in **Table 4-31**, the 2010 recreational landings, which already accounted for newly implemented measures affecting the recreational red grouper sector, are far below the currently preferred ACL alternative. Therefore, applications of AMs on the red grouper recreational sector would unlikely occur in the near future.

### 4.8.3 Social Effects

It is the setting of ACTs where social and economic considerations might enter the equation as management uncertainty is evaluated. Setting of ACTs is utilized in fisheries where there may be management uncertainty that adds risk to reaching target harvest levels beyond the biological risks. It usually entails a further reduction in harvest levels to ensure catch remains at or below the ACL and does not wildly fluctuate. For fisheries where information is scarce and management is uncertain, it becomes a real possibility that there can be negative short-term impacts that may not have been necessary if thresholds are too restrictive. In other fisheries which have more certainty in management and monitoring of catch, a more precise harvest level can be set with certainty and reduce volatility in the fishery.

The setting of AMs, including ACTs, can have significant direct and indirect effects on the social environment as they usually impose some restriction on harvest, either during the current season or the next. The long-term effects should be beneficial as they provide protection from further negative impacts on the stock. While the negative effects are usually short-term, they may at times induce other indirect effects through changes in fishing behavior or business operations that could have long-term social effects.

**Alternative 1 (No Action)** would implement no additional management measures and there would be no additional social impact on the recreational fishery. The variations in **Alternative 2** impose the buffer described for commercial ACT, and it would be expected that short-term negative social effects would accrue as the buffer increased in **Subalternatives 2a-2c. Subalternative 2d (Preferred)** would provide flexibility but the relative social effects are unknown without defined numbers for the ACT.

**Alternative 3** considers a trigger for the recreational AM and **Subalternative 3b (Preferred)** would implement a trigger that was more likely to be reached than those proposed in **Subalternative 3c-3e**. The in-season and post-season recreational AMs are identical to those for the commercial sector and would be expected to have similar social effects on the recreational sector.

### 4.8.4 Administrative Effects

Under this action, the alternatives for specifying ACTs and AMs for the recreational sector are explained using a step-wise process for ease of understanding. It is important to note that recreational data collection can be more administratively burdensome due to time delay and lengthy review. **Alternative 2** and associated subalternatives deal with the specification of the ACT. Specifying an ACT or sector ACTs alone would not increase the administrative burden over the status quo. However, the monitoring and documentation needed to track how much of the ACT has been harvested throughout a particular fishing season can potentially result in a need for additional cost and personnel resources if a monitoring mechanism is not already in place. **Alternative 3** specifies the AM trigger. Once specified, this is not likely to have any administrative impacts. **Alternative 4** and associated subalternatives would specify the in-season AM. This action, like **Alternative 5** to specify the post-season AM will likely have an increased administrative burden associated with enforcement, monitoring, rule making and informing the public. However, the alternatives and associated subalternatives are not likely to differ significantly in their administrative impacts.

# Chapter 5. Council's Choice for the Preferred Alternative

## 5.1 Maximum Sustainable Yield

## 5.2 Minimum Stock Size Threshold

## 5.3 Rebuilding Schedule

## 5.4 Rebuilding Strategy and Acceptable Biological Catch Levels

## 5.5 Allocations

## 5.6 Annual Catch Limits and Optimum Yield

## 5.7 Commercial Accountability Measures

## 5.8 Recreational Accountability Measures

# Chapter 6. Cumulative Effects

## 6.1 Biological

**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. 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). Though the range for red grouper extends beyond the South Atlantic EEZ, the most measurable and substantial effects would be limited to the South Atlantic region.

**3. Establish the timeframe for the analysis.**

The temporal scope of impacts of past and present actions affecting red grouper, non-target species, habitat, and human communities is primarily focused on actions that have occurred after FMP implementation (1983). For the purposes of analyzing the impacts of actions contained in Amendment 24, landings data through 2010 are used. Using the most recent landings data, specifically 2005-2010, ensures that impacts of recently implemented management measures are incorporated as part of the baseline condition for determining impacts of this amendment in addition to and beyond the status quo.

**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 red grouper.**

## A. Past

The reader is referred to **Table 6-1** of this document for past regulatory activity for snapper grouper species including red grouper. These include bag and size limits, spawning season closures, commercial quotas, gear prohibitions and limitations, area closures, and a commercial limited access system.

Amendment 16 to the FMP for the Snapper Grouper Fishery of the South Atlantic Region was partially approved by the Secretary of Commerce. Amendment 16 (SAFMC 2009a) (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.

Amendment 17B to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (SAFMC 2010b) implemented a species group ACL and recreational AM for red grouper, black grouper, and gag, based on harvest levels expected to result from the implementation of Amendment 16 (SAFMC 2009a). The recreational AM for the species group, within which red grouper is included, would close the recreational fishery if the ACL is projected to be met and if any one of the species within the species group is overfished. If the recreational ACL is exceeded based on the most recent three-year running average of recreational landings, the ACL for the following fishing season would be reduced by the amount of the overage. Amendment 24 would specify an individual ACL for red grouper that would be divided among the commercial and recreational sectors pursuant to the preferred allocation alternative.

## 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; however, only one amendment under development includes actions that would specifically affect red grouper. The Comprehensive ACL Amendment includes ACLs and AMs for federally-managed species not undergoing overfishing in other FMPs including Snapper Grouper. Actions contained within the Comprehensive ACL Amendment include: (1) Removal of species from the snapper grouper fishery management unit; (2) designating ecosystem component species; (3) allocations; (4) management measures to limit recreational and commercial sectors to their ACLs; (5) AMs; and (5) any necessary modifications to the range of regulations.

## C. Reasonably Foreseeable Future

Amendments 18A and 18B to the FMP for the Snapper Grouper Fishery of the South Atlantic Region, which is currently under development, would limit effort in the black sea bass and golden tilefish fisheries, change the golden tilefish fishing year, and improve the accuracy and timing of fisheries statistics. Fishing effort shifts that may result from effort limitations in the black sea bass and golden tilefish components of the snapper grouper fishery may increase fishing pressure on red grouper causing the commercial and recreational ACLs to be met earlier in the fishing season. However, because the ACL caps the overall number of fish that can be taken from the population, future management actions are unlikely to impact the long-term sustainability of the stock.

Regulatory Amendment 11 is scheduled to be approved by the Council for submission for Secretarial Review at their August 9, 2011, meeting. Regulatory Amendment 11 would remove the current deepwater closure beyond 240 ft for six deepwater snapper grouper species. Amendments 20A and 20B would address issues associated with the current ITQ system in place for wreckfish, and Amendment 22 would establish a permanent management regime for red snapper in the South Atlantic.

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

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.

How global climate changes will affect the red grouper component of the snapper grouper fishery is unclear. Climate change can impact marine ecosystems through ocean warming by increased thermal stratification, reduced upwelling, sea level rise; and through increases in wave height and frequency, loss of sea ice, and increased risk of diseases in marine biota. Decreases in surface ocean pH due to absorption of anthropogenic $CO_2$ emissions may impact a wide range of organisms and ecosystems, particularly organism that absorb calcium from surface waters, such as corals and crustaceans (IPCC 2007, and references therein).

The BP/Deepwater Horizon oil spill event, which occurred in the Gulf of Mexico on April 20, 2010, is not expected to impact fisheries operating the South Atlantic. Oil from the spill site has not been detected in the South Atlantic region, and is not likely to pose a threat to the South Atlantic red grouper.

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

The trends in condition of red grouper, are documented through the Southeast Data, Assessment and Review (SEDAR process). The status of the red grouper stock is described in detail in **Section 3.2** of this document.

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

Fish populations

Numeric values of overfishing and overfished thresholds have been updated in previous amendments for red grouper. 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). Amendment 24 will update these harvest management reference points. The applicable stock assessment source is SEDAR 19 (2010), which determined red grouper are overfished and undergoing overfishing.

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

For a detailed discussion of the baseline conditions of red grouper the reader is referred to the 2010 stock assessment and stock information sources referenced in **Section 3.2** of this document.

**8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities (Table 6-1).**

**Table 6-1.** 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 |
|---|---|---|
| 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 1988a & b). | Increase yield per recruit of vermilion snapper; eliminate trawl damage to live bottom habitat. |

| Time period/dates | Cause | Observed and/or Expected Effects |
|---|---|---|
| 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 1991a). | 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 continue for a number of snapper grouper species including vermilion snapper and gag. | Spawning potential ratio for vermilion snapper and gag is less than 30% indicating that they are overfished. |
| February 24, 1999 | Gag and black grouper: 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 (SAFMC 1998a). | F for gag vermilion snapper remains declines but is still above $F_{MSY}$. |

| Time period/dates | Cause | Observed and/or Expected Effects |
|---|---|---|
| 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 2009a) | 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. |
| 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. Reduce |

| Time period/dates | Cause | Observed and/or Expected Effects |
|---|---|---|
| | | overfishing of red snapper while long-term measures to end overfishing are addressed in Amendment 17A. |
| Effective Date December 4, 2010 | Snapper Grouper FMP Amendment 17A (SAFMC 2010a). | 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. |
| Effective Date January 31, 2011 | Snapper Grouper Amendment 17B (SAFMC 2010b) | ACLs and ACTs; management measures to limit recreational and commercial sectors to their ACTs; AMs, for species undergoing overfishing. |
| Target 2012 | Snapper Grouper FMP Amendment 18A and 18B (under dev) | Prevent overexploitation in the black sea bass and golden tilefish fisheries, improve data collection timeliness and data quality. |
| Target 2011 | Comprehensive ACL Amendment (under dev) | 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 | Regulatory Amendment 11 (under dev) | Re-addresses the deepwater area closure implemented in Amendment 17B |
| Effective Date July 15, 2011 | Regulatory Amendment 9 (SAFMC 2011b) | Harvest management measures for black sea bass; commercial trip limits for gag, vermilion and greater amberjack |
| Target 2012 | Amendment 20 (Wreckfish) (under dev) | Review the current ITQ program and update the ITQ program as necessary to comply with MSA LAPP requirements. |

| Time period/dates | Cause | Observed and/or Expected Effects |
|---|---|---|
| Target 2013 | Snapper Grouper Amendment 22 (under dev) | Develop a long-term management program for red snapper in the South Atlantic. |

**9. Determine the magnitude and significance of cumulative effects.**

Proposed management actions, as summarized in **Section 2** of this document, would update management reference points for red grouper, specify sector ACLs and AMs, and establish a rebuilding plan for the South Atlantic red grouper stock. Because management measures implemented through Amendment 16 restricted harvest of red grouper through the extension of the snapper grouper spawning season closure and the reduction of the aggregate grouper bag limit, it is unlikely further restrictions will be needed to end overfishing of the stock within the specified rebuilding timeframe. Therefore, cumulative impacts that may result from actions in this amendment are likely to be negligible. Detailed discussions of the magnitude and significance of the preferred alternatives appear in **Section 4** of this consolidated document.

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

The cumulative effects on the biophysical environment are expected to be negligible. 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.

## 6.2 Socioeconomic

The cumulative short-term economic and social effects of recent Snapper Grouper Amendment 17A (SAFMC 2010a) and Amendment 17B (SAFMC 2010b) and as well as Amendment 18A and 18B (under development) and the Comprehensive ACL Amendment (under development) are expected to be negative while the long-term economic and social outcome is expected to be positive. Recent amendments restrict aggregate quotas for all species, impose new trip limits and bag limits, implement accountability measures, and create area and seasonal closures. A number of commercial and recreational businesses are expected to close. A decrease in overall participation is also expected in the form of the number of individual vessels. It is logical to expect that the remaining vessels will switch from the most severely restricted fisheries to those with higher trip limits or aggregate quotas or bag limits, perhaps creating or exasperating derby fisheries. Season length for commercial and recreational fisheries will decrease further for some species.

The proposed actions in Amendment 24 may result in some short-term social impacts due to limitations on harvest, but are also expected to produce long-term social benefits as the red grouper stock is rebuilt. While there will not be immediate benefits, the intended result of the rebuilding strategy is a healthy sustainable red grouper stock that will provide more fishing opportunities, and income for commercial and for-hire fishermen. With restrictions and closures in other fisheries, stocks that will be rebuilt and open to harvest may help to lessen social and economic impacts from future amendments. Overall, the proposed actions may have short-term social impacts on snapper grouper fishermen but will result in long-term social benefits after the stock is rebuilt.

# Chapter 7. Other Things to Consider

## 7.1 Unavoidable Adverse Effects

Amendment 24 does not include actions that are expected to result in unavoidable adverse effects.

## 7.2 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 (SAFMC 1998c), 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. For more detailed information, see **Appendix F**.

## 7.3 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 (SAFMC 1994a) 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 1998a), 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 2009a), 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 1998d) 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.

## 7.4 Relationship of Short-Term Uses and Long-Term Productivity

NOAA Fisheries weighed the short-term impacts upon the fishery against the long-term productivity and stability of this fishery and concluded that the proposed actions would result in net benefits to society. The most recent assessment for the red grouper stock in the South Atlantic indicates that the stock is experiencing overfishing and is overfished thus measures must be adopted to end overfishing and rebuild the stock. Putting in place a rebuilding plan and implementing or revising annual catch limits (ACL), accountability measures (AM), allocations, maximum sustainable yield (MSY), and optimum yield (OY) is expected to have positive effects on the long-term productivity of the red grouper fishery.

## 7.5 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments are defined as commitments which cannot be reversed, except perhaps in the extreme long-term,

whereas irretrievable commitments are lost for a period of time. None of the actions proposed by this amendment would result in irreversible or irretrievable commitments of resources.

## 7.6 Unavailable or Incomplete Information

The Council on Environmental Quality, in its implementing regulations for the National Environmental Policy Act, addressed incomplete or unavailable information at 40 CFR 1502.22 (a) and (b). That regulation has been considered. There are two tests to be applied: 1) Does the incomplete or unavailable information involve "reasonable foreseeable adverse effects…;" and 2) is the information about these effects "essential to a reasoned choice among alternatives…". A stock assessment has been conducted for red grouper using the best available data available. Status determinations for red snapper were derived from the Southeast Data Assessment and Review (SEDAR) process, which involves a series of three workshops designed to ensure each stock assessment reflects the best available scientific information. The findings and conclusions of each SEDAR workshop are documented in a series of reports, which are ultimately reviewed and discussed by the Council and their Scientific and Statistical Committee (SSC). SEDAR participants, the Council advisory committees, the Council, and NOAA Fisheries Service staff reviewed and considered any concerns about the adequacy of the data. The Council's SSC determined that the red grouper assessment is based on the best available data. The Council's Snapper Grouper Committee acknowledged, while stock assessment findings can be associated with different degrees of uncertainty, there is no reason to assume such uncertainty leads to unrealistically optimistic conclusions about stock status. Rather, the stocks could be in worse shape than indicated by the stock assessment. Uncertainty due to unavailable or incomplete information should not be used as a reason to avoid taking action. Therefore, there are reasonable foreseeable significant adverse effects of not taking action to end overfishing and rebuild the red grouper stock. Failure to take action could result in a worsening of stock status, persistent foregone economic benefits, and more severe corrective actions to end overfishing in the future. Where information is unavailable or incomplete, management measures have been designed to adopt a conservative approach to increase the probability overfishing does not occur. None of the impacts of decisions made despite the above mentioned unavailable and incomplete information would be catastrophic in nature as described in Section 1502.22(4) of implementing regulations for the National Environmental Policy Act (NEPA).

# Chapter 8. List of Preparers

**Table 8-1.** List of Amendment 24 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 | | |
| Monica Smit-Brunello | NOAA/GC | Attorney Advisor | | |
| Larry Perruso | 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 8-2.** List of Amendment 24 interdisciplinary plan 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 Coordinator |
| Tony Lamberte | NMFS/SF | Economist |
| Jennifer Lee | NMFS/PR | Fishery Biologist (Protected Resources) |
| Kari MacLauchlin | SAFMC | Social Scientist |
| Anna Martin | SAFMC | Coral Biologist |
| Gregg Waugh | SAFMC | Deputy Executive Director |
| Roger Pugliese | SAFMC | Sr. Fishery Biologist |
| Jack McGovern | NMFS/SF | Fishery Biologist |
| Kate Michie | NMFS/SF | Fishery Biologist |
| Janet Miller | NMFS/SF | Program Specialist (Permits) |
| Noah Silverman | NMFS/SF | NEPA Specialist |
| Monica Smit-Brunello | NOAA/GC | Attorney |
| Andy Strelcheck | NMFS/SF | Fishery Biologist |
| Larry Perruso | 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

# Chapter 9. List of Agencies, Organizations, and Persons To Whom Copies of the Statement are Sent

Responsible Agency

**Amendment 24:**
South Atlantic Fishery Management Council
4055 Faber Place Drive, Suite 201
Charleston, South Carolina 29405
(843) 571-4366 (TEL)
Toll Free: 866-SAFMC-10
(843) 769-4520 (FAX)
safmc@safmc.net

**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

SAFMC Law Enforcement Advisory Panel
SAFMC Snapper Grouper Advisory Panel
SAFMC Scientific and Statistical Committee
SAFMC Information and Education 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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